UXUC

Interaction Design,
User Experience &
Urban Creativity
Scientific Journal

Screens and Beyond
Vol. 2 / Nº 2

Urbancreativity.org

Title:
User Experience & Urban Creativity
Scientific Journal

Editor:
Pedro Soares Neves

Copy Editing:

Lisbon, December 2020
Print Version: ISSN 2183-3869
Online Version: ISSN 2183-9956

Screens and Beyond

Articles

Working paper

Invited authors

Pedro Soares Neves
Executive committee
UXUC Scientific Journal Editor

We place here in discussion the maturity of the academic and pedagogical field that graffiti, urban and street art, urban creativity constitute. It's in fact identified a consistency of knowledge and structure of thought in the several disciplinary areas.

As we are convinced that this trend will continue in multiple forms including experimental ones bridging theory and practice, here's the result of the invite for participation in this reflection.
Here is also combined the conference outcomes. There were two main results to achieve during the dialogues of the 2020 online conference.

One was to observe the maturity of the academic and pedagogical field that graffiti, urban and street art, well, urban creativity in general have. On the 2020 conference was in fact proven that the consistency of knowledge and structure of thought in the several disciplinary areas regarding the urban creativity topics, are giving way to multiple approaches to classes integrated in master courses, informing the teaching of art historians, the work of designers, and research of cognitive scientists and educators. It was evident that this trend will continue in multiple forms including experimental ones bridging theory and practice, sometimes inverting the role of researchers and authors, but always enlarging audiences, practitioners and studious.

The second main result was to observe how the relation evolved between UX and Urban Creativity topics, and the result was fantastic.

Scientific Committee

Contact and information

info@urbancreativity.org
Urbancreativity.org

A Model Proposal to be Used in Evaluation of Urban Open Spaces: Istanbul Ortakoy Square Example

Nasim Valizadeh Bazargan,
Masters Program, Istanbul Aydin University, Turkey

Gökçen Firdevs Yücel Caymaz,
Architecture and Design Faculty, Istanbul Aydin University, Turkey

Abstract

The aim of this study is to propose a checklist-based model that can be used to evaluate urban outdoor spaces, based on the example of Istanbul Ortaköy Square. International studies and theoreticians' perspectives on the subject were investigated in detail in order to determine the criteria that can be used to evaluate the success of the space. When creating the checklist, the result of the studies of Whyte (1980), Marcus and Francis (1997, 2003), Project for Public Places (2000, 2001, 2005, 2009), and Gehl (1996, 2002, 2008, 2009, 2010, 2011, 2013) in particular were effective. The main criteria believed to have an impact on the quality of the open spaces are; Functional qualities (Sub-criteria: Uses and activities, accessibility, attractive places), Social qualities (Sub-criteria: Sense of community, community identity, social interaction, place attachment, sense of ownership) and Perceptual qualities (Sub-criteria: Physical comfort physiological comfort, environmental comfort, safety and security, maintenance and management, technology). The generated checklist was tested in Ortaköy Square, considered a successful urban space in Istanbul. Methods utilized in the study conducted between 2019-20, were on-site determination, observation and photography. As a result of the study, it was determined that the Social and Perceptual Qualities of the urban space play a more important and more effective role than its Functional Qualities.

Keywords: Urban open space, Design Criteria, User Groups, Ortaköy Square

1. Introduction

Urban open spaces are places that combine extensive research and practical experience to demonstrate the opportunities and benefits of different types of outdoor areas to society and individuals. Urban public spaces provide venues for people to express both individual personal and cultural diversity. (Low and colleagues 2009; Thompson, 2002; Wari, 2010). Urban open spaces are areas that are "free to enter or use" in the city, hosting many activities and instant actions of people. Outdoor spaces need to provide social, political and physical venues for the people and communities living around them.

The design and management of urban outdoor spaces will inevitably have an impact on the users' perspective of that area. Many researchers have confirmed there are significant relationships between the urban environment and user behavior, and that the environment can have beneficial or negative effects on individuals and societies (Marcus & Francis, 1997; Greenhalgh & Worpole, 1996).

In looking at the literary studies; outdoor spaces can be divided into two groups, as indoor and outdoor public spaces (Carr et al. 1992; Gehl, 2011). In looking at the historical process, public open spaces are where social life takes place in the cities; Nowadays, it is observed that most social life takes place in indoor public spaces that are generally semi-privatized.

From the user's point of view, outdoor spaces are defined as those that include different types of activities, including mandatory, optional and social activities (Wooley, 2003; Gehl, 2011; LeGates & Stout,

Figure 1. Top: Nashville Public Square, USA: Grass, natural gardens, fountains and sitting areas, passive and active recreation areas, meeting areas (Laud8, 2011). Bottom: Bryant Park, NY: Outdoor movie theater (Memo, 2019).

2015). These open spaces activities will depend on the environment and the quality of said environment. Social activities are considered the result of the integration of compulsory and optional activities. (Wheeler & Beatley, 2014). Social activities rely on the presence of at least one other person and may include children's games, greetings and conversations, social activities, as well as passive activities such as watching and hearing other people. The design and management of the physical environment will have a significant impact upon opportunities that may arise for such social activities (Figure 1). For the urban physical environment to be successful, the characteristics of the space must meet some criteria. These criteria can be categorized under three main headings as; Functional, Social and Perceptual.

Functional Qualities

Activities that happen in the area make the space lively and original, rendering it more recognizable as well as giving it an identity (Project for public space, 2000). The primary reason attracting people to the place will be the activities it offers. Each outdoor space has a functional classification that reflects its main use. Priority use and expected uses are important in this classification. Activities define three fundamental types of urban open spaces: Recreation venues, Sports venues and Natural venues (Rutherford et al. 2013). Certain public outdoor space qualities can have significant effects on the initiation or continuation of physical activity (Santos, 2015). Public outdoor space can affect physical activity in at least three ways. First, the public open space can be an environment where people participate in physical activity. Secondly, the public outdoor space can be a destination where people go to get active or just socialize. Finally, said public space can be used as part of a route to reach another destination (for example, by taking a green route to reach a shop) or as part of a recreational walk or jogging route. Thus, public open spaces can contribute to different physical activity behavior (Sugiyama et al.2013).

Matters such as utilization and activity diversity of functional qualities (space and human scale, functional utilization types, user groups), accessibility (transportation to the area from the environment, transportation within the area), as well as elements that make spaces attractive (urban furniture, planting) will all bear an impact.

Social Qualities

Physical spaces are important in ensuring social interaction in urban spaces, outdoor spaces have an important role as social relations in the development and progress of cities, and are not only places where people meet with nature, but also where they mingle socially and culturally (Mamghani et al., 2015, Kara et al. ., 2011). Wherever there are people, outdoor spaces attract and bring others together; people communicate with each other, look for a place for themselves amongst others, and then new activities are initiated (Rahravi Poodeh & Pouriaye Vali, 2014). In social qualities, matters such as a sense of community, community identity, social communications, a sense of attachment to the place, and a sense of ownership will have an impact.

Perceptional Qualities

Human perception and judgment of the environment are comprised of three stages; the first is color, the second is shape and mass (volume), and the third are the symbolic aspects of the forms consisting of color and mass. Perceivable and identifiable venues give users a sense of security that allow them to learn and dominate the space and to control their movements in the venues (Lynch, 1960). The dimensions of the feeling of comfort include physical comfort (e.g. comfortable and adequate seating, etc.), physiological comfort (e.g. protection from sun, wind, etc.) as well as social and psychological comfort. While psychological comfort may be a precondition for relaxation, relaxation is a more advanced state with 'a comfortable body and mind' (Carr et al. 1992).

Physical comfort (human ergonomics and spatial dimensions), physiological comfort (issues such as heat, temperature, humidity), psychological and social comfort (color, aesthetics, noise, smell, privacy, security and safety, healthcare and management, technological issues) matters will all have an impact in Perceptive Qualities.

2. Materials And Methods

2.1. Research Problem

The main problem in the study is to determine which criteria should be considered in order to increase the success of urban spaces. Chosen as our research area, the problems of Ortaköy Square believed to affect the success of the venue are as follows.

- Lack of facilities or inadequate activities including a children's playground,
- The presence of unwanted persons and activities such as vagrants,
- Worries about filth which dogs and other animals leave in the environment,
- Security, vandalism, maintenance-related problems.

2.2. The Research Objective

The goal of this research is to consider the functional, social and perceptual needs of people while determining the design standards for increasing the quality of urban open spaces. With this goal in mind, a general literature search was carried out regarding the objectives of outdoor spaces, design standards and principles, whereas an attempt was made to create a checklist in order to boost the success of urban spaces. The Functional Qualities of the checklist field were examined under three main headings in order to research the Social and Perceptual Qualities.

- *Functional Qualities*; 'uses and activities', 'accessibility', 'attractive places',
- *Social Qualities*; 'sense of community', 'community identity', 'social interaction', 'place attachment', 'sense of ownership'
- *Perceptual Qualities*; are examined under the subheadings 'physical comfort,' 'physiological comfort' and 'environmental comfort.'

The following stage of the research covers the checklist created based on the literature which was tested in Ortaköy Square in Istanbul.

In creating the checklist, the following issues believed to boost the success of the location, were taken into account.

- Defining (and expanding this definition) the public outdoor space; researching the optimal values needed to attract people to the public outdoor space,
- Defining user expectations by examining the forms of urban outdoor venues,
- The tendency towards physical activity measurements specific to public outdoor spaces,
- Using pedestrian grids to comprehend distances to the public outdoor space,
- A better understanding of the characteristics of urban outdoor spaces associated with physical activities,
- Determining how different user groups interact with the public outdoor space and how people use or will use the square or how to create an attractive public outdoor space,
- Setting up a utilization and activity program which represents the community vision and can be used to shape the design and management strategy,
- Creating an activity plan for each of the destination points in the area,
- Having a better idea of how independent public open space features are related to physical activities,
- Which opportunities will be taken into account in order to increase the social potential of the public outdoor space.

2.3. Location and Characteristics of the Area

Situated near the Beşiktaş and Levent central points and main vehicle traffic lines, Ortaköy Square is advantageous in terms of its view and climate characteristics, due to its close proximity to the Bosphorus (Figure 2,3). Its seaside location reinforces the reason why it is preferred by young people and all Istanbulians alike. Ortaköy Square was listed by PPS in America as one of "60 Great Places in the World." This square sees some of the city's heaviest foot traffic.

The population of the Ortaköy district is about 20,000. Ortaköy Square is a 20-minute walk from the center of Beşiktaş, which is a primary transportation hub between Istanbul's Asian and European sides.

Ortaköy Square fits neither into the closed-off nor the core or shapeless square types (Öztürk, 2009).

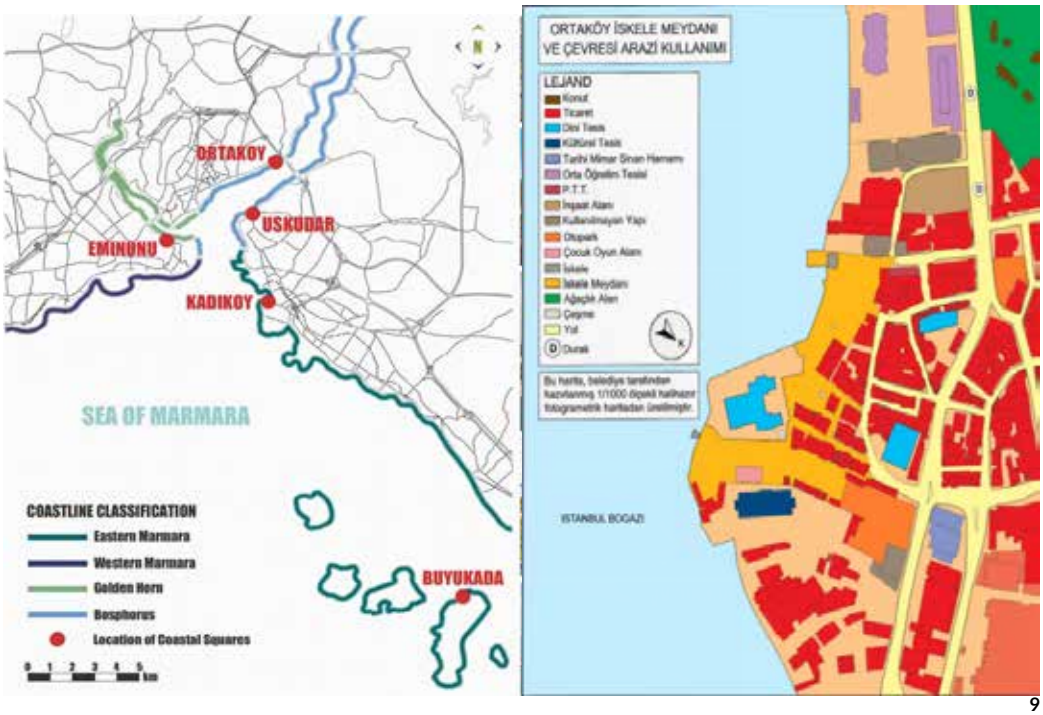

Figure 2. Ortakoy Pier Square and its surrounding land use (Baskaya et al., 2015)

Figure 3. Ortaköy's morphological structure; location of its public square (Dizdaroğlu, 2005)

2.4. Data Collection Method

In this study, a checklist was prepared by taking previously conducted international literary studies as a guide. Subsequently selected as a research area, the current status of Ortaköy Square was examined over a period of approximately a year between 2019-20 using on-site detection and observation methods together with photographs and measurements.

3.Research Results

In looking at the square's functional qualities, on a scale of criteria, the various uses and activities were rated as good overall. It was determined that the occasional presence of undesirable folks such as beggars and alcoholics was observed, whereas in terms of the scale of the square, pedestrians could not use the sidewalks comfortably due to the overwhelming number of street vendors. There were some issues pertaining to the functionality of the utilization areas; it was determined people were standing around due to inadequate places to sit, especially during busy hours, there were no related people lying down, the playing areas were moderately sufficient, the sports venues were insufficient, and they did not appeal to different age groups. Regarding the issue of accessibility, access to the area is generally good. It was determined that accessibility for cyclists is insufficient, the marking of pedestrian crossings, visibility of the space from outside, and those using the space from adjacent spaces are moderately sufficient. There was no problem with the user groups criteria; it was observed that the area was used by different gender, age, income and education groups. It was determined the entrance of the square could be more inviting for inner area transportation, and the speed of the road transits, especially in the car parks on busy days, and the rest areas are moderate enough in busy times. As for the physically challenged, it was observed the roads were insufficient, whereas the touch guidance strips along the roads could be better. The permeability of the flooring materials was moderate, the square's hard floor ratio was high. It was determined that the marking system within the venue was moderately sufficient, the lighting was not timed and the trash cans were insufficient. It was determined no serious problem existed regarding the urban furniture and vegetation.

In looking at the social qualifications; It was observed that there was no problem with the sense of ownership,

community identity, social interaction, community commitment, and ownership of outdoor space.

In looking at the perceptual qualities; while no serious physical, physiological and environmental comfort related problems were observed, it was determined that there was insufficient security personnel, there were a few blind spots in the square, and there was no effective management presence (Table 1).

Ortaköy Pier Square		
Ortaköy Functional Qualities	Typology of the Square	Pier Square
	These attractions and destinations in Ortaköy Square provide functional diversity. The square diverse activities	Offers social and cultural, reasonably priced entertainment as well as religious activities. Ortaköy means 'middle village' in Turkish a reference to its unique location along the Bosphorus Straits. It is a favorite meeting and promenade for local residents. Interesting Objects and Market Bosphorus View / Historical Components Includes recognizability in terms of organization.
Ortaköy Physical Qualities	Location	On the European side, near the Bosphorus
	Important Elements	Ortaköy Mosque Damat Ibrahim Pasha Fountain Esma Sultan Waterside Mansion Ortaköy Pier Building Ayios Fokas Greek Orthodox Church Ha-Hayim Jewish Synagogue
	Ortaköy Square Groups	The square is integrated with its environs.
	Ortaköy Square Proportions	Considered insufficient by its users even though it is spread over a large area.
	Ortaköy Square Shape	Has no particular shape.
	Topography and Geography	Situated next to the sea on flat ground, the square features a temperate climate. Moreover, the flat area helps in its accessibility.
	Ortaköy Square Arrangement	This square covers a district with the sea on one side and buildings and cafes on the other.

Figure 4. Ortaköy Pier Square Qualities (Gökhan, 1992)

Table 1. Ortaköy Square Assessment (Francis, 1987,1989,2003; Heath et al., 2011; Gehl, 2010; Gehl, 2011; Gehl& Svarre, 2013; Lynch, 1981; Marcus&Francis, 1997; Main&Hannah, 2010; ThinkCity, 2020; Project for Public Spaces, 2001; Rad&Ngah, 2013; Saftoe, 2012; Sakip ve ark. 2015; Sarkissian Colleagues Planners, 2000; Thomas, 2016; Whyte, 1980; Zube&Moore,2013).

1 - Sufficient 2 - Insufficient 3 - So-So	EVALUATION		
	1	2	3
1 FUNCTIONAL ATTRIBUTES			
1.1. **USES AND ACTIVITIES**			
Surrounded by destinations (shop, market, music store, cafes and restaurants)	*		
Physical possibilities for sitting, pausing and contemplating in the square.			*
There are focus areas such as playgrounds, bus stops, food courts for people to gather.	*		
Availability of a wide variety of activities.	*		
Non-planned event activities.	*		
Availability of various activity 'options.'	*		
'Undesirables'			*
There is a good balance between men and women.	*		
Availability of a wide variety of uses and activities every day, week and season.	*		
The area is used throughout the day.	*		
There are opportunities for active recreation activities.	*		
Availability of passive recreational activities (people watching, street coffee, informal street entertainment, etc.)	*		
Availability of entertainment / liveliness.	*		
There are local residents.	*		
The square is affordable.	*		
There is an opportunity to learn something new.	*		
1.1.1. **Scale**			
It's not too big.	*		
The surrounding buildings are at a height proportional to the avenue.	*		
The sidewalk design and layout is suitable for pedestrians.			*
The furnishing design and layout is comfortable for pedestrians.	*		
The vegetation design and layout is comfortable for pedestrians.	*		
1.1.2. **Functionality of use zones**			
Field of activity description	*		
Dining Availability	*		
Presence of people standing			*
Presence of people lying down			*
Presence of people sitting down	*		
Playground Availability			*
A wide age range uses the playgrounds.			*
Presence of loose material such as water, sand or wood.	*		
Availability of Food Outlets	*		
Food and drink opportunities (self catering and available for purchase)	*		
Existence of Sports Grounds		*	
1.1.3. **User groups**			
Presence of various social groups	*		
Existence of different age groups (retirees, youngsters, etc.)	*		
Presence of different genders	*		
Group usage outnumbers solo users	*		
1.2. **ACCESSIBILITY**			
1.2.1. **1.2.1. ACCESIBILTY THROUGH AREA (EDGE)**			
Good location (preferably on a busy route and physically and visually accessible)	*		
Public spaces should be at most 91 cm above or below street level.	*		
Traffic thoroughfares should not border the public area.	*		
How is the connection between the square and adjacent buildings?	*		
Ease of entry and exit.	*		
How sidewalks connect adjacent areas to provide easy access for pedestrians.			*
The use of the square by residents in adjacent buildings.			*
Visibility of the square from outside.			*
Pedestrian crossings marking status.			*
Minimal transition distances.	*		
Proximity of public transport stops to the square.	*		
Vehicular accessibility.			*
Pedestrian accessibility	*		
Cyclist accessibility (bike paths, lockers, storage racks, etc.)		*	
Accessibility by all means of transport.	*		
1.2.2. **INTERIOR ACCESS**			
Entry			
Having more than one place and visitor participation.	*		

Visible entry and exit points.	*		
Inviting entry and exit points.			*
Bollards			
Bollards mounted 45cm from the back edge of the curb.	*		
Pedestrian Paths			
Compliance with standards	*		
Availability of path routes	*		
Passageway status			*
The ramps are parallel to the stairs.	*		
The slope of the ramps and stairs is 1/12.	*		
Vehicle Routes			
Strictly controlled vehicle circulation.			*
Easily accessible entrance.	*		
There are no obstacles on the route from entry to exit.	*		
Carpark Facilities			
Proximity to accessible entrances.	*		
High parking turnover rate in accessible public areas.		*	
Visible parking spaces.	*		
Sufficient parking area size.		*	
Physically Challenged			
Pedestrian transition along the travel route is not hindered.		*	
Are recreational facilities located outside of the main circulation route?	*		
Decent resting areas with places to sit.			*
Providing recreational facilities at regular intervals between 100-200 m.	*		
Touch guidance strips along the paths.			*
Ground Pavement			
Non-slip surfaces	*		
Resistant	*		
Easily replaceable materials.			*
Use of permeable surfaces.			*
Sign / Direction signage			
Are maps and other signage system components mounted at least 45 cm from the curb?	*		
Use of Direction Signs along the road at decision points and on main roads not obscured by vegetation or physical features.			*

Legibility of all direction signs.	*		
Availability of adequate signposts, maps and location information.			*
The presence of a decent orientation system in the square.			*
Illumination			
Road lights and light poles to be approximately 90 lcm.	*		
Pedestrian lights along the sidewalk and in open areas start at a height of about 12 feet, depending on the lighting required and lamp and fixture characteristics.			*
Lights are time adjusted		*	
Legibility (Landmark)			
Easily located.	*		
A decent 'front gate' with unobstructed roads.	*		
Marking of important landmarks			*
Defined boundaries.	*		
Finding the focal point.	*		
1.3. **ATTRACTIVE SPACES**			
1.3.1. Lighting			
Pedestrian friendly lighting installation (not too high and with full spectrum housings)	*		
Glare prevention Positioning of lighting at eye-level (i.e., 1.5 - 3 m above ground).	*		
1.3.2. Seating			
Adequate seating elements (one linear foot for every 30 m2 of seating area)	*		
Backrests approximately 17-18 inches from the front	*		
The seats are tilted back 3 - 10 °.			*
Seat heights about 42.5 cm	*		
Seat backs			
Seat depths can be 38 - 50 cm, with a typical depth of 45 cm.			
The presence of an angle of 100 – 110 ° between the seat base and back.	*		
Backrest at least 90 cm above the ground.	*		
Seating with backrest and armrest elements.	*		
Seating area for every 30 m2.	*		
Presence of movable chairs (mounds of grass, panoramic steps, seating walls, retaining walls that allow sitting)			*
Secondary seats should be 50% of the total.	*		
Use of wooden materials in the seats.	*		

Condition of benches, steps, ledges, seating elements.	*		
1.1.3. **Sculpture**			
The existence of public art	*		
1.1.4. **Water Features (Fountains)**			
Visibility and attractiveness of moving water.	*		
Auditory attraction of moving water	*		
1.1.5. **Waste Receptacles**			
Near garbage-generating environments and activities (i.e., food courts, food vendors, grocery stores, news agents and smoking areas.		*	
Has the average street waste capacity of 25 -35 gal. been considered?	*		
Minimum mouth opening should be 30 cm.	*		
Trash receptacles placed 12 m. from where people sit or gather.			*
Regular emptying of trash receptacles.	*		
Material use and quality status of trash receptacles			*
1.1.6. **Other Furniture**			
Table heights of 85-90 cm	*		
Use transparent metal bar fencing (if barrier is required)	*		
Apply anti-graffiti coating to accessible vertical surfaces in sensitive places.			*
Presence of graffiti walls and community billboard in the square.			*
Public toilet facilities and easy accessibility indoors.	*		
1.1.7. **Planting**			
Planting reaching up to 3.5 m in outoor spaces.	*		
Planting suitable trees	*		
Use of elements that boost wind resistance of trees.	*		
Minimizing the use of shrubs (use of plants up to 1.0 m tall where deemed necessary).			*
Do not plant dense bushes with gray or dull dark green leaves.	*		
The use of colorful, fragrant herbs.	*		
Placing of trees near seating areas.	*		
Have trees with open canopy been planted in windy areas to reduce potential damage associated with intense foliage and high winds?		*	
2. SOCIAL ATTRIBUTES			
2.1. Sense of Ownership			
The presence of festivals, concerts and informal events in the square.	*		
Having opportunities for shopping.	*		
Presence of scenery	*		
Opportunity to make eye contact with foreigners	*		
Smiling people	*		
People showing affection in the square	*		
2.2. Community Identity			
Whether the square is somewhere to meet your friends	*		
Existence of different ages, gender and ethnic groups that reflect the majority of the community.	*		
2.3. Social Interaction			
People in groups of two or three.	*		
People chatting with each other.	*		
2.4. Place Attacment			
The presence of users' sense of belonging and preserving square.	*		
Preservation of personal or collective history not only through images, but also through different facilities and entertainment that attract people.	*		
The presence of people who know each other by their names or faces	*		
The presence of people who frequent the square	*		
2.5. Sense of Ownership			
Users coming to the venue with friends or relatives.	*		
Users tend to collect trash when they see it.	*		
Inexpensive	*		
3. PERCEPTIONAL ATTRIBUTES			
3.1. Physical Comfort			
Flexible design	*		
Presence of monuments, stairs, pools and other influencing factors	*		
If possible, add both main seating (chairs, benches, stools) and secondary seats (ledges, steps, flower bed edges) for overcrowded situations			*
The dominance of the 'undesirables' space' over the use of the space.	*		
A sense of connection with the past in the square.	*		
Enough seating space to people design.	*		
1.1. **Physiological Comfort (Microclimate)**			
Protection from sun, shade and cold winds (but encouraging cooling breezes on hot days)	*		

