### Hacking into programmed sociality of F2F encounters: ethical, political and societal challenges in the age of >Big Data< and Al **Alexander Gerner**



XII- Brazilian International Meeting of Cognitive Science: Big Data: Ethical, espietmological and semiotic Implications for Self-Organized Cognition/Action **UNICAMP- Campinas- SP** Faculdade de Engenharia Elétrica e de Computação (FEEC) September 18 – 20, 2019 20/9/2019 8h30-11h









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## 0.1

# Problemas e desafios dos >Big Data< e da IA para as ciências e as sociedades contemporâ neas

- .1 Verdade, causalidade e confiança na era dos fake news: Como devemos encontrar causas, informação de confiança na era da "ciência orientada por dados", simulações e manipulações?
- .2 Qualidade de informação: Como devemos garantir que os dados e fontes de informação sejam de qualidade suficientemente boa e de confiança para os propósitos para os quais os usamos? O que devemos fazer com o movimento de acesso aberto? Que tipo de novas tecnologias podem ser necessárias?

### 0.1

Problemas e desafios dos >Big Data<, algoritmos digitais e da IA para as ciências e as sociedades contemporâ neas

- .3 **Segurança e acesso**: Como podemos proteger adequadamente os dados, tornando-os acessíveis àqueles que precisam deles?
- .4 **Desafios Epistemológicos**: O que define Big Data como um novo método científico? O que é e quais são os desafios?
- .5 Incerteza: Os big data pode ajudar com a incerteza ou apenas gerar novas incertezas? Quais tecnologias são essenciais para reduzir os elementos de incerteza nas ciências baseadas em dados?

O.2Big Data, algoritmos digitais e IA como desafios para a democracia?

• A ameaça à democracia pela desinformação é possibilitada por dois problemas estruturais em nossa infra-estrutura digital: o modo como os dados são coletados e monetizados (capitalismo de vigilância) e como nossa realidade é determinada por algoritmos através da inteligência artificial (IA).

Os governos enfrentam um desafio particular ao governar as plataformas, uma vez que qualquer esforço deve envolver questões de jurisdição competitiva, noções diferentes de liberdade de expressão e tendências tecnológicas de grande escala em direção à automação.

Mecanismos políticos que possibilitem os direitos dos indivíduos (proteção de dados e mobilidade) provavelmente serão mais eficazes do que aqueles que buscam limitar ou regular. Perguntamos então:

# O.2 Big Data, algoritmos digitais e IA como desafios para a democracia?

- Quem é responsável quando os sistemas de IA incluindo curadores de dados usando dados sobre nos, nos prejudicam?
- Como entendemos esses danos e como os resolvemos?
- Onde estão os pontos de intervenção e que pesquisa e regulamentação adicionais são necessárias para garantir que essas intervenções sejam eficazes?
- Atualmente, há poucas respostas a essas perguntas, e as estruturas que atualmente controlam a IA não são capazes de garantir a prestação de contas. À medida que a abrangência, a complexidade e a escala desses sistemas crescem, a falta de responsabilidade e supervisão significativas incluindo salvaguardas básicas de responsabilidade, responsabilidade e devido processo - é uma preocupação cada vez mais

**0.2** Big Data. algoritmos digitais e IA como desafios para a democracia?

Em que sentido nos tornamos dados ou duplos digitais? Com o uso da computação, incluindo as formas virtuais e digitais, o uso de algoritmos tornou-se ubíquo e a formalização do nosso mundo muda a forma de como crescemos e tornamos pessoas Refletiremos aqui uma tendência de programar computadores para programar pessoas, seus hábitos e comportamentos , experiências e socialidades 3) Nesse sentido podemos questionar em que se tornou a missão inicial da *Google* de "organizar as informações do mundo e torná-las universalmente acessíveis e úteis", e como desenvolveu a missão inicial do *Facebook* "Dar às pessoas o poder de compartilhar e tornar o mundo mais aberto e conectado"? Em que medida a Google e o Facebook hoje em dia, entre outras empresas que trabelham com big data, atendem aos quatro pilares da democracia

- 1) eleições livres e justas
- 2) participação ativa do povo, como cidadão, na vida cívica
- 3) Proteção dos direitos humanos de todos os cidadãos
- 4) Estado de direito, no qual as leis e os procedimentos se aplicam igualmente a todos os cidadãos

O.2 Big
Data,
algoritmos
digitais e IA
como
desafios
para a
democracia?

1) Kitchin, R.(2014a). "The Reframing of Science, Social Science and Humanities Research", in: Rob Kitchin. The Data Revolution. Big Data, open data, data infrastructures & their consequences. Los Angeles: Sage 128-148 2) Kitchin, R. (2014b). "Big Data, New Epistemologies, and Paradigm shifts" Big Data & Society, 1-12 2)

How does the availability of Big Data, coupled with new data analytics, challenge established epistemologies across the sciences, social sciences and humanities?

- 3) Chandler, D. (2015). A World without Causation. Big Data and the Coming Age of Posthumanism. Milenium. Journal of International Studies 1-193)
- 4) Roger McNamee. (2019) "Zucked". Waking up to the Facebook Catastrophy. Pinguin Press 2019
- 5) Floridi L, Taddeo M. (2016)"What is data ethics?" Phil.Trans.R.Soc.A374, 20160360.
- 6) Kant, Immanuel (1964). Beantwortung der Frage: Was ist Aufklärung? In W. Weischedel, editor, Werke. Wissenschaftliche Buchgesellschaft, Darmstadt, 1964, Vol. 9
- 7) Bolsover, G., & Howard, P. (2017). "Computational propaganda and political big data: Moving toward a more critical research agenda." Big Data,5(4), p.273-276
- 8) Greyson, D. (2019). "The Social Informatics of Ignorance." Journal of the

Association for Information Science and Technology, 70(4), 412-415

0.3 A velocidade em que algoritmos analizam dados e até tomem decisões sem revisão humana (automatisação de decisão)

### Critic of unsupervised below human threshold decisionmaking (high frequency trading problem)

The contemporary importance of handling dynamic or even "predatory" (Johnson et al 2013) algorithms in the stock markets is nowadays due to the subhuman experiential threshold level events at the millisecond-scale in which data of the global financial market in a new all-machine phase characterized by large numbers of sub-second extreme events automatize the stock market below human decision-making capacities "as humans lose the ability to intervene in real time."(Ibid.)

