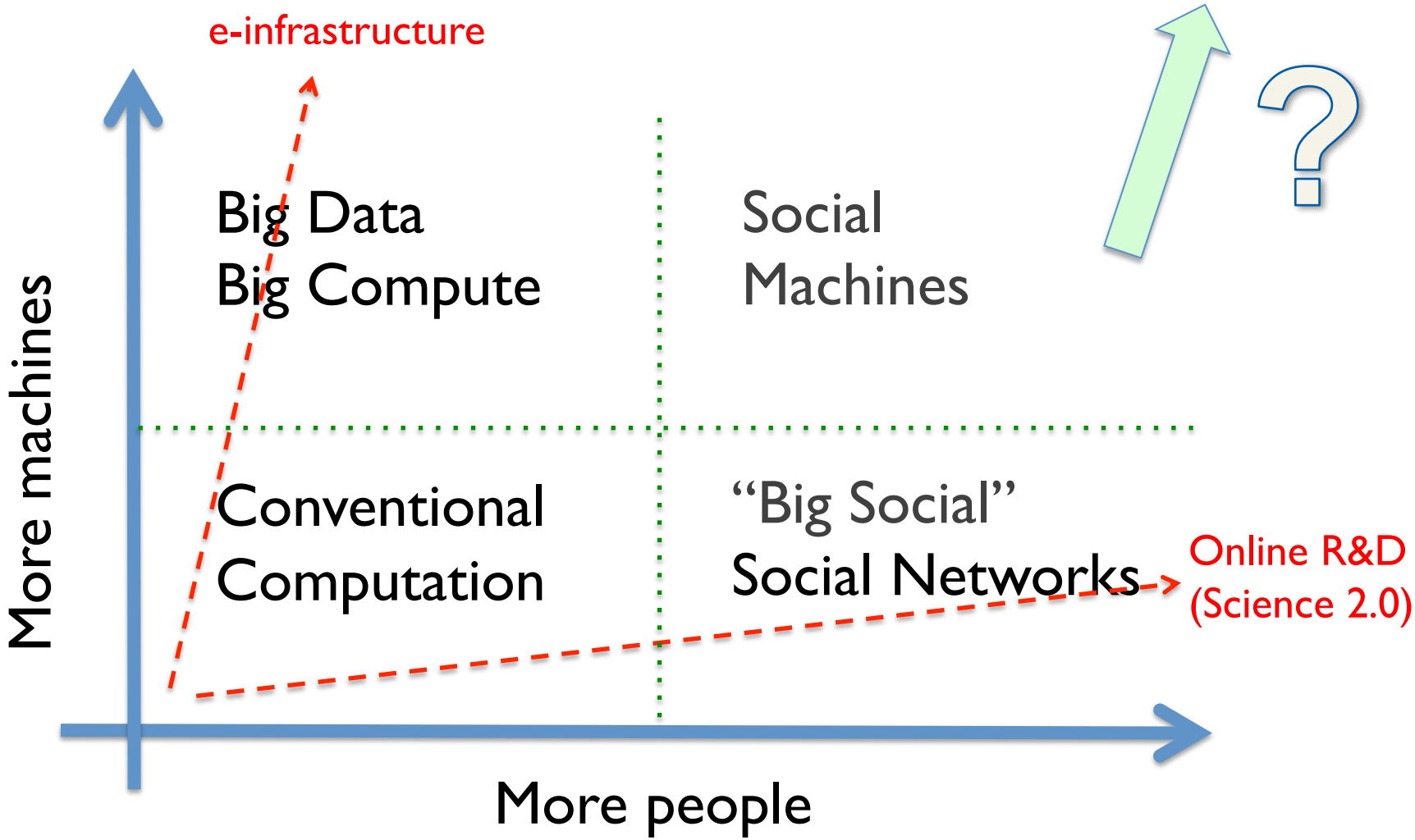
Social Machines:
democratization, disintermediation, and citizens at scale

David De Roure @dder

DIRECTOR, UNIVERSITY OF OXFORD E-RESEARCH CENTRE

The Big Picture(s)

