

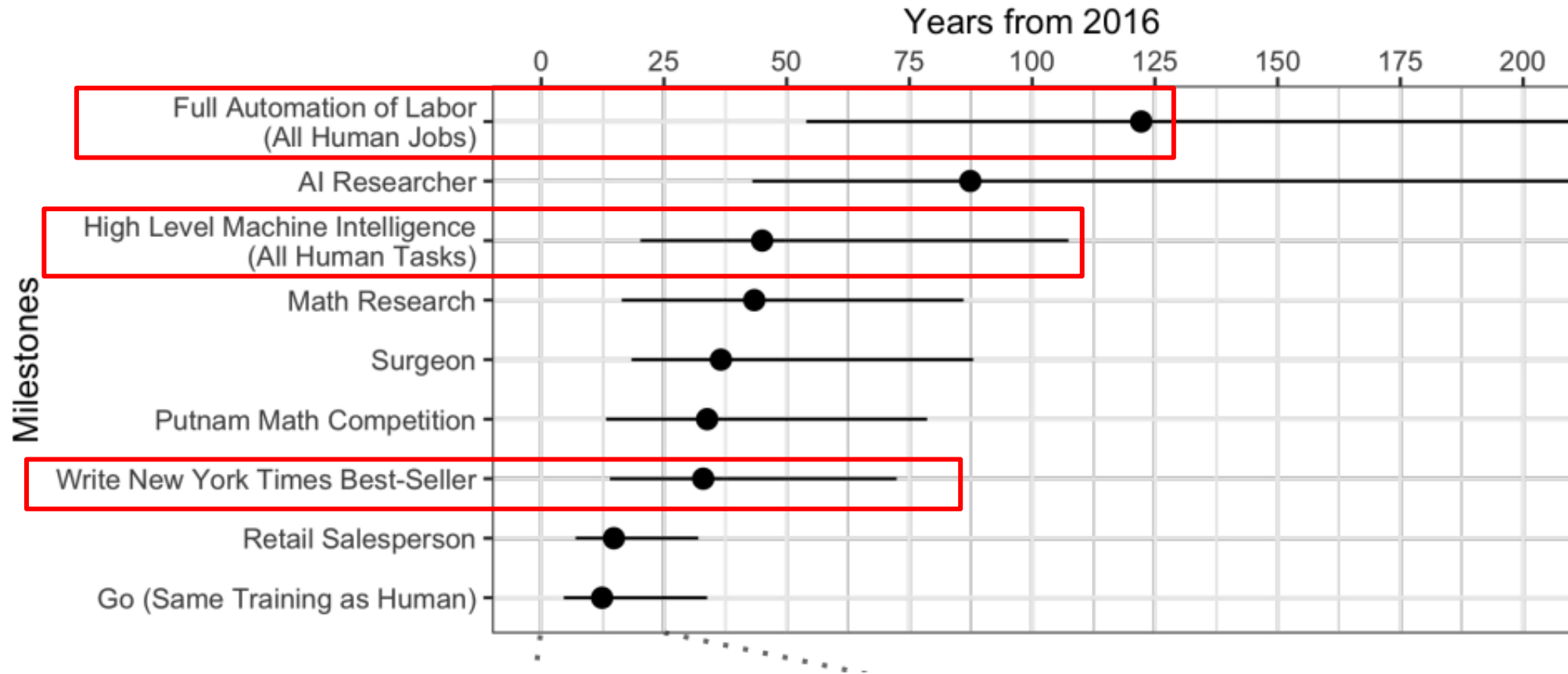


# Ethics and Accountability in the World of Smart Technology

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University of Zagreb, Faculty of Economics and Business

# When Will AI Exceed Human Performance?



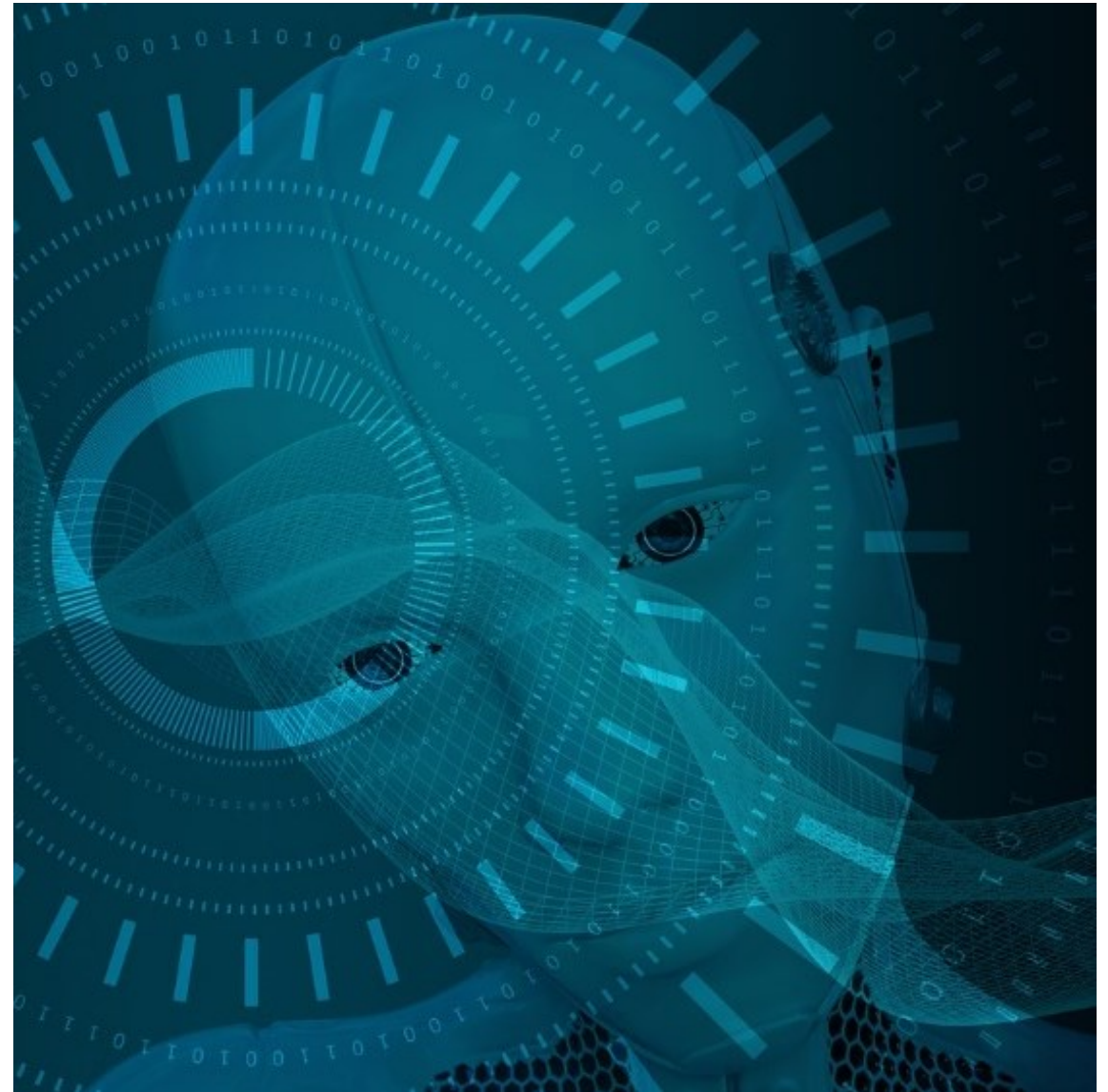
Ref: [arxiv.org/abs/1705.08807](https://arxiv.org/abs/1705.08807) : When Will AI Exceed Human Performance? Evidence from AI Experts