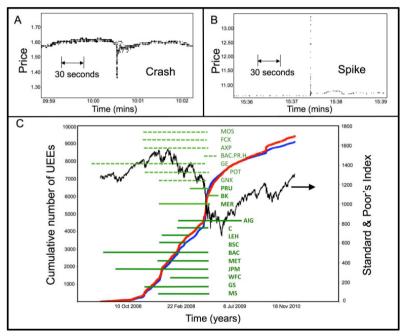
These sub-second extreme algorithmic events are causally linked to the system-wide financial collapse in 2008. JOHNSON, N. et al (2013). "Abrupt rise of new machine ecology beyond human response time ", Nature Scientific Reports 3:2627. DOI: 10.1038/srep02627

### Critic of unsupervised below human threshold decisionmaking (high frequency trading problem)

"Society's techno-social systems are becoming ever faster and more computer-orientated. However, far from simply generating faster versions of existing behaviour, we show that this speed-up can generate a new behavioural regime as humans lose the ability to intervene in real time. Analyzing millisecond-scale data for the world's largest and most powerful techno-social system, the global financial market, we uncover an abrupt transition to a new all-machine phase characterized by large numbers of subsecond extreme events. The proliferation of these subsecond events shows an intriguing correlation with the onset of the system-wide financial collapse in 2008."

JOHNSON, N. et al (2013). "Abrupt rise of new machine ecology beyond human response time ", Nature Scientific Reports 3:2627. DOI: 10.1038/srep02627

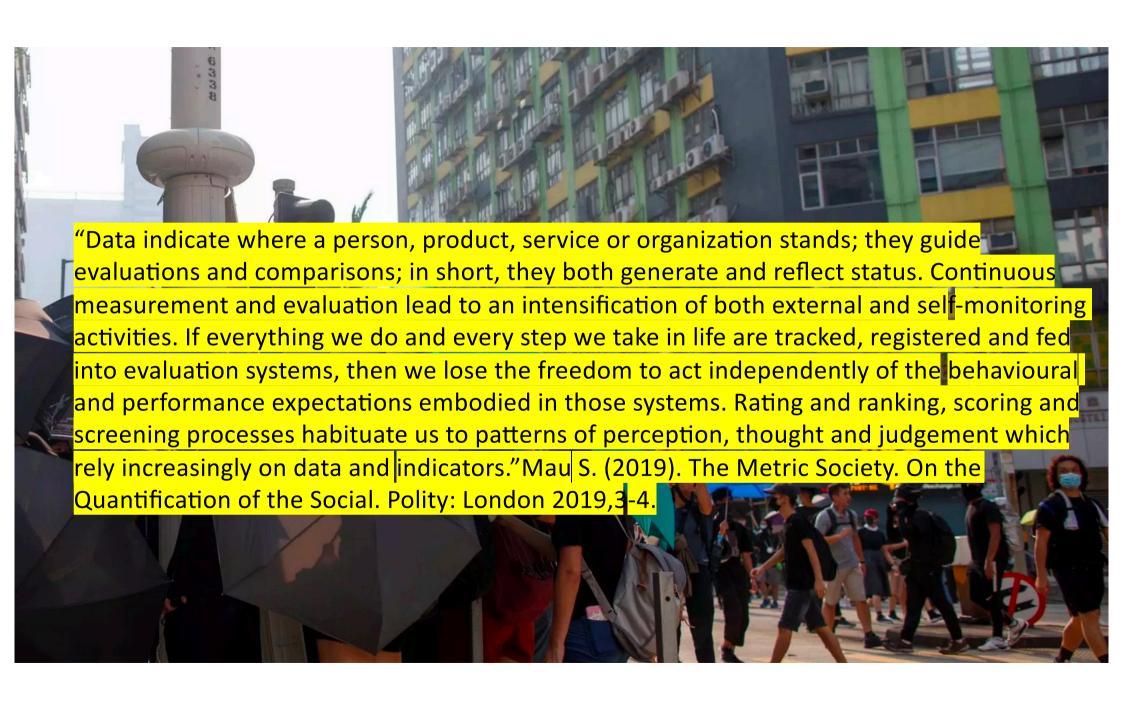
### Critic of unsupervised below human threshold decisionmaking (high frequency trading problem)