The Big Picture



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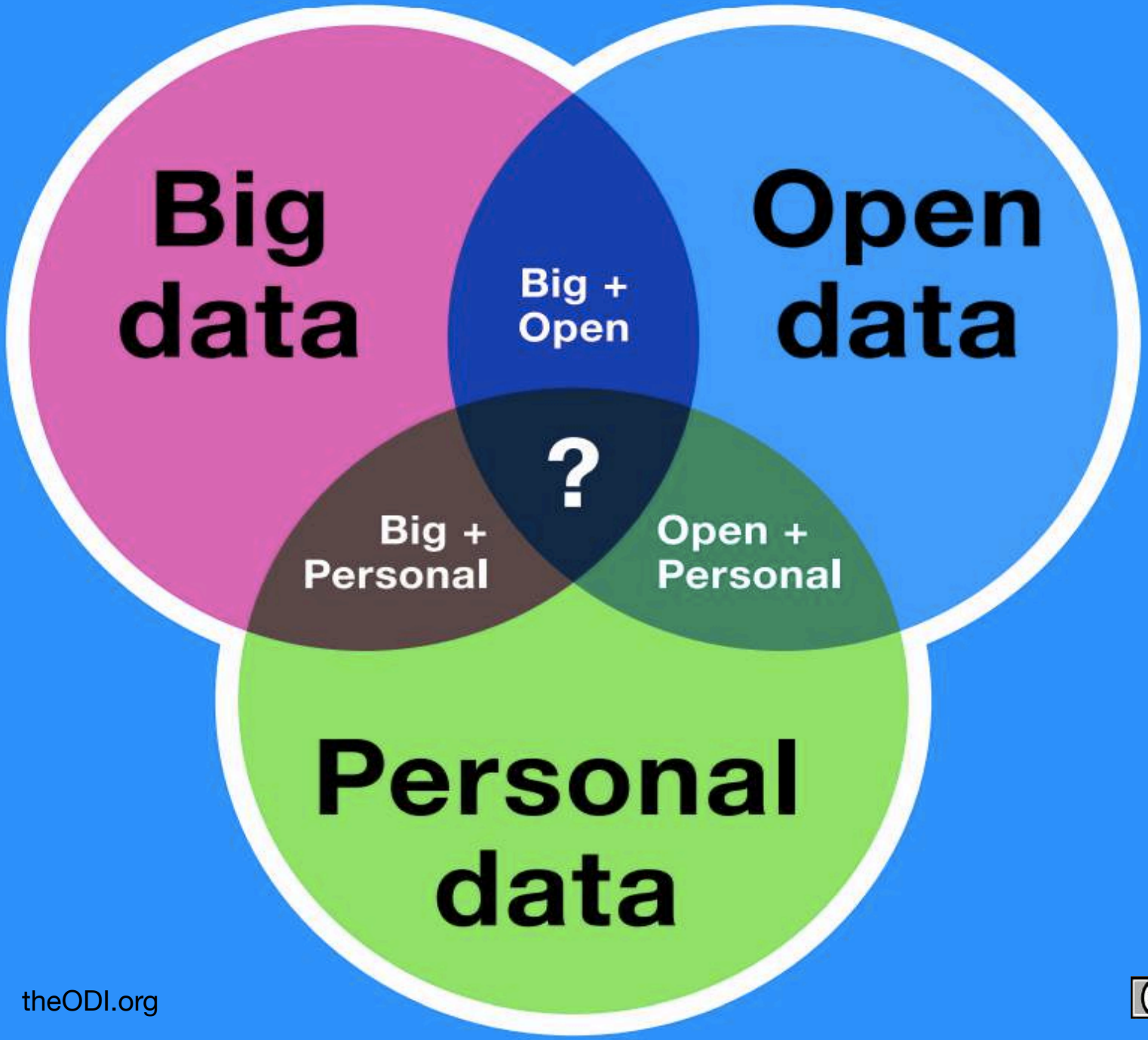
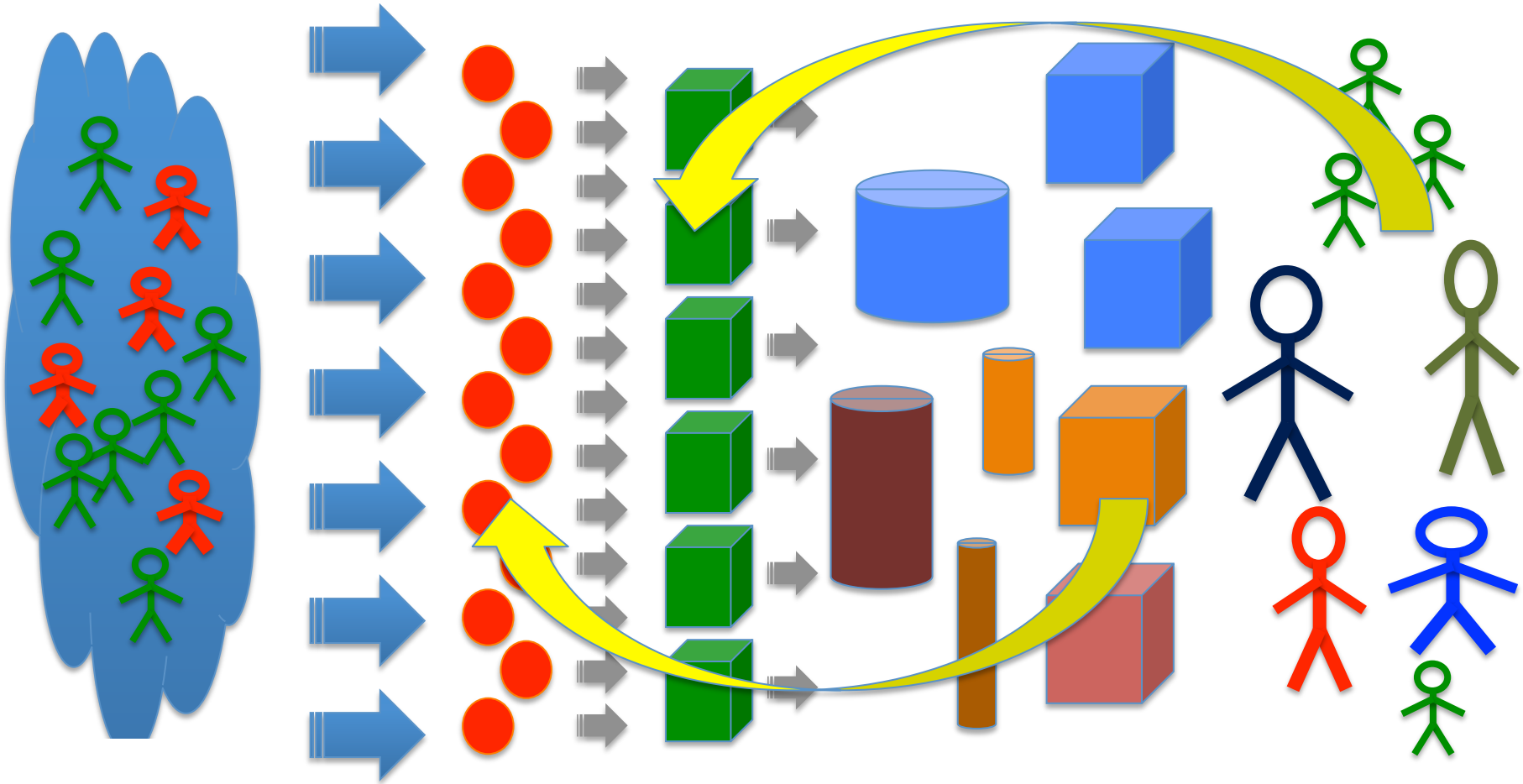

Big data
Open data
Personal data
Big + Open
Big + Personal
Open + Personal
?

BY-SA



Data Detect Filter Store Analytics Analysts

@dder

cc BY

There is no such thing as the Internet of Things

There is no such thing as a closed system

Humans are creative and subversive

The Rise of the Bots A Swarm of Drones

Accidents happen (in the lab, bin)

Holding machines to account Software vulnerability

Where are the throttle points?

@dder

CC BY

Social Machines Empowered Citizens

Social Machines

Real life is and must be full of all kinds of social constraint – the very processes from which society arises. Computers can help if we use them to create abstract social machines on the Web: processes in which the people do the creative work and the machine does the administration... The stage is set for an evolutionary growth of new social engines. The ability to create new forms of social process would be given to the world at large, and development would be rapid.

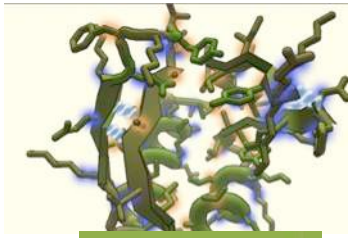
Tim Berners-Lee with Mark Fischetti
Weaving the Web, 1999 (pp. 172–175)

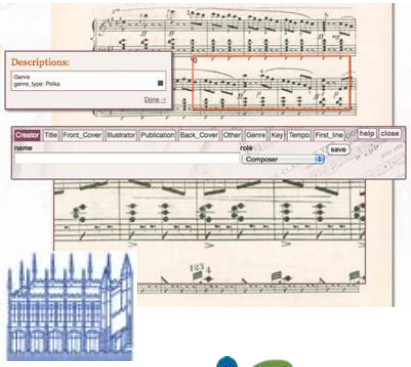
Pip Willcox

Bodleian Libraries
UNIVERSITY OF OXFORD

What's the score at the Bodleian?