Most benches are positioned in shady or high activity areas.	*		
Provide umbrellas or other shade in areas that offer no natural shade, or add naturally shaded options.	*		
Place seating options along a wall, bush, or sheltered side of the building.			*
Protection against the wind.	*		
Provide glare control for sunny days.			*
1.2. **Environmental Comfort**			
Free view	*		
Presence of interesting facades	*		
Leaves a decent first impression	*		
Presence of people taking photos and opportunities to take photos.	*		
Sunlight			
Finding seating in places with maximum sunlight	*		
Using reflective light surfaces (if there is no direct sunlight)	*		
Wind			
Using elements to block large, open, unprotected areas from the wind (trees, buildings, etc.)	*		
Are the building roofs made with wind resistant materials?	*		
Color			
Night light color use	*		
Clever use of cheerful colors such as yellow, blue, orange and turquoise in buildings.	*		
The use of various colored trees, shrubs, flowers.	*		
The use of color in ground pavement.			*
Aesthetics			
Visually appealing	*		
Integration	*		
Visual connection of the square	*		
The liveliness of the square	*		
Quality of the square (largely defined by water, trees, walls, texture, floor and any other object in space)	*		
Noise Control			
Mechanical noise (does not prevent you from chatting)			*
Smell			
Presence of pleasant fragrance (preferably pleasant aromas (such as coffee, fresh bread or flowers)	*		
Trees, foliage and water features			*
Distance from vehicular traffic	*		
Weather Protection			
Canopies, canisters, shelters, gazebos			*
Privacy (Inner and Outer Distance)			
The manner the square is surrounded by trees, buildings and other items	*		
1.3. **Safety and Security**			
Feeling safe	*		
Police, security guard presence			*
More women than men	*		
Good visibility			*
Suitable lighting			*
Open views (having blind spots)			*
Use of signage			*
Placement of seating at a sufficient distance from the sidewalks so that feet do not protrude onto the curb (optimum distance is 75 cm)			*
Do not place benches where they can be used to support jumping over fences or obstacles.	*		
Bollards, benches, flowerbeds, bus stops and the like can be used to visually 'harden' the square and prevent vehicle occupation.	*		
Protection			
Protection against traffic and accidents - a sense of safety	*		
Protection against crime and violence - feeling of safety.	*		
Protection against unpleasant sensory experience.	*		
1.4. **Maintenance and Management**			
The square is clean and free from garbage	*		
Well-kempt status			*
Presence of caregivers.	*		
The existence of effective design and management of the link between natural and development areas	*		
Minimizing on-site pollution			*
Ground wear and surface erosion Management			*
1.5. **Technology**			
Mechanical control (Camera, door ...)		*	
Wi-fi usage		*	

FUNCTIONAL QUALITY ANALYSES	SOSYAL QUALITY ANALYSES	PERCEPTUAL QUALITY ANALYSES
Diversity of Utilization and Activities **+** The square offers various activities such as; viewing the scenery, walking, exercising, cycling, eating, playing, sitting and chatting. It is seen in cultural and artistic activities. The size of the square is not very large. There are many food outlets in the area. There are utilization options for different age groups. **Accessibility** + Considering the transportation there is access from outside the area by various means of transportation such as private vehicles, buses and seaways. Since there are no height differences around the area, there are no serious problems in regards to usage by physically challenged people. □ There is no inviting entry point. Parking areas are insufficient on busy days. The directional signage bunched up at many points creates too much confusion. **Furniture** □ The square lacks adequate outdoor seating, and offers no shading elements around seating areas. There is no serious problem with furniture ergonomics, but problems do exist especially in the placement of benches, waste bins and signage. There are occasional problems with furniture coating materials. **Planting** □ There is no windbreaking vegetation."	**Sense of Community** + The scenery and presence of people, as well as shopping opportunities support the sense of ownership. **Community Identity** + Daily and occasional activities socially cover all users of different age groups, cultural backgrounds and gender. **Social Interaction** + There are many cafeterias and restaurants catering to different social groups (drinks, traditional tea and light snacks). + Some outdoor areas include meeting corners, such as dining areas, where people can sit and relax. **Place Attachment** + There are people who frequent use the square. **Sense of Ownership** + There are people who frequent come to the square with their family, relatives and friends. Users feel a sense of control and ownership within the square.	**Comfort** □ The use of shading elements around the seating areas overlooking the sea is insufficient. □ On holidays and at night, the sound of music from surrounding cafes mix with human conversation. + Aesthetically, the view of the Bosphorus, the presence of historical buildings and colorful facades exude a positive effect. **Safety & Security** □ Inadequate security personnel, low lighting in certain areas. **Maintenance & Management** □ There is inadequate maintenance service in the square, whereas the ground pavement seems to be of sufficient quality, albeit neglected. □ A camera system makes the place feel controlled; the utilization of smart furniture was not encountered in the area.

Figure 5. Overall views of Ortaköy (Photographed by the author)

As a result of the study, suggestions for increasing the spatial quality of Ortaköy Square can be listed as follows:

Functional

- The number and variety of seats should be increased.
- Sidewalk width and its use should be reviewed, especially in sections where street vendors peddle their wares.
- Seats are insufficient due to their heavy usage especially on weekends, evening hours and holidays. Temporary seating can be provided with the use of portable chairs. The existing playground can be positioned in a different location by slightly enlarging its scale.
- Increasing the playground functions can ensure the inclusion of more current activity elements.
- An entrance area should be designed with appealing spatial facilities.
- The parking lot volume should be raised, especially on busy days. Preferably, a multi-storey car park system could be useful on days of heavy use.
- An effective and simple marking system is needed, especially for those using the area for the first time.
- It is necessary to ensure unity and harmony in the design of waste receptacles as well as increase their number.
- Windbreaking vegetation, should be planted, especially in regards to the wind blowing in the square from the sea.

Social

- The presence of international festivals and events in the square can be increased.

Perceptual

- The use of shading elements such as pergolas and awnings can be increased, especially in the seaside portion of the square.
- A technical study on urban acoustics can be conducted whereby improvements can be made accordingly.
- The number of security personnel can be increased, and luminescence levels of lighting elements in certain areas can also be increased.
- Ground pavement can be rearranged without damaging the existing texture, esvpecially where there are maintenance problems.
- The use of an effective and perceptible camera system, as well as the use of smart furniture, which is now widespread in today's design world, can be highlighted.
- It has been identified in international studies that functional, social and perceptual qualities affect the success of the venue at similar ratios. The results of the research study conducted in Ortaköy Square support the impact of the aforementioned qualities upon the quality of any space. As a result of the study, it can be said that the Social and Perceptual Qualities of an urban space play a more important and effective role than its Functional Qualities.

References

Carr, S., Stephen, C., Francis, M., Rivlin, L. G., & Stone, A. M. (1992). Public space. Cambridge University Press. https://books.google.com.tr/books?id=pjo4AAAAIAAJ&printsec=frontcover&dq=Carr,+S.,+Stephen,+C.,+Francis,+M.,+Rivlin,+L.+G.,+%26+Stone,+A.+M.+(1992).+Public+space.+Cambridge+University+Press.&hl=en&sa=X&ved=2ahUKEwjkhsqW6KnqAhX1ZxUIHX-TC50Q6AEwBnoECAMQAg#v=onepage&q&f=false

Dizdaroğlu, D. (2005). Boğaziçi İskele Meydanları-Anadolukavağı ve Rumelikavağı Meydanlarının Rekreasyonel Potansiyellerinin Değerlendirilmesi (Doctoral dissertation, Fen Bilimleri Enstitüsü).

Francis, M. (1987). Urban outdoor spaces. Advances in environment, behavior, and design, 1(7).

Francis, M. (1989). Control as a dimension of public-space quality. In Public places and spaces (pp. 147-172). Springer, Boston, MA.

Francis, M. (2003). Urban outdoor space: Designing for user needs. Island Press.

Gehl, J.(2008 _1987), yenilenmiş baskı, Life Between Buildings: Using Public Space, Danish Architectural Press. Kopenhagen.

Gehl, J. (2002). Public space https://books.google.com.tr/books?id=viYqPQAACAAJ&dq=Gehl,+J.+(2002).+Public+spaces+and+public+life:+City+of+Adelaide,+2002.+City+of+Adelaide,+Adelaide.&hl=en&sa=X&ved=2ahUKEwiomvG--qnqAhWy6KYKHRyIAXEQ6AEwAHoECAAQAQs and public life: City of Adelaide, 2002. City of Adelaide, Adelaide.

Gehl, J. (2011). Life between buildings: using public space. Island press. https://books.google.com.tr/books?id=X707aiCq6T8C&printsec=frontcover&dq=Ge-

hl,+J.+(2011).+Life+between+buildings:+using+public+space.+Island+press.&hl=en&sa=X&ved=2ahUKEwi6l-6vt-qnqAhWQwMQBHUvxBK4Q6AEwAHoECAAQAg#v=onepage&q&f=false

Gehl, J. (2009). Downtown Seattle. Public spaces, public life. Seattle: International Sustainability Institute.

Gehl, J., & Gemzøe, L. (1996). Public spaces. Public Life, Copenhagen. https://books.google.com.tr/books?id=SfFIQgAACAAJ&dq=Gehl,J.,+and++Gemz%C3%B8e,L.(1996),Public+Spaces&hl=en&sa=X&ved=2ahUKEwjt_JmR-6nqAhXNMZoKHcXPCPkQ6AEwCHoECAcQAQ

Gehl, J., & Svarre, B. (2013). How to study public life. Island press. https://books.google.com.tr/books?id=DUGiAQAAQBAJ&printsec=frontcover&dq=Gehl,+J.,+%26+Svarre,+B.+(2013).+How+to+study+public+life.+Island+press.&hl=en&sa=X&ved=2ahUKEwjhsZDN-6nqAhWGfZoKHWFCC4cQ6AEwAHoECAEQAg#v=onepage&q&f=false

Greenhalgh, L., & Worpole, K. (1996). People, parks and cities: a guide to current good practice in urban parks. HMSO Publications Centre.

Gökhan, Erce A (1992). Ortaköy Meydanı ve Çevre Düzenlemesi, Tasarım No:27, Tasarım Yayıncılık, Istanbul.

Heath, T., Oc, T., & Tiesdell, S. (2011). Public Places-Urban Spaces. Routledge.

Kara, B., Tuncay, H. E., & Deniz, B. (2011). Investigating recreational qualities of the parks in Aydın. Procedia-Social and Behavioral Sciences, 19, 158-164. https://www.sciencedirect.com/science/article/pii/S1877042811012341

Krier, R. (1979). Urban Space, New York: Rizzoli. Transl. C. Czehowski. https://books.google.com.tr/books?id=ZDZUAAAAMAAJ&q=Krier,+R.+(1979).+Urban+Space,&dq=Krier,+R.+(1979).+Urban+Space,&hl=tr&sa=X&ved=2ahUKEwj0q9yQj6rqAhXKMZoKHZe1CskQ6AEwAHoECAAQAg

Laud8, 2011. Nashvılle Publıc Square, https://laud8.wordpress.com/2011/05/03/nashville-public-square/
LeGates, R. T., & Stout, F. (Eds.). (2011) The city reader. Routledge.

Low, S., Taplin, D., & Scheld, S. (2009). Rethinking urban parks: Public space and cultural diversity. University of Texas Press.

Lynch, K. (1960). The Image of the City, The MIT Press and the President and Fellows of Harvard College, Massachusetts.

Lynch, K. (1981). Good city form. MIT press. https://books.google.com.tr/books?hl=tr&lr=&id=flJdgBoKQHQC&oi=fnd&pg=PA1&dq=Lynch,+K.+(1981)+A+Theory+of+Good+City+Form,+Cambridge,+MA:+MIT+Press&ots=WGhrgEW5SN&sig=yUmKq_2ehxdA7JEd44a89dpptlU&redir_esc=y#v=onepage&q&f=false

Main, B., & Hannah, G. G. (2010). Site furnishings: a complete guide to the planning, selection and use of landscape furniture and amenities. John Wiley & Sons.

Marcus, C. C., & Francis, C. (Eds.). (1997) People places: design guidlines for urban outdoor space. John Wiley & Sons. https://books.google.com.tr/books?hl=tr&lr=&id=tFVLm-A5hEgC&oi=fnd&pg=PR7&dq=Marcus+%26+Francis,+1997&ots=Jt5FgDSKYM&sig=6bHh4rxVjka7LcFOH-mIjwVqg8Y&redir_esc=y#v=onepage&q=Marcus%20%26%20Francis%2C%201997&f=false

Sakip, S. R. M., Akhir, N. M., & Omar, S. S. (2015). Determinant factors of successful public parks in Malaysia. Procedia-Social and Behavioral Sciences, 170, 422-432.

Sarkissian, W., Bateman, R., & Hurley, B. (2013). Outdoor space in medium-density housing guidelines for planning and design. Nimbin NSW, 2480.

Turer Baskaya, F. A., & Tekeli, E. (2015, October). Coastline changes and Istanbul coastal landscape. In The Twelfth International Conference on the Mediterranean Coastal Environment (MEDCOAST'15) (pp. 06-10).

Madanipour, A. (1999). Why are the design and development of public spaces significant for cities?. Environment and planning B: Planning and Design, 26(6), 879-891.

Mamaghani, N. K., Asadollahi, A. P., & Mortezaei, S. R. (2015). Designing for improving social relationship with interaction design approach. Procedia-Social and Behavioral Sciences, 201, 377-385. https://www.sciencedirect.com/science/article/pii/S1877042815048387

Marcus, C. C., & Francis, C. (Eds.). (1997) People places: design guidlines for urban outdoor space. John Wiley & Sons. https://books.google.com.tr/books?hl=tr&lr=&id=tFVLm-A5hEgC&oi=fnd&pg=PR7&dq=Marcus+%26+Francis,+1997&ots=Jt5FgDSKYM&sig=6bHh4rxVjka7LcFOH-mIjwVqg8Y&redir_esc=y#v=onepage&q=Marcus%20%26%20Francis%2C%201997&f=false
Memo, 2019. Free movies with the Movie Nights at Bryant Park, https://www.new-york-city-travel-tips.com/new-york-bryant-park-summer-festival/

Öztürk, A. A. (2009). Kentsel Kamusal Alan Olarak Meydanlar: Mekan ve Yaşamla Kurduğu İlişki (Doctoral dissertation, Fen Bilimleri Enstitüsü).

Project for Public Spaces (Ed.). (2000) How to turn a place around: a handbook for creating successful public spaces. Project for Public Spaces Incorporated. https://books.google.com.tr/books?id=HHhPAAAAMAAJ&q=How+to+Turn+a+Place+Around:+A+Handbook+of+Creating+Successful+Public+Spaces.+New+York:+Project+for+Public+Space.&dq=How+to+Turn+a+Place+Around:+A+Handbook+of+Creating+Successful+Public+Spaces.+New+York:+Project+for+Public+Space.&hl=tr&sa=X&ved=2ahUKEwjE-K2HjKrqAhXix6YKHbeZAhEQ6AEwAXoECAMQAg

Project for Public Spaces (2005). 10 Principles for successful squares, https://www.pps.org/article/squaresprinciples
Project for Public Spaces (2009). Creating Park Signage. http://www.pps.org/reference/signage/

Project for Public Spaces (2001). Place Audit: An Assessment Exercise, https://www.dot.ny.gov/divisions/engineering/design/dqab/css/repository/audit.pdf

Rad, V. B., & Ngah, I. (2013). The role of public spaces in promoting social interactions. International Journal of Current Engineering and Technology, 3(1), 184-188.Radwan, A. H., & Morsi, A. A. G. (2019). The Human Scale in Public Spaces. An Analytical Study of New Cairo Settlements. An Analytical Study of New Cairo Settlements (April 8, 2019).

Rahravi Poodeh, S., & Pouriaye Vali, A. H. (2014). Investigating the Characteristics of Outdoor spaces to Enhance Social Interactions in Neighborhood Environments. European Online Journal of Natural and Social Sciences: Proceedings, 3(4 (s)), pp-148.7, http://european-science.com/eojnss_proc/article/view/4161

Rutherford, J., Carter, M., & Christidis, K. (2013). Classification framework for public outdoor space. Australasian Parks and Leisure, 16(1), 34.

Santos, P. M. Dos, Caccia, C.S., Barbosa Samios, A. A., Ferreira, L. Z. (2019). The 8 Principles of the Sidewalk: Building More Active Cities. https://thecityfix.com/blog/the-eight-principles-of-the-sidewalk-building-more-active-cities-paula-santos/

Sarkissian Colleagues Planners (2000). Australian Capital Territory, Crıme Preventıon And Urban Desıgn Resource Manual, https://www.planning.act.gov.au/__data/assets/pdf_file/0010/891397/crimemanual.pdf

Shaftoe, H. (2012). Convivial urban spaces: Creating effective public places. Earthscan

Sugiyama, T., Giles-Corti, B., Summers, J., du Toit, L., Leslie, E., & Owen, N. (2013). Initiating and maintaining recreational walking: a longitudinal study on the influence of neighborhood green space. Preventive medicine, 57(3), 178-182. https://www.sciencedirect.com/science/article/pii/S0091743513001783?casa_token=cPEQ11t7NF8AAAAA:t3mz4be29wzG1IzGtjg3J8O0UOTDA_MnwsA0nv2RotlGp54t7o94iHGgU9X09ZHCdBqLPooQrA

Thomas, D. (2016). Placemaking: An urban design methodology. Routledge.

Thompson, C. W. (2002). Urban outdoor space in the 21st century. Landscape and urban planning, 60(2), 59-72.

ThinkCity (2020). http://www.thinkcity.com.my/pps/pdf/Place.pdf

Wari,S.(2010),Palestinian Berlin: Perception and Use of Public Space, Habitat - International: Schriften Zur Internationalen Stadt, Publication date 01 Sep 2018, Publisher Lit Verlag, ISBN10 3643908199_ ISBN13 978364390819.

Wheeler, S. M., & Beatley, T. (Eds.). (2014) Sustainable urban development reader. Routledge.

Whyte W.H. (1980) The social life of small urban spaces. Washington, D.C.: Conservation Foundation.

Woolley, H. (2003). Urban outdoor spaces. Taylor & Francis. https://books.google.com.tr/books?hl=tr&lr=&id=7UJ5AgAAQBAJ&oi=fnd&pg=PP1&dq=Helen+Woolley(2003),%E2%80%9DUrban+Open+Spaces%E2%80%9C,+London,Published:Taylor+%26+Francis,ISBN9780203402146.&ots=k8TFZSZPNg&sig=99Y2UqmIKgSCJrgTU58F3DNejBw&redir_esc=y#v=onepage&q&f=false

Zube, E. H., & Moore, G. T. (Eds.). (2013). Advances in Environment, Behavior and Design: Volume 2 (Vol. 2). Springer Science & Business Media. s

Providing a comprehensive model of inter-sectoral coordination with the express purpose of the creative city realization: Case study of Yazd city

Dr. Mirnajaf Mousavi
Professor of Geography and Urban Planning, Urmia University, m.mousavi@urmia.ac.ir

Kamran Jafarpour Ghalehteimouri
Ph.D. fellow research in DPPC-MJIIT-UTM & Research assistant at Kharazmi University of Tehran, space.kamran@gmail.com

Dr. Hassan Hekmatnia
Associate Professor of Geography and Urban Planning, Payame Noor University, ehsanhekmatnia@gmail.com

Dr. Ali Bagheri Kashkouli
Graduated of Geography and Urban Planning, University of Isfahan, alib336@gmail.com

Abstract
The aim of this study was to investigate a clear role of the creative potential of Yazd city in the realization of a creative city. To achieve this, the potential of Yazd city in the field of traditional food, creative industries (handicrafts), urban context (type of architecture), development of knowledge and technology, and urban spaces has been examined. Surveys show that support for creative human resources by public and private institutions; belief in requisiteness to invest in creative industries in the city's neighborhoods, especially the activities and industries of ancient and forgotten creators as the structural foundations of Yazd's identity, has led to the growth of creativity indicators in the city's neighborhoods. Studies show that in the focus component, large populations, especially in modern contexts as well as historical contexts, have led to the widespread development of human relationships. Accordingly, a large amount of information and notions have been exchanged for the dynamism of creative industries in these regards. In the components of diversity, the historical context of Yazd city has a various population (families, entrepreneurs, artists, immigrants, the elderly, or students) which conducive to innovation in multifarious economic sectors and the revival of traditional and old industries such as rug weaving, cashmere weaving, and Daraie Bafi (ikat). Furthermore, organizing passages such as Mazari Alley, which had a high potential, and their strengths include identification elements such as millstones, sensory richness in the complex, containing the pleasant smell of henna and spices, and such like, which has turned it into a memorable environment and as a creative urban space in Yazd city. Related to this matter, the study has presented a comprehensive inter-sectoral coordination model for the permanence of creative activities in the neighborhoods of Yazd city.

Keywords: creative industries, human resources, urban spaces, creative city, Yazd city

Introduction

Creativity and its theory are driven by Richard Florida's (2005) work on creative classes and other scientists such as Allen Scott with different perspectives on attraction to specific places, and different authors discuss this from various angles such as creative workers, innovation, small and large cities, the talents and the governance of talents are examined (Andrew, 2015). In cities where creative workers are employed in various fields, a balance is struck between the production system and the cultural environment, and each reinforces another qualitative function and forms an important basis for the creative city (Scott, 2006). According to the statements, urban policies should be based on the formation of creative cities, arguing that a dynamic cultural scene is essential for revitalizing

neighborhoods and economic development (Hague, 2017). Furthermore, studies suggest that cultural planning is shaped by the analysis of industry and job dynamics and the recommendation of creative economy support strategies with a focus on creative and entrepreneurial space (Grodach, 2013).

Generally, there are complex connections between education, creativity and cities. Educational networks and the strengthening of educational policies are effective in expanding creativity (Kraehe & Lewis, 2019). It is noteworthy that considering to statistical data, innovative activities are more prevalent in cities with a higher degree of cultural diversity, so that they are positively affected by all individuals with high or low skills and abilities (Zhang, 2019). Creative policies are also substantial for urban education and the encouragement of arts, festivals, and creative community events and the creation of a sustainable culture (Tuck & Habtom, 2019). Recently, extensive studies have been accomplished in the comprehensive performance of creative cities and their effects on the economic growth of regions and countries and their classification in different clusters in terms of quality (Rodrigues & Franco, (2020), as well as the positive relationship between creative workers and the creation of economic development in cities (Lin, 2019).