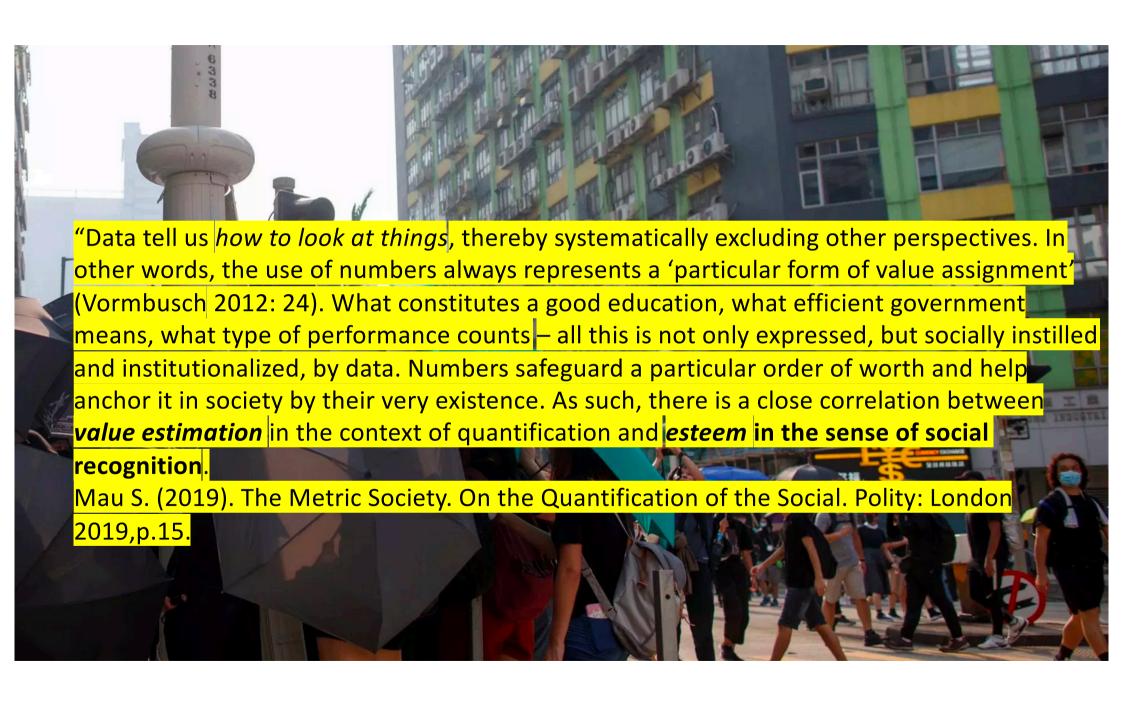


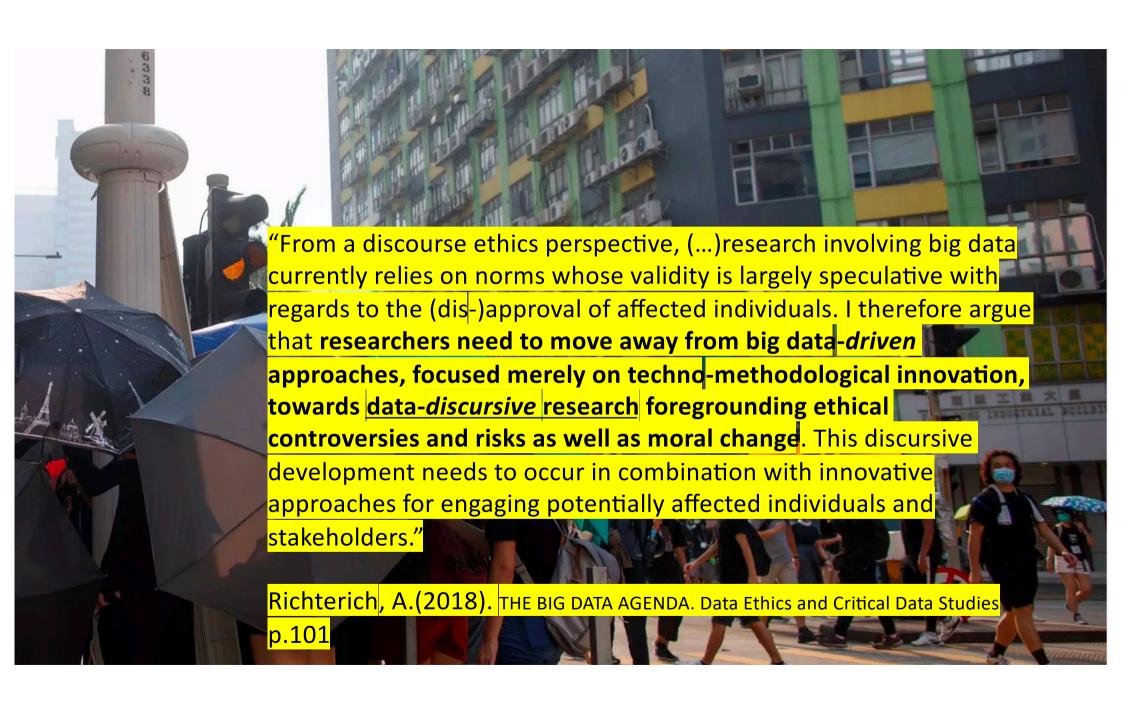
Below human response threshold

Ultrafast extreme events (UEEs).(A) Crash. Stock symbol is ABK. Date is 11/04/2009. Number of sequential down ticks is 20. Price change is -0.22. **Duration is 25 ms (i.e. 0.025** seconds). The UEE duration is the time difference between the first and last tick in the sequence of jumps in a given direction. Percentage price change downwards is 14% (i.e. crash size is 0.14 expressed as a fraction). (B) Spike. Stock symbol is SMCI. Date is 10/01/2010. Number of sequential up ticks is 31. Price change is + 2.75. Duration is 25 ms (i.e. 0.025 seconds). Percentage price change upwards is 26% (i.e. spike size is 0.26 expressed as a fraction). Dots in price chart are sized according to volume of trade. (C) Cumulative number of crashes (red) and spikes (blue) compared to overall stock market index (Standard & Poor's 500) in black, showing daily close data from 3 Jan 2006 until 3 Feb 2011. Green horizontal lines show periods of escalation of UEEs. Non-financials are dashed green horizontal lines, financials are solid green. 20 most susceptible stock (i.e. most UEEs) are shown in ranked order from bottom to top, with Morgan Stanley (MS) having the most UEEs.

JOHNSON, N. et al (2013). "Abrupt rise of new machine ecology beyond human response time ", Nature Scientific Reports 3:2627. DOI: 10.1038/srep02627