SOCIAM





Ushahidi

fold it
Solve Puzzles for Science

WIKIPEDIA

amazon mechanical turk
Artificial Artificial Intelligence

github
SOCIAL CODING

iSpot

edX

climateprediction.net

EasyChair
conference system

hubzero

ZOONIVERSE
REAL SCIENCE ONLINE

media commons
a digital scholarly network

stackoverflow

LIFEGUIDE
COMMUNITY WEBSITE

UBhave

patientslikeme

myexperiment

SOCIAM: The Theory and Practice of Social Machines is funded by the UK Engineering and Physical Sciences Research Council (EPSRC) under grant number EPJ017728/1 and comprises the Universities of Southampton, Oxford and Edinburgh. See sociam.org

Snapshot Serengeti

Go wild in the Serengeti! We need your help to classify all the different

Get Started

Notes from Nature

Take Notes from Nature. Transcribe museum records to take notes from

Get Started

Cell Slider

Analyse real life cancer data. You can help scientists from the world's largest

Get Started

Higgs Hunters

Uncover the building blocks of the universe. Help search for unknown

Get Started

Worm Watch Lab

Track genetic mysteries. We can better understand how our genes work

Get Started

Bat Detective

You're hot on the trail of bats! Help scientists characterise bat calls

Get Started

Seafloor Explorer

Help explore the ocean floor. The HabCam team and the Woods Hole

Get Started

Planet Four

Explore the Red Planet. Planetary scientists need your help to discover what

Get Started

Asteroid Zoo

Help us discover near-Earth asteroids: protect Earth, find potential future

Get Started

Floating Forests

Discover Floating Forests. We're studying how kelp forests grow and

Get Started

Operation War Diary

Explore soldiers' diaries from the First World War. Annotate and tag diaries from

Get Started

Penguin Watch

Spy on penguins for science. Tag penguins in remote regions to help us

Get Started

Disk Detective

Find the birthplace of planets. Help comb our galaxy, looking for stars that could

Get Started

Cyclone Center

Classify over 30 years of tropical cyclone data. Scientists at NOAA's National

Get Started

Planet Hunters

Find planets around stars. Lightcurve changes from the Kepler spacecraft can

Get Started

Galaxy Zoo

How do galaxies form? NASA's Hubble Space Telescope archive provides

Get Started

Moon Zoo

Explore the surface of the Moon. We hope to study the lunar surface in

Get Started

Solar Stormwatch

Study explosions on the Sun. Explore interactive diagrams to learn about the

Get Started

Radio Galaxy Zoo

Match growing black holes to their jets. We need help to compare infrared

Get Started

Chicago Wildlife Watch

Monitor wildlife in urban Chicago. We need your help to tag

Get Started

Science Gossip

Uncover the history of citizen science. Help us to classify their drawings and

Get Started

Chimp & See

Discover the secret life of chimpanzees. We need your help to study, explore,

Get Started

Ancient Lives

Study the lives of ancient Greeks. The data you'll gather helps scholars study

Get Started

Old Weather

Model Earth's climate using historic ship logs. Help recover observations

Get Started

Milky Way Project

How do stars form? Help us find and draw circles on infrared image data

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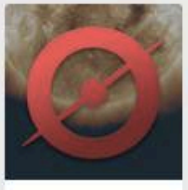


Sunspotter

Sorting out sunspots. Help us organize images by complexity to better

Get Started

Condor Watch

California condors need your help. By tracking their location and social

Get Started

Galaxy Zoo: Bar Lengths

Measure the engines of evolution in disk galaxies.

Get Started

Whales as Individuals

Help us identify individual Humpback Whales by clueing our computer

Get Started

Plankton Portal

Dive into the planktonic world. No plankton means no ocean life. Identify

Get Started

Orchid Observers

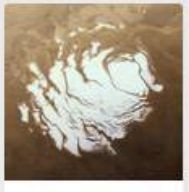
Help measure the effect of climate change. Photograph and classify orchids

Get Started

Wildebeest Watch

Explore collective intelligence in wildebeest!

Get Started



Planet Four: Terrains

Help planetary scientists characterize surfaces on Mars by

Get Started

ZOONIVERSE

People-Powered Research

The Zooniverse provides opportunities for people around the world to contribute to real discoveries in fields ranging from astronomy to zoology. Welcome to the largest online platform for collaborative volunteer research.