The creative city will be more successful as an emerging concept with the participation of social groups and professional circles, especially creative individuals and groups. On a global scale, the most influential concept for a creative city includes the concepts of creative class, which allows us to distinguish between subsequent circles of people of creative and accompanying professions (Klasik, 2017). The definition of creative industries is determined by the reflection it receives from creative cities. The creative and attractive industries of a city are also expressed by artists, with the concept defined by Florida (bohemian) who know how to make a city winsome and cool (Pruvot, 2020). Among creative industries, cultural buildings such as libraries and museums are of particular importance at the local level. Artists and cultural producers play an essential role in the economic sector and the realization of creativity, so in this regard, infrastructure and creative culture are two important elements (Yum, 2020). It can be affirmed that the major focus of research at the intersection of art and urban space on creative cities has been creative clusters and the role of art and culture and their interventions in urban regeneration and development (Bell & Orozco, 2020). It can be considered that extensive networks have been formed to create, produce, distribute, and disseminate cultural activities, goods, and services, which heir goal is to expand opportunities for creators and cultural professionals in creative fields such as handicrafts, folk arts, gastronomy, film, literature, media arts and music (Gaižutytė-Filipavičienė, 2020).

The historical context of Yazd city in the matter of having the required infrastructure, has a lower cost to create a foundation than other neighborhoods of the city, which leads to faster movement of this texture in strengthening the indicators of the creative city. Also, the development of this context in the indicators of the creative city can lead to faster conduction of the creative city thoughts to the surrounding neighborhoods. Since the historical context of Yazd has been an excellent example of a brick structure, what is left of the urban planning and architecture of the last generation in this context is pristine and delightful for many tourists in the world. In addition, along with architecture and pristine urban planning structure in this texture, the creative handicrafts that produce a variety of tourism products using the creative class and innovator is considered as one of the tourist attractions of this texture.

In this study, we intended to examine the city of Yazd and its neighborhoods in Iran as a creative city in terms of cultural and social foundations and evaluate inter-sectoral coordination with the aim of realizing a creative city. For this purpose, we have first reviewed the literature of the creative city, and then expressed the research methodology, findings and introduced the creative industries in the context of Yazd. Eventually, we discussed the infrastructure and results obtained from the studies of the realization of the creative city.

Systematic review of the literature

Nowadays creativity is known as one of the most important basis of prousprous urban development (Rodrigues & Franco, 2019). Conceptual studies have shown that the importance of the creative city notion was initiated by urban theorists Landry and Bianchini (1995). The ‘‘creative city” label has increased due to the growth of cultural and economic policies in the world, and large metropolises have become the main drivers of the creative economy (Ratio, 2013: 3). Having a strong creative system does not necessarily mean shifting a city’s innovation capacity for economic growth. Expressing the issue of sustainable development in the innovation process requires a public understanding of the importance of this matter (Johnson, 2008: 153).

The number of researches on creative city in Iran is growing in last decades on cultural aspect of creative city (Pourzakarya and FadaeiNezhad, 2019) urban tourism development (Zaal and Ramezanzadeh, 2019), social integrity and urban creativity (Rabbani et al., 2011), metropolitans (Moafi et al., 2019) public space revitalization and people participation (Ashrafi and Rashidi, 2019). Attracting creative people and innovative businesses is a complex process, and authorities have a responsibility to leverage the unique inherent characteristics of cities in their policies. (kashkkouli et al, 2018). Considering the realm of the context, policy aimed at the creative economy is formulated by municipal actors in leadership roles, who specialize in developing the overarching strategy of ideating and implementing tools such as municipal cultural plans. This is a process that includes representatives from the public, private and nonprofit sectors working together to envision, design, and plan creative economy projects, events, and built environment options (Goldberg-Miller, 2019: 30).

As He and Wang (2019) put it, the ‘SoHo model’ of the late 1970s and the “Guggenheim effect” of the late 1990s are examples of how creative and cultural elements become the power of urban growth and wealth accumulation. Cities such as Cultural Quarters (CQs) in the UK gained popularity in the latter half of the twentieth century, and sought to consciously incorporate creative/cultural city-making in their urban agendas. Artists are considered as a key (though diverse(group in debates, policy and practice in the constant contestation of the ‘‘creative city” in Stockholm’s urban politics. Rather than reducing the role of artists to opponents this offers the potential for them to function as actors who co-operate with urban authorities in a range of projects, and bring critical thinking to bear on the issue of how artists’ visions of creativity might be involved in co-producing more progressive urban policy (Borén & Young, 2017: 5-6).

According to Florida (2005), creative capital basically begins with the people who are called the “creative cities”. *The distinguishing characteristic of the creative class is that its members engage in tasks whose function is to “create meaningful new forms”*. While researchers have thoroughly examined how “creative classes” and “creative cities” may exclude every day, working-class, or poor residents, new urban imaginaries focused on sustainability potentially imply less stratified urban outcomes. Competitive city policies are responses to new economic pressures, both external and local (Lederman, 2015: 47-63). These findings support the argument that economic austerity policy is often perceived by private sector elites and neoliberal government advocates as a sign of the favorable state of business in places where communities are reoriented toward global competition and away from serving public needs (Adua & Lobao, 2019: 478).

After the emergence of “creative cities” and their dissemination worldwide, networks have created to integrate innovative knowledge and strategies in the local culture management, which is an opportunity for international cooperation adopting UNESCO priorities on culture and sustainable development (Mulero & Rius-Ulldemolins, 2017). As a prime examples, the city of Ljubljana was surveyed by Bogilović and Pevcin, which is part of the Creative Cities Network, dedicated by UNESCO to a permanent City of Literature in December 2015 and thus provides depth view on how creative initiatives can stimulate individual creativity. In this regard, it could be worth mentioning that in German cities, for example, in

Hamburg, where in October 2009 a collective of artists, musicians, and social activists published a manifesto attacking the "branding" of Hamburg as "creative city," the type of urban (re)development policies done in the name of the "creative city" agenda, and the instrumentalization of artists and cultural producers in the process (colomb, 2012: 146).

On the other hand, in some case, creative city strategies have been criticized for exacerbating socioeconomic inequalities due to strategies used to cater to the desires of an already privileged, well-educated, and economically better-off demographic, which will go against the social demands and political aims to addressing a creative city (Culver, 2017). Furthermore, big cities may indeed feature better levels of diversity and tolerance due to greater face-to-face contact opportunities. However, greater levels of generalized trust may be found in smaller cities due to a stronger sense of community. In their assessment culture has specific place for creative city (Montalto et al, 2019).

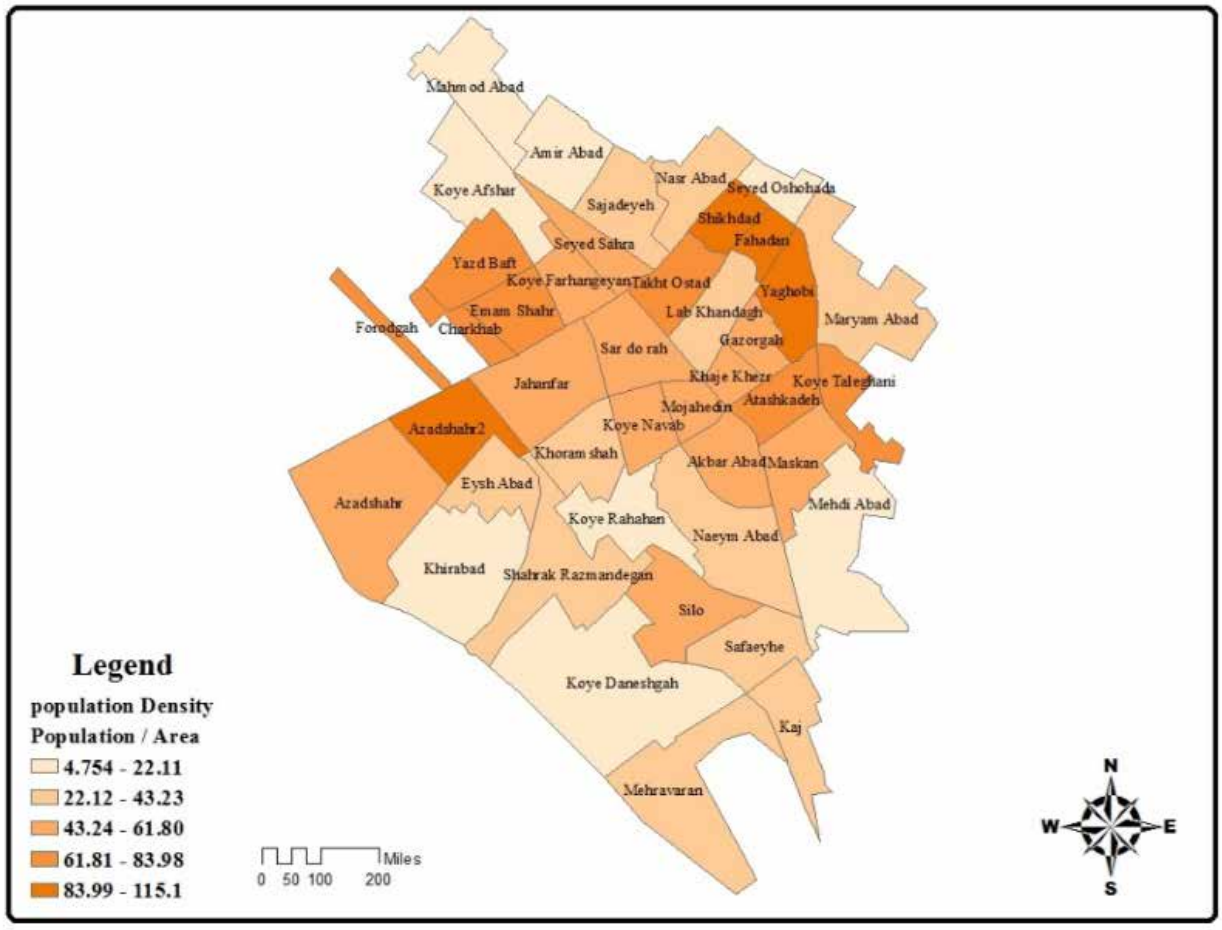

FIG. 1. Population density in Yazd city neighborhoods

Methodology

The objectives of this research provided the type of employed researches which was "descriptive-analytical". The statistical population studied is 42 neighborhoods of Yazd city based on municipal divisions in 2016. The data collection tool for examining creativity stimuli in Yazd city includes 21 demographic, economical, physical and managerial indicators. The content analysis method has been used to analyze the data. The required information in this regard has been extracted from urban development schemes, foundation system, pedestrian path design plans, comprehensive color plans and materials, and road adaptation programs for the disabled. On the other hand, the quantitative TOPSIS model has been used to level the neighborhoods in the matter of creative city indicators.

In 2016, the city of Yazd had a population of 529,673. The city has four urban areas, which historical context with all its potential in creating human capital, innovation in various fields of handicrafts, and tourism is located in district 2 of the city. Whereas, concentration and diversity are the two main indicators of the realization of a creative city, based on Fig (1), population density in different neighborhoods of Yazd city has been studied. Accordingly, high-density neighborhoods also have a variety of potentials that play a significant role in realizing the indicators of the creative city. However, it should also be noted that densely populated areas do not always have the highest levels of creativity.

Research findings

The creative city must be able to accommodate different social groups with various cultures. Because having a diverse population with different ideas increases the chances of creativity. It also requires diversification of employment and leisure opportunities. For this purpose, in order to attract

FIG. 2. The historical context of Yazd city

FIG. 3. Cashmere weaving and Daraie Bafi in Yazd

human and creative capital, cities and related districts must have special features that can lead to the realization of a creative city. In this regard, in addition to the platforms of knowledge, industry and especially industries with superior technology, social and cultural platforms such as social diversity, habitat desirability, quality of life and social equality have played an important role. In addition, a creative city is a conducive environment for human education and has provided a breeding ground for the creativity of its inhabitants, and such cities often have dynamic and healthy spaces (Fig 2). The city of Yazd, with its cohesive historical texture, has creative industries such as cashmere weaving workshops, Daraie Bafi, or rug weaving which has provided many attractions for tourists by setting in this texture. Moreover, the number of employees in this industry is increasing day-to-day, which has led to the sustainability and preservation of these creative industries.

Examining the indicators of the creative city in different components reveals that the city of Yazd has a lot of potential in terms of creative industries. The people of Yazd have been working in the textile industry since ancient times because of their location on the Silk Road, and luxurious fabrics and expensive handkerchiefs originated from this historic city. One of these fabrics is cashmere. Nowadays, with a focus on the city's historical context, the creative industry of cashmere weaving has not only provided employment for young people, but also the old and historical workshops and tools of this industry have created many attractions for tourists (Fig 3). Each of the cashmere weaving machines works with two persons, one cashmere weaver and the other called a Goushvareh-Kesh. Most of the Goushvareh-Kesh workers are young people between the ages of 10 and 13, who, along with studying, often help preserve the creative industry by learning proper experience in the field of this industry.

Daraie Bafi (ikat) is another old industry with 800 years old. Unfortunately, in the past years, owing to the lack of consideration and employment hardship in this field, Daraie Bafi was forgotten and we could find a sign of that industry in the alleys of Yazd markets much less than before. These days, this industry has received more attention due to the growth of tourism in Yazd city and has regained its position as one of the creative industries by renovating old workshops (Fig 4).

A special feature of Daraie Bafi fabrics is its type of design. The beautiful and colorful Daraie Bafi fabric with warm and sensational colors such as yellow, green, red and purple subconsciously reminds one of the scorching heat of the desert and suggests that perhaps the choice of warm colors by ikat weavers of Yazd is instinctive and

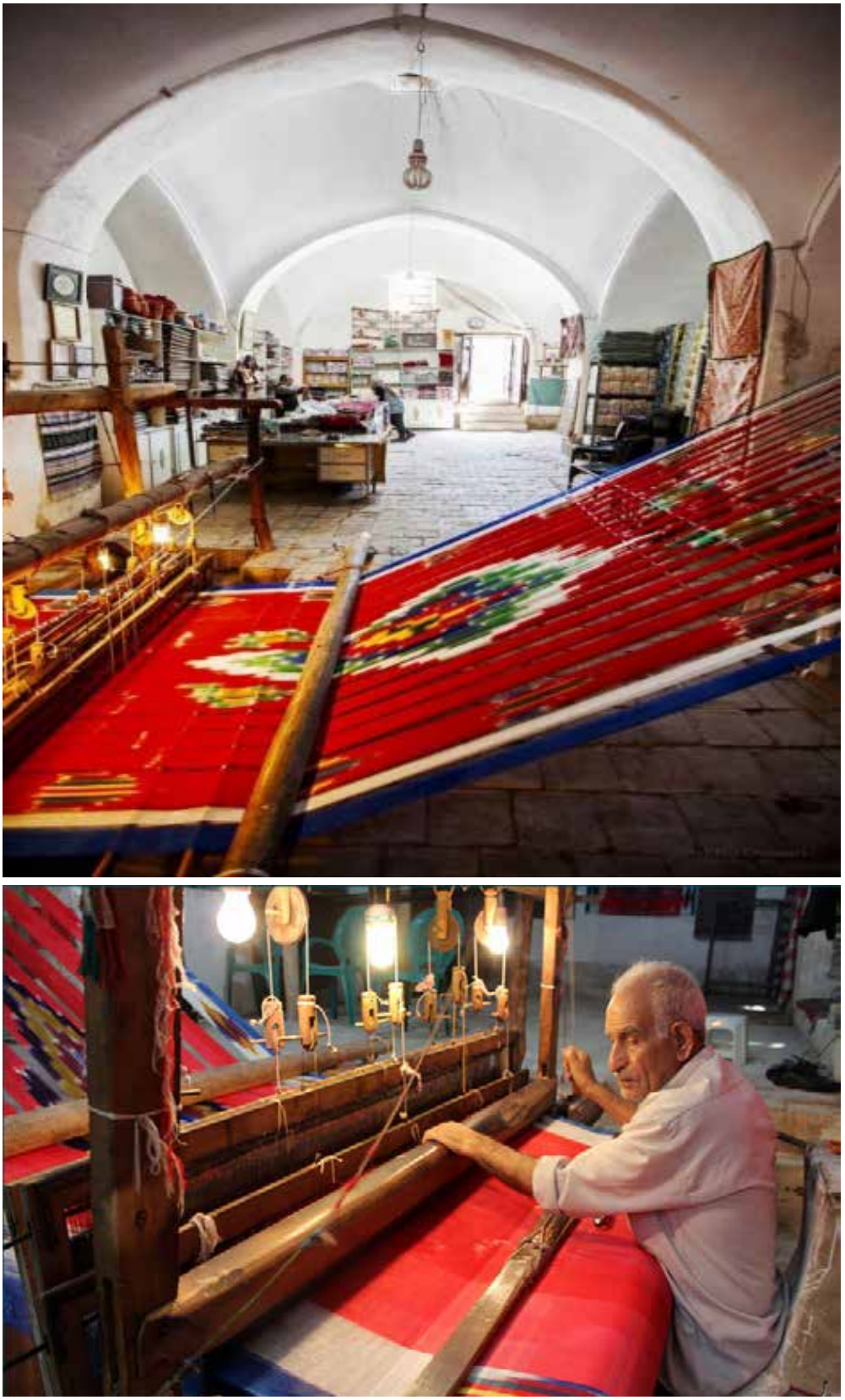

FIG. 4. The place of production and sale of Daraie Bafi fabrics

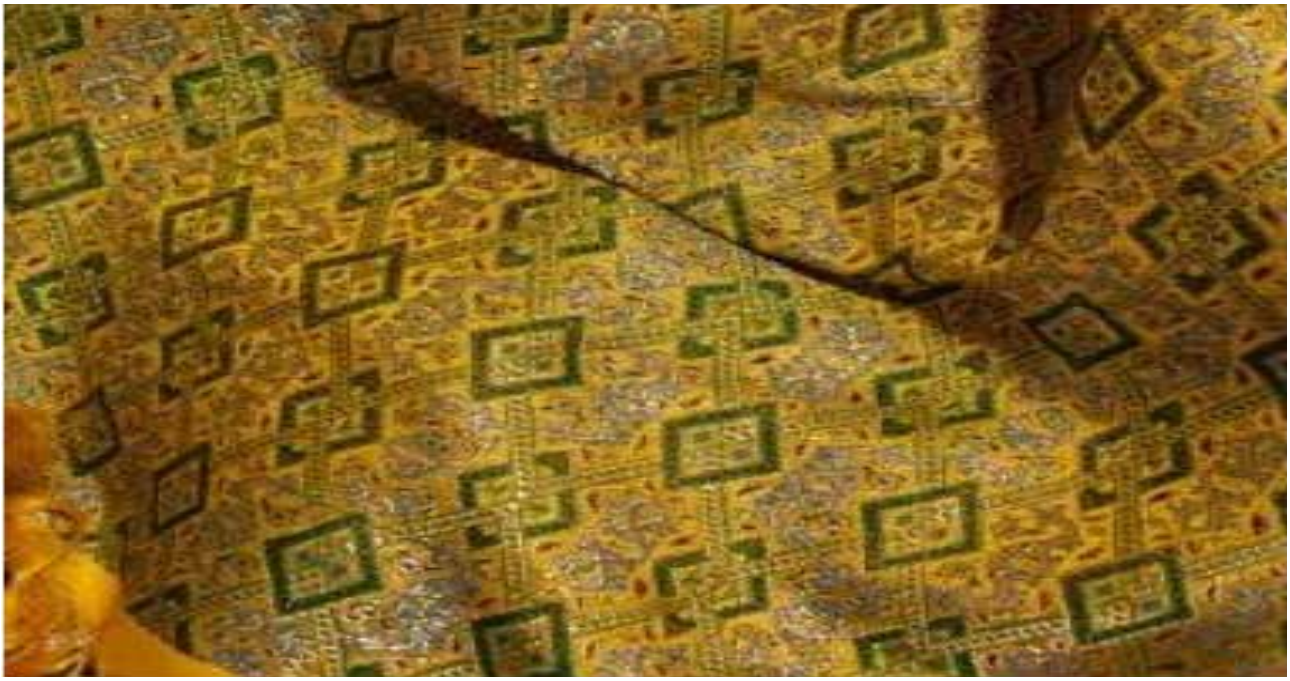

FIG. 5. The "brocade" Daraie Bafi fabrics.

it has been affected by the hot and dry climate of this province. The design seen in the Daraie Bafi fabric is the pattern calling "Chalipa" and its history in traditional Iranian art dates back several thousand years.

Another product of Yazd textile handicrafts is "brocade" (Fig 5). The history of this type of activity dates back to the Achaemenid and then Sassanid periods. Brocade fabrics are used to decorate homes. Today in Iran, brocade is produced only in traditional workshops in Yazd. According to the statistics of the year, the number of people working in this industry in Yazd is 137 people, which has increased due to the registration of the historical context of Yazd in the UNESCO World Heritage List and the growth of tourism.

A variety of candies and traditional foods as one of the components of a creative city in Yazd

One of the remedies that humans use for their natural environment adaptation is to use foods that are appropriate for environmental facilities and needs. Therefore, human beings respond culturally to their biological needs and combine the demand for eating and adapt to the environment with many traditions and customs. In Yazd, many traditional foods have their own valuable concepts and each of them is used in a special ceremony and occasion. Among the types of candies, we can mention baklava (pistachio Louz, almond or pussy willow Louz, coconut Louz, bicolor mixed Louz, Tahrimi Louz), Yazdi cake, Sheet cake, Haji Badam, rice bread, Window Cookies (Rosette Cookies), Yazdi comfit, Ghotab, cotton candy, candy, farinaceous Sohan, flour bread, khani Sohan, coconut bread, manga bread, and Shami baklava. Among the types of pottage or soups, Shuli, stirabout, wheat soup (Halim), mung bean, turnip, cabbage, noodle, Sambusak, lentil, pumpkin, plum, vegetable, and pomegranate soups are used in various ceremonies. Baklava, Window Cookies (Rosette Cookies), and Coconut Breads are special wedding cakes that are arranged in a "frame" and covered with "gold leaf". Furthermore, "Pardeyi Candies" arranged in the form of flowers or brides and grooms are also used to decorate the wedding table (Figs 6 and 7).

FIG. 6. Types of traditional candies in Yazd

FIG. 7. Types of traditional Yazd foods

One of the most important components of the realization of creative cities is the existence of scientific and research centers in urban areas of Yazd city in order to develop knowledge boundaries and create innovations that can help industrial and service sectors. The study of research data in this field shows that Yazd city with the highest rate of establishment of scientific and research centers has a large share of knowledge production. The city has 3 public universities, 16 scientific-applied centers, and 8 research institutes. In this regard, Science and Technology Park, which has started its work since 2003 in four areas of technology (biotechnology, information technology, textile and new energy), by popular and city demands and the time and place requirements, has expanded its activities.

in areas such as nanotechnology, tile and ceramic, and soft technologies. Given the effective role of science and technology parks in the development of science and technology, job creation, commercialization of scientific research, and innovative ideas at the community level, the need for a considerable and strategic approach aimed at planning future activities and programs is considered inevitable. In 2016, this park accommodated over 90 knowledge-based companies, which were included (21 companies in the field of information and communication technology and computer software, 16 cases of advanced products in other fields, 17 cases of computer hardware companies, 2 cases of new energy, 5 advanced equipment manufacturing and laboratory equipment companies, 1 advanced oil and gas equipment and materials company, 2 aerospace companies, 6 companies in nanotechnology, 2 companies in medical equipment and commercialization services and advanced medicines).

According to Table 1, regarding the number of higher education centers in Yazd in 2016, Yazd University with15623 students, 513 faculty members, 6 research institutes, 2 research centers, 14 faculties and 5 university campuses with 12 faculties, has the largest share in scientific production.

Creative and innovative industries in Yazd can be sought in the field of science and technology park activities. Yazd Science and Technology Park is active in many different contexts by accepting various ideas and registering knowledge-based companies in the fields of technology, IT, art, tourism, electronics, civil engineering, or social. Yazd Science and Technology Park includes the following sections:

Innovation Center: Innovation Center of Yazd Science and Technology Park has been established along to support creative and innovative people in order to cultivate innovative ideas. The center started its activities in December 2004 and by accepting and supporting the projects presented with the aim of leading to entrepreneurship, patenting, participating in festivals and competitions, has played an important role, especially among students, in developing creativity and innovation at the community level.

