UNIVERSITY OF CAMBRIDGE

The Psychometrics Centre

How psychological digital footprints change our understanding of cyberspace

Professor John Rust

Liberal Democracy in recession

- The Perfect Storm
  - Personal data harvesting (‘psychographics’ or ‘quizzes’)
  - Market segmentation and micro-targeting
  - Digitally applied behavioural science (Nudge)
  - Disruption of traditional news media
  - Chasing virality (fake news and emotions)
  - Machine Learning and AI
- … is happening in Cyberspace
  - But where is that?

Elements

- The Threads
  - *Computer Science: Machine Learning, AI*
  - *Information science and big data analytics*
  - **Obtain psychological metadata from digital footprints**
  - **Micro-target with psychographic segmentation**
  - **Behavioural Science: nudge, emotion, Psy Ops**
  - **Psychometrics; Ancient and Modern**
  - **Cyber threat, Cyber action and Cyber science**

Utopias and Dystopias

B. F. Skinner, Walden Two (1948)

“Utopian society is possible, but only through behavioural engineering. Human beings are sometimes selfish, greedy and mean. Human nature must be changed, engineered so that people are non-competitive, happy and harmonious. Positive rewards can change both outward behaviour and inner motives. People can be ‘conditioned’ to live together in peace and harmony.”

George Orwell, 1984 (1948)

“For, after all, how do we know

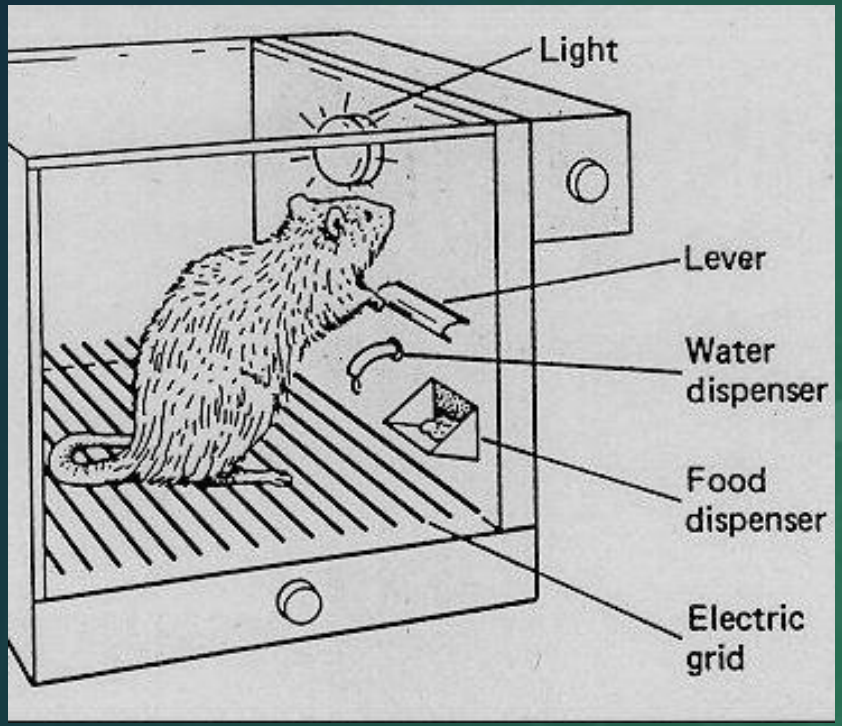
- that two and two make four?

- or that the force of gravity works?

- or that the past is unchangeable?