**1. Is it possible?** .... e.g. that the smart technologies will replace all human labour?

**2. If yes, do we want it?** ... e.g. how it will impact the quality of life?

**3. If we want it, who will controll it?** ... e.g. companies or government



# The role of science...

- To **develop** smart technologies
- To **discuss and foresight** the impact of smart technologies
- To **propose solutions** for preventing negative impact and to **participate in their implementation**

# Goal of the presentation

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In order to explore the current role of ethics in smart technology research, the preliminary literature review analysis has been conducted, with the goal to reveal:

- the **time trend**
- the **main financing institutions**
- the **main topics**

using bibliometric and text mining analysis.

# Methodology

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5.407 document results

## Bibliometric analysis

- TITLE-ABS-KEY (ethics) AND (smart AND technology)
- 1985-2023
- 5,407 document results

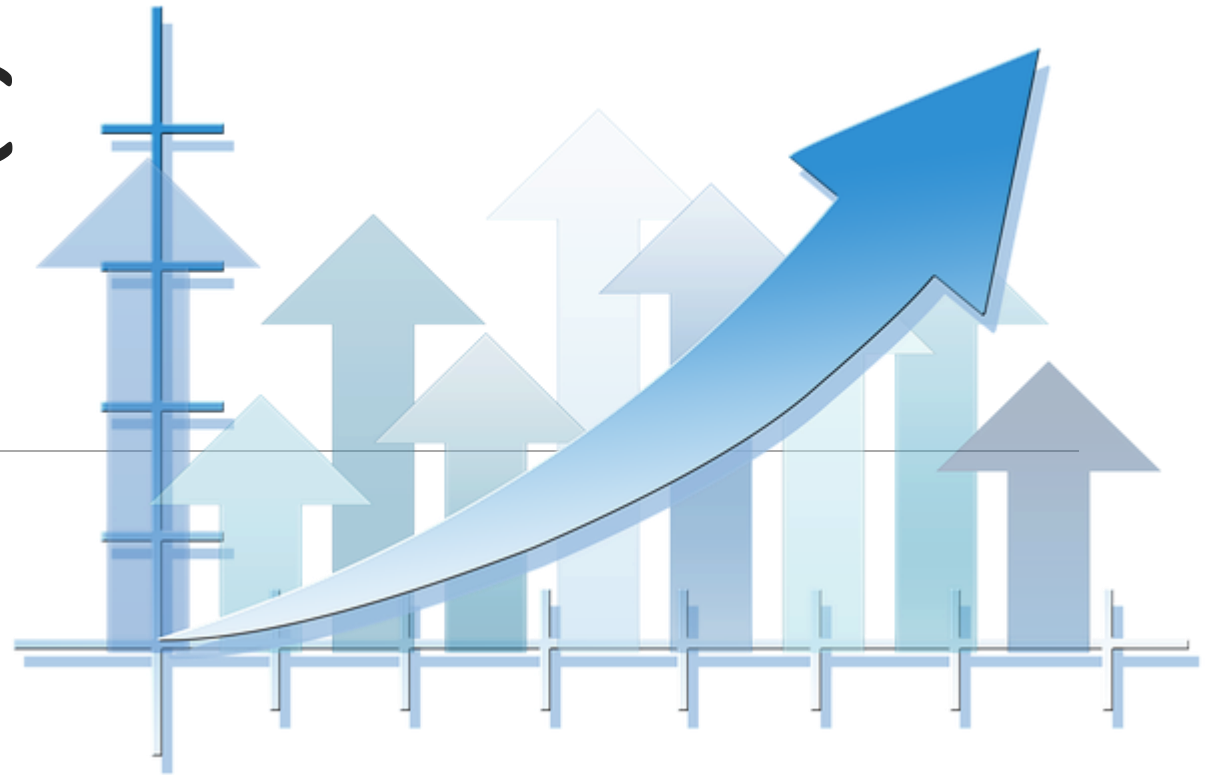
## Text mining

- Key-word extraction
- Topic mining



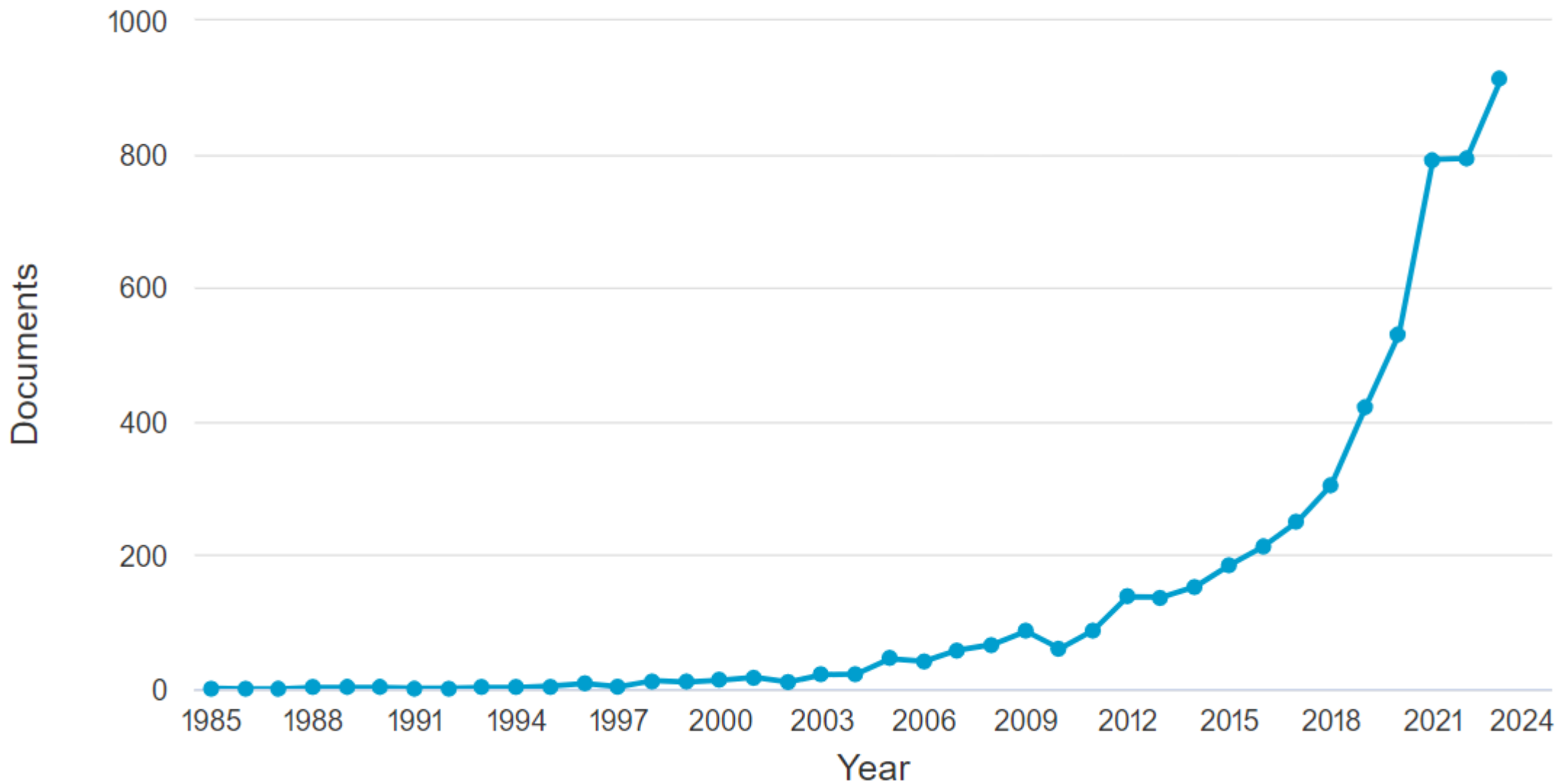
# Bibliometric analysis

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# Documents by year

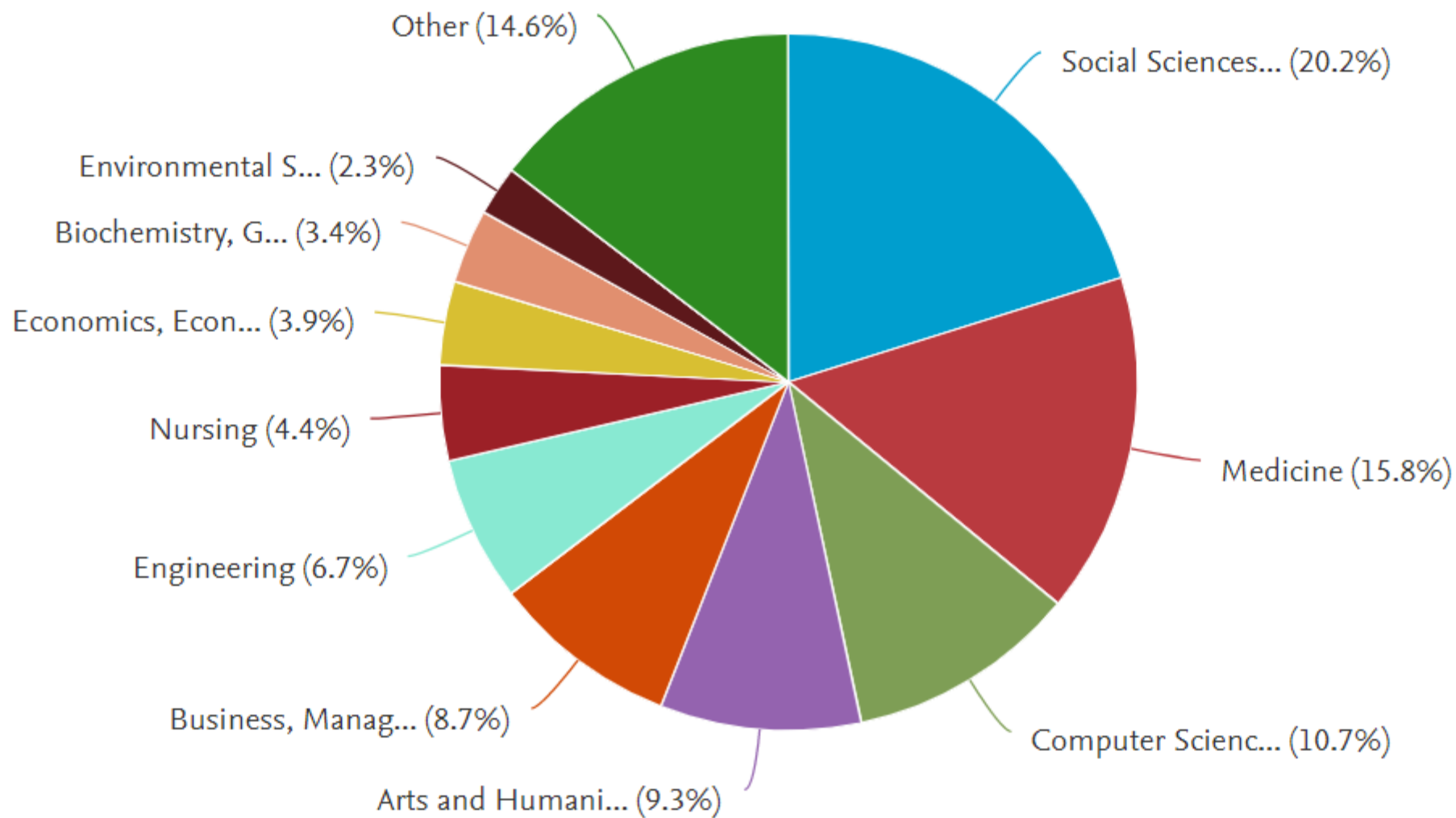
5.407 document results





## Documents by subject area

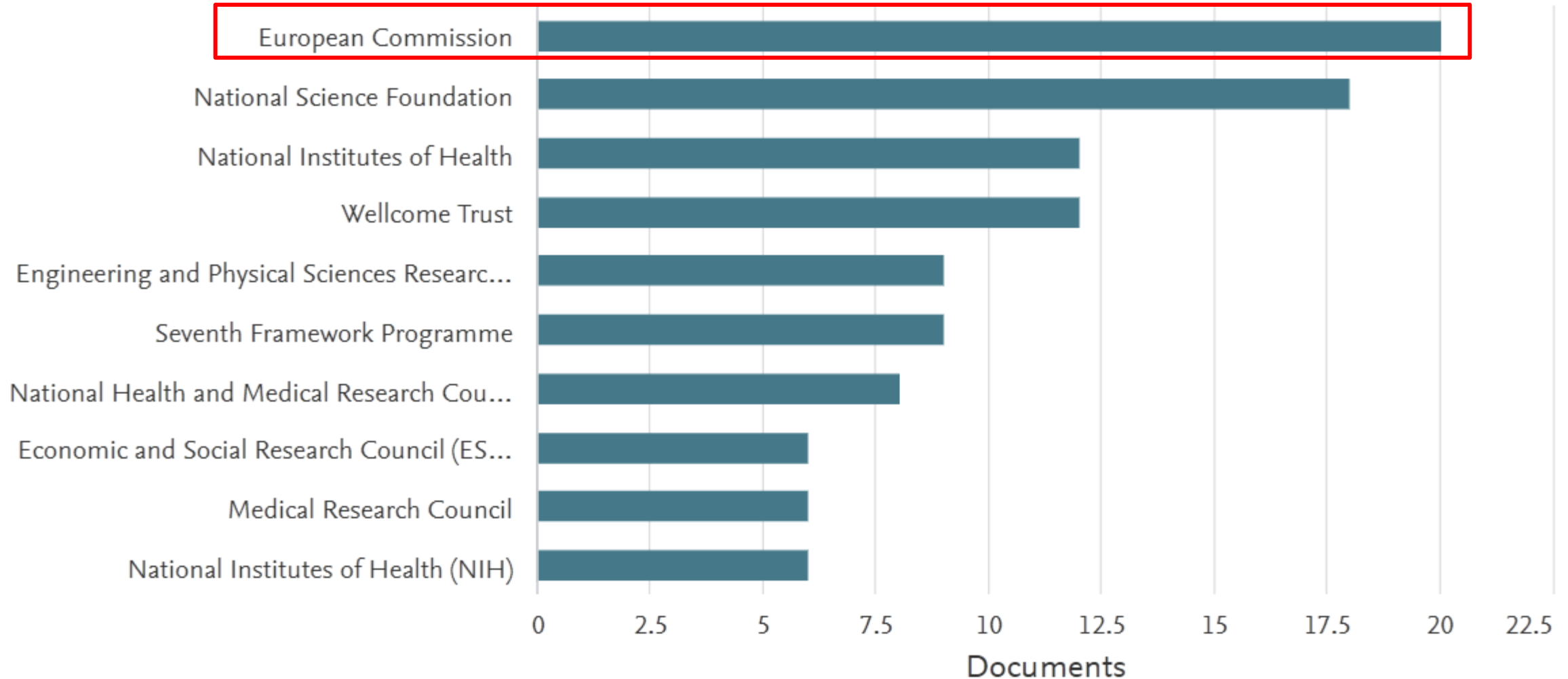
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5.407 document results