Children and Adolescents Science Park: Each person normally has talents, abilities and capacities for creativity, innovation, initiative and invention, which can be brought to the stage of development due to proper and appropriate upbringing and education. In the

TABLE 1. Scientific and academic centers of Yazd city, 2016

Public	Payame Noor	Azad	Applied Science	Non-profit	Technical and professional	Institute
3	1	1	16	3	4	8

Source: Statistics Center of Iran, 2016.

knowledge-based age, a country can have a favorable position in economic, cultural, and social competition if it has invested in teaching creativity to their students. Based on the results of various studies and contrary to misconceptions that consider creativity is inherent, it is an acquired thing that is not only born with some lucky people at birth, but this ability is common in humankind and everyone has this talent at birth to varying degrees and it is not just smart kids who are creative. Factors such as skills, flexibility, level of knowledge and awareness, level of experience and empirical perceptions, risk-taking, not being afraid of mistakes and failure play an important role in fostering children's creative minds. Therefore, our students need to know that they can't live in today's world just by relying on traditional education that is based on reading and writing skills. The study of science must be done deeply in the human mind and heart in order to be used for innovation (creativity + commercialization). Basically, creative talents flourish and crystallize in the idealistic environment. One of the most important requirements and methods for crystallizing creativity is to create a stimulating, talented and generally creative atmosphere, where children and adolescents have the opportunity to think and explore without fear of immediate evaluation. Considering this purpose, and in order to achieve the main mission that education for children should be enjoyable, Yazd Science and Technology Park has decided to build a children's and adolescents' scientific park complex. The immense goals of this collection include the following:

- Creating a dynamic and lively collection without the presence of a teacher, and fostering thinking, especially creative thinking
- Stimulating the natural curiosity of children and adolescents and encouraging them to pursue and find answers by searching, experimenting, and touching the world
- Acquaintance with new technologies by providing modern and practical equipment for children and adolescents
- Creating opportunities to value and validate their individual initiative
- A place for children to find out to learn independently, to think freely, and to explore
- Encourage students to have new and thoughtful ideas and express them, and familiarize students with the lucrative economy and ways to start a small business

TABLE 2. Cultural-artistic and historical spaces prone to creative class growth in Yazd city

Related space	Number	Number of students per year	Functional level
Children and Adolescents' Intellectual Development Center	6	900	regional
Research centers	8	2451	Urban
music Academy	5	3372	regional
School of Visual Arts	12	5328	regional
Art institutes	10	2894	local
Cultural institutions	17	4692	regional
Handicraft training and production centers	42	10259	regional

Source: Ministry of Culture and Islamic Guidance of Yazd Province, 2019.

Centers and spaces related to the talent of the creative class of Yazd city society can be related to cultural, research, educational and sports functions. The quality and functional quantity of these spaces is very important in Yazd city. In addition, the distribution of spaces in different neighborhoods of the city is important for people convenience. In fact, the creative city seeks to lay the groundwork and flourish the talents of citizens throughout the city by taking advantage of the capabilities of the neighborhoods. Different spaces, known as talent discovery practices, must function well at different levels of the local, city, and even region to empower the elites of the community and bring their talents to fruition. In general, the capability of neighborhoods in the creative city is not only the existence of a physical and social boundary, the creative city seeks the appropriate and proportionate distribution of these spaces in the neighborhoods based on social and cultural characteristics (Table 2). Functional orientation refers to the formal and informal functioning of these spaces, which will identify various reasons such as use and holding in government or public programs and its functional orientation. The impact of this issue on dealing with the talents of young people is organized and disorganized.

In the rapid changeful world, cities have changed by two main forces globalisation and the 'new economy'. These two are important as they are very influential international technology, creativity, capacity for innovation, and they form urban design. In such complex national and international connections street networks are considered as a significant component to ease physical movements easier, promote businesses, reduce traffic, and reduces emissions with more sustainable urban develop. That is how cities are responsible to their function and work in the context of such competitive world (Mercer 2006; Wood and Dovey, 2015).

Mazari alley is one of the passages that, despite having creative industries such as Mazari and Hanasabi (creative industries), has lost some of its functionality as a creative urban destination and space, and has only found function as a transitory passageway. What is more, with the location of this passage a short distance from a three-way street, as well as its branching from a relatively narrow and busy urban thoroughfare, has also diminished the importance of the complex as an urban space, turning part of the complex's entrance into a point with high potential for traffic accidents and urban traffic. Unfortunately, nowadays, many of the important dimensions of this passage and its valuable and historical uses have been overshadowed by these changes. This passage has a high potential that can be used by utilizing strengths include the existence of identification elements like millstones and sensory richness in the collection, such as the pleasant smell of henna or spices, introduced it as a memorable environment and a creative urban space in Yazd city. Therefore, goals such as expanding the city's recreational areas, considering the complex as a stopping point in a continuous structure with Kashani Street, and paying attention to the route as an urban public space can be considered. It is possible to develop the paused space by reconstructing the passageway, changing its functional role, and the prosperity and reopening of the creative industries (Fig 8).

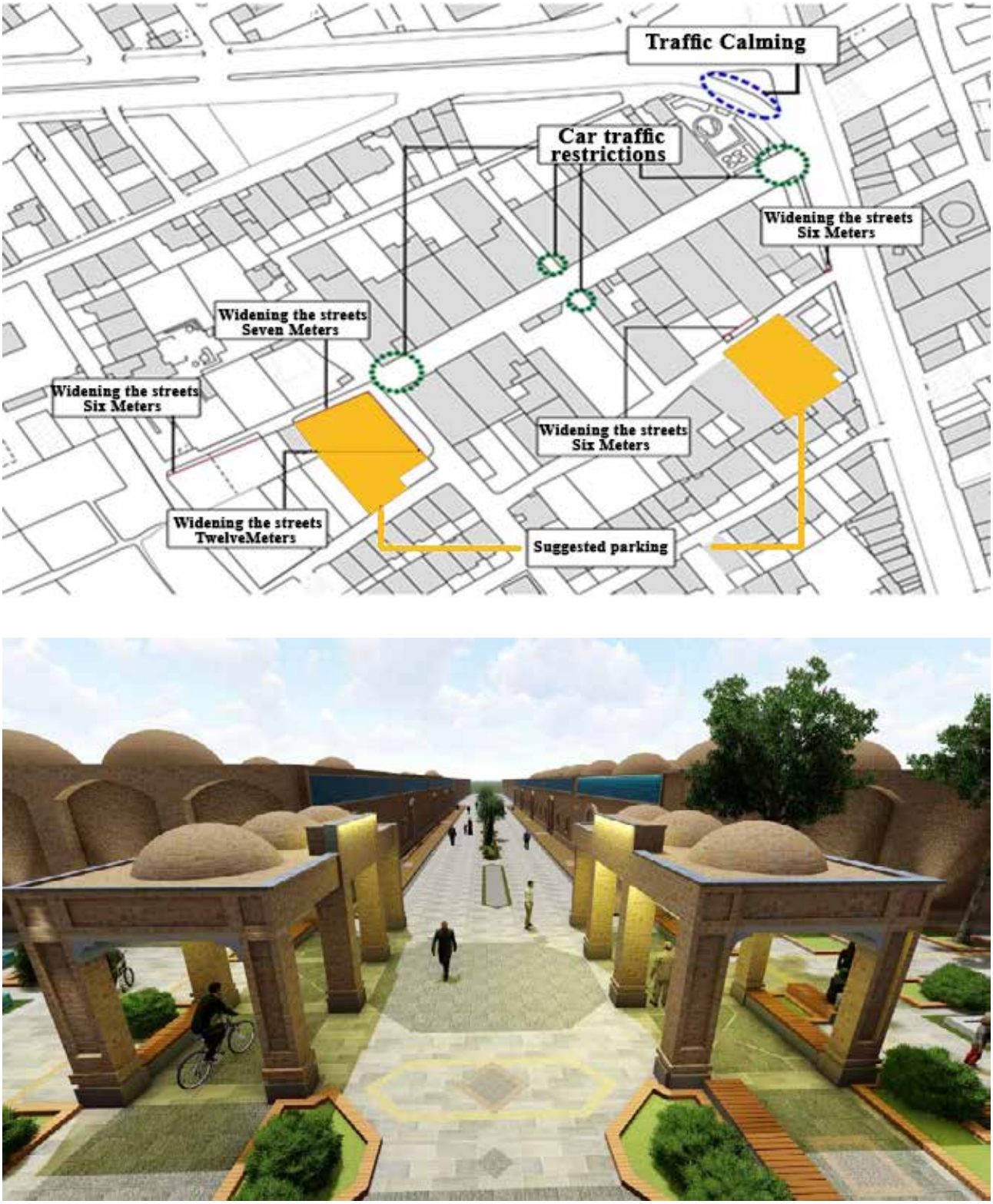

FIG. 8. The final design of the Mazaar Alley, which has led to the prosperity of the creative industries of Mazari, the creation of a space for social interaction, and attraction for tourists

The research findings show that the creative class in different neighborhoods of Yazd city is often attracted to neighborhoods that have high potentials and capacities in terms of creative city indicators such as valuable historical context, variety of handicrafts, diversity of cultural and artistic centers and institutions, and most notably, the diversity of art schools. Attracting the creative class in such neighborhoods is based on the following perspectives:

To give credence to the necessity for investment in creative industries in the city's neighborhoods to bring about creativity, which includes the development of creative tools and solutions that help identify the old cultural and socio-economic context of Yazd, especially the historical neighborhoods of Fahadan and Sheikhdad . Emphasis on the old and forgotten sections, activities, and creative industries as the structural foundations of Yazd's identity. In other words, believing that forgotten creative and cultural activities such as handicrafts play a key role in the city's growing economy, whose historic sites have recently been inscribed on the World Heritage List. Therefore, it is necessary for the city's space constructions to act as the economic engine of the neighborhoods, emphasizing the diversity of activities and services, especially for tourists.

Since the city of Yazd, especially its historical context, has been registered globally, and on the other hand, this context has various heritage and historical elements, which today in the new urban contexts, traditional and historical patterns have become the criterion for action, urban management institutions defend the attraction of creative skills or human resources.

Discussion

New forces attracted to creative industries in Yazd neighborhoods, have provided a wave of creative human capital called creative driving force for economic growth of neighborhoods in the fields of handicrafts, tourism, and leisure services in the spaces of social interactions created in the historic sites of this city. The greater absorption of this creative manpower in areas of the city that have high capacities and potentials of the creative city indicators showed that human creativity is the main source of innovation in the workplace and, finally, it has created an innovative source of energy in old and new contexts that has been critical to the economic success of these neighborhoods. Developing creative spaces such as walking paths, has not only failed to defeat the creative industries on these trails, but has also created a strong link between new technologies and the preservation of the city's traditional arts and indigenous identity. Designing a pedestrian-oriented path of science and culture (Mazari), has not only failed to the loss of the Mazari industry, which has not prospered before, but has also created many pauses using new technologies to create elements along the way. This route has had a large number of talented workers, which has provided planning in the form of a pedestrian-oriented route and fields of economic growth.

The findings show that companies are increasingly attracted to urban areas that have the potential for creativity. In this regard, the second and third districts of Yazd have a great ability in terms of urban creativity indicators. Urban management in these areas has made great efforts to attract, retain and develop creative forces as developers of urban creative spaces, the optimal development of urban services, and investment attraction.

The capacity of district two due to the existence of valuable historical texture, and District 3, as a new urban development area with a checkered urban shape, has helped attract talented people. This in turn has led to the acquisition and production of innovation in old handicrafts, the attraction of tourists in the old textures, and the creation of a variety of high-creativity science parks in the new area. In the second and third districts of Yazd, creative people have tended to live in a wide range of cultural, leisure, and recreational facilities, and a scene of vibrant subcultural thinking has formed in these contexts. In addition, in these areas, due to the formation of creative spaces, people are attracted to these spaces that have cultural, artistic and economic activities such as live music performances, social interaction spaces at night providing a variety of healthy recreational services, and the city is alive, despite having a hot and dry climate for hours until midnight. Fig (9) shows the creative spaces in the neighborhoods of Yazd city.

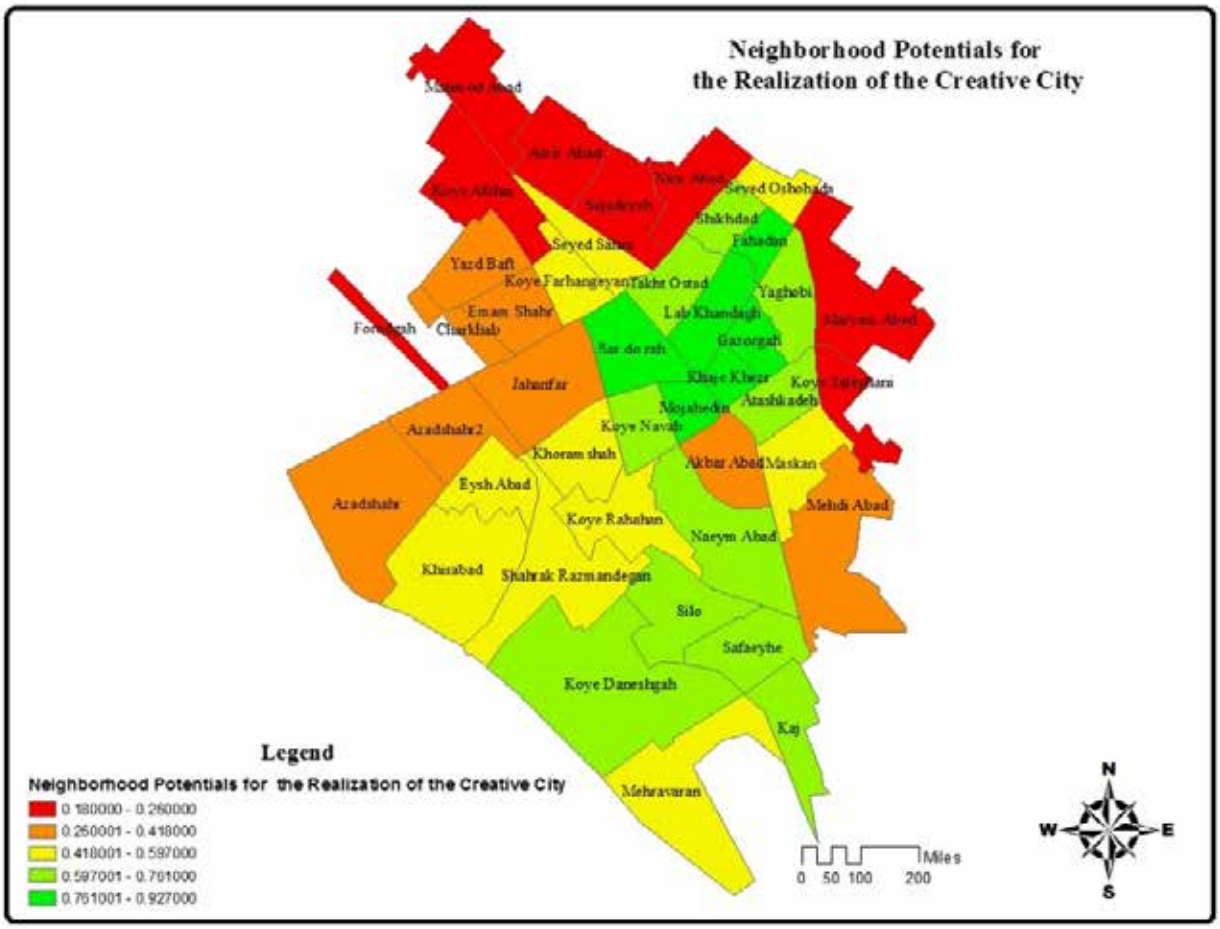

FIG. 9. The final design of the Mazaar Alley, which has led to the prosperity of the creative industries of Mazari, the creation of a space for social interaction, and attraction for tourists

An examination of the streets designed in the city of Yazd shows that the creative class is more and more inclined to the streets with high cultures and originality, such as "Jame Masjid" street. Culture is reflected in these streets, as this has led to the formation of clusters along this street with small circles for leisure and other activities. These clusters include coffee shops, restaurants and cafes, some of which offer performances or exhibitions with food and drink. On the other hand, district 2 of Yazd, which cover a large part of the historical context, have old and traditional houses, that today with the approach of utilizing the indicators of the creative city, for purposes such as creating art galleries, bookstores, and other outlets, small and medium-sized theaters for film distribution or live performances, have been used. In addition, the interactive spaces created on these streets have equipped their sidewalks with dining tables, a gathering of musicians, vendors, and a large number of passersby, who are active at all hours of the day and night.

The findings show that the creative class living in different neighborhoods of Yazd, especially historical neighborhoods, have had a major impact on revitalize of industries that were forgotten in previous years, but with the global registration of the historical context of Yazd once again, these textures became the hallmark of the creative class. This class set up old industries for the economic prosperity of the neighborhoods. These industries, which owed their dynamism to the revival

of the historical and old textures of Yazd, were able to regain their native identity and flourished in accordance with the physical part of the city's identity. It should be noted that the prosperity of these industries such as Daraie Bafi, cashmere weaving, production of traditional sweets depends on the quality of the place, and since this place (historical context) was registered globally, it has an impact as an effective factor in attracting talented people. This led to public and private investment in this field, which eventually became more attractive to talented people by developing urban facilities and environmental quality standards. Such conditions, like the combination of human capital and the development of urban facilities, led to the economic growth of Yazd's neighborhoods.

On the whole, it can be claimed that factors such as concentration, diversity, level of tolerance and urban credibility, dynamism or sustainability have had a great impact on stimulating creativity in the neighborhoods of Yazd city. In the focus component, large populations, especially in the new context as well as the historical context, have led to the widespread development of human relations, and large amounts of information and ideas have been exchanged for the dynamism of the creative industries in these contexts. In diversity, the historical context of Yazd city has a diverse population (families, entrepreneurs, artists, immigrants, the elderly, or students) that has been conducive to innovation in various economic sectors. In the component of urban credibility, the registration of the historical context of Yazd city in the UNESCO list as well as the regular urban development in the new urban context with the chess network has contributed to the growth of different cultural, artistic and economic sectors. By and large, all these components have caused the new texture of Yazd city to move towards dynamism and sustainability along with the historical context of the neighborhood and provide the grounds for the full realization of the creative city.

Conclusion

To execute a creative city, one must pay attention to the available capacities and resources and administer appropriate policies. There are several indicators for assessing a city's position to become a creative city based on its strengths and weaknesses. Each of these indicators focuses on specific features, and emphasizes them. In order to realize and flourish the creative city, strong cultural and economic contexts are needed for creativity to emerge in the urban space. On the other hand, attention to human and social capital, in the form of addressing spatial features, is pursued with the aim of creating economic competition, social cohesion and cultural diversity in achieving a dynamic image of the city. What can be seen from the survey of Yazd neighborhoods is that so far many urban development projects such as Qiyam streets, Mazariha alley and Jame Masjid street, comprehensive color plan and materials in Yazd neighborhoods, garden organization plan and garden house development plan with the approach of expanding educational gardens and participatory gardens, eco-tourism projects with the reconstruction of old houses, or the construction of urban streets, has been done in order to realize the creative city and achieve a dynamic image of the city's neighborhoods.

In addition to the aforementioned points, the design of pedestrian paths by the creative class, which ends in single historic buildings, has had many social and economic effects on the neighborhoods of this context, which has resulted in the establishment of tourist service offices, the formation of interactive spaces on the sidewalks by providing various services, the establishment of cultural and artistic offices, restaurants and cafes, and shows a complete picture of the dynamism and creativity of this context.

Along with the historical context, the new texture of Yazd city has also used the innovations of the creative class to formulate urban creative plans. Most of these projects have been prepared on a human scale with the approach of providing open spaces as well as pause spaces to provide leisure time for the residents. Moreover, in the new neighborhoods of Yazd, there are many knowledge-based companies that, with the approach of realizing the creative city and sustainable

development, have designed modern buildings with optimal energy consumption, creating green walls to provide the required green spaces. Designing smart urban elements that provide visitors with a source of information about the identity of each neighborhood is another example of creative class innovation in the new neighborhoods of Yazd.

When studies and findings are taken into account it would be rational to opine that the creative class has played a major role in the development mobility of these neighborhoods. At the same time, for maintain the creative classes in these neighborhoods, public and private investments have been made in order to equip and develop the facilities and services required by the creative class. However, the old neighborhoods of Yazd city, hypothetically, will lose their residential attractions for the creative class, using the findings of the research, a proposed model of realizing the creative city in Yazd city has been developed. In this proposed model the joint creative office has been set up primarily by influential institutions in urban governance, such as municipalities, governorates, provincial government, and housing and urban development. The joint office seeks to integrate urban management decisions that ensure the feasibility of projects. In order to achieve its goals of realizing a creative city, this office is developing a joint program that has a comprehensive executive rules and regulations derived from all the criteria of organizations and institutions. The office identifies areas for funding, projects, and the way to monitor projects. In the second phase of the proposed model, the thought room office includes representatives of the creative classes in various fields of economics, urban planning, architecture, art, and social sciences, should evaluate development plans in terms of their feasibility and the extent to which their social and economic effects are positive. A point that is worth mentioning is that the social and economic consequences of the projects, which, if not carefully studied, will certainly have negative complications to the citizens. The thought room office also takes advantage of non-governmental organizations' views so that all citizens can fully participate in the preparation and implementation of development stimulus projects. Since these development stimulus projects take full advantage of the creative city indicators, The possibility of realizing a creative city increases.

To sum up, considering that the proposed model has been introduced as a precondition for moving towards the realization of the creative city of Yazd, actions and policies in the neighborhoods of this city should be under the supervision of this model. The loading of activities and populations, which are an important indicator of the realization of a creative city, should be commensurate with the distribution of services in the neighborhoods. Likewise, supporting new creative class ideas should be in line with the positive socio-economic effectiveness of these ideas in urban areas. Achieving this depends on government agencies' support for private sector investment security, human capital, knowledge-based companies' products, and the strong link between industry and academia. On the other hand, the discipline of urban planning, which is a very important step in the realization of the creative city, requires the creation of executive guarantees for institutions controlling construction activities and wise decisions of urban managers in urban development projects with the consultation of society's elites, and emphasizes the provision of welfare for citizens, which is guaranteed by recommended model offices.

References

Adua, L., & Lobao, L. 2019. The Growth Machine Across the United States: Business Actors' Influence on Communities' Economic Development and Limited-Government Austerity Policies. City & Community, 18(2), 462-482.

Andrew, C. 2015. Seeking Talent for Creative Cities: The Social Dynamics of Innovation Edited by Jill L. Grant Toronto: University of Toronto Press, 2014. Economic Geography, 91(2), 227-228.

Armanshahr Consulting Engineers 2016, Detailed plan of Yazd city, General Department of Roads and Urban Development of Yazd Province, Deputy of Urban Planning and Architecture, yazd.mrud.ir/portals/36/def_compressed

ASHRAFI, Y., & RASHIDI, T. 2019. Creative public space for the city's marginalized people; Case study: Fereshtegan (Angels) Park (for children with autism) in Tabriz. JOURNAL OF THE SOCIETY OF IRAN'S SOCIAL PROBLEMS 2019 , Volume 8 , Number 1

Bell, D., & Orozco, L. 2020. Neighbourhood arts spaces in place: cultural infrastructure and participation on the outskirts of the creative city. International Journal of Cultural Policy, 1–15. doi:10.1080/10286632.2019.1709059 .

Bogilović, S., & Pevcin, P. 2015. How Small City is Stimulating Creativity and Innovation: The Case Study of Ljubljana and Selected European Cities.

Borén, T., & Young, C. 2017. Artists and creative city policy: Resistance, the mundane and engagement in Stockholm, Sweden. City, culture and society, 8, 21-26.

Colomb, C. 2012. Pushing the urban frontier: temporary uses of space, city marketing, and the creative city discourse in 2000s Berlin. Journal of urban affairs, 34(2), 131-152.

