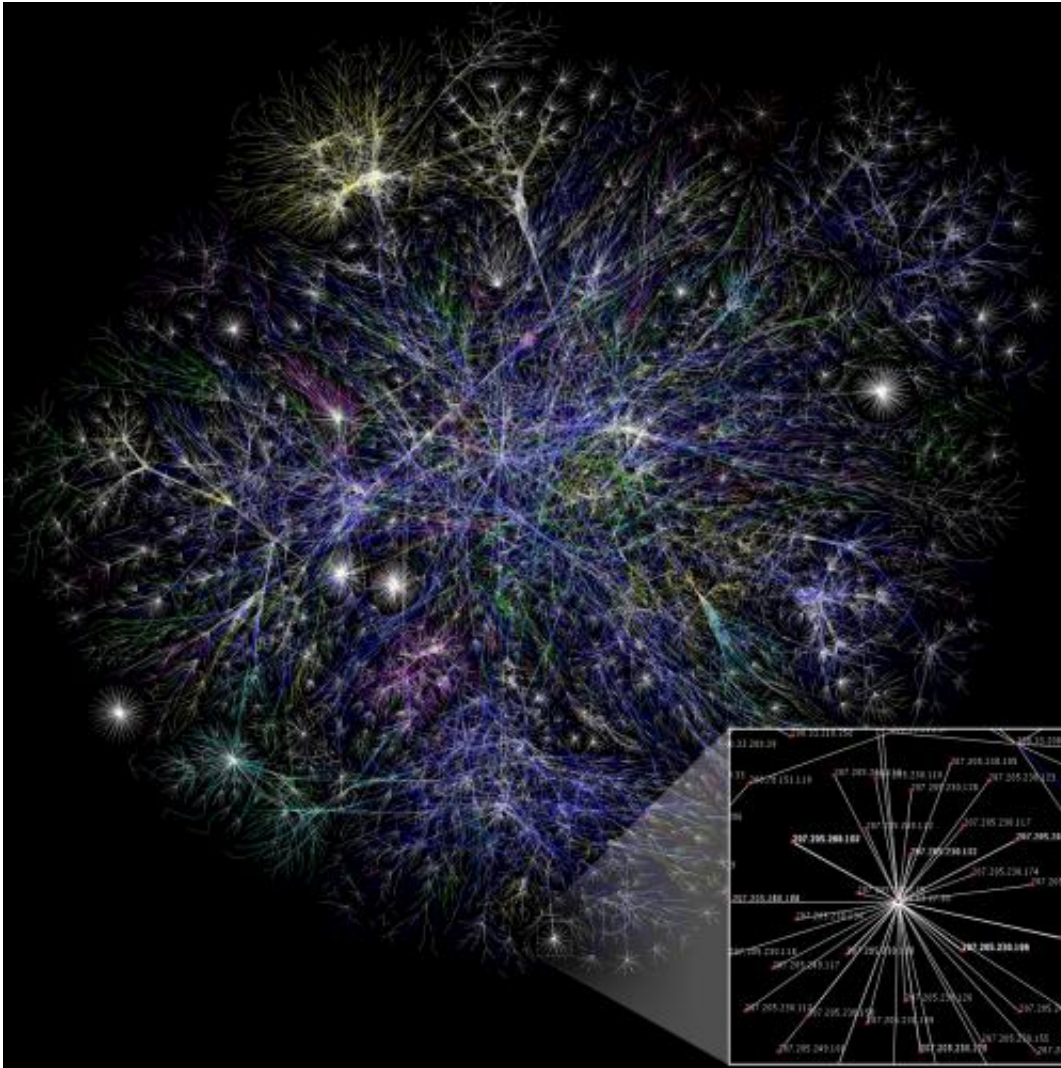# Algorithms: the managers of our digital lives

February 11 2017

Partial map of the Internet based on the January 15, 2005 data found on opte.org. Each line is drawn between two nodes, representing two IP addresses. Credit: Wikimedia Commons

Algorithms are a crucial cog in the mechanics of our digital world, but also a nosy minder of our personal lives and a subtle, even insidious influence on our behaviour.

They have also come to symbolise the risks of a computerised world conditioned by commercial factors.

Read: [How algorithms (secretly) run the world](#)

A gift from a Persian scientist

Long before they were associated with Google searches, Facebook pages and Amazon suggestions, algorithms were the brainchild of a Persian scientist.

The term is a combination of mediaeval Latin and the name of a ninth century mathematician and astronomer, Al-Khwarizmi, considered the father of algebra.

A bit like a kitchen recipe, an [algorithm](#) is a series of instructions that allows you to obtain a desired result, according to sociologist Dominique Cardon, who wrote "What Algorithms Dream Of".

Initially known mainly to mathematicians, the term spread as computers developed.

The brains of computer programmes are algorithms, and are thus a central cog in the internet machine.

Where are algorithms found?

"We are literally surrounded by algorithms," says Olivier Ertzscheid, a

French professor of information technology and communication.

"Every time you consult Facebook, Google or Twitter you are exposed to choices" that algorithms calculate for us, and we are also sometimes influenced by them, he told AFP.

They reign in the finance sector, one example being high frequency trading programmes, which can execute trades in milliseconds driven by algorithms that analyze a range of market and economic factors. Their speed and rule-based nature means they can make markets volatile and have triggered so-called flash crashes in the foreign exchange and stock markets.

Police forces increasingly use algorithms to predict where and when crimes are most likely to be committed. Predpol, a software programme, claims to have contributed to double-digit drops in burglaries, robberies and vehicle theft in several US states and is also used in Kent, southern England.

Satellite tracking and surveillance would not have reached the point they are at today without sophisticated algorithms.

How Google began

In the 1990s, PageRank (PR) was created in Stanford, California by Larry Page and Sergey Brin, Google's co-founders.

PR made it possible to class web pages by order of popularity. It became the heart of the Google research engine, which responds to key words within a fraction of a second. In addition to PR, Google uses "a dozen algorithms... to deal with spam, detect copyright infractions" and handle other crucial tasks, Ertzscheid explains.

Facebook and the 'filter bubble'

Facebook uses [sophisticated algorithms](#) to offer its more than 1.8 billion users worldwide personalised content, in particular on its News Feed service which compiles messages from "friends", and shares articles selected according to each users [social media](#) contacts.

One risk posed by such a system is that of "The Filter Bubble" according to Eli Pariser, who developed the concept in a book of the same name. Being surrounded by information filtered by algorithms based on one's friends, tastes and previous digital searches and choices, someone surfing the internet can be plunged unwittingly into a "cognitive bubble" that just reinforces their convictions and perspective on the world.

Algorithms and the truth

Another risk was exposed during the last US presidential election—the prevalence of so-called fake news or hoaxes on Facebook and other social media. Facebook's algorithms were not designed to distinguish true from false—a feat that is difficult even for artificial intelligence—but the popularity of information.

Facebook chief Mark Zuckerberg has sought to deflect criticism that it had been used to fuel the spread of misinformation that may have impacted the presidential race, but the company responded to growing criticism by saying new tools would be provided so users could call attention to controversial content.

Thinking for us?

Cardon says four main "families" of web algorithms exist. One calculates the popularity of web pages, another assesses their authority

within the digital community, and a third evaluates the notoriety of social network users. The fourth attempts to predict the future.

This last one is "problematic" for the sociologist, because it tries to anticipate our future behaviour based on clues we have left on the internet in the past.

It shows up on Amazon for example as book recommendations based on past purchases.

"We build the calculators, but in return they build us" too, Cardon concluded.

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