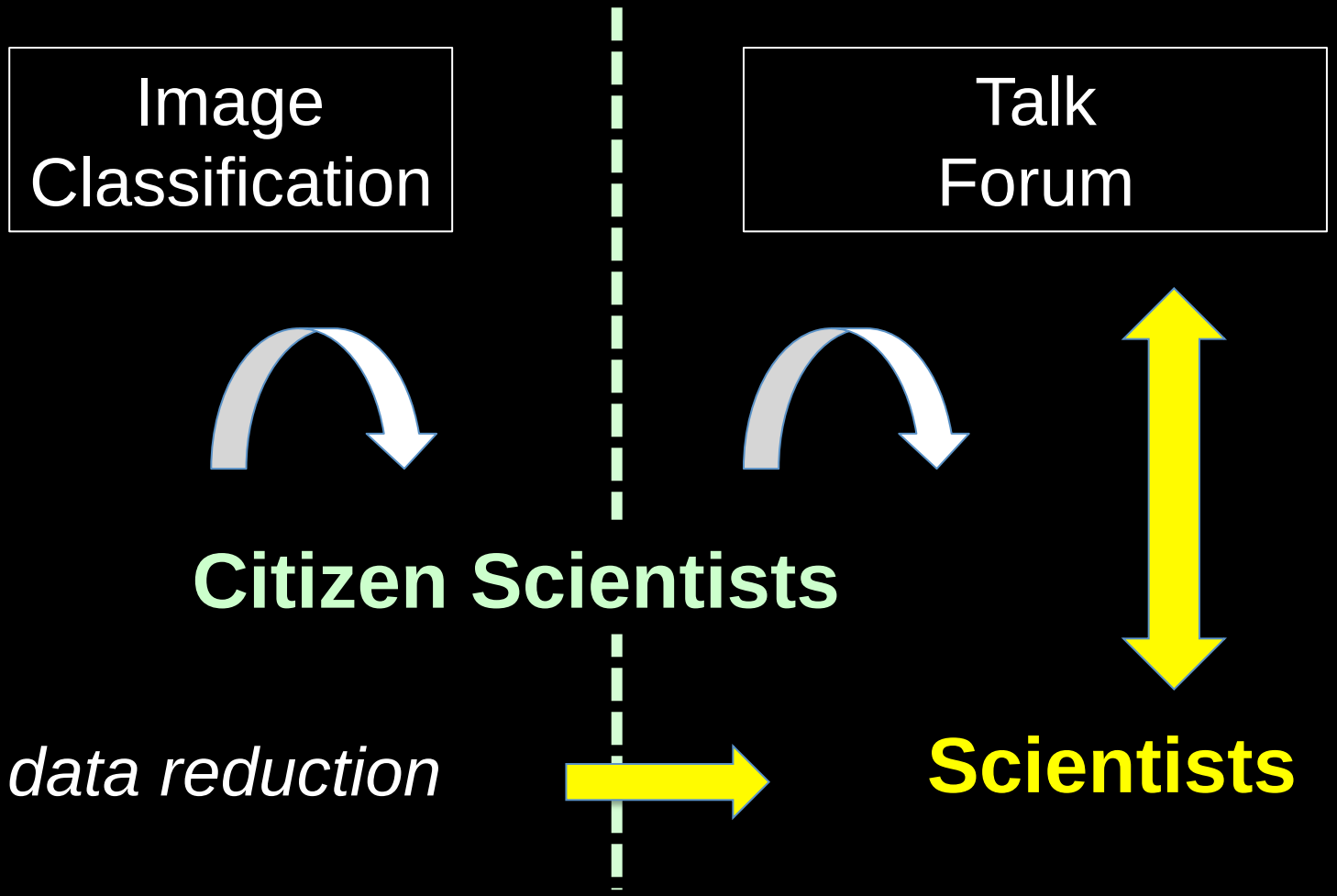


Image Classification
Talk Forum
Citizen Scientists
data reduction
Scientists

Thank you for donating £3 to Cancer Research UK & helping to beat cancer. Join our Facebook group to find out more www.facebook.com/cancerresearchuk

CANCER RESEARCH UK

Photographs: Cancer Research UK

Fundraising Through Digital: How clicktivists, slacktivists and hacktivists are helping us beat cancer sooner—Michael Docherty

https://twitter.com/CR_UK/status/446223117841494016/

Some people's smartphones had autocorrected the word "BEAT" to instead read "BEAR".

"Thank you for choosing an adorable polar bear," the reply from the WWF said. "We will call you today to set up your adoption."

http://www.bbc.com/news/technology-26723457

Citizen Science apps and games from Cancer Research UK

The Impossible Line

This latest project tests your ability to spot genetic faults in breast cancer data. In the lab, scientists map these faults to better understand how mutations cause different subtypes of breast cancer.

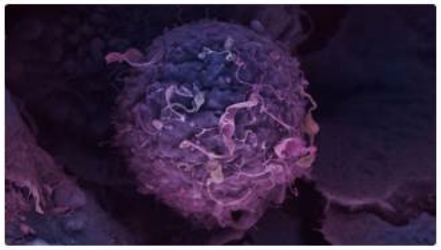
› Find out more

Reverse The Odds

Create a magical world, save a race of adorable minions and help our scientists analyse real cancer data, all through a puzzle game on your mobile.

› Learn more about this free app
› The science behind the game

Play Cell Slider



Spot real cancer cells through Cell Slider and help our scientists improve the diagnosis and treatment of cancer.

› Give it a go!

Play to Cure: Genes in Space

Take the fight against cancer to space in this world-first mobile game that analyses cancer data and plots genetic faults as you play.

› Learn about the free app
› The science behind the game

chordify 2.0

Instant chords for any song:

Search or upload song

David De Roure

Discover
My Library
Premium
Blog
Help
Feedback

http://chordify.net/

Anais Mitchell - Why We Build The Wall

EDIT | DOWNLOAD | DIAGRAMS | SONG | CHORDS | TRANSPOSE | SPEED | PRINT

Gm								F		C					
	G								Gm	C		G			
								F				Em			
G								C		Am		G			
												F			
C				G								B♭		Am	
G								F				C			
	F		C		G	Gm									
C		Am		G		Gm									
		G		F				C				Gm			
						A		G							

Similar to Anais Mitchell - Why We Build The Wall

LEGO IDEAS

2524
SUPPORTERS

447
DAYS LEFT

Support

62k 167 601

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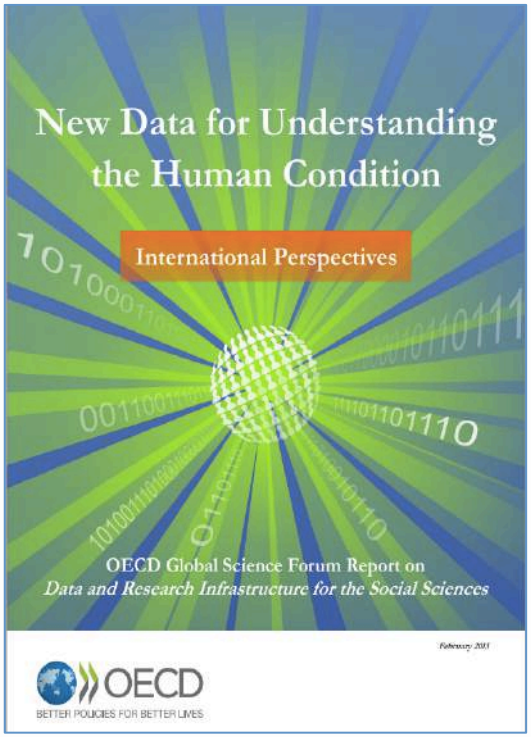
Research benefits of new data

- Undertaking research on pressing policy-related issues **without the need for new data collection**

- Food consumption, social background and obesity
- Energy consumption, housing type and climatic conditions
- Rural location, private/public transport alternatives and incomes
- School attainment, higher education participation, subject choices, student debt and later incomes



http://www.oecd.org/science/sci-tech/new-data-for-understanding-the-human-condition.htm

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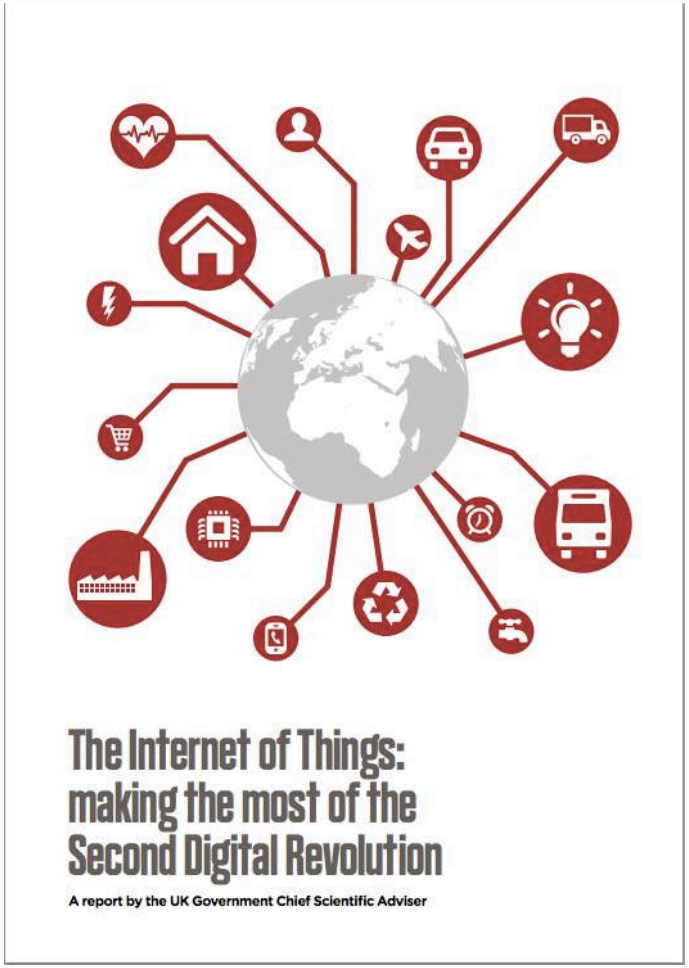
A rehearsal for the future