Culver, G. 2017. Mobility and the making of the neoliberal "creative city": The streetcar as a creative city project?. Journal of transport geography, 58, 22-30.
Florida, R. (2005). Cities and the creative class. Routledge.

Gaižutytė-Filipavičienė, Ž. 2020. Jewish heritage in the creative cities of Central and Eastern Europe: tourism, technologies and prosthetic memory. Creativity Studies, 13(1), 41-52..

Goldberg-Miller, S. B. 2019. Creative city strategies on the municipal agenda in New York. City, Culture and Society, 17, 26-37.

Grodach, C. 2013. Cultural economy planning in creative cities: Discourse and practice. International Journal of Urban and Regional Research, 37(5), 1747-1765.

Hague, E. 2017. Creative Cities. International Encyclopedia of Geography: People, the Earth, Environment and Technology, 1–2. doi:10.1002/9781118786352.wbieg1005

He, S., & Wang, J. 2019. State-led creative/cultural city making and its contestations in East Asia: A multi-scalar analysis of the entrepreneurial state and the creative class.

Iranian Students News Agency ISNA 2019, Declining Traditional Textile Weaving Assets in Yazd, isna.ir/news/97011202432

Islamic Republic of Iran News Agency 2013, Yazd: The second historical city in the world with pure attractions, news code 81066912, Iran.ir/news/81066912

Johnson, B. 2008. Cities, systems of innovation and economic development. Innovation, 10(2-3), 146-155.

Kashkouli, A. B., Zarabi, A., & Mousavi, M. N. 2018. The role of creative economy in the realization of a creative city: A case study of the city of Meybod in Yazd Province, Iran. Geographia Polonica, 91(3), 335-351.

Klasik, A. 2017. Concept of creative cities in shaping of future of contemporary cities. Studia Regionalia, 119-131..

Kraehe, A. M., & Lewis, T. E. 2019. Urban Education and the Creative City. Educational Theory, 69(2), 145-151.

Landry, C., & Bianchini, F. 1995. The creative city Demos. Comedia, London.

Lederman, J. 2015. Urban fads and consensual fictions: Creative, sustainable, and competitive city policies in Buenos Aires. City & Community, 14(1), 47-67.

Lin, J. 2019. Taking Back the Boulevard: Art, Activism, and Gentrification in Los Angeles. NYU Press.

Mercer, C. (2006). Cultural planning for urban development and creative cities. Selfpublished manuscript.

Ministry of Culture and Islamic Guidance of Yazd Province 2019, Annual Report on the Performance of Cultural and Artistic Spaces in Yazd Province, yazd. farhang.gov.ir

Moafi, R., Ghadami, M., Mazaheri, M., et al., 2019. Presenting the Ideal Pattern of Creative City in Tehran Metropolis. JOURNAL OF IRANIAN SOCIAL DEVELOPMENT STUDIES (JISDS) winter 2019 , Volume 11 , Number 1 #T00149; Page(s) 33 To 61.

Montalto, V., Moura, C. J. T., Langedijk, S., & Saisana, M. 2019. Culture counts: An empirical approach to measure the cultural and creative vitality of European cities. Cities, 89, 167-185 .

Mulero, M. P., & Rius-Ulldemolins, J. 2017. From creative city to generative governance of the cultural policy system? The case of Barcelona's candidature as UNESCO City of Literature. City, culture and society, 10, 1-10.

Pourzakarya, M., & FadaeiNezhad, B. S. 2019. A Restudy of Culture-Led Regeneration Approach in Creative City Building Developing an Analytical Framework for the Regeneration of Cultural and Creative Quarter. BAGH-E NAZAR November 2019 , Volume 16 , Number 77 #I00761; Page(s) 5 To 14.

Pruvot, S. 2020. Can participative arts help deliver (more) socially just creative cities?.

Rabbani, K. A., Rabbani, R., Adibi, S. M., et al., 2011. Review the Role of Social Diversity in Creating Innovative and Creative Cities (Case Study: Isfahan City). Geography and Development SPRING 2011 , Volume 9 , Number 21; Page(s) 159 To 180

Ratiu, D. E. 2013. Creative cities and/or sustainable cities: Discourses and practices. City, culture and society, 4(3), 125-135.

Rodrigues, M., & Franco, M. 2020. Taxonomy of Holistic Performance of Current Creative Cities: Empirical Study. Journal of Urban Planning and Development, 146(1), 04019030.

Scott, A. J. 2006. Creative cities: Conceptual issues and policy questions. Journal of urban affairs, 28(1), 1-17.

Statistics Center of Iran 2016, General Census of Population and Housing in Yazd Province, www.amar.org.ir.

Tuck, E., & Habtom, S. 2019. Unforgetting Place in Urban Education through Creative Participatory Visual Methods. Educational Theory, 69(2), 241-256..

Wood, S., & Dovey, K. (2015). Creative multiplicities: Urban morphologies of creative clustering. Journal of Urban Design, 20(1), 52-74.

Yazd Municipality 2019, Mazariha Street Construction of Project, Yazd Municipality Deputy for Urban Planning and Architecture, shahrsazi.yazd.ir

Yum, S. 2020. How Can We Measure the Magnitude of Creative Cities? A New Creativity Index: 3Ci. Creativity Research Journal, 1-10.

Zaal, M. H., & Ramezanzadeh, L. M. 2019. Creative tourism a tool for urban development (case study of Tabriz city). GEOGRAPHICAL URBAN PLANNING RESEARCH winter 2019 , Volume 6 , Number 4 #t00277; Page(s) 753 To 768.

Zhang, C. 2019. The Chinese mosaic: Cultural diversity and creative cities. Journal of Regional Science, 59(2), 214-227.

Pulacerca – Coletivo Opavivará!

Aura Fernandes Rosa
Faculdade de Belas Artes da Universidade de Lisboa
Post Graduate Student

OPAVIVARÁ! is a Brazilian collective of contemporary art that has been producing artistic manifestations in public spaces, galleries, and cultural institutions since its creation in 2005, proposing shifts in the way urban spaces are occupied through interventions that promote collective experiences. For this paper, the *Pula Cerca* work was chosen, which consisted of an intervention done on the fence of Tiradentes Square during the 1st *Viradão Cultural* in Rio de Janeiro, 2019. Eight ladders were installed to compose a diagonal passageway in which pedestrians would be able to cross a fence barrier from the street to the square.

The message, which was was communicated in a simple, quick, and efficient manner, suggested new movements and fluxes in space. It did not create a solution for the railings that isolate public spaces, but instead it enticed people to question the reasons for the existence of the barrier. After the intervention, the members of the collective affirmed that their work helped the subsequent removal of the fence from the square. The medium chosen had special characteristics for the locale, that is, it was specifically conceptualized with that unique location in mind and was carried out in on-site.

When analyzing the political interest of the intervention at hand, one can note the proximity between its questionings (even if such questionings are more related to the domain of visual arts) and tactical urbanism, which is composed precisely of urban interventions. However, even though the approach used in Tiradentes Square had tactical characteristics, it did not look to present an urban solution generated from discussions and decisions made in an agreement with local residents. Even if classified as an impulse for urban solution, it was not defined collectively with local residents, as most tactical urbanism manifestations are. In turn, this does not minimize its democratic character, nor the positive outcomes generated, such as the subsequent removal of the fence.

According to Nogueira (2017, pg 91), the use of tactical urbanism as a way to solve urban problems through interventions, that are close to the visual arts and many times committed to problematizing urbanity, is a political method by nature. When the power of decision-making is withdrawn from citizens, the possibility of them getting organized independently and autonomously emerges, which in turn enables them to point out gaps in government planning and implement interventions that usually involve the construction of low-cost urban prototypes that are transient or permanent in nature. In addition, it's a way to criticize the notion of urban projects, showing that testing possible urban solutions on-site is better than projecting them on an architect's clipboard. The author also affirms that tactical urbanism does not substitute urban planning, nor does it possess the same goal, but it can help inform the government. Such urban prototypes can be sanctioned, like in the case of the fence being removed from the square and freeing the flux of pedestrians through public spaces. This interpretation enables us to imagine that the various occurrences of tactical urbanism throughout the world are result of power schemes, that is, a correlation between power and resistance, and that such interventions can dodge the bureaucracies of the State, enabling citizens to alert the government about local needs.

References

NOGUEIRA, Pedro C. E. Urbanismo tático e intervenções urbanas: aderências e deslizamentos. Arcos Design. Rio de Janeiro: PPD ESDI - UERJ. Edição Especial Outubro 2017. pp. 89-101. Available in: [http://www.e-publicacoes.uerj.br/index.php/arcosdesign]

http://opavivara.com.br/

Images: Instalação Pula Cerca, na Praça Tiradentes,(Rio de Janeiro/ 2009). Source: opavivara.com.br/p/pc/pulacerca


1955
1953
1953
1953
1953

* All authors on this section were students on the Interaction Design Curricular unit of the Communication Design course at the Faculty of Fine Arts, University of Lisbon, supervised by Assistant Professor Sónia Rafael and Invited Assistant João Ferreira.

Disclosed eyes
An Interactive Installation on the Impact of Hypervigilance

Sofia Taipa - taipa.sofia@gmail.com **/ Susana Barata -** susana.oliveira.barata@gmail.com / **Rafael Anacleto -** rpmca1991@gmail.com , Faculty of Fine Arts, University of Lisbon. Largo da Academia Nacional de Belas-Artes, 1249-058 Lisbon, Portugal.

Sónia Rafael - ITI/LARSyS – Interactive Technologies Institute, Instituto Superior Técnico, University of Lisbon. Avenida Rovisco Pais, 1. 1049-001 Lisbon, Portugal. - s.rafael@belasartes.ulisboa.pt

João Ferreira - Faculty of Fine Arts, University of Lisbon. Largo da Academia Nacional de Belas-Artes, 1249-058 Lisbon, Portugal. - j.ferreira@belasartes.ulisboa.pt

Abstract
Disclosed Eyes is an interactive installation that explores a speculative future where the current potential of facial recognition algorithms is taken to the utmost. It's based on the innate obscurity of these mechanisms and seeks to reflect on the impact they may have on the individuals' privacy. In the installation there is always one player who's being exposed to the judgment of the viewers and has all the actions in-game being monitored at all times. Apart from the installation, there is also a video regarding this subject, that illustrates the same experience that the player faces.

Keywords: Interaction Design, Artificial Intelligence (AI), Hypervigilance, Data Surveillance, Obscurity, Installation

1. Theoretical Background
Facial recognition is a system designed to identify a human face from an image or video. It's not a recent technology, but its application has become exponential nowadays. Some examples are two-factor authentication for mobile devices, or even systems developed for anti-terrorism purposes. However, this type of technology can jeopardize the citizens' right to privacy. Therefore, it is essential to find a middle ground between the privacy protection of the citizens and the practical usefulness of these algorithms.

1.1. Facial Recognition
Algorithms like facial recognition are useful in countless situations. These technologies are slowly covering the social networks with purely playful or whimsy features. For example, the filters designed to recognize and age a human face, or even alter the gender, in real time like the ones found on FaceApp. Another example of the use of facial recognition technologies is as a complement to the search engine of romantic social networking-based apps, where the users can use filtered searches according to their appearance preferences. However, the substantial advantage of facial recognition arises in the implementation of these algorithms on philanthropic scenarios. Per example, the ones used by humanitarian entities to identify and rescue victims of human trafficking. A recent example is the report from the New Delhi Police[1], who, in just four days, rescued more than three thousand missing children. Another case is the use of this software for the diagnosis of rare genetic diseases in Africa, Asia and South America.

Lucas Introna and David Wood introduced the concepts of silent and salient technology[5]. Facial recognition algorithms are considered an example of silent technology, because their performance is embedded in the surveillance systems, making them impossible to detect. Therefore, they work in an imperceptible and obscure manner. Other aspects to be underlined are, on the one hand, the unilaterality of the operation itself, since it does not require consent from their targets. On the other hand, their flexibility due to the wide range of possible applications - from tracking to prevent theft or fraud, to searching and identifying possible acts of terrorism. However, Introna and Wood highlight the obscurity of the operation in this type of technologies, emphasizing two factors: the general hardship of analysing and inspecting the algorithm, and the excessive legitimacy that it is embedded in it. In fact, taking into account that these technologies are proprietary software objects, it would be extremely hard to have the required access to the code in order to analyze it and its complexity. Furthermore, considering that these are algorithmic processes of artificial intelligence that optimize themselves autonomously, it's not even possible to perceive for sure which aspects of the human face are being analysed. This makes the algorithmic software operationally more obscure. Moreover, most of these systems are based in very sophisticated statistical methods, only interpretable by experts. This set of features encourage the apparent legitimacy of these technologies, and can even hold more authority than exclusively human-based recognizing processes.

1.1.1. The Consequences

This missjudment and overvaluation of facial recognition enhances the acceptance of false positives and can lead to biased results or even discrimination, influenced by the algorithm. For the information processing to be efficient, facial images are reduced to a numeric representation. Consequently, some information is discarded, as it is considered incidental or irrelevant. However, this choice is purely algorithmic, which leads to the questioning of possible consequences of this reduction process. As the database increases, more and more faces are generated with closer proximity, making the recognition task more difficult. For this reason, the system will always be better at identifying those that look less similar to those already on the database. One of the variables of these algorithms is the identification threshold, which can be increased or reduced. This parameter affects the rate of false acceptance and tolerance due to the accuracy of the search. If this threshold is reduced to 70% accuracy, the performance of the system is increased and, consequently, the face being tracked may be detected more often. But, as a result, the number of false positive cases would increase. The problem is that, if this identification threshold is raised, for example, to 80%, the number of false positives would decrease, but the number of false negatives would increase. This would lead to an obvious devaluation of the use of this system. This way, the small differences in identifiability, called biases, will affect those who are easier to be identified by the algorithm (African-Americans, Asians, dark-skinned people and the elderly, in the american, australian and european context), meaning that they are more likely to trigger the alarm and be detected. Thus, the idea of greater precision achieved by the algorithm running at a higher level, will, again, contribute to the overvaluation of the authority of these softwares. With this added factor, the most easily recognizable groups will be subjected to a greater discrimination, scrutiny and judgment.

1.2. Hypervigilance and Data Surveillance

The trivialization of facial recognition leads to an unlawful intrusion into the privacy of individuals. As Introna and Wood pointed out, technologies like this do not require the consent of their targets, which triggers a distrust in the use of this technology. In addition, the amount of personal networked information, including photographs and videos, contributes to the colossal database that can be accessed within a few clicks. The combination of the ubiquity of video surveillance with the colonialism of our data, and adding the algorithms such as facial recognition, which are already in use today, makes our reality a dystopian scenario. With the current technological breakthroughs it is already possible to follow any individual at any time, or all individuals at all times. Besides that, facial recognition significantly expands the control of governments. But do we really want to remain anonymous, when we expose ourselves daily on social networks? Everyday, we witness an unreasonable contribution to a scenario where our privacy is questioned or even surrendered.

2. Design Research

2.1. Purpose and Goals

Through a subversion and ironic perspective, we seek to instigate awareness and reflection in the general public regarding algorithmic data surveillance. On the other hand, we aim to convey the usefulness of facial recognition and, also, its incorrect appropriation. Through an artistic installation, we intend to provide an experience of a possible dystopian future. One of the main goals of this project is to mirror the usefulness of facial recognition through a positive connotation in the beginning of the interaction. As the narrative unfolds, the user is increasingly exposed to a subversive application of these technologies. The ultimate goal is that the interactor ends this experiment with an introspection on how to expose personal data, but mainly with the awareness of the ultimate potential of these algorithms.

2.2. Target Audience

Our target audience for this project are teenagers, young adults and adults. This is because, since they avail themselves of technology and social networks daily, they're also the most affected by the intrusion of their privacy. Inevitably, they are the ones who will suffer the greatest impact on this issue that will, in the short to medium term, affect the society's privacy in an irreversible way.

3. The Project

Disclosed Eyes consists of three fundamental stages. In the first place, at the installation, the viewer has two role options: play or watch. Both of these tasks are essential to the installation, as they represent the same issue from two divergent perspectives. The second stage is the game itself. Here, the players experience an immersive adventure, through virtual reality, where they are both morally and ethically tested. The public observes and judges the player in real time, through the broadcast provided in the respective room. At this point, the players make their choices, under the pressure of being watched at all times. Finally, the last crucial stage is the installation website. Here, it is also possible to observe the interactor's performance in real time, without being actually present at the installation. This represents a whole new level of surveillance, as anyone can watch the player without their knowledge.

Fig. 1 - Entrance Corridor

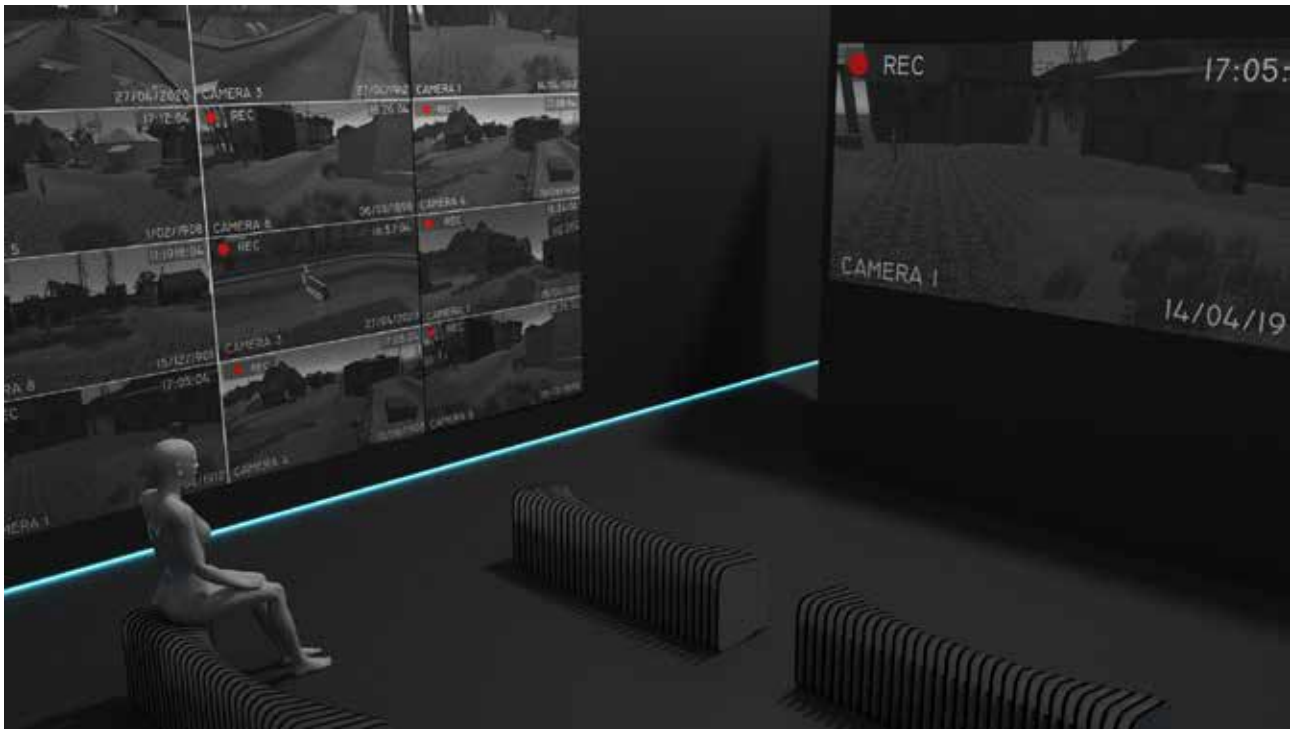

Fig. 2 - Viewers' Room

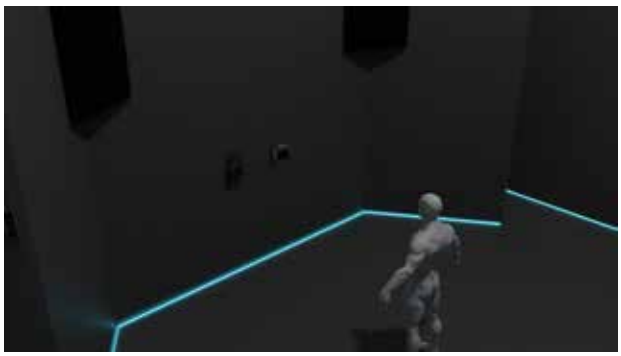

Fig. 3 - Players' Room

Fig. 4 - Exit Corridor

Here[11] the short-film developed for this project can be accessed.

3.1. Installation

Each player has a few minutes in this universe, where it is possible to fulfill one of the goals provided with total freedom over the game narrative.

3.1.1 Room Layout The installation has four different areas. The entrance, the main room - with the viewers' zone separated from the players' zone, and, lastly, the exit. Without revealing any information regarding what the visitor will experience next, the entrance (Fig. 1) consists in a corridor lit by blue ambient light, with a curtain in the background to separate from the next area. The viewer area (Fig. 2) has a total of six benches facing the main projection, and real-time images of the players' experience are being projected on every wall, making the public the authoritative figure of the installation. Close to the player (Fig. 3), there are two speakers, whose function is to channel the sound reproduced not only by the public present in the installation, but also by the viewers of the website. Finally, in the exit (Fig. 4), the player can relive their experience from the point of view of the public, since in this corridor there are projections of the game's surveillance cameras. Being these the images reproduced at the livestream website, the player realizes,

for the first time, that they were being watched also online.

3.1.2 Website Through the installation website it is possible to watch the livestream, where the different surveillance cameras of the game can be seen in real time, while being used by a player present in the installation. All CCTVs are available in the first menu (Fig. 5), and when any of the cameras is clicked-on, that camera appears in fullscreen (Fig. 6). This livestream holds great importance since it deepens the scrutiny and obscurity of the experience, considering that, in addition to the installation itself, the players' decisions were also being judged online without their consent.

3.2 The Game

The player has a score monitored at all times and when they start the experience they are assigned to the rank of Lower-Class. The player's actions in the game have a direct influence on their score, and can either increase it or lower it, depending on the positive or negative connotation associated with each action. On the one hand, the access to a zone on the map that requires a higher status is only unlocked if the player raises enough the score to reach that rank. Oppositely, if this score decreases to a certain level, the player reaches the Outlaw status, unlocking specific actions of this way of life.

3.2.1 The Concept In order to demonstrate the impact that the algorithms referenced above can have in the near-future, the game reflects a dystopian environment where the society is constantly divided by ranks and scores. Thus, right after the user enters the game, they immediately realize that all of their actions are monitored and limited. By taking this concept to an extreme level, the game contributes to the introspection and reflection of not only the player, but also those who observe it.