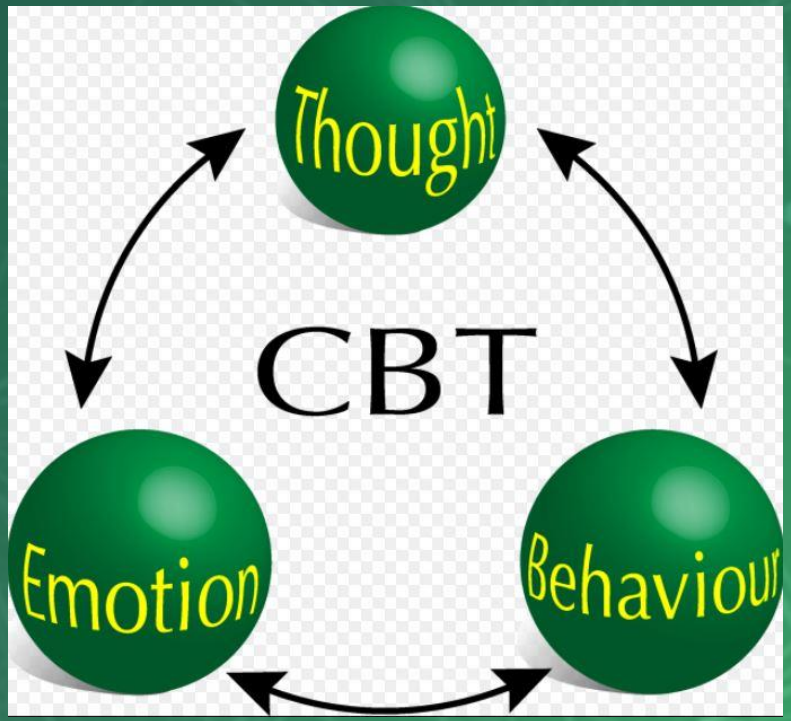
If both the past and the external world exist only in the mind, and if the mind itself is controllable – what then?”

Behavioural Science: “The prediction and control of behaviour” *(B. F. Skinner, 1904-1990)*



Cognitive Behavioural Therapy (CBT)

- “CBT is based on the belief that thought disorders and maladaptive behaviours play a role in the development and maintenance of psychological disorders.”
- Who decides what counts as a ‘though disorder’ or ‘maladaptive behaviour’?
- E.g. Is ‘Not being able to see the obvious advantages of a communist system’ a thought disorder?



The nudge initiative in politics

- “Improving decisions about Health, Wealth and Happiness” (Thaler and Sunstein, 2008)
- Soft paternalism: to encourage people to remedy ‘incorrect behaviour’ by covert means: E.g.
    - Not saving enough for retirement
    - Eating too much junk food
    - Smoking
    - Not getting vaccinated
    - Excessive use of energy
    - Not recycling your rubbish

The UK Behavioural Insights Team

- House of Lords Report (2011) “(Nudges) prompt choices without getting people to consider their options consciously, and therefore do not include openly persuasive interventions such as media campaigns and the straightforward provision of information”

- Cabinet Office (2014) “The Behavioural Insights Team, often called the ‘Nudge Unit’, applies insights from academic research in behavioural economics and psychology to public policy and services.”

Those at risk

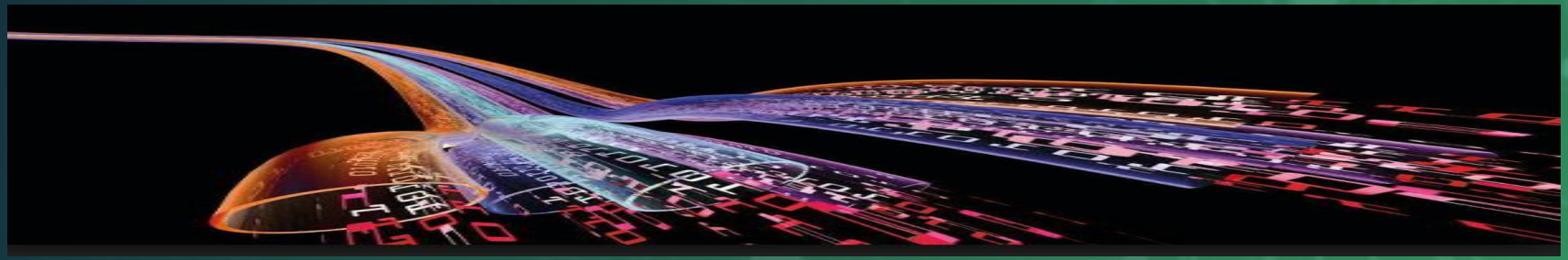
- Health
  - Eating disorders
  - Lifestyle
  - Depression
- Behaviour
  - Dangerous driving
  - Substance abuse
  - Bullying