## Documents by funding sponsor

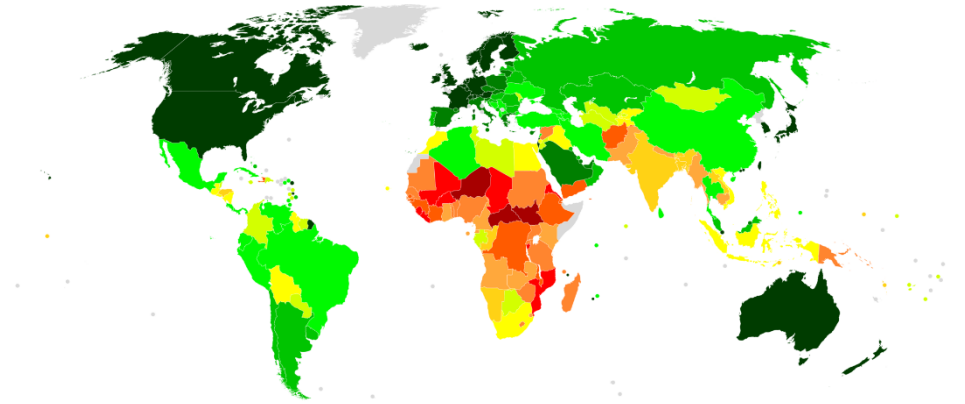
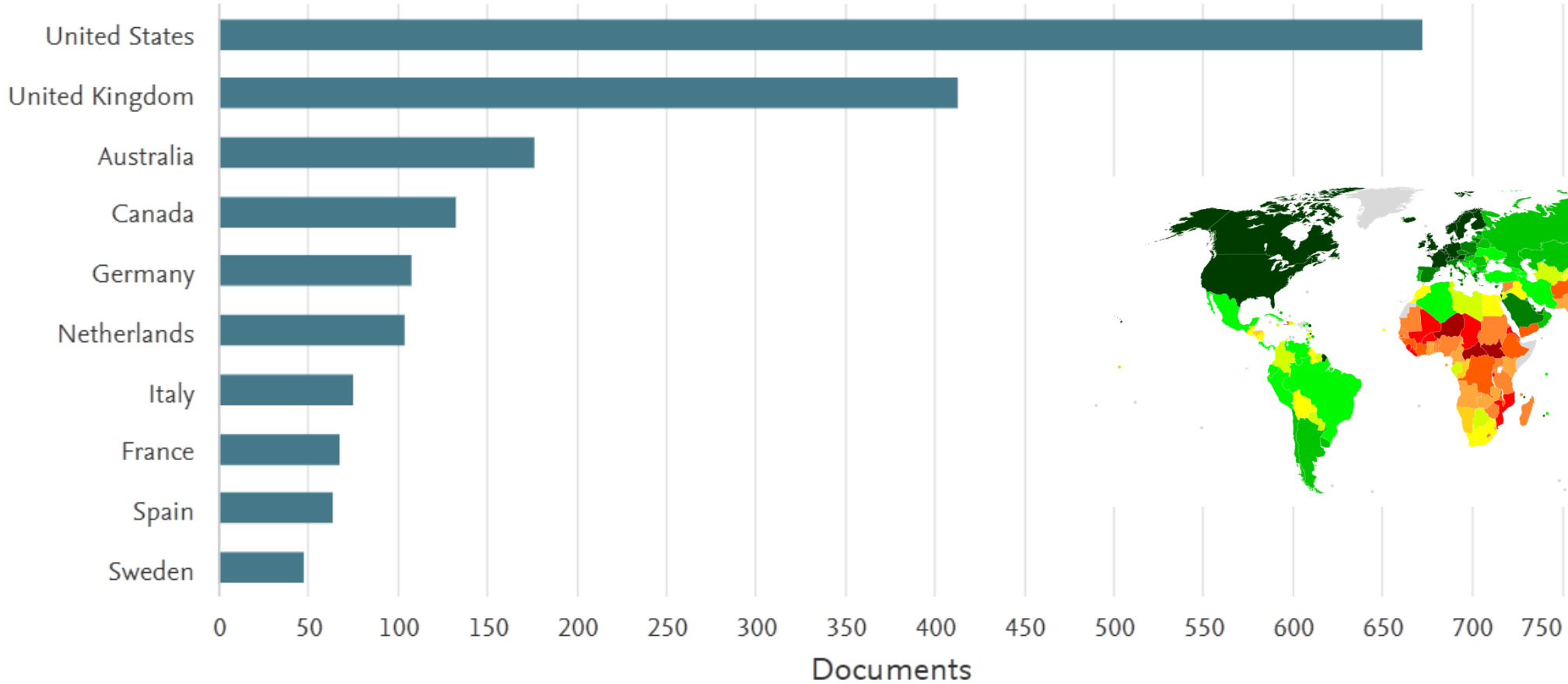
Compare the document counts for up to 15 funding sponsors.



## Documents by country or territory

Compare the document counts for up to 15 countries/territories.

5.407 document results



# Text mining

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# Methodology

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- Text mining is the process of **exploring and analyzing** large amounts of **unstructured text** aided by software that can identify **concepts, patterns, topics, keywords** and other attributes in the data.
- **1st step – word and phrases extraction** – Where is the concern?
- **2nd step – topic extraction using cluster analysis** – What issues are in the focus?



The background is a dark blue gradient with a grid pattern. It features several concentric circular elements: a central circle with a spiral-like pattern, and several larger circles containing binary code (0s and 1s) arranged in a circular path. The overall aesthetic is high-tech and digital.