- The Internet of Things describes a world in which everyday objects are connected to a network so that data can be shared.
- But it is really as much about people as the inanimate objects.
- It is impossible to anticipate all the social changes that could be created by connecting billions of devices.

https://www.gov.uk/government/publications/internet-of-things-blackett-review

Social Machines as disruptive (socio-)technology

"Yet Wikipedia and its stated ambition to "compile the sum of all human knowledge" are in trouble. The volunteer workforce that built the project's flagship, the English-language Wikipedia—and must defend it against vandalism, hoaxes, and manipulation—has shrunk by more than a third since 2007 and is still shrinking…

The main source of those problems is not mysterious. The loose collective running the site today, estimated to be 90 percent male, operates a crushing bureaucracy with an often abrasive atmosphere that deters newcomers who might increase participation in Wikipedia and broaden its coverage…"

http://www.technologyreview.com/featuredstory/520446/the-decline-of-wikipedia/

Commons Select Committee

Social media data and real time analytics

07

Trac
anal
data
the possibility of studying social p
of populations as an alternative to
The data from social media is des
quantitative scale" and requires ir

House of Commons

Science and Technology

MPs label Twitter and Facebook T&Cs 'more complex than Shakespeare'

Report, together with formal minutes relating to the report

Ordered by the House of Commons to be printed 19 November 2014

http://www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/news/report-responsible-use-of-data/

WIRED You Can't Do Squat About Spotify's Eerie New Privacy Policy

Spotify Wants to Go Through Your Phone

"With your permission, we may collect information stored on your mobile device, such as contacts, photos, or media files. Local law may require that you seek the consent of your contacts to provide their personal information to Spotify, which may use that information for the purposes specified in this Privacy Policy." – Spotify

Like a jealous ex, S
see who you're talk
collect from you is
but it's doing it rega
go through your cor
sharing their data w
ridiculous.

BRIAN BARRETT SECURITY 08.21.15 11:25 AM

SPOTIFY CLEARS UP ITS CONTROVERSIAL PRIVACY POLICY

http://www.wired.com/2015/08/cant-squat-spotifys-eerie-new-privacy-policy/

Gartner Digital Marketing Transit Map

Use this map to understand the connections among business functions (neighborhoods), applications (tracks) and providers (stations) so you can easily mediate discussions between marketing and IT.

https://www.gartner.com/technology/research/digital-marketing/transit-map.jsp

Principles of Robotics

1. Robots are multi-use tools. Robots should not be designed solely or primarily to kill or harm humans, except in the interests of national security.
2. Humans, not robots, are responsible agents. Robots should be designed; operated as far as is practicable to comply with existing laws & fundamental rights & freedoms, including privacy.
3. Robots are products. They should be designed using processes which assure their safety and security.
4. Robots are manufactured artefacts. They should not be designed in a deceptive way to exploit vulnerable users; instead their machine nature should be transparent.
5. The person with legal responsibility for a robot should be attributed.

Association for Computing Machinery
WEB SCIENCE 2015 #WebSci15

https://www.epsrc.ac.uk/research/ourportfolio/themes/engineering/activities/principlesofrobotics/

Alan Winfield

Principles of ~~Robotics~~ Social Machines?

1. Social Machines are multi-use tools. Social Machines should not be designed solely or primarily to kill or harm humans, except in the interests of national security.
2. Humans, not Social Machines, are responsible agents. Social Machines should be designed; operated as far as is practicable to comply with existing laws & fundamental rights & freedoms, including privacy.
3. Social Machines are products. They should be designed using processes which assure their safety and security.
4. Social Machines are manufactured artefacts. They should not be designed in a deceptive way to exploit vulnerable users; instead their machine nature should be transparent.
5. The person with legal responsibility for a Social Machine should be attributed.

Computing Machinery
WEB SCIENCE 2015

Studying Social Machines

Ecosystem Perspective

- We see a community of living, hybrid organisms, rather than a set of machines which happen to have humans amongst their components
- Their successes and failures inform the design and construction of their offspring and successors