Those who place others at risk

- Criminals
- Terrorists
- Cyber-criminals
- Sex offenders
- Fraudsters
- ‘Insider Threat’

Brave New World (Aldous Huxley, 1932); Revisited (again)

Records of health, education, crime, tax, credit, spending, travel, work, genealogy, internet and mobile use, location, webcams



All along the digital superhighway, you will be nudged

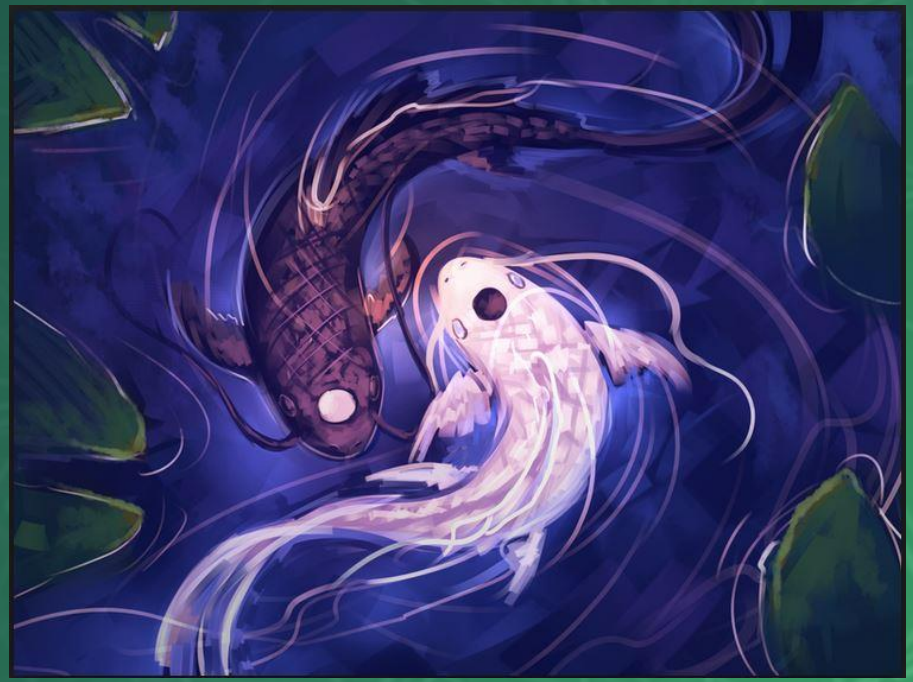
- In the interests of your health, welfare and the environment.
- And to protect society, should you in any way present a threat
- “If you have nothing to hide you have nothing to fear”
  (William Hague, UK Foreign Minister, 2013)

Psychometrics in the online age

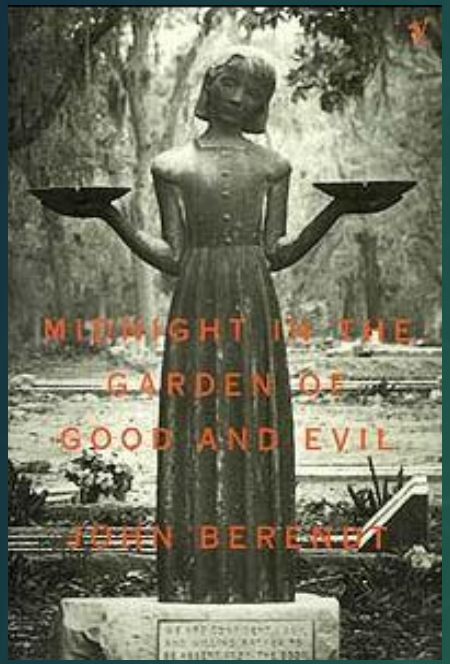
- Online prediction
- Your digital footprint consists of items
- that can be analysed psychometrically
- This predicts your behaviour