3.2.2 Aesthetic The realm of the game consists of three different and rank-separated areas (Fig. 7) - the Lower-Class (Fig. 8), the Industrial (Fig. 9), and the Upper-Class (Fig. 10). The game's aesthetic seeks to reflect this dystopian scenario. For example, while in the Upper-Class area, the houses are well built and visually pleasing, the Lower-Class area is mostly built from containers and wreckage. As for the characters, for the player to feel immersed in this realistic si-

Fig. 5 - Website Livestream

Fig. 6 - Website Livestream (Fullscreen)

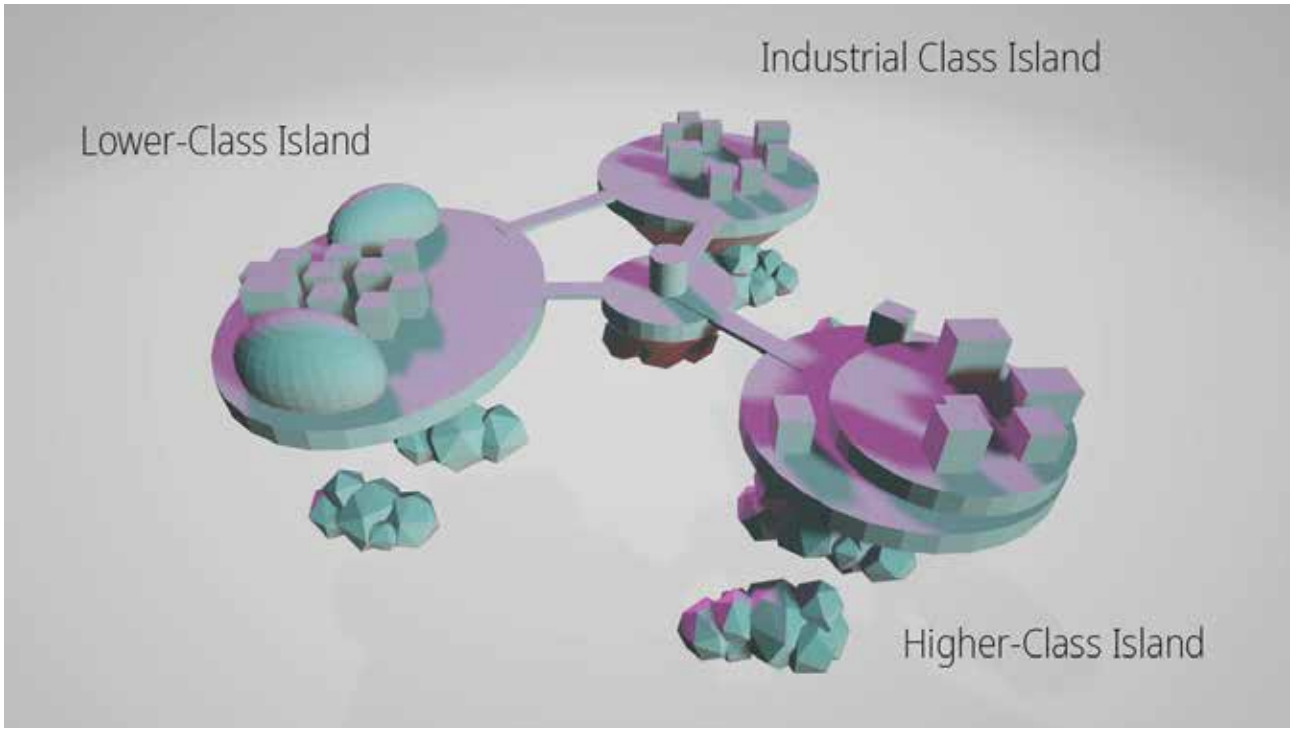

Fig. 7 - Game Map

mulation, the fictional characters that will accompany him throughout the game have a huge influence and must have some diversity. However, so that none of them stands out excessively, since there will be several recurrences of each, they refer to a very monochromatic color palette. Thus, the degrading and monotonous dimension of this reality is also emphasized.

4. Conclusion

In conclusion, this project aims to raise public awareness of the consequences and potential of facial recognition and surveillance technologies. By instigating this reflection, it promotes a debate about the future of these tools, as well as a new look on how our data is so easily exposed and, therefore, appropriated.

5. References

[1] Delhi: Facial recognition system helps trace 3,000 missing children in 4 days.
(2018). Retrieved 3 March 2020, from https://timesofindia.indiatimes.com/city/
delhi/delhi-facial-recognition-system- helps-trace--3000-missing-children-in-4-
days/articleshow/63870129.cms
[2] Hale, K. 2019. Amazon Pitches Shady Facial Recognition Laws. Retrieved
3 March 2020, from https://www.forbes.com/sites/korihale/2019/10/01/amazonpitches-
shady-facial-recognition-laws/#78b16416f7d5
[3] Hicks, J. 2019. 'Digital colonialism': why some countries want to take control
of their people's data from Big Tech. Retrieved 3 March 2020, from
https://theconversation.com/digital-colonialism-why-some-countries-want-totake-
control-of-their-peoples-data-from-big-tech-123048
[4] "How AI Facial Recognition Works". 2020. [Podcast]. Retrieved 20 February
2020, from https://www.youtube.com/watch?v=SguNDt-5go
0&feature=youtu.be
[5] Introna, L., & Wood, D. 2004. Picturing algorithmic surveillance: the politics
of facial recognition systems.
[6] Os fatos sobre a tecnologia de reconhecimento facial com inteligência
artificial. Retrieved 3 March 2020, from
https://aws.amazon.com/pt/rekognition/the-facts-on-facial-recognition-withartificial-
intelligence/
[7] Raji, I., Gebru, T., Mitchell, M., Buolamwini, J., Lee, J., & Denton, E. 2020.
Saving Face: Investigating the Ethical Concerns of Facial Recognition
Auditing
[8] Robertson, D., Noyes, E., Dowsett, A., Jenkins, R., & Burton, A. 2016. Face
Recognition by Metropolitan Police Super-Recognisers. Kun Guo.
[9] Smith, B. 2018. Facial recognition technology: The need for public
regulation and corporate responsibility. Retrieved 3 March 2020, from
https://blogs.microsoft.com/on-the-issues/2018/07/13/facial-recognitiontechnology-
the-need-for-public-regulation-and-corporate-responsibility/
[10] Smith, B. 2018. Facial recognition: It's time for action. Retrieved 3 March
2020, from https://blogs.microsoft.com/on-the issues/2018/12/06/facialrecognition-its-time-for-action/
[11] Taipa, S., Barata, S. 2020. DISCLOSED EYES. Retrieved 31 October 2020 from https://vimeo.com/474249148
[12] The Watchmen. 2019. [Podcast]. Retrieved 12 March 2020, from
https://player.fm/series/sleepwalkers-2504091/the-watchmen

Fig. 9 - Industrial Island

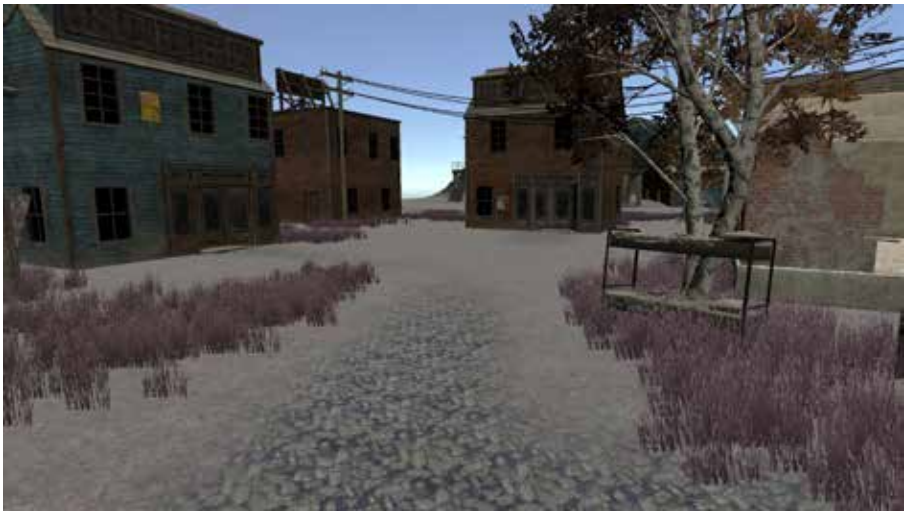

Fig. 8 - Lower-Class Island

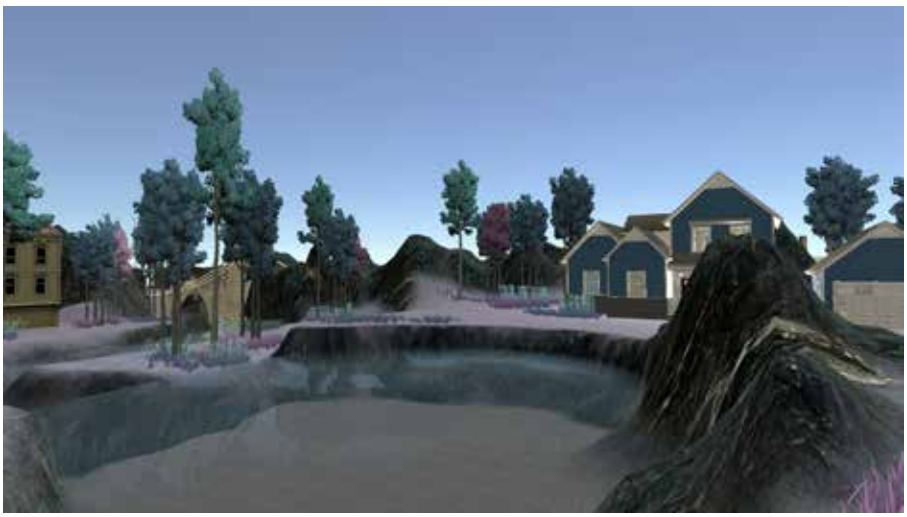

Fig. 10 - Upper-Class Island

NotBot: a Gamified Online Experience to Increase Awareness of Malicious Social Media Bots

Simon Stimberg
Filmuniversität Babelsberg, Konrad Wolf, Potsdam, Germany, simon.stimberg@filmuniversitaet.de

Rodrigo Julião
Faculdade de Belas-Artes da Universidade de Lisboa, Portugal, rodrigojuliao@campus.ul.pt

Tomás Santos
Faculdade de Belas-Artes da Universidade de Lisboa, Portugal, tomassantos2@campus.ul.pt

Abstract
With the presented application NotBot we would like to sensitize people for the mechanisms of bots in social media. Not only will automated agents continue to be part of the online discourse, but through rapid advances in artificial intelligence there is a constant refinement in their ability to mimic human behavior. Therefore we chose the way of a gamified online experience to emancipate the user through a playful and interactive way, without being educational. Through understanding, we hope to sharpen people's awareness, as well as training their ability to scrutinize posts in social media and distinguish human activity from automated ones.

Keywords: bots; social media; interaction design; gamification;

Introduction

Bots are a part of online communication more than ever. With advances in technology and the way social media and other online platforms fail to regulate this emerging problem, bots have become more common and harder to detect, leading to many of us believing what they say and spreading baseless misinformation. By utilizing bots, a powerful individual may sway the public's opinion on a certain topic or subject through the social manipulation that these multiple, seemingly real, "people" can achieve.

We would like to raise awareness for this situation, as its consequences are reaching far beyond cyberspace and into the physical world. Having the power to reverse the reputation of real public individuals, causing economic damage and even undermining democracy itself, reveals the dramatic impact social media bots have on society itself. By looking for the most efficient way to sensitize people to the mechanisms of bots in the context of social media manipulation, we came to the conclusion that a first hand experience with gamification elements would be the best way to convey this rather complex topic.

The Paper will hence outline the progress of developing this experience, by starting with an overview of the given problem and looking at other didactic/artistic approaches to convey societal issues. From this research we derive our design concept and describe our chosen implementation. In the last section the results are being discussed.

Related Work

Other applications have made the attempt to convey complex societal issues through a gamified experience. By looking at three examples we will derive what aspects work well in terms of immersion and information seeding.

Spent [5] is an online poverty simulation in which the user is given a minimum wage and asked to survive on this amount of money, facing the challenges of precarious employment. Spent utilises a narrative to construct it's idea, and to convey it to the player. By making the user go through these experiences in a virtual environment, rather than simple ex- planations, he/she builds empathy towards those who expe- rience them in real life. We can derive from their work that interactivity and engagement can help building a greater understanding of the topic.

Bad News [3] is a fake news game that carries the user through the experience of being the owner of a fake news website, thus giving you a look at how fake news are generated and how they target people and sway their opinion. Much like Spent, Bad News utilizes a narrative to convey a message, although, while Spent puts you in the shoes of the oppressed, Bad News features the perspective of the oppressor. Through embodying the "villain" position, the user gets a peek behind the curtain and learns common practices of fake news creation and upvaluation - thus helping them to gain a more critical perspective in valuing dubious news posts in their online life.

Memopol [6] is an interactive installation that exposes all data in the participant's smartphone to expose him/her to a sensation of surveillance. The performance is tailored to the visitors personal data, hence the whole experience is unique for each person. The data is being analysed by an algorithm which compiles the information to an audiovisual representation, consisting of sensitive information like tracked geo data, online purchases, and even the user's similarity with wanted criminals. Visitors described the experience as frightening, while it gave them a feeling of being surveilled in the most shocking way. In its physicality, the experience represents an impressive approach on how a topic can be conveyed in a lasting manner to the user.

Design Research

Since our main goal is to educate and bring awareness to the Social Bot pandemic, we will have a look at how users perceive social media accounts and what is the main user group of those communication platforms in regard to age and interests. From this we derive our central decisions for designing our experience and creating our content.

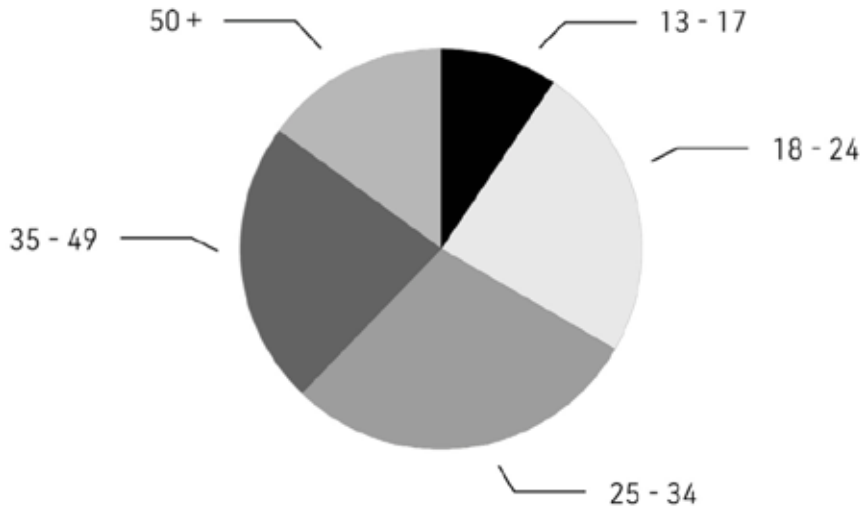

Figure 1: Distribution of Twitter users worldwide as of April 2020, by age group. [2]

Feature	Weight
Profile Image	0.032
Screen Name	0.060
Description	0.211
Location	0.008
Profile URL	0.015
Followers Count	0.014
Friends Count	0.007
Tweet Count	0.009

Table 1: Feature Importance according to Human Perception of Social Media Accounts [1]

User Perspective and Perception of Bots

N. Katherine Hayles in How We Became Posthuman:

> "[...] living in a condition of virtuality implies we participate in the cultural perception that information and materiality are conceptually distinct and that information is in some sense more essential, more important, and more fundamental than materiality." [4]

The quote puts in a nutshell the discrepancy of dealing with the flood of information in the virtual world from a sociological perspective. Statements made online can become "true" just by infinite repetition and reaffirmation, as users (most of them bots) repost and upvote the post in question. But if materiality does no longer matter, how can we tell if a user, posting or sharing information is a machine or made of flesh?

As shown by the research of Appling and Briscoe users tend to assess the authenticity of a social media account mainly by its account appearance (cues like profile im- age/name/ description) as well as its posted content. [1] (see Table 1) Nevertheless as technology evolves, and by incorporating artificial intelligence, it is more and more feasible to mimic those attributes in a more credible way.

From this we conclude that an experience that strives to put awareness on that point has to emphasize to the user the way how bot accounts being created and work on the in- side. This leads us to the central decision of designing the experience in a way that puts the user into the perspective of a bot. By choosing this unusual point of view we would like to breach the habitual perception of the user towards his/her social media consumption, as well as it appears to us as an effective way to illustrate the mechanics of implementation and coordination of multiple bot accounts.

Gamification

As a vehicle we want to create an experience, where the media consumer learns through play and insight rather than via a didactic approach. We believe this to be more effi- cient and engaging to the user and helps him/her to retain a longer attention span. Through the interaction the user gets a different perspective on the subject, making him/her question and rethink his/her opinion and choices about the subject itself.

By implementing a narrative the user is asked to personally engage with the project, making it a custom experience, and thus having a more lasting effect on his memory and behavior towards the subject at hand.

Target Audience

As we want to reach a demographic as broad as possible, we feel the need to include in our target audience people of all races, genders and social situations. In this we want to focus on people who utilize the internet and social networks as daily consumers, not media professionals that have a training or profound experience in the way media manipula- tion works.

Figure 1 shows a breakdown of Twitter Users by age, derived from the research of J. Clement. [2] Looking at the distribution of consumers by age we can infer that middle aged people are the most susceptible party - people who have just started getting used to the internet and wireless interaction and are unaware of the automation that is working in the background. This doesn't mean the experience won't be catering to younger demographics as well, just that it necessitates an ease of understanding for those not so well versed in utilizing technological devices.

Narrative Plot

Thematically, we think political opinion making and commercial profits are the most common use of bots for information manipulation and as well are the most powerful and hazardous in the sense of societal impact. Therefore we want to focus on the user group that is searching and sensible for this kind of media posts, being influenced by them in terms of behavior change and opinion spreading/ multiplication.

Figure 2: Not-Bot Interface: Landing Page.

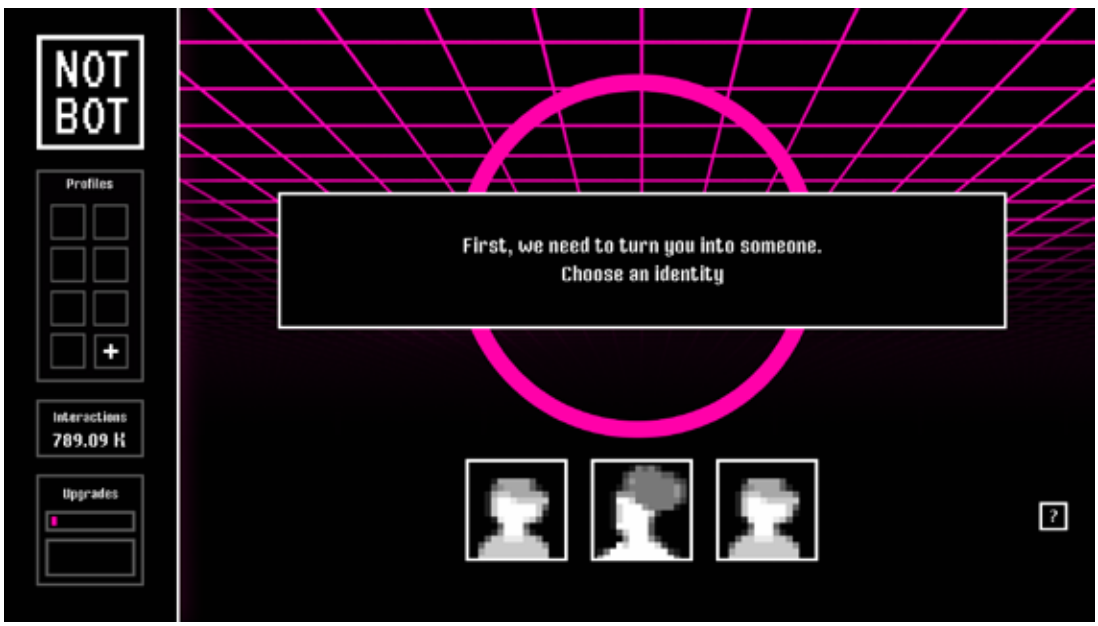

Figure 3: Not-Bot Interface: Main GameScreen.

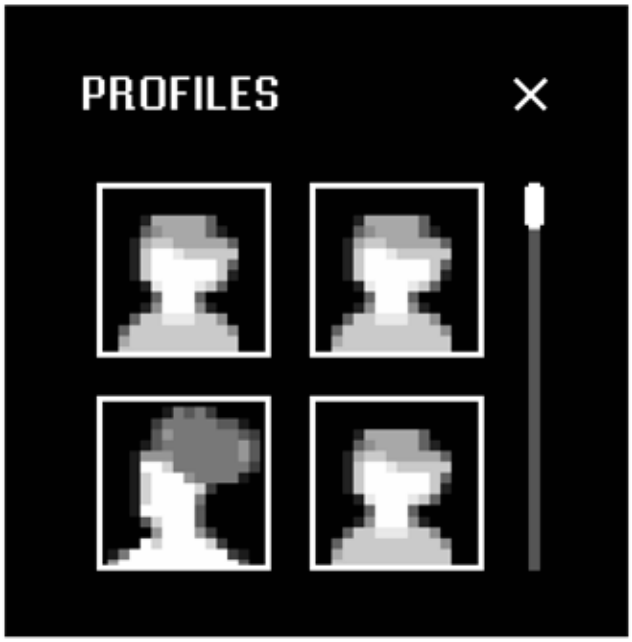

Figure 4: NotBot Interface: Sidebar with Fake Profile Badges

Implementation

In this section we will outline our implementation of the gamified online experience NotBot, departing from our choices for the visual identity, designing the game interface and elaborating on the underlying narrative that altogether influences the user experience.

Visual Identity / Inspirations

To mirror visually the theme of bots in the internet we opted for a representation associated with the early computer age, incorporating pixelated graphics and typography as well as simple geometric forms. Communicating a topic of non-material entities we drew inspiration from landmark science fiction movies such as Tron and 2001: A Space Odyssey that deal with a similar theme of artificial intelligence out of control. This led us to a retro futuristic design approach, that as well connects to contemporary aesthetic movements such as Vaporwave. With this in mind we derived a simple and bold primary color palette, consisting of neon magenta, black and white. (see Figures 2 and 3)

Interface Design

In reminiscence to early computer games and point and click adventures we designed the experience's main screen as a sort of cockpit view, with a central part where the main action takes place and a sidebar for gadgets/upgrades and score monitoring (Figure 3).

The background of the main screen depicts an animated grid landscape that evokes the illusion of permanent forward movement and creates a dynamic restlessness to trigger tension. In the center of the screen a dialog box carries the main narrative part and multiple choice options under neath enable the user to react to the story. A "game score" in the sidebar displays the hypothetical interactions in social media, which grows as the user advances through the story.

Furthermore fake identities can be collected throughout the game which will appear as profile badges in the sidebar (see Figure 4). This shall illustrate to the user the common approach of group spamming practised by multiple bot

accounts that reaffirm each other posts.

The landing page is held intentionally simple, depicting only the title and a play button. Its background is filled by an animation of a grid-lined vortex that seems to drag the viewer into the screen (Figure 2).

Narrative / User Flow

The narrative of our gamified experience puts the user into the role of a social media bot that is being activated by its master (it remains intentionally unclear whether that is a human or another bot). Then the story unfolds, in which different goals have to be achieved through public opinion engineering. The narrative is divided into five episodes or levels, each taking place in another setting to illustrate different real world applications for malicious bot usage such as account boosting, causing damage to an e-commerce or nudging a political election. The interaction is done via multiple choice answers that give the user a illusion of a certain freedom of choice. Whereas the underlying decision tree is pretty linear, the detour via different answers gives the impression of influence on the story, but in the end is leading to the same result.

The story is divided into five levels that can be seen as acts in a storytelling sense and incorporate a narrative arc that consists of an introduction, several stations of quests, a development in the main character and an epilog that sums up the experience and releases the user with a lasting impression about the topic.

Discussion

As user testing showed, the gamification approach towards the complexity of the topic was well received. Users stated that they did enjoy the experience and found it intuitive to use. Some claimed that an introduction to the main topic of bots would have been desirable, considering the very different levels of knowledge each user has of the matter.

Nevertheless most users found the game-like environment helped a lot to understand the complex mechanics of how bots are used in social media to engineer opinions and to spread propaganda.

Altogether it can be said that the narrative helped to keep the users engaged. Showing them only a part of the game story in the testing session, already stimulated them to the topic and made them eager to know more about the story development as well as raised their intention for being more attentive to possible bot content in their daily social media experience. Herefrom we conclude that the gamification approach is well suited to tackle such a complex topic. What remains unclear is if our experience has a long term effect on the user's attention to successfully distinguish bot posts or if falling back into old behavior patterns is more likely to occur. This question requires further observation in a long term study.

Nevertheless we can conclude that the proposed interface design worked out successfully, in terms of interaction experience as well as in the visual communication of our concern.

References

[1] Scott Appling and Erica J Briscoe. 2017. The Perception of Social Bots by Human and Machine. In Proceedings of the Thirtieth International Florida Artificial Intelligence Research Society Conference. 6.