Destinations by henrikj https://www.flickr.com/photos/henrikj/6333091742/
Attribution, Non Commercial (http://creativecommons.org/licenses/by-nc/2.0/)
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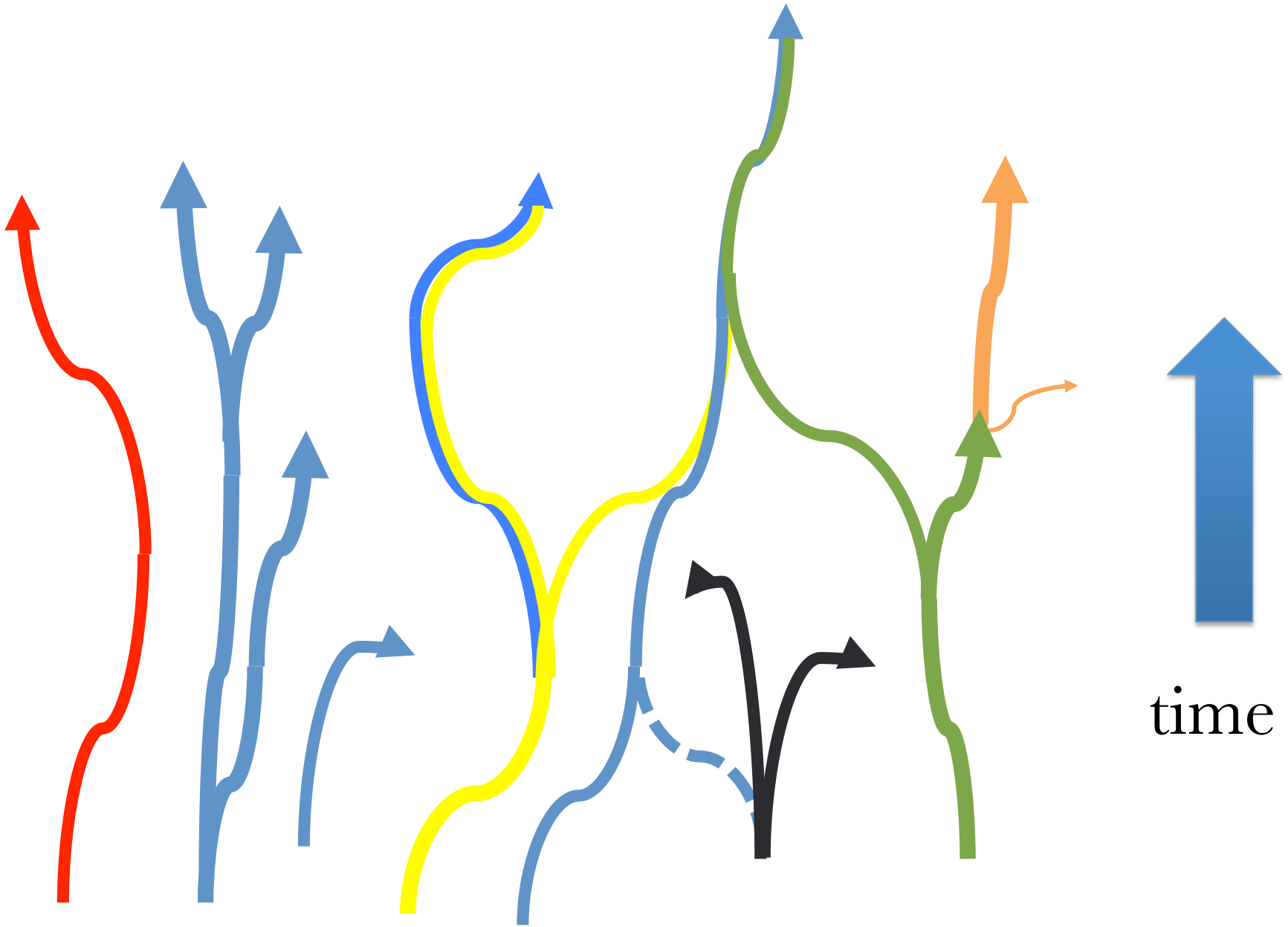
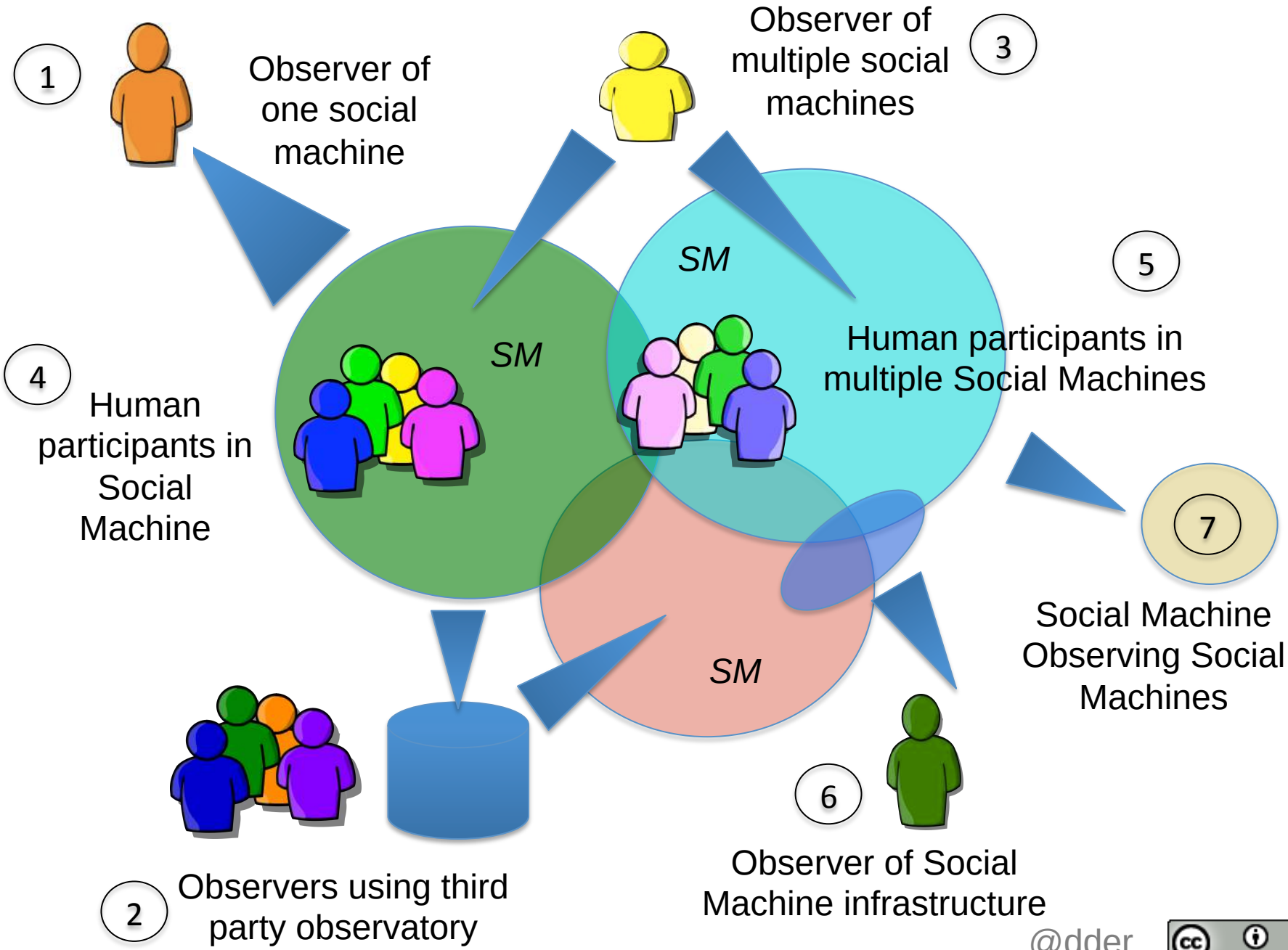
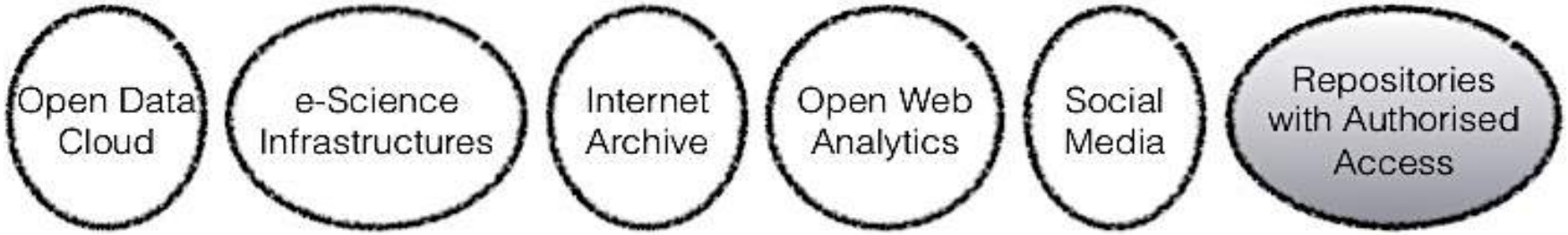