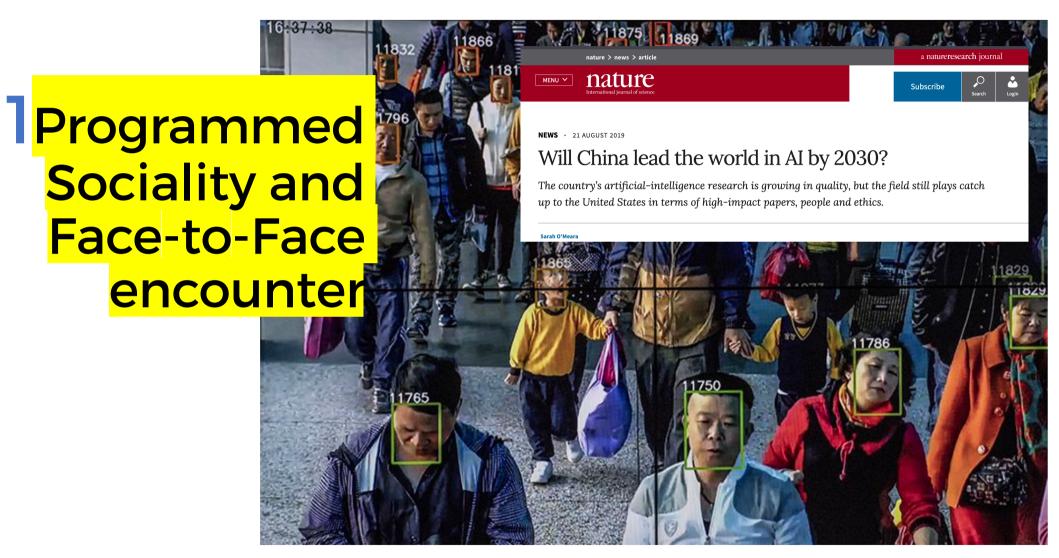






# 1. Facing techno-social engineering (programmed sociality)

Humanity is facing to be increasingly immersed in the digital world, becoming hackable (Harari) in relation to self-, personhood and our sociality. Companies and even states are engaged in digital governance of our behavior and our extended digital doubles and interconnected bodily selves by profiling, tracking, surveillance, automated decision-making and big data that redefine values and our humanity. Brett Frischmann and Evan Selinger call these phenomena "techno-social engineering", "processes where technologies and social forces align and impact how we think, perceive, and act" (2018,4), Taina Bucher (2018) in a similar stance calls them "programmed sociality", in which software and computational infrastructure have become conditions of possibility for sociality in digital media.



China's huge population is helping the nation make great strides in facial-recognition technology. Credit: Gilles Sabrie/NYT/eyevine

# Programmed Sociality and Face-to-Face encounter

"I do not know if one can speak of a 'phenomenology' of the face, since phenomenology describes what appears. So, too, I wonder if one can speak of a look turned toward the face, for the look is knowledge, perception. I think rather that access to the face is straightaway ethical. You turn yourself towards the Other as towards an object when you see a nose, a forehead, a chin, and you describe them. The best way of encountering the Other is not even to notice the colour of his eyes! When one observes the colour of his eyes one is not in a social relationship with the other." Emmanuel Levinas

# 1 Programmed Sociality and Face-to-Face encounter

"Não sei se podemos falar de fenomenologia do Rosto, já que a fenomenologia descreve o que aparece. Assim, pergunto-me se podemos falar de um olhar voltado para o Rosto, porque o olhar é conhecimento, percepção. Penso antes que o acesso ao Rosto é, num primeiro momento ético. Quando se vê um nariz, os olhos, uma testa, um queixo e se podem descrever, é que nos voltamos para Outrem como para um objecto. A melhor maneira de encontrar Outrem é nem sequer atentar na cor dos olhos! Quando se observa a cor dos olhos, não se está em relação social com Outrem. A relação com o Rosto pode, sem dúvida, ser dominada pela percepção, mas o que é especificamente Rosto é o que não se reduz a ele (LÉVINAS, 1988b, p. 77)." Emmanuel Levinas



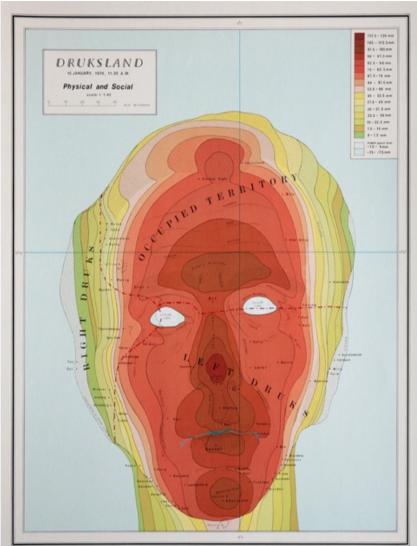
Still: Pedro Costa (2014) Horse Money

"Vision surely inhabits the face, but this optical kinship should not lead one astray: the face is the only prey that the imagehungry hunter can never catch. The eye always returns emptyhanded from the face of the other, who slips out of the forms he assumes, plays representation for the fool and constantly opposes the gaze in which I fix him." Alain Finkielkraut, The **Encounter with the other [on** Levinas] in: A. F. (1997) The Wisdom of Love, p.12-13 **University of Nebraska Press** [1984]

See the "resurrection" of **Albert Einstein's** artificial face in an animated image created by animation scientists at the Film **Academy Baden-**Württemberg using a movable composite **body:** Volker Helzle & Kai Gotz, "Digital Albert Einstein. a Case Study", SIGGRAPH '18 Talks. August 12-16, 2018, Vancouver, BC, Canada, last viewed online 27.1.2019 https://animationsins titut.de/fileadmin/us er upload/files forsc hung/pdf/Publication s/DigitalActor\_Siggra ph2018.pdf

### Face-to-face? Faceing the CGI-Face

"What we call the *face* (Gesicht) in German is less simple and uniform than we might think. There is no basic face in the sense of Dantos basic actions. (...) While the Latin facies, like the English word face derived from it, reminds one of doing (facere) and thus brings the plastic face form to the fore, the French word visage, like the German word Gesicht, refers to seeing and being seen. The Hebrew expression panim, on the other hand, emphasizes the special process of facing, the sight that flashes and multiplies in an alternating gaze, similar to the German word *Antlitz*. The Russian word *lico* means face, cheek, person. In the latter it resembles the Greek word prosopon, which literally refers to the act of looking at, but it does not stand for the face, but also for masks and roles, which are reproduced in Latin with persona. In this way, the view and the speech are combined." Waldenfels (2005, p. 187-188 my translation)



Druksland—Physical and Social—January, 15, 1974, 11:30 am; Beardsmore Gallery London, © Michael Druks (cf: Gerner (2010). Diagrammatic Thinking)

# 1. Facing techno-social engineering (programmed sociality)

For a simulated face is a thing, a surface, a map, an animated thing(coisa/Ding), at best, in analogy to the incomprehensible face, an image that at the same time functions as a death mask - just as in the revival of the face of a dead person in a film (e.g. Albert Einstein's face). The triangle "human-body-image" of which Hans Belting speaks of would have to be extended to include both the sociality-inducing face2face encounter as its *performative* dimension. For it is the *face-to-face encounter*, which essentially constitutes the basis of the social and which is at play when substituted by a deliberately programmed sociality, far more radically than this could ever be expressed in Belting's prosopic unity of mask and face.