- Online control
- These predictions determine
- what you see (and don’t see)
- This determines your behaviour

- **The world is being change**
- **But what is it being changed into?**



The classic conundrum

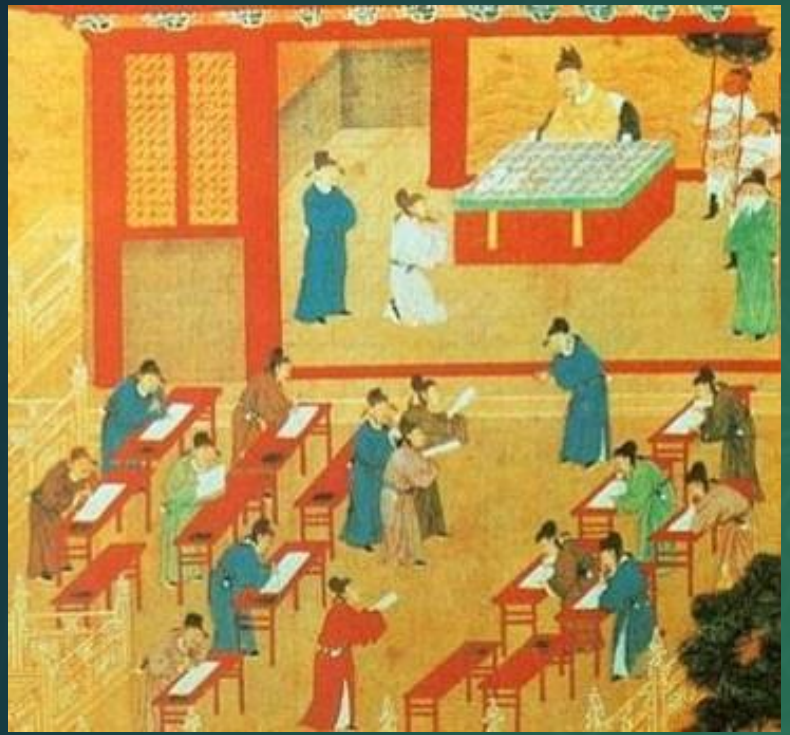


Samuel Taylor Coleridge (Table Talk, 1831)

If men could learn from history, what lessons it might teach us!

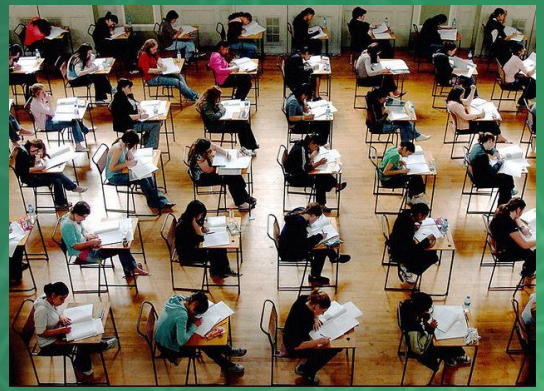
But passion and party blind our eyes, and the light which experience gives us … … is a lantern on the stern which shines only on the waves behind.