Social Machine instances

@dder

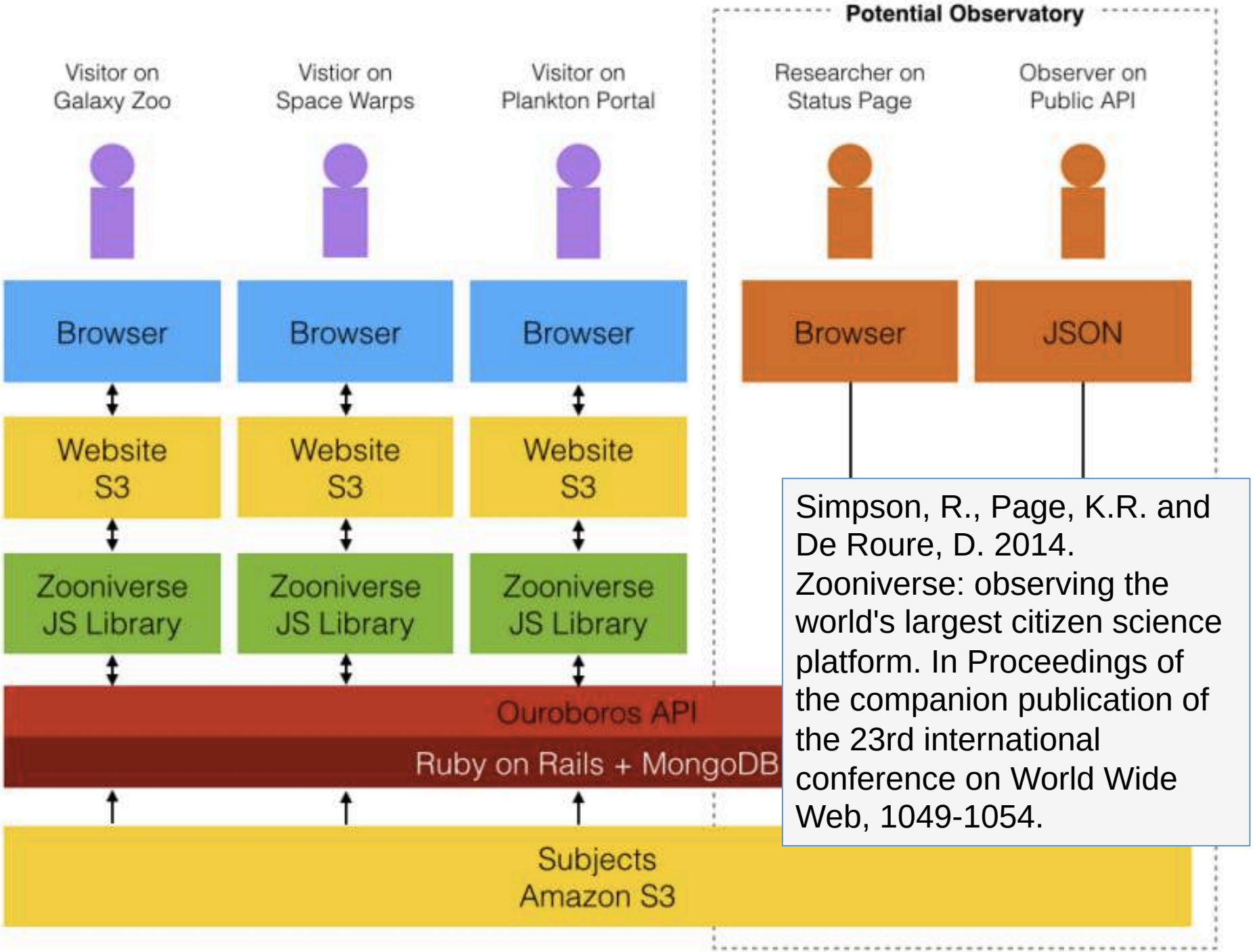

1
Observer of one social machine
Observer of multiple social machines
3
SM
SM
SM
5
Human participants in multiple Social Machines
4
Human participants in Social Machine
7
Social Machine Observing Social Machines
6
Observer of Social Machine infrastructure
2
Observers using third party observatory
@dder

The Web Observatory



webscience TRUST

Tiropanis, T., Hall, W., Shadbolt, N., De Roure, D., Contractor, N. and Hendler, J. 2013. The Web Science Observatory, IEEE Intelligent Systems 28(2) pp 100–104.

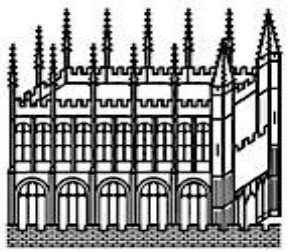


Simpson, R., Page, K.R. and De Roure, D. 2014. Zooniverse: observing the world's largest citizen science platform. In Proceedings of the companion publication of the 23rd international conference on World Wide Web, 1049-1054.

Working out the Plot

The Role of Stories in Social Machines

By Ségolène Tarte, David De Roure and Pip Willcox



Tarte, S.M., De Roure, D. and Willcox, P. 2014. Working out the Plot: the Role of Stories in Social Machines. *SOCM2014: The Theory and Practice of Social Machines,* Seoul, Korea, International World Wide Web Conferences pp. 909–914

STORYTELLING AS A STETHOSCOPE FOR SOCIAL MACHINES

1. Sociality through storytelling potential and realization
2. Sustainability through reactivity and interactivity
3. Emergence through collaborative authorship and mixed authority

Zooniverse is a highly storified Social Machine

Facebook doesn't allow for improvisation

Wikipedia assigns authority rights rigidly

http://ora.ox.ac.uk/objects/ora:8033

Prosopography

"Prosopography integrates more or less large numbers of descriptive individual biographical studies into quantitative and statistic research on the combined total of these biographical studies."

"Prosopography is a typical inductive method. It starts from concrete data [...] and aims at understanding general phenomena."

Verboven, Koenraad, Myriam Carlier, and Jan Dumolyn. 2007. 'A Short Manual to the Art of Prosopography'. in *Prosopography Approaches and Applications. A Handbook*, 35–70. Unit for Prosopographical Research (Linacre College).