# Fundamental critic (Geltungskritik) of programming the social or the F2F encounter

- (1) Algorithms and programs follow the laws of repetition and identity. As far as they have their roots in mathematics, they obey logical principles, in particular the proposition of identity and the principium contradictionis, which excludes contradiction. Art and the social on the other hand, often exploit contradictions and antagonisms and multiple selves and identities in order to make its statement or show and enter singular encounters, that can never be identical.
- "Part of what makes the incipient big data revolution a watershed human moment is that for the first time in history we cannot leave the question of personal identity for later. Are we going to be one tightly integrated self, or will the disintegration of multiple, serial identities remain a vigorous possibility? As the volume and variety of gathered data rises, and as the velocity of the processing accelerates, and as more of our lives plug into those circuits, it's decreasingly possible to avoid sensing that if a decision is not made by us, then the forces of information gathering and surveillance capitalism will make it for us."

  Brusseau, J. (2019) Ethics of Identity in the time of big data, First Monday Vol 24/5, 6<sup>th</sup> of May 2019

# Fundamental critic (Geltungskritik) of programming the social or the F2F encounter

Mark Zuckerberg: "You have one identity. The days of you having a different image for your co-workers, and for the other people you know, are coming to an end. Having two identities for yourself is an example of a lack of integrity."

Zuckerberg cit.in: D. Kirkpatrick, 2010. The Facebook effect: The inside story of the company that is connecting the world. New York: Simon & Schuster. p.199

2) in the successive execution of discrete steps, digital programs recur to their respective predecessors, but reflect neither their own limitations nor the conditions of their possibility or their necessary foundation in materialities. Literally, they know nothing of their attachment to these, so that the peculiarity of art or the concrete social encounter, must fail or at least become paradoxical in its algorithmification/ social Programing.

# Data voluntarism : unifying all data in a datified self?

- Is it at all worrying that our freedom can be restricted for receiving better data of oneself?
- What about status of health detection, motion capture, behavior detection, etc.? (e.g. a Smart Watch combined with app sending our monitored (big) health data to a third party( e.g an insurance company) to analyse our heart rate/sleep patterns?
- This monitoring/profiling can/could also save lives, help find a partner, etc..: How much autonomy and privacy are we willingly giving up for a personalized datified self?







One of my favorite things about building Facebook is I can walk through almost any city in the world and people will stop and tell me stories about how they met their husband or wife through Facebook. It's a great feeling. And until recently, Facebook didn't even have any features to help with dating.

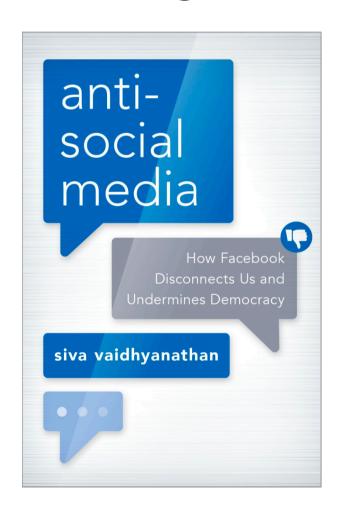
Starting today, we're launching Facebook Dating in the US. I'm excited to see how it'll help people come together and find love around interests, groups and events in common. We've worked with privacy and security experts from the beginning to make it safe and give you control over your experience. Facebook Dating is now live in 20 countries and I'm looking forward to launching more soon.





2016-04-12 Business Insider: <u>Facebook just showed us</u> <u>its 10-year road map in one graphic</u>

# Data Voluntarism as social engineering: Data/ing



"Some claim the world is gradually becoming united, that it will grow into a brotherly community as distances shrink and ideas are transmitted through the air. Alas, you must not believe that men can be united in this way. To consider freedom as directly dependent on the number of man's requirements and the extent of their immediate satisfaction shows a twisted understanding of human nature, for such an interpretation only breeds in men a multitude of senseless, stupid desires and habits and endless preposterous inventions. People are more and more moved by envy now, by the desire to satisfy their material greed, and by vanity."

—Fyodor Dostoevsky, *The Brothers Karamazov* (1880) cit.in Vaidhyanthan (2019)

2 Hacking facial
Big Data by art:
critic of profiling,
tracking,
surveillance,
automated
decision-making
face re-cognition





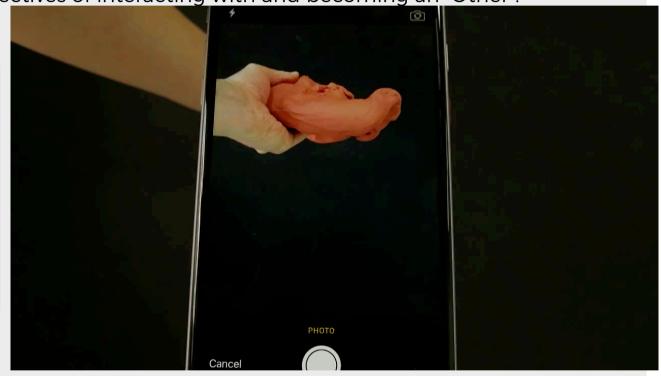
Johanna Reich (2018) FACE DETECTION 2018

HD Video, 5 forms of clay

In her work "Face Detecion" JOHANNA REICH explores the relationship between man and machine in the digital age. In front of a smartphone camera with face detection she is forming clumps of clay until they were recognized by the facial recognition program of the smartphone as humans. At the point of recognition she stops forming. When does the human appear? When does it disappear? And: What does humanity actually look like? The Software obviously has a sense of abstraction, because it discovers it already in roughly worked lumps.

2 Hacking into the face in the age of (Big) Data by art: profiling, tracking, surveillance. automated decisionmaking face recognition

Hacking is understood as a method of probing and investigation in the sense initially proposed by P.R. Samson, of an unconventional application of technology that may enhance the potential of human experience by multiplying its energy, by transforming its habitual uses to open up new perspectives of interacting with and becoming an "Other".



Johanna Reich (2018) http://johannareich.com/mies\_portfolio/face-detection

## Social Credit systems & the metric society



Demonstrators use umbrellas for cover as smart lampposts are damaged in Hong Kong.