Where is the concern?

# Word extraction









What issues are in focus?



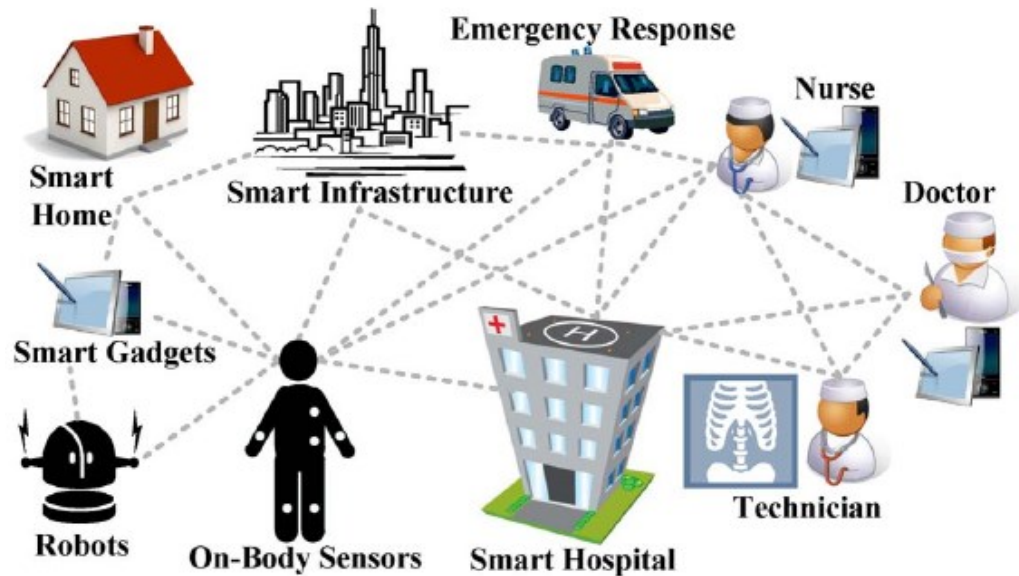




# Example topics and ethical issues

- Ambient intelligence
- Augmented reality
- Learning analytics
- Privacy issues

## AMBIENT INTELLIGENCE



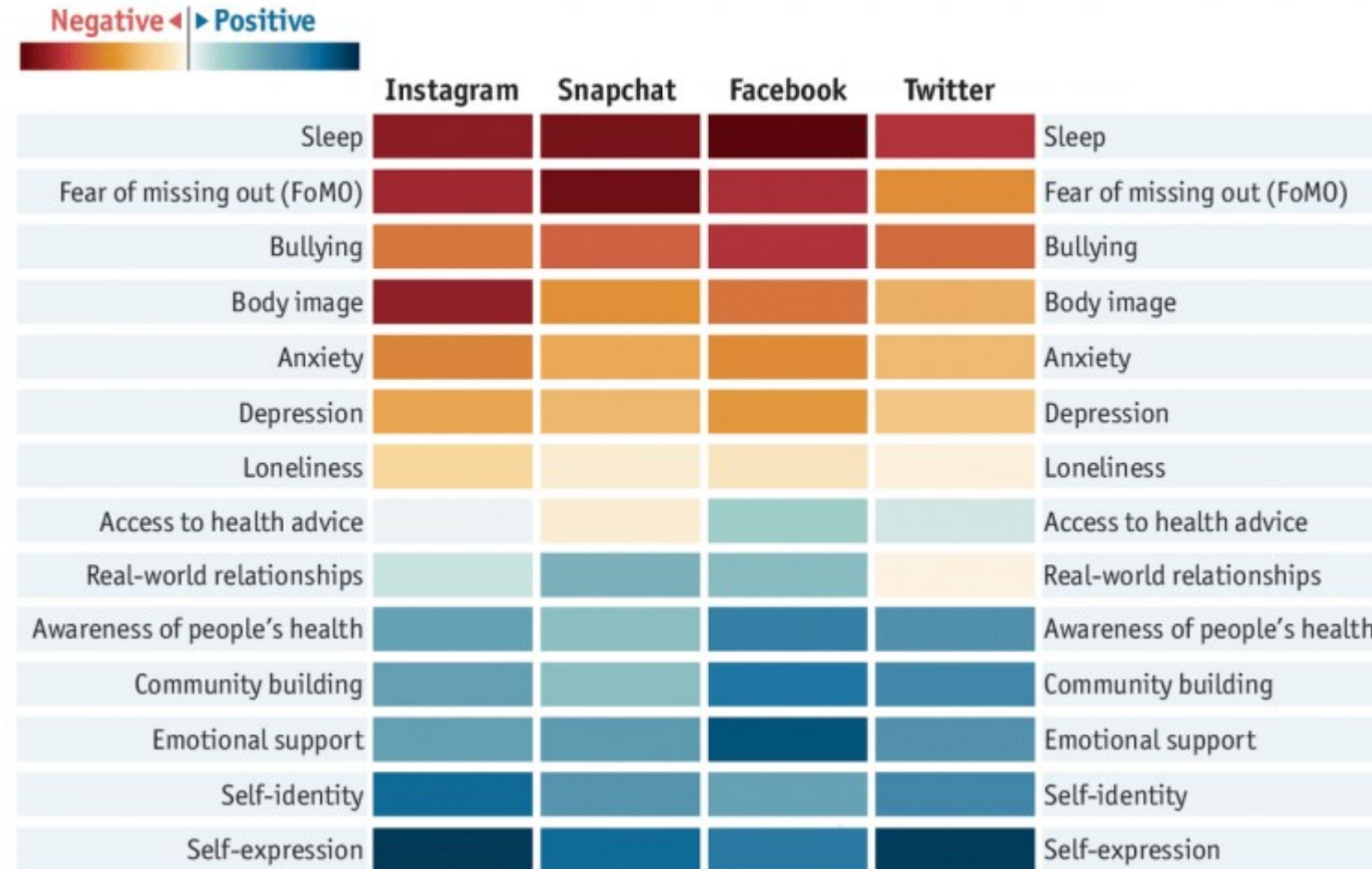
<https://lifesciences.ieee.org/article-archive/technology-spotlight-and-feature-articles/a-survey-on-ambient-intelligence-in-healthcare/>