Pip Willcox

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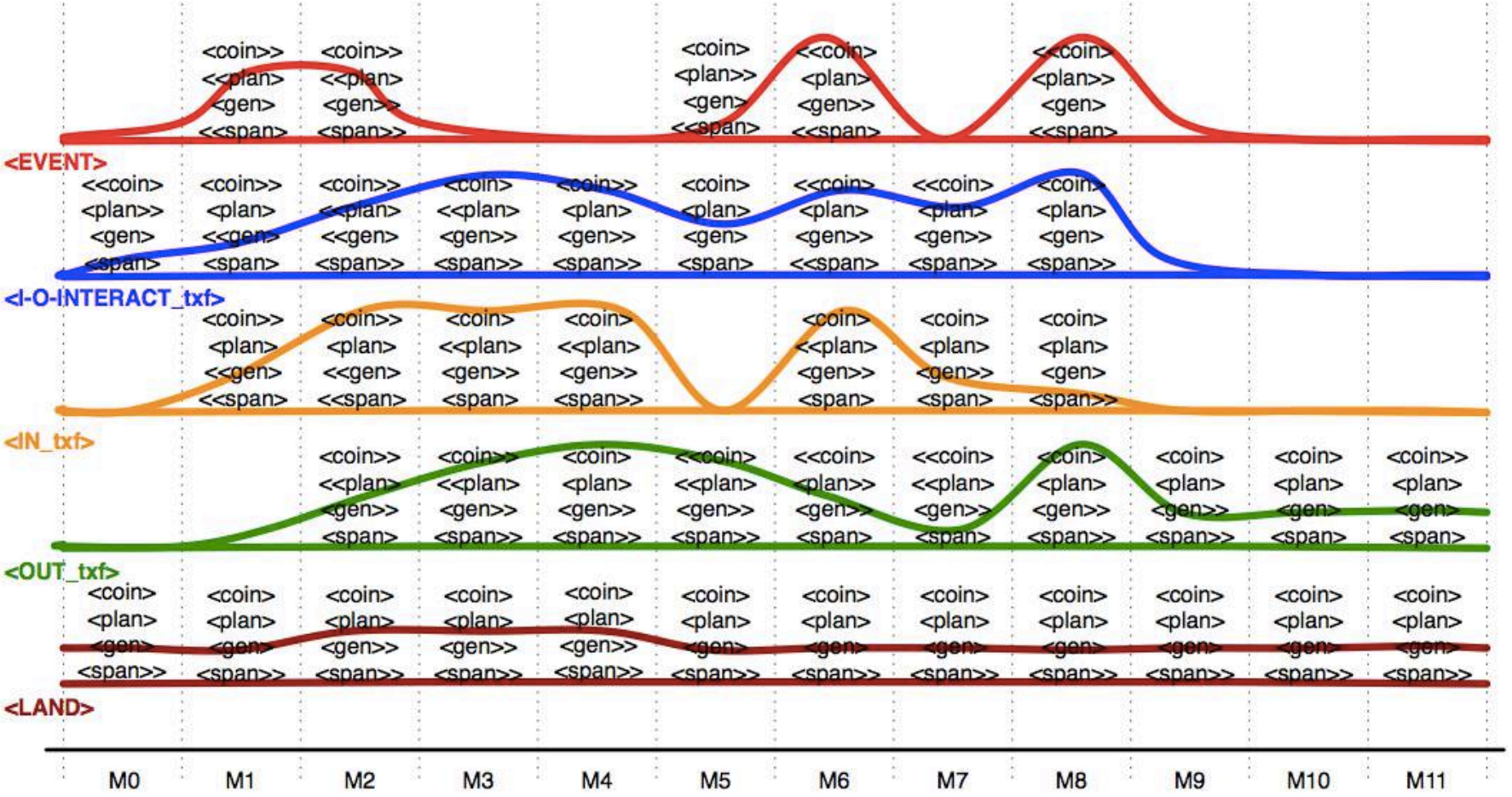
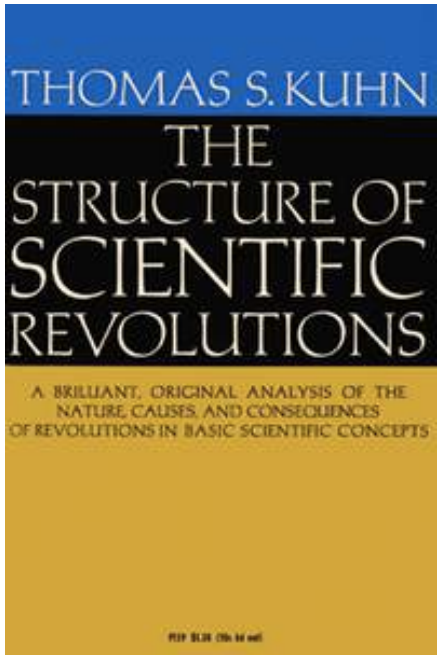
Archetypal Narratives in Social Machines: Approaching Sociality through Prosopography



Tarte, S. Willcox, P., Glaser, H. and De Roure, D. 2015. Archetypal Narratives in Social Machines: Approaching Sociality through Prosopography. ACM Web Science 2015.

SégolèneTarte

Kuhn cycle



Normal Science – computer science is a puzzle-solving activity under our current paradigm, inspired by great achievements.

Successful social machines, like Wikipedia, are the ***anomaly***. They do not yield to standard techniques despite attempts to extend those techniques and fit social machines in as machines. *cf* Newtonian mechanics.

We are in the period of ***crisis***, where the failure of established methods permits us to experiment with new methods to crack the anomaly. We experiment with social machines as an underpinning model.

If successful, social machines become the *n* scientific revolution has occurred. This is e papers and books that train the next gener

De Roure, D. 2014. The Emerging Paradigm of Social Machines, Digital Enlightenment Yearbook 2014 227 K. O'Hara et al. (Eds.) IOS Press, 2014. pp 227-234.

In 1999 Tim Berners-Lee predicted the rise of *social machines*, anticipating that "the ability to create new forms of social process would be given to the world at large, and development would be rapid".

This is clearly demonstrated through today's social media, an arena where democratization and disintermediation encourage participation, and where new phenomena are set to emerge with increasing automation.

The social machines perspective is a useful lens for all those engaged with socio-technical systems – which is all of us, as participants, observers and designers, but above all as humans.

Thanks to Chris Lintott, Grant Miller, Kevin Page, Ségolène Tarte, Pip Willcox, our SOCIAM colleagues in Southampton and Edinburgh, Susan Halford, and Alan Winfield.

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@dder

http://www.slideshare.net/davidderoure/social-machines-democratization

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Oxford e-Research Centre

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FAST

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