[2] J. Clement. 2020. Distribution of Twitter users worldwide as of April 2020, by age group. (2020). https://www.statista.com/statistics/283119/age-distribution-of-global-twitter-users/

[3] DROG. 2020. Bad News. (2020). https://www.getbadnews.com/

[4] Katherine Hayles. 1999. How We Became Posthuman: Virtual Bodies In Cybernetics, Literature, And Informatics. University of Chicago Press. DOI: http://dx.doi.org/10.1002/(SICI)1520-6696(200021)36:23.0.CO;2-8

[5] Urban Ministries of Durham. 2020. Spent. (2020). http://playspent.org/

[6] Timo Toots. 2018. Memopol-3. (2018). https://www.memopol.ee/

AUXI Affective Computing

Madalena Montellano
Communication Design Faculty of Fine-Arts Lisbon, Portugal - madalena.montellano@campus.ul.pt

Gonçalo Nascimento
Communication Design Faculty of Fine-Arts Lisbon, Portugal gonçalopnascimento@campus.ul.pt

Catarina Quitério
Communication Design Faculty of Fine-Arts Lisbon, Portugal catarinaquiterio@campus.ul.pt

Isabel Flores
Communication Design Faculty of Fine-Arts Lisbon, Portugal isabelflores@campus.ul.pt

Abstract
AUXI is an interaction design project focused on Affective Computing, more specifically on emotional design. Nowadays, society is regularly exposed to stress and anxiety, therefore, our project focuses on panic attacks, a condition that affects a large part of the world population. AUXI aims to help users coping with and avoiding this condition related to mental health, so that they are not limited by these attacks and are able to achieve a better quality of life.

Keywords: Affective Computing, Emotional Design, Panic Attacks, Anxiety, Stress

1 - Affective Computing

The word emotion cannot be defined in a clear and objective way. There are several scholars who defend different perspectives regarding its meaning and most of these concepts define emotion in a human perspective, directly linked to cognitive and physiological functions. However, since the focus of the project is Affective Computing, we will highlight the vision of renowned personalities who dedicate themselves to the study of emotions related to technologies, such as Rosalind Picard, founder and director of the Affective Computing Research Group at MIT Media Lab, and Donald Norman, author and professor in the areas of design, usability engineering and cognitive science, among others. Numerous implications arise when discussing Affective Computing, such as the dilemma regarding a computer's' ability to analyze a person's emotions, seeing as they have a large cognitive component. However, as William James argues, emotions are linked to its body symptoms:

"If we imagine a strong emotion, and then try to abstract from the awareness that we have of it all the feelings of its bodily symptoms, we will see that there is nothing left" [1]

For example, fear is directly linked to the acceleration of the heart rate, the trembling of the lip, the weakened legs, the goosebumps and the tightness in the stomach. Can we imagine what would be left without these symptoms? Reinforcing this idea, Donald Norma says:

"Facial expressions and body language are automatic, indirect results of our affective state, in part because affect is closely tied to behavior." [2]

After clarifying that emotions are not only related to their cognitive component but also to physical manifestations, what would prevent a computer from recognizing and analysing human emotions?

"Professor Rosalind Picard at the MIT Media Laboratory leads a research effort entitled "Affective Computing," an attempt to develop machines that can sense the emotions of the people with whom they are interacting, and then respond accordingly. Her research group has made considerable progress in developing measuring devices to sense fear and anxiety, unhappiness and distress. And, of course, satisfaction." [2]

Accordingly, we can define Affective Computing as an aspect that seeks to improve human-computer interaction, introducing emotion to appropriate mechanisms to deal with affective information, which allows the natural adaptation of the device to its user. At this point another dilemma arises: can we mask our own emotions so that the computer cannot detect them? Rosalind Picard questions:
"The level of control involved in perfecting one's "poker face" is praised by society. But, can we perfect a "poker body?" [3]

Donald Norman answers this question by stating:
"The body displays its emotional state in a variety of ways. There are, of course, facial expressions and body language. Can people control their expressions? Well, yes, but the visceral layer works automatically, and although the behavioral and reflective levels can try to inhibit visceral reaction, complete suppression does not appear to be possible. Even the most controlled person, the so-called poker-face who keeps a neutral display of emotional responses no matter what the situation, still has micro- expressions—short, fleeting expressions that can be detected by trained observers. In addition to the responses of one's musculature, there are many physiological responses. For example, although the size of the eye's pupil is affected by light intensity, it is also an indicator of emotional arousal. Become interested or emotionally aroused, and the pupil widens. Work hard on a problem, and it widens. These responses are involuntary, so it is difficult—probably impossible—for a person to control them. (...)". [2]

In the field of Affective Computing we find different ways of associating emotion with computers: "Emotion Recognition Machines", that is, computers with the ability to recognize emotions and act according to the information collected; "Machines with Emotion", that is, computers capable of interpreting the user's emotions and express their own emotions in response; and "Emotion Inducing Machines" that deal with emotions as a consequence of interaction with the computer.

Previously we addressed what is classified as "Emotion Recognition Machines", this being the direction taken in the development of this project, that is, the creation of a tool that promotes the well-being of its users by detecting and monitoring their emotions.

2 - Auxi

2.1 - Problem Statement

A panic attack is a sudden and intense episode of fear that triggers a set of physical reactions that can resemble a heart attack or generate a feeling of impending death. It starts suddenly, without previous warning, and can occur at any time, for example while walking, driving, sleeping or working. Therefore, one of the most difficult aspects of panic attacks is the intense fear that they will reoccur, leading the person to avoid situations in which they may occur (agoraphobia) or even avoiding leaving the house because nowhere seems safe.

Without treatment, panic attacks end up affecting all aspects of life, whether personal or professional, and can lead to the development of various forms of phobia, withdrawal from sociallife, problems at work or school, depression, suicidal tendencies, alcohol or drugs abuse and financial problems.

Even though panic attacks occur in the absence of real danger, they affect the quality of life of about 33.7% of the population annually. It is also estimated that 90% of the population will, at some point in their lives, go through this type of experience. However, the explanations, treatments and means of accompanying individuals suffering from panic attacks, unfortunately, do not yet follow this frequency. Although panic attacks significantly affect quality of life, it is possible to prevent and treat them effectively.

2.2 - Goals

Our interaction design project aims to improve the quality of life of individuals who suffer from panic attacks. We intend to do so by creating a tool capable of detecting physiological stimuli and effectively intervening in the occurrence of these episodes. Auxi will allow users to monitor the development and frequency of panic attacks, so that their detection and identification is as accurate as

possible, by sharing and teaching skills that help prevent and manage this condition.

The main goal of the project, in terms of social impact, is to reduce the stigma associated with panic attacks and to contribute to the social inclusion of those affected by this condition. We emphasize the need of adopting healthy habits that promote well- being and a positive mindset.

2.3 - Benchmarking

Before the project started, a benchmarking research was developed, a strategic analysis based on the study of the competition, in order to identify references, trends and successful practices. We were inspired by several projects within the theme of Affective Computing, and we will highlight those that most influenced our approach.

2.3.1 - AI Smart Watch That Detects Seizures – Rosalind Picard

At the MIT Media Lab, Rosalind Picard, a researcher specialized in the field of Affective Computing, developed sensors that collect data on physical stimuli related to stress. The project had as its initial goal the monitoring of these stimuli during daily activity, however, it took a quite different course when, accidentally, it discovered that through this bracelet it was possible to detect stimuli previous to a seizure.

This discovery allowed the creation of a bracelet that through data collection, artificial intelligence and machine learning helps in the study and prevention of SUDEP (Sudden Death from Epilepsy). This smartwatch is nowadays marketed by the startup Empatica.

Figure 1: E4 Wristband, Empatica

Figure 2: Calm App

2.3.2 - Calm - The #1 App for Meditation and Sleep

Calm is a meditation app that lets users know about the benefits of mindfulness. It does this by sharing different contents, for instance audios that promote relaxation and concentration, stories that make it easier to fall asleep and teach users how to meditate and strengthen mental fitness, in order to face some of the biggest mental health challenges today: stress, anxiety, insomnia and depression.

2.4 - Project

Auxi is a project that focuses on the issue of panic attacks, which despite being very common these days, are the focus of only a small number of projects. Therefore, this project aims to empower people who suffer from this condition by helping them to deal with it and showing how they can manage and prevent its occurrence. AUXI has two components that have complementary functions, an app and a smartwatch. The smartwatch detects physical stimuli associated with panic attacks through sensors and sends that information to the app where it will be stored and analyzed. The app is divided into four sections: Prevention Techniques, Emotional Diary, Support Group, and Panic Attacks.

At Prevention Techniques we provide users numerous strategies to prevent these attacks, which may include meditation, yoga exercises, nutrition guidelines, among others. We believe that this section of the app is relevant because the best way to deal with this condition is to prevent its occurrence, which can be done throughdaily habits that can reduce stress and anxiety, improving the users' health.

The Emotional Diary is the section of the app that is used to store and analyze the user's emotions. These emotions begin as sets of physical stimuli collected by the smartwatch which are analyzed and translated into emotions, using the classification of *The Ekmans' Atlas of Emotions*. We considered that it would be important for the users to have an overview of their emotional map in order to understand the oscillation of their emotions throughout the day and its relation to the panic attacks.

The Support Group consists of a forum where users can share their experiences, and a chat where they can exchange private messages with more restricted groups or even with their doctor. In the research carried out for the development of this project, we realized that sharing experiences had a fundamental role in the process of accepting this condition and as well as in the perception that they are not fighting it alone. Thus, we thought that it was essential to include a sharing space in the app.

All the components previously described were thought of, however, Panic Attacks was the only one we developed on a deeper level. This is the section of the app where the data recorded in the users' day-to-day life is stored, such as hours of sleep, hours of sunlight exposure, number of steps, body temperature, heart and respiratory rate.

This information is collected by the watch, regardless of whether a panic attack occurs. However, when these happen, data such as the location at the time of the attack, the symptoms and the duration are added. There is also the possibility to access the data from previous days, which allows the user to establish comparisons between the days when he suffered or not a panic attack, and to withdraw important information regarding his evolution.

Acknowledgments

Once again, we would like to shine a light on our main goal which is to improve the quality of life of AUXI's users. While developing our project, we carried out user testing sessions with individuals from our target group, which allowed users to test our prototype. The feedback from these sessions was very positive, with every user considering our tool beneficial and useful in helping to manage and live with this condition. We believe that if it were to be implemented, AUXI would have a very positive and significant impact, not only on the users' personal lives, but also on their social engagement within a society where there are still many stigmas associated with mental illnesses.

References

1] R. Damásio, António. O Erro de Descartes: Emoção, Razão e o Cérebro Humano, 1994

2] Norman, Donald. Emotional Design: Why we love or hate everyday things, 2004

3] W. Picard, Rosalind, Affective Computing, M.I.T Media Laboratory Perceptual Computing Section Technical Report No. 321

HOMIE

Catarina Marques
Communication Design Faculty of Fine-Arts Lisbon, Portugal

Luisa Hentsch
Staatliche Hochschule für Gestaltung Karlsruhe, in Karlsruhe Germany.

Sofia Domingues
Communication Design Faculty of Fine-Arts Lisbon, Portugal

The problem statement

Our society is changing! The isolation of people and social distancing are not only an actual problem, created by Covid19, but also a general issue in the era of digitalization. The term "being connected with someone" became a different meaning today and our relationships appear in countless different shapes.

Through Design Research und User Testing in the field of "changing social environments" we found out, that the aspect we are missing the most, is the physical contact and the feeling of "really being connected" to someone. Additionally in this period of #stayhome, the lack of daylight and Vitamin D is challenging us. We feel like losing any sense of time and struggling with keeping up our daily rhythms.

All together, the (unexpected and fast-paced) physical disconnection to our social environment, the loss of daily routines and the limited contact to nature, while being "locked-up" (alone) in our four-walls can overwhelm us. Depression, anxiety and a worse mental health are often the consequences.

The Solution

HOMIE - someone you truly feel comfortable with!

"Homie" is the short version of the term "homeboy or homegirl". It describes a friend or a kid from the neighbourhood you know since ages and you have a special connection with.

We developed "homie" (a special blanket) to support our society during (and after) the current situation and encourage people with less sensible behavior or even fear. In addition, we have taken into consideration the impacts of the this situation, to prevent mental health as well as maintain social connections by using the benefits of textile electronic technologies.

The Concept / Goals

H OMIE is a BLANKET with the aim to:
- (re)connect people
- satisfy their needs of physical contact
- compensate the desire for a natural lightning situation

Into the familiar knitting of a blanket, we special fibres that fulfill these aims through the techniques of textile electronics.

HOMIE is an APP with the aim to:
- keep up relationships
- increase social interaction while isolation
- build up a special connection in between people

As addition we have developed the HOMIE App, integrate that upgrades your blanket and creates a feeling physical connection and a real time interaction with your homies.

To create a product that truly reflects the needs of our users, we created four personas: Two female, Svenja, a 36 year old woman who follows her job in a communication

agency from home and maintains a long distance love relationship to her boyfriend. Often she is finding herself in need of physical and mental comfort.

Maria, a 75 year old woman, retired and a widow who lives alone in the center of the city, is used to receive many visits from her children and grandchildren and loves to have her freedom to go to the country and be surrounded by nature. Due to the pandemic situation, she belongs to the risk group and has to stay at home. Without being able to receiving the normal visits from her family, each day is becoming more and more difficult to her.

And Our two male personas are Lukas, a 17 year old, active and rebellious young man who spends much of his free time hanging out with his friends. Due to the current situation, he is obliged to stay at home, which makes him angry and unmotivated.

Our last persona is Paulo, a 46 year old, single father working as a freelancer in the creative industry. With his 4 year old son at home, the days become even more tiring and there is very little time left for him to connect with his parents and friends. He needs physical contact and support for taking care of his hin and managing his job at the same time.

In the next step, we simulate the thoughts and behaviors of the personas while interacting with our product (HOMIE blanket).

All of our personas had a positive interaction in general, even if they all started in a lower emotional and mental state, as expected in times of isolation and loneliness. After exposure to the blanket their feelings varied between, satisfied, comforted, calm or tranquil.

In Maria's case, she had to ask for help from her relatives to understand how the blanket worked. All the others experienced the first usage as an easy and intuitive process.

Design of the visual aspects

Logo design

For the design of the Logo, we decide to keep it simple. Nevertheless it can be associated quickly with the physical product.

We work with clear and static lines in the front, which stay in contrast to the organic and round shapes in the background. The line extends the letter E of the typographical element and represents the connection between the users. It forms a rectangle which symbolizes a blanket and is the simplest form for our logo.

In the complete version we add 2 irregular shapes in the back, which are simple blanket shapes again, but illustrated as more organic and cozy elements. The shapes can be pink & green or orange & lilac.

The font is connected to the sensation of comfort, we experience while using the blanket.

The name "HOMIE" influenced the choice of the typography. We choose "Righteous" because of its strong but organic appearance.

Name and Line - White or Grey - #5E5E5E; Irregular shapes - Green - #80836B; Rose - #D5C3B8; Orange - #B27F45; Lilac - #B7B6BB

The physical product works parallel with the digital ones, the HOMIE application and the website. All visual aspects and sensations are similar when using both.

The first interaction with the public and the point of sale for our product is the HOMIE website.

Here features of the product and its usage are explained. Here for us it is essential that the design of the purchase process is fast and easy to understand.

W ireframe / Design of the App

Options: The app can be used by both, those who own a blanket and those who don't but simply want to interact with friends.

- Interaction flow: We organized the app by pages to show the content of each screen. Mental map of the interaction flow h ere.

- Wireframes: The wireframes helped us to have a first layout for the HOMIE App.

- Interactions in Application:
Tool bar: We created a tool bar in the bottom for an easy guiding through the application.
Its menu contains Settings, My blanket/profile, List of friends and Make friends/search friends.

Settings: In the settings menu you have the possibility to customize your experience.

My blanket / profile: On the profile you can switch your blanket on and off. Depending on if you want to receive touches from your homies or not.

Make / List of friends: After you add your friends to your "list of friends" you have the possibility to interact with them. Send a simple touch (vibration) or a light draw.

- Color Scheme. We decide to use a subtle grey for text and buttons and a light beige for the background. To customize the profile you can choose between pink, green, orange or lilac (our color scheme). In the initial pages, like login and create account, have use the irregular shapes in order to connect with the logo.

W ireframe / Design of the Website

- Architecture: Because of its simple functionality (information + sales point), the website only have one page with different sections. Sections: Home, About us, Shop, Services and Contacts.

Color Scheme: Connecting to the app, we use the beige as background color to convey tranquility, and the colors of the logo to divide the sections. Here we use orange for buttons and titles because it's the most appealing color in our palette.

User testing results

In preparation for the User testing session (which was supposed to happen in person) we created a script.The script is divided into three parts, and contains in total 40 questions:

- WARM UP: About us, our idea and a section of questions about the person and how they are dealing with isolation.

- INTRODUCTION: A Section about the name "HOMIE", a section about the app usability and a small task section, to understand if our App is intuitive and easy to understand.

- FINAL QUESTIONS: Comments / feedback.

Due to the isolation extension we had to adapt the user testing, we used the Google forms creation tool, which allowed us to reach a larger number of people and have all the answers organized.

Link to the form. The results can also be consulted here.

Results: Our survey was answered by 33 people, nine men and 24 women between the age of 19 and 60 years. In general they are coping well with isolation, but having some moments of sadness and loneliness. What they are missing most is to be outside with people they like and the ones they normally live with. They also feel a lack of security.
The app was considered to be intuitive and easy and 90% of the people said they would use the product more than once.

Conclusion: The product is received and understand well. It strengthen the belief in our concept and the chance of having a good sales number.

V ideo

Proof of concept video: Our video presents a narrative (storyline) of the problem and the project developed in context of use.

We chose a simple narrative that is easy to follow. Therefore we came back to our Persona “Svenja” who is isolated at home and having a long distance relationship with her boyfriend. While spending time alone, in separate houses all they want is being together.

Svenja receives a surprise package, which turns out to be from her boyfriend who ordered the HOMIE blanket for her. Svenja gets intrigued, discoveres the website, downloads the HOMIE application and starts using it.

Some frames show the interaction of the HOMIE blanket. Svenja and her boyfriend discover a new way of feeling connected without talking by phone or being with each other.

In the last scene the couple feels united again and more relaxed being alone.

For the light and color choice of the video, we opted for bright colors and lots of natural light to make it appealing and relaxing for the viewer with the ultimate goal of creating a desire of purchase.

Timy
Artificial Intelligence that will help you maneging your time

Bárbara Mota, Eva Rua, Roberta Verdi
Communication Design Faculty of Fine-Arts Lisbon, Portugal

Abstract
Timy project emerged after a reflection on what we could bring new and useful to society. After analysing our society we acknowledge that we are living in an era when everything is immediate and everyone is racing against time. We started thinking about what we could do to help people face this race against time using tecnology. So we created Timy to motivate people to become more productive, help them managing better their time.

Introduction
Timy is an AI that communicates with the user through an app creating an adapted personality to each user. Having access to the user's devices and through a bracelet, it monitors the user's habits and routines. With this information and taking into account the goals of each user, TIMY creates a personalized plan that will help them achieve their goals.

By adapting the app's personality to the user, the product becomes more effective, because the AI can be a friend and consultant to each user. The app provides a friend that promises to increase the user's productivity in a comfortable and fun way, improving the user's life quality. The interaction between the interface and the user is through voice commands.

Benchmarking
Before we started developing our Timy project we did a market study.

We found some projects that were really helpfull to our product design, such as the "Bond Touch, Pair of Bracelets", a bracelet that is capable of trasmitting touches to another bracelet that can be across the world; "Timely", a app that tracks the time spent in others apps; and "Mi Fit Band" a device that tracks physical activity and analyses sleep.

With this study we were able to figure out how we could make a difference.

Target
With TIMY we address all those who feel like they lack time to get their projects underway, those who are looking to be more productive or those who simply want to know how they are spending their time.

Timy app
This aplication is available for smarthphone. After signing up, the user can start exploring the app's features. The app is divided in three tabs: home, profile and data.

The home page is where we have the representation of Timy, that is voice activated. If the user, because of hearing problems or other reasons, wants Timy to talk to him through writing that option is also available.

The profile tab integrates name, username, phone number, mail, address, gender, birthday, language and special needs options. These categories can be changed at any time.

Through the profile tab the user can set and change the goals they want Timy to help them with. They can synchronize other devices with Timy, such as the Timy Bracelet, laptop, tablet, television, and others. They can also turn on and off Timy's notifications, change the app's password, access the terms and privacy area and sign out of the app.

Figure 1: App's home tab

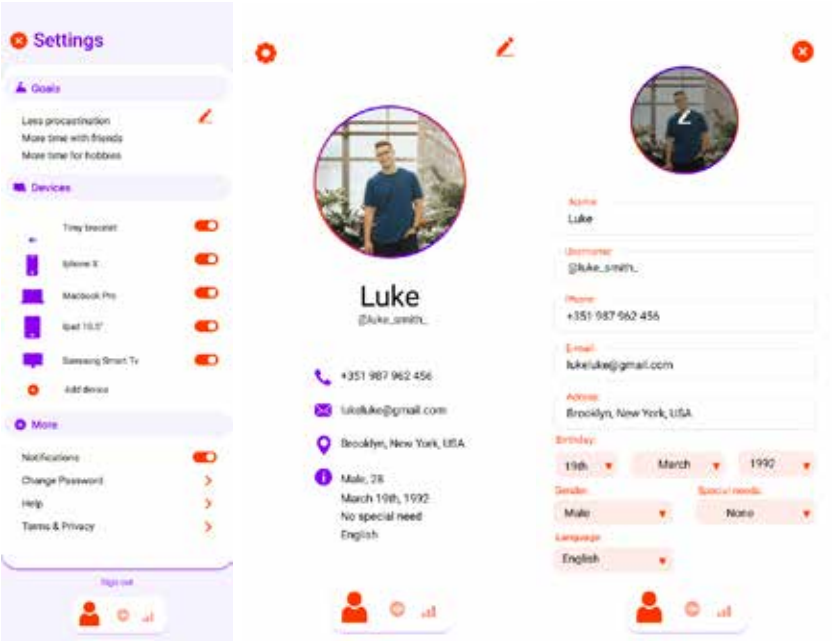

Figure 2: App's profile tab

The data tab integrates a calendar and an achievements section.

Through the calendar the user can see the data collected by the app and bracelet in a specific day. It can tell how much time the user has spent in activities like sleeping, working, watching tv, on social media, talking to people, listening to music, and much more.

Process

After defining the problem statement we started building a possible user flow (figure 4), and then in order to figure out who could be the main target for our project we created personas. After that we created user journeys for each of them, which was very important to understand the personas's main problems and needs.

With the information that we gathered in the previously mentioned phases we started designing the wireframes and than a possible interface and prototype, that we used to make user tests.

The user testing was really helpful to identify problems in the app and to help us create something funcional that fits the target's needs.

After all of this phases we felt ready to design the final interface.

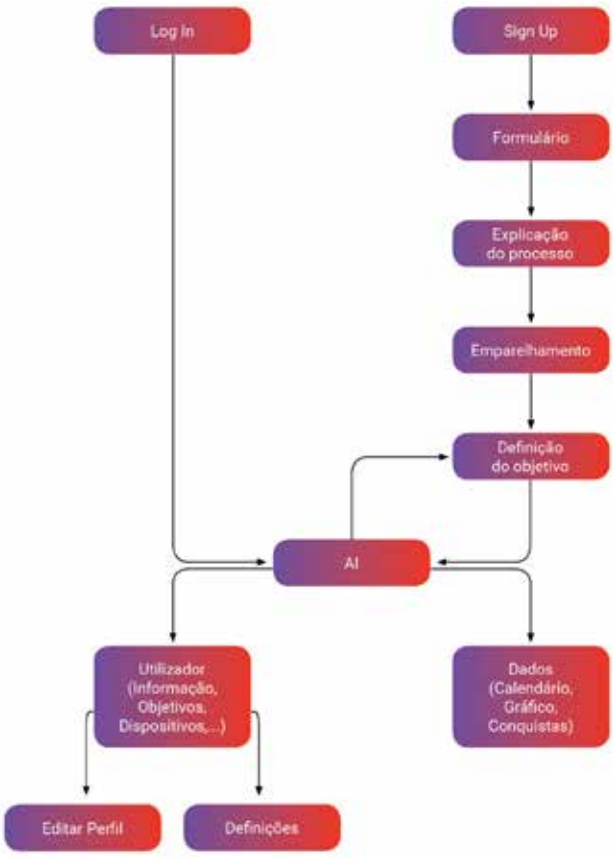

Figure 4: User Flow

Design

We created an interface that conveyed clarity, to allow the user to have a quick and easy interaction with the app. We chose simplicity over complexity and created intuitive interfaces.