## VIRTUAL REALITY



## Like, obsessed

Britain, social media users, 14- to 24-years-old, reported impact on well-being, 2017



Source: Royal Society for Public Health

Economist.com

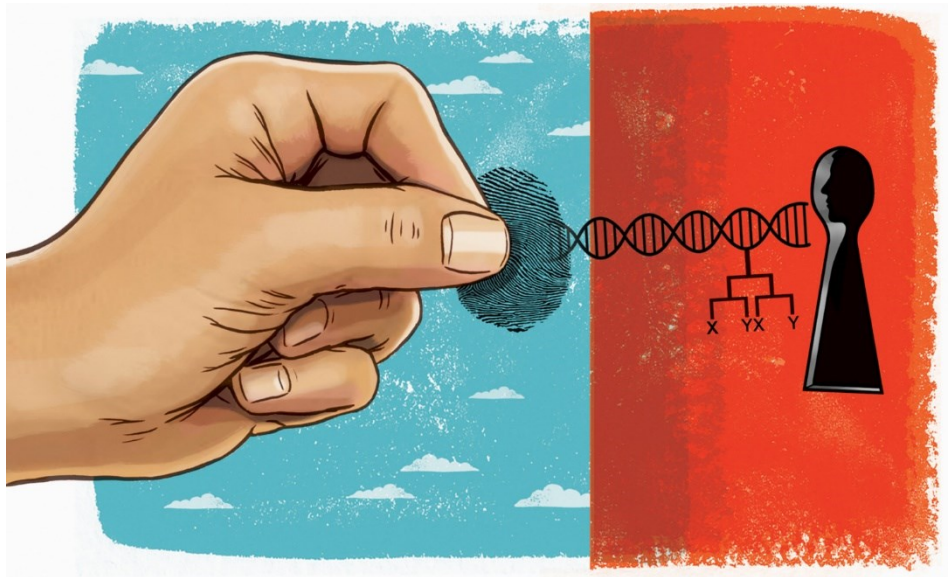
<https://www.economist.com/graphic-detail/2018/05/18/how-heavy-use-of-social-media-is-linked-to-mental-illness>

- Big data
- Social media
- Law and ethics
- Mental health
- Data protection
- Personal data
- Risk management



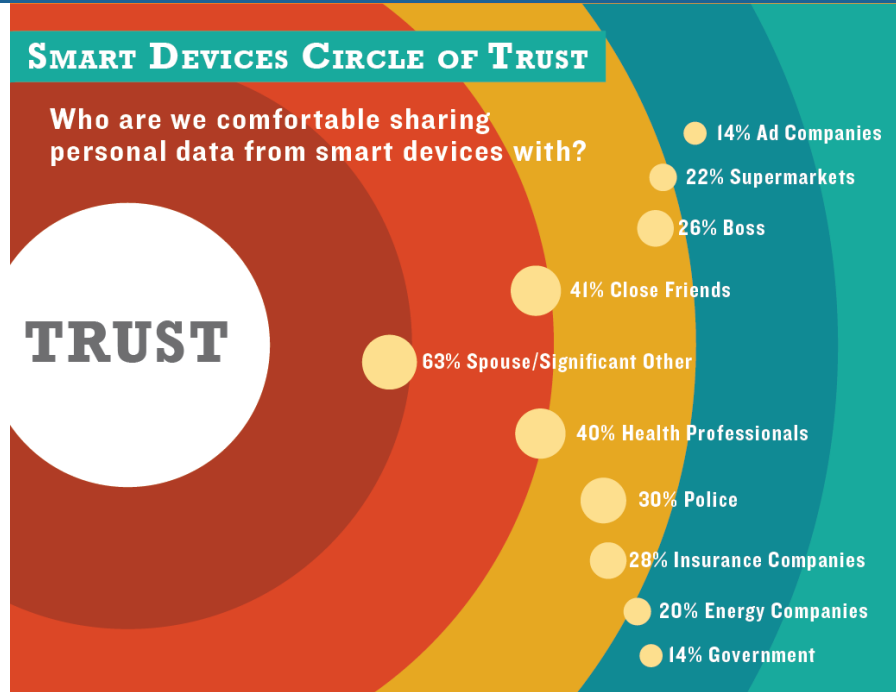
- Data sharing
- Policy makers
- Health data
- Security and privacy
- Internet of things

## SHARING HEALTH DATA



<https://news.harvard.edu/gazette/story/2019/01/perspectives-on-gene-editing/>

## INTERNET OF THINGS



<https://www.trustarc.com/blog/2014/05/29/internet-of-things-industry-brings-data-explosion-but-growth-could-be-impacted-by-consumer-privacy-concerns/>

Original Paper

# The Impact of Search Engine Selection and Sorting Criteria on Vaccination Beliefs and Attitudes: Two Experiments Manipulating Google Output

Ahmed Allam<sup>1</sup>, MSc; Peter Johannes Schulz<sup>1</sup>, PhD; Kent Nakamoto<sup>2</sup>, PhD

<sup>1</sup>Institute of Communication and Health, Faculty of Communication Sciences, University of Lugano (University of Applied Sciences) Switzerland

<sup>2</sup>Marketing Department, Pamplin College of Business, Virginia Tech, Blacksburg, VA, United States