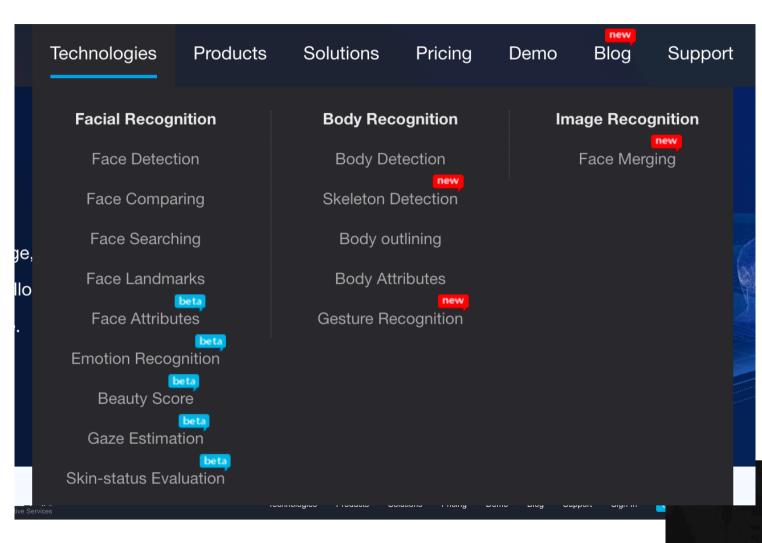
"In spring 2015, the Chinese government announced the spectacular and truly revolutionary plan to develop a so-called **Social Credit System** by 2020. Under this system, data on individual conduct in every social sphere is to be gathered, evaluated and aggregated into a single score. Internet activity, consumption, driving offences, employment contracts, teachers' reports, supervisors' reviews, conflicts with one's land-lord or one's children's behaviour – all this may be factored in and may affect an individual's score. Everyone is to be included, whether they like it or not. The idea is to build up an overall picture of each person's value as a basis for granting or refusing them certain opportunities in terms of housing, employment or access to credit. Authorities will be able to draw on this information when interacting with citizens, as will companies seeking to gain an insight into potential business partners. In this way, the Chinese government proposes to reward honest citizens and punish dishonest ones. The declared aim of the project is to create an environment of trust, a 'mentality of honesty' - and to do so by means of total social control. This book is about the emergence of a society of scores, rankings, likes, stars and grades. It is concerned with data and indicator-based methods of evaluation and monitoring which are encouraging a wholesale quantification of the social sphere. In short, it is a study of the allpervasive phenomenon of sociometrics, or the metric society. Sociologically speaking, quantified selfdescriptions of this kind are not just a reflection of a pre-existing reality, but can be regarded as a generative method of constructing difference. Quantitative representations do not create the social world, they re-create it (Espeland & Sauder 2007); therefore, they should be regarded as a sui generis reality. "Steffen Mau (2019). The Metric Society. On the Quantification of the Social. Polity: London, Introduction, p.1-2; cf. Espeland, Wendy N., and Michael Sauder (2007) 'Rankings and reactivity: how public measures recreate social worlds', American Journal of Sociology

#### PAY WITH YOUR FACE

While in certain restaurants in China customers can "pay with your face" (Feng 2019), we ask: how do companies such as Face++ serve or hack the four pillars of democracy[2] by the power of big data and a monopolizing corporate algorithmic governance? [1] Emily Feng, E. F. (2019, April 25). China's unchecked expansion of datapowered AI raises civic concerns. Financial Times, Retrieved from https://www.ft.com/content/2237 a15e-0219-11e9-bf0f-53b8511afd73



21 1) free and fair elections (cf. the Cambridge Analytical case) 2) active participation of the people, as citizens, in civic life 3) Protection of the human rights of all citizens 4) The rule of law, in which laws and procedures apply equally to all citizens.



#### "Key Features

Facial Recognition: Face++ detects and locates human faces within an image, and returns high-precision face bounding boxes. Face detection is the first step to analyzing and processing faces, Face++ also allows you to store metadata of each detected face for future use. Body Recognition: Face++ detects and locates human bodies within an image, and returns highprecision body bounding boxes. Body detection is the first step to analyzing and processing bodies. You can perform body attributes analysis on each detected body image, to get more detailed body-related information."

Our Technologies



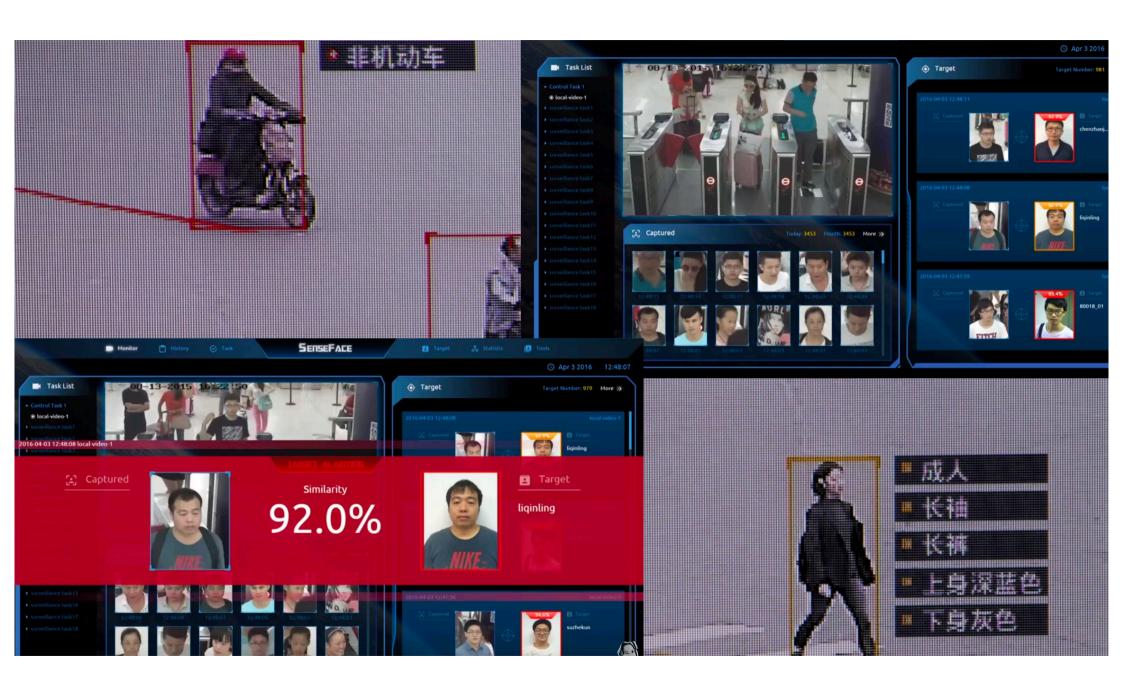


This demonstration of SenseTime's software shows how it can track customers as they move around a department store.