Psychometric Prediction



… with the best of intentions

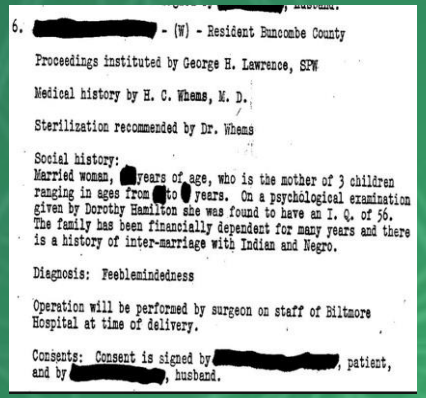
MERITOCRACY



… and also the worst

What is 'fair' to individuals can be unfair to groups

Immigration (Ellis Island), sterilization of the 'unfit', euthanasia



6. [redacted] - (W) - Resident Buncombe County

Proceedings instituted by George H. Lawrence, SPW

Medical history by H. C. Whems, M. D.

Sterilization recommended by Dr. Whems

Social history:
Married woman, [redacted] years of age, who is the mother of 3 children ranging in ages from [redacted] to [redacted] years. On a psychological examination given by Dorothy Hamilton she was found to have an I. Q. of 56. The family has been financially dependent for many years and there is a history of inter-marriage with Indian and Negro.

Diagnosis: Feeblemindedness

Operation will be performed by surgeon on staff of Biltmore Hospital at time of delivery.

Consents: Consent is signed by [redacted], patient, and by [redacted], husband.

Psychometric revolutions

Innovation

- Examinations
- Mental Tests
- Online testing
- Adaptive Testing

Intended consequences

- Meritocracy
- Diagnosis
- Instant results
- Efficiency

Taking our eyes off the ball

Innovation

- Examinations
- Mental Tests
- Online testing
- Adaptive Testing

Unintended consequences

- Discrimination
- Eugenics
- Cyber insecurity
- Artificial Intelligence

Openness

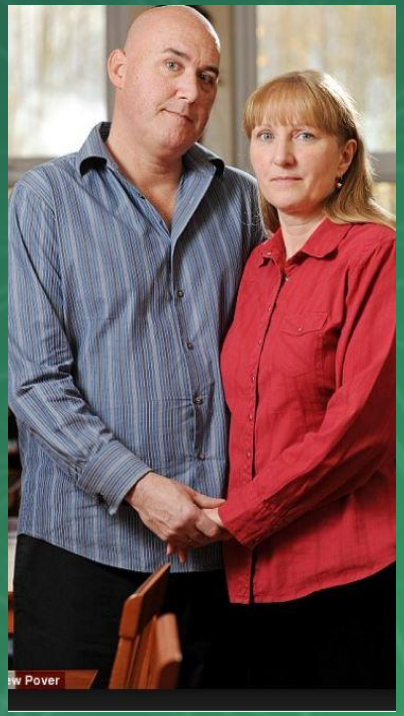
Openness-to-Experience

I am always on the lookout for new ideas to explore

Conventionality

I stick with tried and tested ways of doing things

Conventionalism



Conscientious

Detail conscious

If you get the details right

everything will come out fine.