- Artificial intelligence
- Machine learning
- Cloud computing
- Personal information

Typing in a neutral search term, such as 'vaccination', gives results for anti-vaccine propaganda. Photograph: YouTube

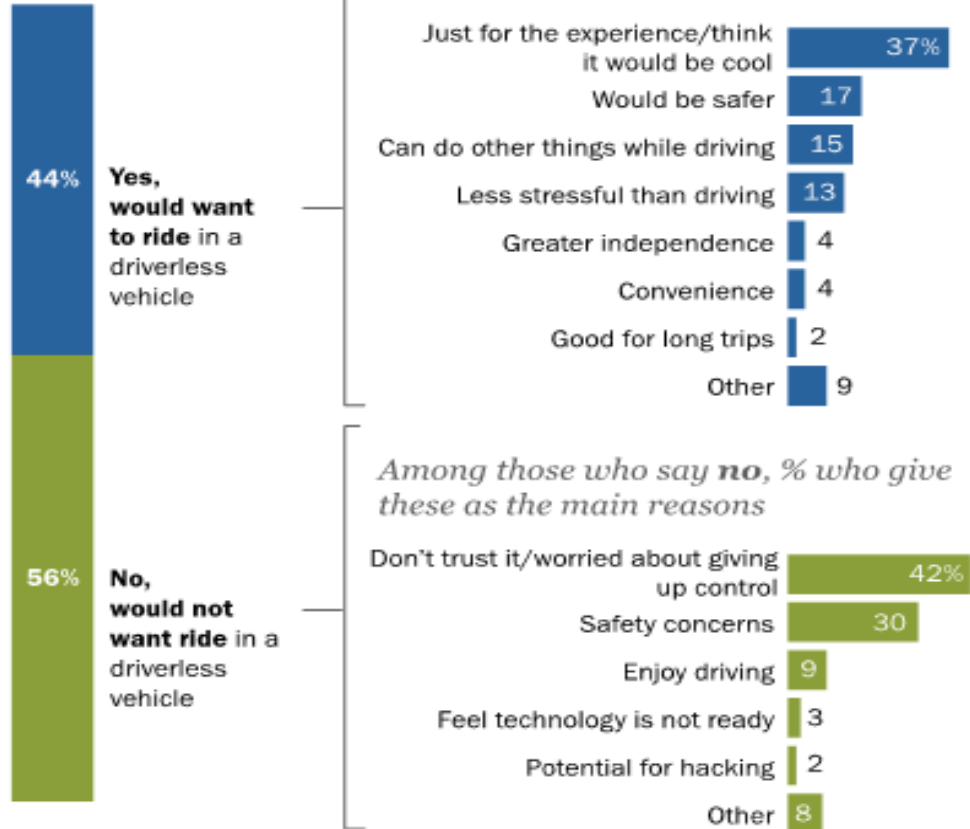


<https://www.theguardian.com/media/2019/feb/01/facebook-youtube-anti-vaccination-misinformation-social-media>



## Slight majority of Americans would not want to ride in a driverless vehicle if given the chance; safety concerns, lack of trust lead their list of concerns

% of U.S. adults who say they would/would not want to ride in a driverless vehicle



Note: Respondents who did not give an answer are not shown. Verbatim responses have been coded into categories; figures may add to more than 100% because multiple responses were allowed.

Source: Survey conducted May 1-15, 2017.  
"Automation in Everyday Life"



- Data driven
- Smart city
- Smart devices
- Driving cars
- Internet of things

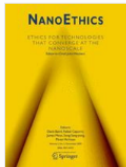
## What Happens to American Myth When You Take the Driver Out of It?

The self-driving car and the future of the self.

By Robert Moor

<http://nymag.com/intelligencer/2016/10/is-the-self-driving-car-un-american.html>

Various, but not coordinated efforts have been taken in relation to smart technologies' ethics → the need for a coordinated and unified approach.



[NanoEthics](#)

December 2009, 3:231 | [Cite as](#)

### Ambient Intelligence and Persuasive Technology: The Blurring Boundaries Between Human and Technology

Authors

[Authors and affiliations](#)

Peter-Paul Verbeek

[Ethics and Information Technology](#)

December 2010, Volume 12, [Issue 4](#), pp 313–325 | [Cite as](#)

### “But the data is already public”: on the ethics of research in Facebook

Authors

Michael Zimmer



ELSEVIER

Computer Law & Security Review

Volume 28, Issue 2, April 2012, Pages 184-194



### Unmanned aircraft systems: Surveillance, ethics and privacy in civil applications

Rachel L. Finn, David Wright

[Ethical Theory and Moral Practice](#)

November 2016, Volume 19, [Issue 5](#), pp 1275–1289 | [Cite as](#)

### The Ethics of Accident-Algorithms for Self-Driving Cars: an Applied Trolley Problem?

Authors

[Authors and affiliations](#)

Sven Nyholm , Jilles Smids

Commentary

### Big Data ethics

Andrej Zwitter

BIG  
DATA  
& SOCIETY

Big Data & Society  
July–December 2014: 1–6  
© The Author(s) 2014  
DOI: 10.1177/2053951714559253  
bds.sagepub.com

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# Conclusions

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- Smart technology has become **pervasive and abundant**, and it has become evident that it impacts various aspects of **human well-being**.
- **Unintended consequences** occur, that are generated by the smart technologies.
- In order to assure the **economic, societal and environmental sustainability**, smart technology needs to be implemented using **ethical principles**.

„Responsible leaders, including acclaimed scientists, should exercise greater **humility** to the **complexity and inherent uncertainty** of their activities and strive to seek out and challenge hubristic behaviors.”



Diamandis, E. P., & Bouras, N. (2018). Hubris and sciences. *F1000Research*, 7.