The computer ate my personality
Human-algorithm interactions are making the digital world more personal – and polarised. By Sofia Olhede and Russell Rodrigues

Once upon a time, two people visiting the same website simultaneously could expect to see exactly the same content. Increasingly, however, websites target specific types of content to different users, in an attempt to personalise services and stimulate interest. When searching for news, for instance, one user may find certain headlines prioritized, or on a retail site, may discover selected products on offer, which are not highlighted to others.

These subtle variations stem from online recommendation systems. Websites increasingly assimilate location and demographic information, and historical preference and purchase data from individuals and wider populations, in order to profile each of their users, cluster similar groups and classify market segments. Specialised algorithms then select and present subsets of content that they determine are most likely to satisfy a particular user's demands – and these are the recommendations presented.

Big business
Recommender systems often use biclustering algorithms, which simultaneously group rows and columns in large data matrices and can uncover intriguing, often unexpected patterns and relationships. They can help vendors to develop a better understanding of their consumer base and meet demands that might otherwise go undetected. In 2006, Netflix famously offered $1 million for an algorithm that could boost its film recommendation quality by 10%. Whilst the 2009 winning solution was never implemented, the contest stimulated scientific and commercial interest in recommendation engines, and they are now a lynchpin of online business success. Currently, 80% of Netflix viewing hours (read.bi/2oHF1D9), and 35% of Amazon sales (bit.ly/2oHRfM0) originate through their respective recommender systems – generating billions of dollars in profit. Personalisation thus drives business for vendors, and can mutually benefit consumers by offering them more of what they desire – whether movies, clothes or groceries.

But while it might be convenient to have double cream recommended to us when adding strawberries to our online shopping cart, or beach towels when searching for swimwear, there are important, unresolved questions at the interface of human and algorithmic decision making. For instance, to what extent can recommender systems not only pre-empt our wants, needs and interests, but actively contribute to shaping them? What are the implications for us as humans if we continuously consume the content our technology serves us, and less frequently discover things for ourselves?

Echo chambers
These questions become more pertinent beyond the domains of entertainment and retail. also receive recommendations when browsing recruitment websites, when searching for financial products and when accessing news stories – the latter especially via social networks. In these situations, algorithms similarly infer user

preferences and propose content, but here personalisation may have greater consequences: it may shape users' socio-economic engagement and even their worldviews.

In 2015, Lazer discussed the rise of 'social algorithms' and their potential to fortify ideological divisions.[1] Whether one favours news reporting with a more liberal or conservative slant, for instance, recommenders are likely to offer more of the same, and to dampen the presentation of variant viewpoints. With over 60% of social media users accessing news via these platforms[2], there are concerns that recommendation algorithms are accelerating the formation of echo chambers – polarized enclaves within which specific narratives are continually reinforced, with limited scope for challenge or correction – increasing the potential for misinformation to spread.

Opinions and perspectives are typically shaped by individual and cultural preferences, customs and experiences. While groupings naturally coalesce around shared views, ordinary (offline) social interactions will usually expose individuals and groups to others with divergent opinions. Differing viewpoints may never be entirely reconciled, but frank discussions between groups can help identify pathways to the common good, or at least help establish common ground.

But as increasing volumes of information reach us via the suggestions of our peers and of recommendation algorithms, those discussions become less likely to take place. The common ground recedes from view as all sides are exposed to more and more content that simply reinforces pre-existing beliefs or opinions. This can sharpen, coarsen and calcify perspectives, especially on controversial or emotionally-charged topics. As Lazer intimated, the interactions between social and computational codes have the potential to shape world events in ways not seen before, and it is widely speculated that feedback loops of this kind were a factor in the divisive political events of 2016 in the UK (Brexit) and US (presidential election) – and may well explain the fractious tone of politics since (see sidebar).

Recent research does suggest that content actively sought by readers plays a more significant role in shaping viewpoints than content served by algorithmic recommendations.[3] However, the longer-term impacts of news recommendation are as yet unstudied. It is conceivable that as algorithms digest our preferences and those of our peers, and thus learn from us, the content they supply could in turn influence the ways in which we perceive ourselves and others, and how we process stimuli to make decisions – thereby subtly shaping aspects of our personalities.

Bridging the gap
To counter excessive polarization, it has been suggested that recommendations made by algorithms could be supplemented by randomly selected choices. In this way, users would maintain some exposure to content that differs in terms of politics or perspective. Whether they read it, though, is another matter.

There are also efforts underway to quantify and reduce levels of controversy in online communities, by developing algorithms to classify and bridge echo chambers.[4] Algorithms could also be harnessed to check the veracity of information and to flag dubious sources – and Facebook, Full Fact and others are taking steps to implement this (bit.ly/2oHVBmr).

Moreover, as news is increasingly propagated not only as text, but as images and video, especially on social networks, recent work has focussed on extracting and classifying features from these visual media, to assist in source verification. Successful adoption of any of these approaches, however, will require the underpinning algorithms to be sufficiently transparent – that is, open to scrutiny[5] – if they are to be considered trustworthy and objective across the board.

The UK Parliament recently launched an enquiry into algorithmic decision making (bit.ly/2owbikV), signalling that these types of issues, though far from being resolved, are being seriously considered by policymakers. The enquiry attracted almost 50 responses, including a submission from the RSS (http://bit.ly/2poyyjK).

There is currently much scientific and popular-level debate on the impact of algorithms for society, and this will surely remain topical as political events such as the June elections in the UK and France unfold. Personalisation can be beneficial, but it is crucial to implement algorithms in ways that will help, and not harm, individuals and societies.

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Sidebar
Blue Feed, Red Feed
In May 2016, the Wall Street Journal devised a neat demonstration of the echo chamber effect. Its Blue Feed, Red Feed project replicates what a liberal or conservative voter might be exposed to through their Facebook News Feed – and there are stark differences in the tone and nature of reporting on key issues. For example, the blue side describes President Trump's "100 days of fail"; the red side claims to have "absolute proof that Donald J. Trump is the best commander in chief we've had in a while". Experience it for yourself at bit.ly/2oI1os4

References

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