Seeing the bigger picture

I prefer to leave the boring

details to my staff

Disorganised

Extraversion

Extraversion

I can be the life and soul of any party

Introversion

I have my best ideas when I am left alone

Introversion

Agreeableness

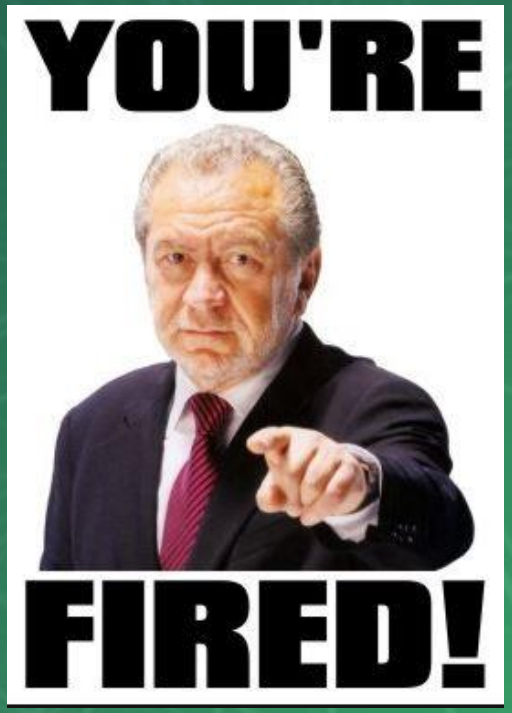
Tendermindedness

I will always try and help my friends when they need me

Disagreeable

I have a special ability to make tough decisions when needed

Toughmindedness



Neurotic

Emotional

I get anxious when I have to make difficult decisions

Unemotional

I am more able than most to cope with disaster

Stable

Temperance

Patience

I am slow to anger and calm in the face of adversity

Hostility

I am sometimes impatience with the foibles of others

Anger

Justice

Fair-mindedness

I am balanced and impartial in decision making

Subversion

I tends to be suspicious of the intentions of others

Envy

Charity

Generosity

I am honest and open in dealings with other

Covetousness

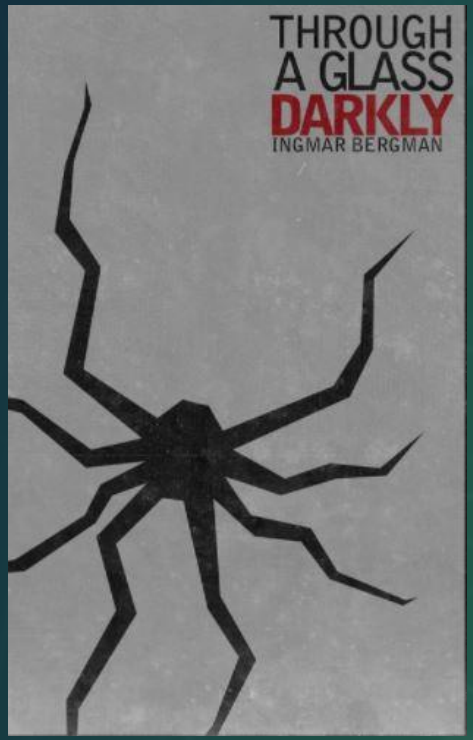
I am occasionally prone to elaborate or distort the truth

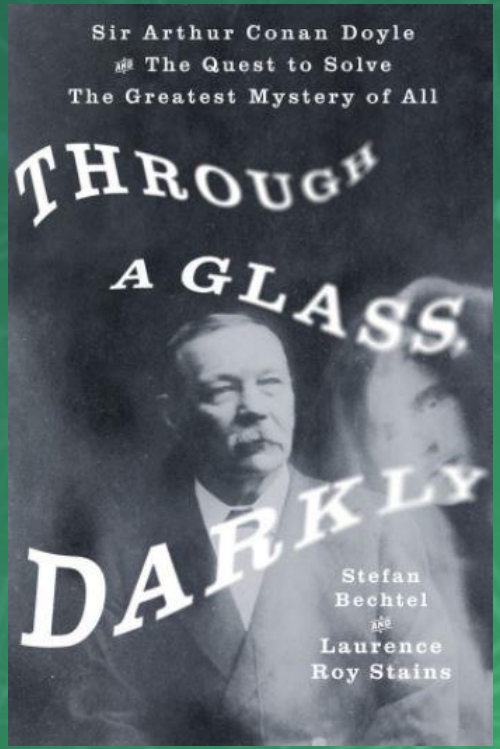
Greed

What and where is Cyberspace?