REUTERS/Thomas Peter



22 eerie photos show how China uses facial recognition to track its citizens as they travel, shop — and even use toilet paper Tara Francis Chan Feb. 12, 2018, 6:24 PM Business Insider, retrieved online: https://www.businessin ider.com/how-chinauses-facial-recognitiontechnology-

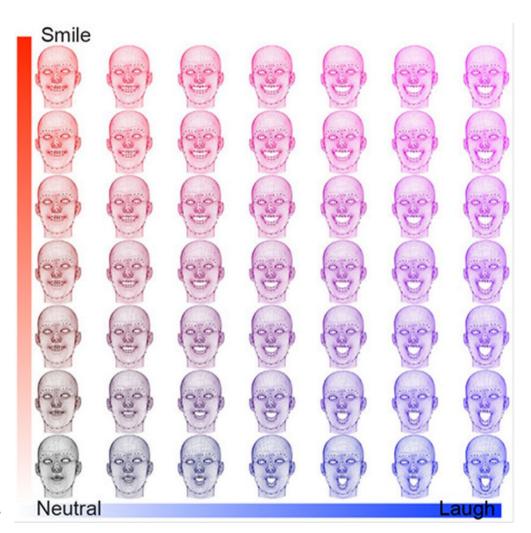


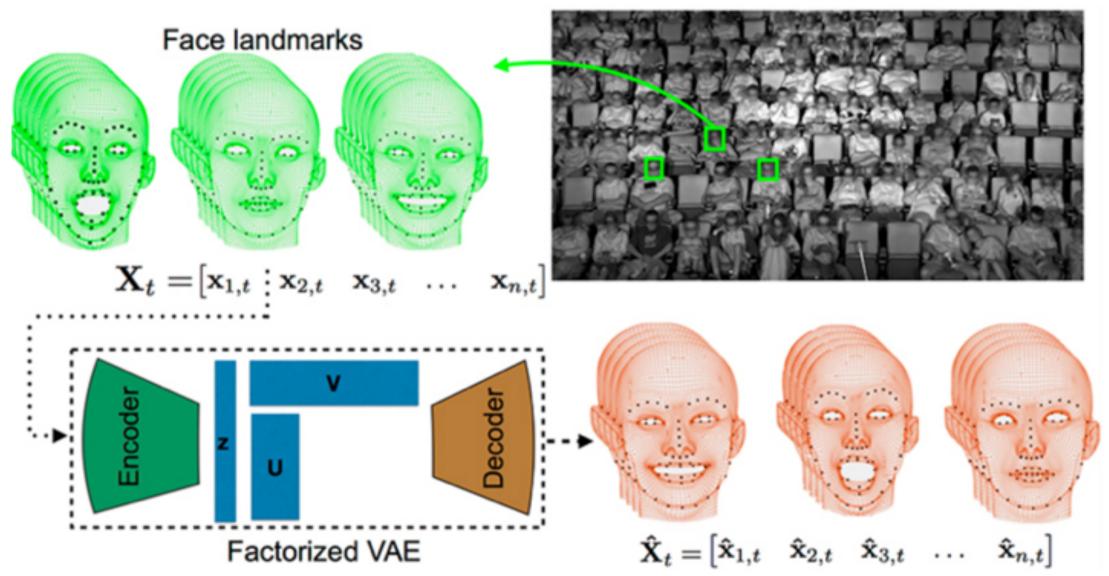
Coded Affective expression with the help of big data analysis: Disney research

The software monitors the viewer's facial expressions using a method called a factorized variation auto encoder or FVAE.

Deng, Zhiwei and Navarathna,
Rajitha and Carr, Peter and Mandt,
Stephan and Yue, Yisong and
Matthews, Iain and Mori, Greg
(2017) Factorized Variational
Autoencoders for Modeling
Audience Reactions to Movies. In:
2017 IEEE Conference on Computer
Vision and Pattern Recognition
(CVPR). IEEE, Piscataway, NJ. ISBN
978-1-5386-0457-1.

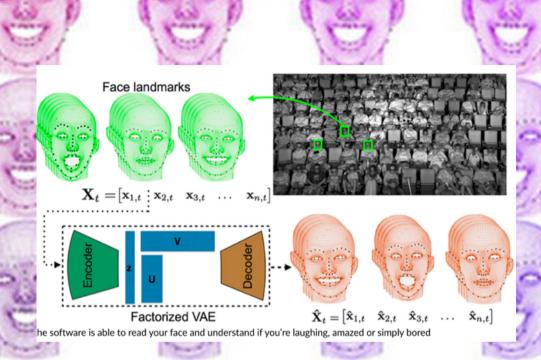
http://resolver.caltech.edu/CaltechA UTHORS:20170721-141656092





he software is able to read your face and understand if you're laughing, amazed or simply bored