We wanted the project to reach a broad audience so we offer an universal language through the used icons.

For a better user experience we tried to bring a nice and attractive aesthetic. In conclusion, we sought to combine efficiency with aesthetics.

Visual identity

For the logotype (figure 5), no different from the app, we created a simple design. It combines the project's name and the idea of a digital watch. We integrated two dots in the "i" (from Timy) position resembling the separation between the hours and minutes used in digital watches.

We used the roboto typographic font. A simple sans-serif typeface developed to balance content density with reading comfort and perfect for digital suport.

T:MY

Figure 5: Timy's Logotype

For the app's chromatic palette we chose purple that suggests purification, cleanliness, peace and balance; orange, a color associated with energy and vitality, that positively affects mood being even considered an antidepressant colour; we also used a gradient to bring some dynamism and movement to the app. To complete the chromatic palette we use black for the typography.

Timy bracelet

Timy bracelet is one of the two main parts of the project. The Bracelet must be connected to the App for more accurated results.

Figure 6: Timy Bracelet

The product requires inductive charging, using an electromagnetic induction cable, included with the bracelet. The bracelet has a multiple funcionalities, such as:

1. A pedometer that counts steps made throughout the day.

2. An heart rate monitor that measures physical activity intensity and stress levels, including calories burned.

3. A sleep monitoring motion sensor that measures REM sleep, as well as light sleep or deep sleep.

4. Built-in GPS, that accurately monitors outdoor activities and even a wide variety of indoor activities.

In addition to the wireless charging system the bracelet has other important and efficient features, such as:

1. The Timy bracelet is synchronized with the Timy application, which allows the user to analyse the collected data.

2. The color is costumizable.

3. The size can be adjusted.

4. The bracelet is waterproof, perfect for swimming.

5. It has a system battery management that allows it to have an autonomy of about 2 months.

6. It is compatible with all operational systems.

Promotion video

To promote Timy we made an animation, that tells the story of a young man, Luke, that is getting Timy's help to succeed in his school studies.

Timy appears with a physical form to defeat Luke's procrastinator side, which has also a physical form.

We wanted Timy's funcions to be presented in a catchy and funny way. We created the characters with adobe illustrator then animated them in adobe after effects.

References

[1] Max Tegmark, 2017, Life 3.0, Ser-se Humano na Era da Inteligência Artificial, Dom Quixote grupo LEYA, Alfragide, Portugal, 2610-038

[2] Kendra Cherry, 2019, The Big Five Personality Traits, Verywell Mind - Know More. Live Brighter, website https://www.verywellmind.com/the-big-five-personality-dimensions-2795422

[3] Ashton Hauff, 2018 The Know It All Guide To Color Psychology In Marketing + The Best Hex Chart, CoSchedule, website: https://www.coschedule.com/blog/color-psychology-marketing/

[4] Christoph Dressel, 2013, Bond Touch, Pair of Bracelets, San Francisco Bay Area, West Coast, Western US, https://www.bond-touch.com/

[5] Memory.ai company, Timely - Fully Automatic Time Tracking, Oslo, Norway, Mølleparken 2, 0459 Oslo, https://memory.ai/timely

Snoops
A real time information app for your day to day life

Beatriz Lopes, Ema Nassar, Gonçalo Marques
lopesbeatriz@campus.ul.pt, emanassar@campus.ul.pt, goncalomarques2@campus.ul.pt
Communication Design Faculty of Fine-Arts Lisbon, Portugal

Abstract
Ideally, when hearing a political speech or reading a news article, we would be able to trust it and know that the information conveyed was factual and trustworthy, devoid of any partiality. In reality, this doesn't always happen.

The information itself might not be entirely incorrect but the way it's delivered can suggest something false or mislead the receiver. The problem described is Post-Truth, and this way of manipulation is unexpected since it can come from any person and the most diverse platforms, bringing some severe consequences. The distorted information shapes the thoughts and opinions of everyone who consumes it and ultimately can influence society's development from the moment politics are shaped by manipulated data.

Post-Truth can only take place in a society where there is a lack of education towards critical thinking. This enables mainly political personalities to push their agendas employing different techniques of discourse and mixing factual with erroneous information, making it difficult to tell them apart. Finally, this issue is not simple to solve since there is a fine line between information selection and censorship.

Therefore, we believe that the answer to this problem is never to reduce the information available to the public but to increase it and make it easily accessible for everyone, that way when a piece of information arises, each person can double-check it with other sources and authors and make an informed decision to believe it or not.

Our project consists of an app that tracks and collects all the information the user is exposed to throughout the day, such as informal conversations and interactions, visited websites, and news articles shared. Then, the app will rate the information on a scale from one to ten according to a number of criteria that determines if it is trustworthy. Moreover, the app compiles various sources about every subject apprehended to complement and further clarify the data absorbed by the user.

Keywords: Post Truth, Information, Media, News, Manipulation

1 - Existing Problems
While researching for this project we came across what we believe to be the main problems that contribute to the increasing of fake news and the growth of the Post-Truth Era.

Starting with education, according to Daniel J. Levitin in "Weaponized Lies", "this is a dangerous by-product of a lack of education in our country that has now affected an entire generation of citizens". The lack of education combined with the language being adopted nowadays has begun to obscure the relation between facts and fantasy, making it harder each time to make good decisions for ourselves and our fellow citizens.

Blended with language is the manipulation of the public, through different speech techniques such as insinuation, the omission of important information, lack of context, and others; The use of these techniques can lead to changing the public opinions according to what we want them to

believe. With social media increasingly becoming a primary platform for the consumption of information, it also clearly has become a field where this manipulation and propaganda campaigns play out.

Finally, there's the problem with misinformation, also known as "fake news". Misinformation happens when false information is randomly mixed with the factual one, making it difficult to separate the two and therefore creating a fine line between the selection of the data we think is real and censoring someone's opinion or work.

2 - Snoops app

The Snoops app is meant to be a tool to filter and facilitate access to verified sources. The information featured in the app depends on the user, the data they came across, and their interests.

The homepage will display a list of the received news in chronological order, with the additional sources and articles available as soon as the user clicks on the text they want to know more about.

A score will be included in the app next to every affirmation detected to give an immediate appreciation of its accuracy. This score will be an average of five groups of criteria that we believe are the best system to rate each information. The groups are Purpose and Intended audience, Authority and Credibility, Accuracy and Reliability, Currency and Timeliness, and Objectivity or Bias. Clicking on the score, the user will be presented with a detailed description of every principle and how it is met or not.

Swiping left from the homepage, the user is presented with a profile page, which includes basic user information, notifications, and settings. Swiping right, there is a page with graphics and data to analyze the amount of information captured, the peaks, and the lows and other statistics.

2.1 - Objectives and Target audience

During the making of the Snoops app, we kept in mind specific objectives. Our main intention is to bring to light the Post-truth problem and to warn our users that we must never absorb nor accept information acritically. Beyond bringing awareness, we also wish to provide our users with a tool that will help them endure this critical process, which starts by learning more about a certain subject and ends with a more complete and informed opinion. Altogether, our app should inform, educate, and protect its users.

The target audience we intended for the Snoops app is people between the age of 18 to 55 that search for and receive a lot of information daily and are worried about the veracity of the facts that reach them.

Figure 1: Snoops app first screen and home screen

Figure 2: Snoops app animation frame

Limitations

To accomplish this project we are aware that there are several restraints. In our original concept, the app would be able to collect all of the information that the user would assimilate, by seeing or hearing. But that would raise the need for a way to capture the same as the user's eyes, and for the moment we couldn't find a solution for it. However, we recognize that in the future this app could be more comprehensive. For this project, we decided to make an app, and thus we focused on what the user hears and can be captured by the mobile phone. From the start, we faced the privacy issue, since the assumption that the Snoops app hears everything the user hears can be problematic, but in reality, this basically already happens with our smartphones. Therefore we figured that this aspect wouldn't be shocking since with the app the user knows how it operates and the data is used only for its known purposes.

References

[1] Daniel Levitin, 2017. Weaponized Lies: How to Think Critically in the Post-Truth Era. New York: Dutton;

[2] S. Lewandowsky, U. Ecker & J. Cook, (2020). Beyond Misinformation: Understanding and Coping with the "Post-Truth" Era. In https:// www.sciencedirect.com/science/article/abs/pii/S2211368117300700;

[3] Lee McIntyre, 2018. Post-truth. Cambridge: The MIT Press;

[4] Yuval Noah Harari. 2018. Are we living in a post-truth era? Yes, but that's because we're a post-truth species. TED Talk in https://ideas.ted.com/are-we-living-in-a-post-truth-era-yes-but-thatsb e c a u s e - w e r e - a - p o s t - t r u t h - s p e c i e s / ?fbclid=IwAR36Z3cMArjj4qjqVy3RTe_vSRNld8j1RRXVlT7m1b11ePCplQNm_vjBPBw

[5] David Mikkelson, Barbara Mikkelson, 1994. Snopes in https://www.snopes.com/

[6] Massachusetts Institute of Technology, Computer Science & Artificial Intelligence Lab.

[7] Andrew Jaspan, Jack Rejtman, 2011. The Conversation.

[8] Niemen Foudation, 2008. Neimen Lab.

Feel inside
Artificial Emotional Intelligence

Inês Mateus, Laura Dâmaso, Margarida Godinho
i.mateus@campus.ul.pt, lauradamaso@campus.ul.pt godinho.margarida@campus.ul.pt
Communication Design Faculty of Fine-Arts Lisbon, Portugal

Abstract
Feel Inside is an interaction design project focused on home- dweller interaction, through artificial emotional intelligence. The present project aims to deepen and speculate about a technological future around smart homes, and to explore various subjects in the domain of artificial intelligence and affective computing. Always keeping in mind the current direction of modern technology, the possibilities and future realities.

Feel inside is a smart and sensitive home, that connects with people through neural implant (biohacking), in order to help improve the daily life. This paper exposes the various domains and characteristics of the project for the purpose of demonstrating a range of scenarios of home-dweller relationship.

Keywords: Artificial Intelligence (AI), Affective Computing, Biohacking, Emotional intelligence, Home Automation, Machine Learning, Smart House, Sustainability, Virtual Home Assistant

Introduction
The emerging interest in the abolition of the boundary between artificial and natural, in other words, between machine and human being, and the technical aspects of this technological

Progress in different areas, lead to the questions how these new techniques can be integrated into everyday life and how they can be an improvement in people's well-being.

"In a constant search, robotics has crossed many of the frontiers of the present "by always seeking to go further in understanding the intelligence and autonomy that characterizes humans, in order to create machines that resemble them" [12]

The experimentalism in the search for new solutions it's based on the awareness of the need to understand and trust the machines that modern technology allows us to develop, so that the interaction between us and them is as smooth as possible. More than a machine that knows how

to perform tasks, what is sought is that "it is able to react to unforeseen situations, interact naturally with human beings and protect itself." 1
In fact, according to Gerard Kim, human-machine interaction is increasingly one of the important factors of interactive software. So, the ultimate goal of this natural interaction is to see beyond the «machines» and accept them as companions for our day life.

Theorical Framework
Affective Computing
"More than facial recognition, what this is about is a machine being able to know what we feel, our state of mind." [4]

Artificial Emotional Intelligence is still a developing area, that means, is at an embryonic stage. Its main goal and differentiating characteristic is the emotional humanization of the machine so that there is better interaction with the human being. It is through the ability to read and identify emotions that the machine seeks to achieve its goals, but as we know in the human being that ability is related to cognitive and physiological functions. Empathy is an aspect that the current AI still doesn't answer, but that in future developments will undoubtedly bring a contextual understanding of situations and environments, in order to better understand the human being, so that the machine can respond in a more appropriate way, and with an adaptation more natural of the device to the user.

"Emotions play a role in decision-making, which in the past was thought to be exclusively a rational process. (...) All these explanations are an enormous asset to create robots that learn, that make decisions in the presence of uncertainties, that reveal emotions, and that manipulate objects individually or together with humans, helping them." [12]

In fact, the role of neurosciences in robotics is relevant, in the context of development around emotions. In this context, Rosalind Picard developed the theorization of the affective computing concept.

"Once the emotion process is initiated, deliberate cognitive processing and physically activity may influence the emotional experience, but the generation of emotion itself is hypothesized to be a perceptual process." [20]

Many questions have been raised, considering that the machines don't have a cultural, historical and narrative past specific, in other words, life experiences that condition their decision- making and feelings.

"It is in these human-computer interactions that the creative agency of the user must be translated in a way that can be processed by the code written by developers. By placing user intent within a digital environments to assess if the environment is serving the user, or if the user is serving the environment."[11]

An important factor will be to determine and certify that in these human-machine relationships, the purpose of technology is the common idea that it is a "tool" always ready to serve the purposes and needs of the user. The way the interaction develops is based on an algorithmic code and the own development that each system does (machine learning), building by itself an artificial neural network, which due to its complexity of data crossing isn't readable or possible to interpret, nor by the programmer who wrote the operating code.

"(...) the fact is that artificial intelligence tools are already greatly influencing human behavior. What makes this situation dangerous is that these algorithms are hidden and have no clear line of accountability. These highly influential algorithms are described by Cathy O'Niel (2016) as «weapons of math destruction» or «WMDs». WMDs have three defining elements: opacity, scale and damage. Opacity does not just refer to the ability for an individual to recognize that there is an algorithm, it also refers to the awareness of the algorithm model of what and how things are being measured and calculated. Scale refers to an algoritms ability to grow. (...) damage describes an algoritm's fairness to the subject involved in the model and the resulting ability to ruin or destroy quality of life." [11]

Smart houses and cities
The smart cities are still an area in research and exploration, however, we understand how contemporary cities can be seen as hybrid spaces, of continuous adaptation

according to the crossing of information, relationships and interactions between users, user-device and between devices. The possibilities for transformation and evolution are multiple, raising several ethical issues related to privacy, control and surveillance. The increasing urban complexity means that the incorporation of technological systems in the city's functioning is mandatory.

Biohacking

According to Dave Asprey, "Biohacking is the art and science of changing the environment around you and inside you so that you have full control over your own biology." The term, at first, may seem somewhat fictional, but in fact it is present in our daily lives more than we are aware of. It is undoubtedly a very vast area, which is present in several technologies, such as: microchips; body implants; devices for recording biometric data, and even for increasing physical capacities, psychological and human intellectuals; interaction chips with electronic devices for various tasks (such as unlocking cars and making payments). The border of this field is as far as we want to expand the human body and establish the limits of interference in nature.

"The notion of a creative or intelligent machine invites fresh perspectives on the human condition." [14]

Project

Problem Statement

As a first step of idealization phase of we identified some current problems and negative factors, which we intend to solve with this project, such as:

Currently, there is no interaction from the house and to the inhabitant, just from the inhabitant to the house.

Residents are responsible for controlling and managing housing, in order to provide themselves the best surrounding. The need to adapt the house to different situations, and to the different moods of the residents.

When an external person (friend, guest, etc.) enters a home, the environment is not ideal for them, as it is already established and designed for the residents of it. Security and surveillance of protection of the habitation is dependent on cameras and alarms.

Inhabitants concerns for the safety and actions of pets, when they are absent of the home.

Practice Area

Feel Inside focuses on two main areas: housing combined with modern technology, in the field of smart houses and cities.

General Concept

Creating a smart and emotional home, specifically an artificially emotional intelligent operating system without screen interfaces.

Goals

We intend to explore the idea of a house adaptable and custom to its dwellers, allowing an interpersonal relationship between them, where both sides demonstrate and share their emotions.

Therefore, Feel Inside assume a more fictional and experimental character, as it speculates about a future possibility and technologies under development. Exploring the functionalities of artificial intelligence in emotional terms. With this project we try to artificially reproduce the human mind in a technological system, more than a brain we try to replicate the "heart", the human emotional and sensitive side. We aim to create a home that feels and decides directly based on its emotions, that has its own personality, empathy and that has the ability to understand the feelings and moods of the dweller(s) allowing a relationship between them and the home. This means that the home has contextual understanding to respond more appropriately to each situation and day-life scenario.

This would be a house that provides its dwellers the ideal environments and settings adapting to the changing moods of them. The house is self-management, so it will control the environments (temperature, ventilation, humidity, light), electricity, gas and water expenses, inventories of food and other essential goods in order to be a sustainable and environmentally conscious home. The house will ensure surveillance without resorting to cameras, which for many residents are an invasive presence of technology in their day-life, stealing their privacy, but will resort to motion sensors. It will also control pets and children to maintain

their safety when there is no adult around. With all these general functions the inhabitants will be able to establish a personal connection with their home that resembles a relationship between two persons. The resident will receive an attention and care in his day-to-day experience custom to the specific personality of them, and to the mood of each moment.

Related work - Benchmarking

ONLY. According to its creators, "ONLY materializes the dream of a smart home in a simple and intuitive way. Seductive design, simplicity of use and absolute customization provide an incomparable lifestyle. " It consists of an app, and so the dweller has on their devices (tablet, smartphone or computer) the power of home automation, for a better comfort, safety and energy efficiency. Tthis operating system materializes in wall panel, which ONLY currently has available according to three technological typologies: Only Click: For users who like the feel of a button; Only Touch: A subtle touch option; Only Wave: no buttons or touch, just wave up or down, to left or right.The current features possible are: audio; lighting; air conditioning and safety. All of them available at any time.

ONLY was for us a reference to the main functions of a smart home, as a starting point for our project. In which we develop a house that is more than an assistant to tasks but a friend, because there is an emotional relationship with the resident.

RealEyes. This project is a startup in the area of Emotional Artificial Intelligence. They consider themselves "The World's Leading Emotion AI Platform", and aim to transform the technology more human, creating memorable experiences for its users through human responses incorporated into the content and work. This system collect and analyze data about people's reactions and emotions during visualization of videos or online content, only through facial recognition done by the webcam of the device in question for viewing. It allows companies that depend on this type of content understand and monitor the impact of their business strategies.

Figure 1: ONLY home control interface [In http://onlysmartbuildings.com/pt/smart home/]

RealEyes was for our project, a reference about the analysis and recognition of emotions in specific contexts, although this project uses a different technique (webcams) comparing to Feel Inside. In our project the recognition of emotions is made by neural data collected by an inner implant in the body of the users, that recognizes the dispositions and actions of the user that may reflect his psychological state.

Smart Assistants. A smart home is convenient, but voice control takes it to another level. Smart Assistant is a software agent that can perform tasks or services for an individual based on commands or questions. Users can ask assistants questions, control home automation devices and media playback by voice, and manage other basic tasks, such as email, task lists, and calendars with verbal commands. Regarding to virtual home assistants, it is also expected that they will be able to bring sustainability.

Some of the best known on the market are Google Home, a smart speaker that can play music but it's primarily designed as a vehicle for Google Assistant (Google's voice-activated virtual helper that's connected to the internet) and Alexa from Amazon who is capable of doing the basic actions of any virtual assistant and also has the ability to control lots of devices around the house and add skills from programmers other than Amazon. Apple also supplies the well-known Siri, present in all branded devices of the last generations and capable of supporting a wide range of user commands. One of the last concerns of its programmers was to make their voice even more human, so that there is more empathy.

Target Audience

In the matters of such ample and experimental project, we believe it is directed to a very varied target audience, according to their interest in the issues and specific needs of their day-to-day lives. Therefore, we intend to highlight the machine learning factor of the artefact, which will have the ability to adapt and evolve, developing a personality and simultaneously establishing an emotional relationship based on the information it collects and the decisions it makes. So, the home will grow in a increasing knowledge according to each user and context.

It is our intention to make the installation and adaptation of Feel Inside in any home feasible. Although, in certain cases it will be an "adaptable conditioning", due to certain construction and technological factors of the house that may limit the system and its functions. In these more restrictive situations, the system will be readjusted. Consequently, any person or family will be able to access and own this home system, regardless of their age groups, genders and place of residence. The vastness of users is numerous, and because of that the Feel Inside is prepared to adapt to everyone, from users who are more or less comfortable with technological devices, to larger or smaller habitations, or even to home sharing contexts in which the residents have no relations between them.

How Feel Inside works

Nowadays there are already several studies of biohacking on the market. For our project we thought that the best option would be to use a neural implant that would be able to recognize the emotions and feelings of the user. The house, through this implant, will have access to the users preferences, adapting to them in all situations, for example concerning to temperature and light (intensity and color adjustment).

Another very important fact is that the house is safe. Security will be done through motion and heat sensors, with no invasion of the residents' privacy. The house can identify whether or not it is a resident, analyzing the person's implant. This recognition of the implant allows the access to the property to be made without using the conventional keys (useful function when the user forget them).

The sustainable aspect is reflected in the control of expenses, such as gas, water, and electricity. The house is connected to all technological devices and has smart plugs: for recording usage data, monitoring the amount expended; identifying anomalies and problems; and being autonomous to turn them on or off (remote power control). In this way the house creates a better plan for the environment and allow the resident to have less expenses to pay. This plan is also created taking into account several factors such as the number of residents, the hours they stay at home and their professional activities.

The house also has a concern for the health of its residents by giving them different suggestions for habits and meals.

It makes an inventory of the food we have at home, being very useful when we want to make the shopping list. This functionality is possible through a system that controls food expenses by weight. When an ingredient is running out the house adds it to the shopping list and notifies the resident. Each ingredient has its own container that is connected to the house through technology.

It is through the sharing of feelings that the house expresses itself, making possible a relationship between the resident and the house as close to a human relationship. If she doesn't feel clean and organized, she will react sadly or even irritably towards the resident. We can hear the house in two different ways, through speakers in the house or in our head (in order to have more privacy). It is adaptable to all types of people even if they have some type of disability, it adapts to their way of thinking, whether through images or gestures. If there is more than one resident in the house, she can speak to more than one person at the same time almost like telepathy.

Conclusion

This paper introduces a virtual home assistant for prototyping home-dweller interaction and connection, for a mutually affective and emotional relationship. To this end, we designed a emotion AI system that is highly personalized to each individual, and that defines his own personality as his relationship with the resident develops.

We believe that in a future scenario in which Feel Inside was implemented, it would have a very positive and significant impact on improving the well-being of residents who use it.

Acknowledgments

During the entire period of creation, structuring of ideas and concretion of the project some assistance from outside the student team was drawn by our teachers in the faculty. And that's why we thank our teachers João Ferreira and Sónia Rafael for helpful suggestions and project monitoring.

References

[1] A Inteligência emocional em máquinas e o futuro da IA. [Emotional intelligence in machines and the future of AI.] (8'august'2018). Obtained from Transformação Digital: https://transformacaodigital.com/a
inteligenciaemocional em maquinas e o futuro da ia/

[2] Austin, P. L. (25'july'2019). What Will Smart Homes Look Like 10 Years From Now? Obtained from TIME: https://time.com/5634791/smart homes future/

[3] Biohacking: A human upgrade? (10'may'2019). Obtained from DW - Made for minds: https://www.dw.com/en/biohacking-a-human-upgrade/av-48694315

[4] Calheiros, S. (17'november'2019). Primeiro foi o reconhecimento facial. Agora, a Inteligência Artificial quer saber o que estamos a sentir. [First was facial recognition. Now, Artificial Intelligence wants to know what we're feeling.] Obtained from VISÃO: https://visao.sapo.pt/atualidade/sociedade/2019 11 17
primeiro foi oreconhecimento facial agora a inteligencia artificial quer
saber o que estamos a sentir/

[5] Cronenberg, D. (Director). (1999). eXistenZ [Movie].