- “There is no need for cyberspace. All internet related things can be handled with existing conceptual categories. The internet has nothing to do with technology. It is just a person talking to another person, using a different technology”. *(Souls writing on the net, Giancarlo Livraghi, 2001)*
- “Cyberspace is an interactive domain made up of digital networks that is used to store, modify and communicate information. It includes the internet, but also the other information systems that support our businesses, infrastructure and services”. *(UK Cyber Security Strategy, 2011)*
- “For now we see through a glass, darkly; but then face to face. Now I know in part, but then shall I know even as also I am known*”. (St Paul , Letter to the Corinthians 13: 12-13)*

Seeing through a glass darkly





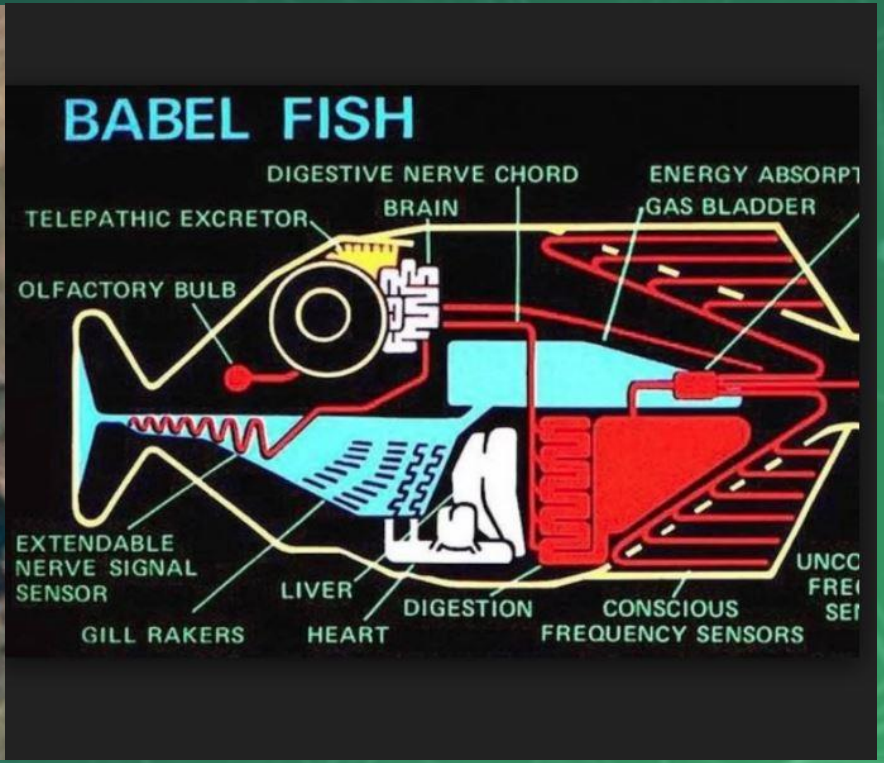
Cyberspace with or without Big Brother

Communication

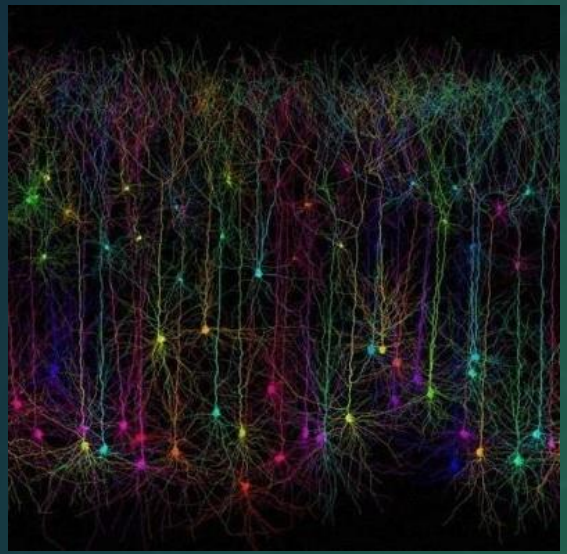
Big Brother

The Cyber Oracle

The Cyber Babel

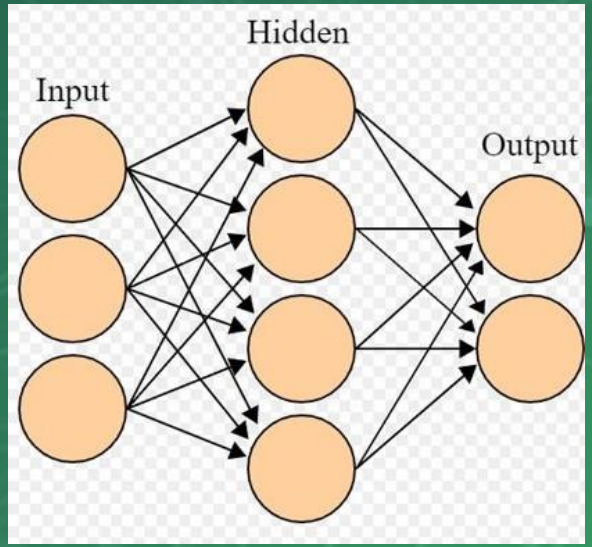


Machine Learning in Cyberspace: Lighting the fire