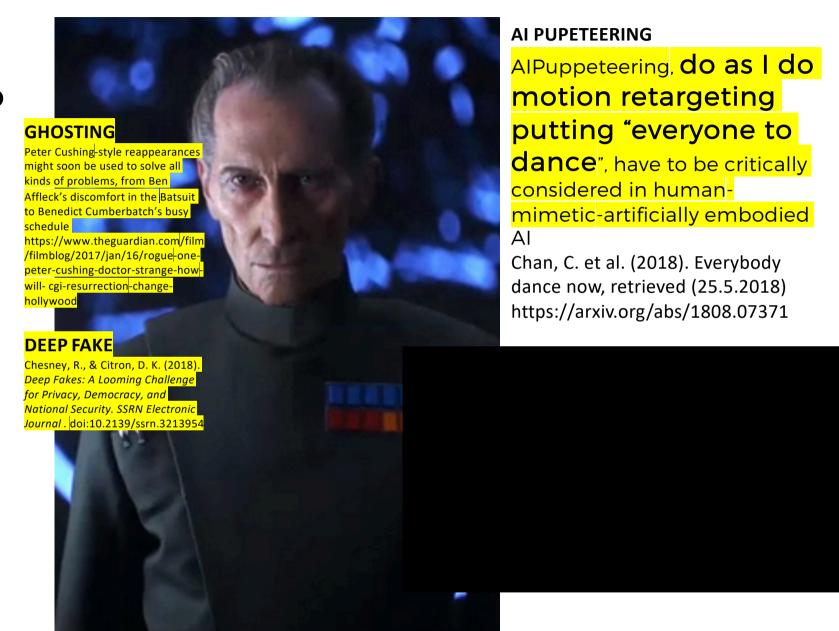
Neural networks model the reactions of viewers to films. Software automatically recognizes patterns in carthographed vector-based facial maps of facial expressions and analyzes how viewers react to films in Disney's research experiment. Presented in collaboration with caltech and at the IEEE Conference on Computer Vision and Pattern Recognition in Hawaii, this study shows how a face recognition system modelled after American filmmakers can help to understand some of the emotions and reactions generated by the films in the audience. The software monitors the viewer's facial expressions using a method called a factorized variation auto encoder or **FVAE.** According to one of the researchers, the individual reaction of a single cinema viewer becomes predictable: "with enough information, the system can assess how an audience is reacting to a movie so accurately that it can predict an individual's responses based on just a few minutes of observation" Deng, Zhiwei and Navarathna, Rajitha and Carr, Peter and Mandt, Stephan and Yue, Yisong and Matthews, Jain and Mori, Greg (2017) Factorized Variational Autoencoders for Modeling Audience Reactions to Movies. In: 2017 IEEE Conference on Computer Vision and Pattern



However, this is already decided at the level of the conception of expressive affects, e.g. a mapped continuity is assumed between two categorically different types of laughter that are no longer distinguishable: between socially coded smiles and physical laughter that is not limited to the face.

# From F2F encounters to Gesture-enhanced Alsociality

How do these human-programmed Avatar encounters change how we communicate and define sociality?



### Deep fake- face animation

Face2Face: Real-time Face Capture and Reenactment of RGB Videos

Justus Thies<sup>1</sup>, Michael Zollhöfer<sup>2</sup>, Marc Stamminger<sup>1</sup>, Christian Theobalt<sup>2</sup>, Matthias Nießner<sup>3</sup>

> <sup>1</sup>University of Erlangen-Nuremberg <sup>2</sup>Max-Planck-Institute for Informatics <sup>3</sup>Stanford University

> > CVPR 2016 (Oral)

## Deep Fake -talking head animation









#### Deep talking head animation

#### Few-Shot Adversarial Learning of Realistic Neural Talking Head models

Egor Zakharov<sup>1,2</sup> Aliaksandra Shysheya<sup>1,2</sup> Egor Burkov<sup>1,2</sup> Victor Lempitsky<sup>1,2</sup>

<sup>1</sup>Samsung Research

<sup>2</sup>Skolkovo Institute of Science and Technology



## Fundamental critic (Geltungskritik) of programming the social

• (3) computer programs can only generate the unregulated in the form of contingency or statistical variations, but not exceed their own mathematical foundations. Their "creation" is, strictly speaking, rather a "re-creation" that takes place transformatively along mathematical or stochastic rules. And to put it another way: while the mathematically virtual can draw solely from possible worlds, as they appear constructible within the framework of consistent modelling, the artistic passion as well as the social encounter can also focus on the impossible, the otherness that has

not been programmed, yet.

SUPER MODEL A Python-based, deep learning gesture recognition model based on large-scale crowd-acting operation to collect over millions of short video clips. The development of a network architecture that allows for classifications of video clips solely with RGB input frames, the iterations necessary to make the neural network run in real-time on embedding devices deployed on an embedded system, works in real-time and can recognize up to a 1000 different actions and motions of body movements and different hand gestures from simple webcam stream. In contrast to traditional visionbased gesture controllers like the Microsoft Kinect, this system requires no depth information.



#### **SuperModel**

Sensor:

Trained on the entirety of our proprietary video data, SuperModel internalizes visual common sense of the world and effectively identifies a wide range of fundamental human-object interactions and human body motions. Use Cases: Smart home, retail, interactive advertising, digital signage, consumer electronics, social robotics, health monitoring, automotive Hardware: CPU, Embedded GPU, Desktop GPU OS: Linux

**RGB Camera** 

# Millie: Al Avatar with mimicking social gesture skills

Immediate Aims: - build an interactive social sales assistance; gesture control systems for car industry

and smart home devices

#### Bigger scope:

to build full digital avatars that could have a personality and

interact with people in various settings including full digital social companion

 exploring avatars that could help teach children in schools or instruct adults in skills such as yoga or cooking

 (cf. Kahn, J. (2018, December 15). Retrieved July 3, 2019, from https://www.bloomberg.com/news/articles/2018-12-15/meet-millie-the-avatar-she-d-like-to-sell-you-apair-of-sunglasses







- Object detector
- Action/Motion detector
- Dialogue system

- Computers are universal machines, their potential extends uniformly over a boundless expanse of tasks. Human potentials, on the other hand, are strong in areas long important for survival, but weak in things far removed. Imagine a "landscape of human competence," having lowlands with labels like M"arithmetic" and "rote memorization," foothills like "theorem proving" and "chess playing," and high mountain peaks labeled "locomotion," "hand-eye coordination" and "social interaction." Advancing computer performance is like water slowly flooding the landscape. A half century ago it began to drown the lowlands, driving out human calculators and record clerks, but leaving most of us dry. Now the flood has reached the foothills, and our outposts there are contemplating retreat. We feel safe on our peaks, but, at the present rate, those too will be submerged within another half century. I propose that we build Arks as that day nears, and adopt a seafaring life!
- Max Tegmark on general Human-Level AI: in Life 3.0: applying a metaphor of Hans Moravec

Arithmetic