Neural Networks

Prometheus



Inside the Black Box

Human/machine interaction in Cyberspace

- Using
  - What you look at or search for online
  - Where you are
  - What you click on, like, dislike or share
  - What you write in texts, tweets and emails
  - The images and videos you paste
- Machines can learn:
  - How much money can safely be lent to you
  - Your likelihood of committing a criminal or civil offence
  - What advert to show you to maximize make you more likely to buy
  - What news to show you to change your mind
- And can respond to masses of people simultaneously in real time

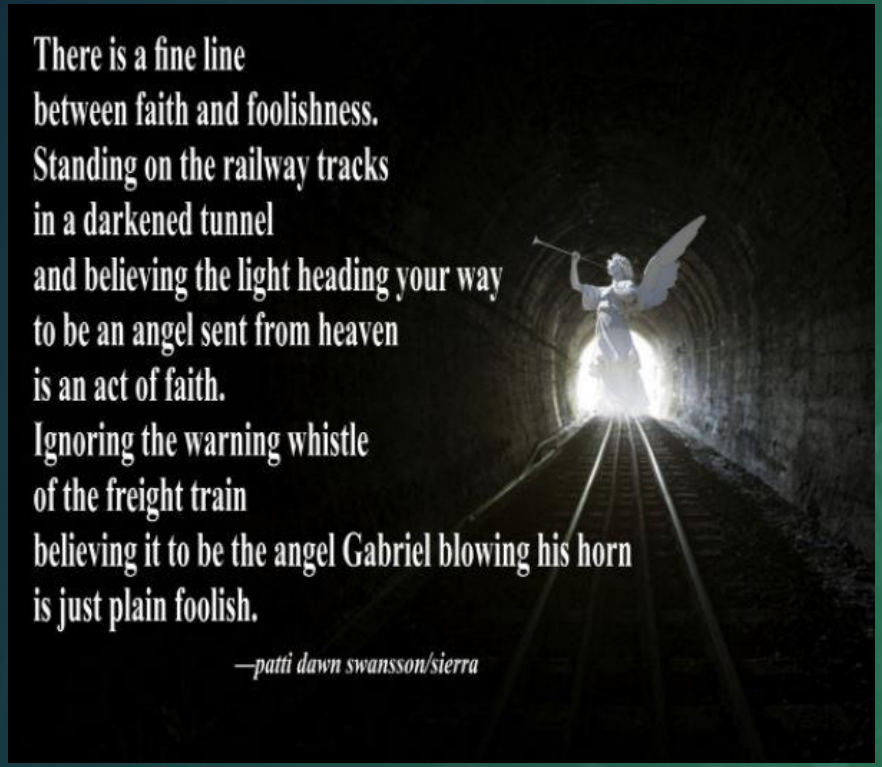
XAI (eXplaining AI)

“As a society, we must be able to look into the ‘black box’ of big data analytics in order to ensure that any particular analytics application can be safely installed and will benefit us all”.

European Data Protection Supervisor Opinion, July 2015
“Meeting the Challenges of Big Data”

Denizens of Cyberspace

Escaping the Pied Piper

Hope left in Pandora's Box

The wake-up call