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Fake News, Filter Bubbles and Echo Chambers: *A Short Overview of Basic Terminology and Key Issues*

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A Short Overview of Basic Terminology and Key Issues

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Abstract

Online news and news sources differ from tradional media in two important ways. First, new media are interactive and second they can offer news and content in adaptive ways. This paper focuses on the issues related to these developments and potential solutions. First, the technological developments are discussed, such as automatisation and algorithmic decision-making. Next, fake news, filter bubbels and echo chambers are discussed, including several issues they may cause.

Keywords: *A/B testing, profiling, personalization, media law, fake news, filter bubbles, echo chambers, fact checkers*

Preface

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In 2019, media law professor Wouter Hins retired as our colleague at Leiden University Law School. He had been affiliated with eLaw, the center for law and digital technologies of Leiden University for many years. As the tradition at Dutch universities goes, particularly in law schools, a retiring professor is offered a *liber amicorum* (Festschrift in English and German, Mélanges in French), i.e., an edited volume containing contributions from colleagues, former pupils and others honoring the professor and discussing topics in the field he or she has been working in for so many years. In the case of professor Hins, the contributions obviously focused on media law, a topic that is nowadays more relevant than ever.

My own contribution[2] to this book, focusing on introducing some basic terminology and core concepts in the field of fake news, filter bubbles and echo chambers, was posted online. To my surprise, this was downloaded many times by an international audience, despite the fact it was in Dutch. For this reason, I decided to translate and further edit the paper into a longer version in English, to enable access to it for a larger, international audience. This way, hopefully this contribution can be useful in further structuring and shaping the current debate on fake news, filter bubbles and echo chambers.

Introduction

Media law is more relevant than ever nowadays. Some people focus their attention mostly on the steadily declining newspaper circulation figures and the fact that people read less and less books, but in fact there is more news and there are more types of media, more media platforms and more sources of news than ever before. Virtually everyone can nowadays create news and disseminate it. The new media are the social media. Online news and online news sources differ from traditional media in two important aspects. Firstly, the new media are interactive: the user consumes news and other information ('content'), but the newsmakers and content controllers also monitor what the user actually reads. In fact, it is not only possible to monitor what a person views, but also how much time is spent on this, at which times of the day, where the transfer of information falters, and which content people recommend or forward to others.

This way of monitoring user behavior leads to a second important difference, namely that news and content can be adaptively presented to users. For instance, more news can be provided to user when they show interest in particular topics. Moreover – and this goes much further – also the format and the content of the news can be modified accordingly. In this paper, problems related to these developments are discussed and potential solutions are suggested. First, the most relevant technological developments are examined, including automatization and algorithmic decision-making. Next, fake news, filter bubbles and echo chambers are discussed, including some issues they may cause. Finally, potential solutions are examined.

[2] An earlier version of this paper was published in Dutch, see: Custers, B.H.M. (2019) Nepnieuws, filterbubbels en echokamers, In: S.van der Hof, B.H.M. Custers, F. Dechesne en E.L.O. Keymolen (eds.) Recht uit het hart, Universiteit Leiden: Meijers Instituut.

Technological developments

In the past, news used to be unidirectional: newsmakers informed the public about what was happening in the world. For those creating other content, such as books, movies and music, this was no different – they also created something and only later (sometimes much later) it became apparent whether the public would appreciate the content. With the mass digitization of content and offering it online, this unidirectional character of news has completely disappeared. Almost all types of digital information transfers can be monitored. Obviously, that is not done by human beings, since manual monitoring is not realistic given the large amounts of data involved. The monitoring takes place in automated ways, using specialized software that keeps track of whom is watching what, for how long, how often, when, etc. Furthermore, the routings towards specific content and on which links is clicked when browsing through content can be tracked.

Via A/B testing and personalization it is possible to keep users longer on websites. This can be important for advertisement revenues: if a user stays longer on a website, more advertisements can be offered. At the same time, also more personal data can be collected.

In case of *A/B-testing,*[3] some users are offered screen A and other users are offered screen B. Screen A and B usually differ in one aspect only, sometimes a very subtle difference. The difference can, for instance, be the pale yellow or pale blue background color, a logo in black letters or dark blue letters, or underlined headers or not. Both version A and B are monitored in terms of how long people stay on the website, whether they click on advertisements, or order something. If the monitoring shows that version A yields better results (e.g., more sales) than version B, the latter is rejected and the former is continued with in a next iteration. By applying this repeatedly to very large numbers of users, the optimum result is achieved, namely the most seductive way of offering information. In fact, it could be argued that all users are guinea pigs in a live online social experiment.

Apart from this, users can be lured and retained via personalization. This is done via *profiling*, a general term for techniques focusing on the characteristics and preferences of particular users. For this, it is usually required to keep data on users, in order to recognize them every time they are online. Hence, the use of cookies plays an important role in this context. Via the preferences a user explicitly indicates and implicitly reveals by his reading and clicking behavior, and via characteristics distilled form other available data, it is determined what is the optimum way of offering specific information. A typical, well-known example of this is suggesting related products when searching for something (‘others have also ordered this book’). Another typical example is the ordering of search results (for instance, hotel rooms) on the basis of user preferences.

[3] Kohavi, R., and Thomke, S. (2017) The Surprising Power of Online Experiments. *Harvard Business Review*, September 2017, p. 74-82.

Both A/B testing and profiling are rarely or never manual processes, not even partially. In most cases, algorithms are used to discover patterns and relations in the data. *Data mining* and *machine learning* are often the underlying technologies used for this.[4] Subsequently, via algorithmic (automated) decision making processes, information is offered in particular ways. It is important to realize that the use of A/B testing does not require the use of personal data. The use of profiling can use personal data, but also anonymous data. The resulting profiles can be individual profiles (which obviously are personal data) or group profiles (which can be personal data, but not necessarily so, for instance, if aggregated and anonymized). Whether personal data are used or not is relevant in the EU to determine whether the EU General Data Protection Regulation (GDPR) is applicable, offering protection to people regarding their personal data.[5]

It may be obvious that both A/B testing and profiling cannot only be used for determining the most attractive ways of presenting content, but also for determining which content is most attractive.[6] Some information simply is more attractive, juicy or newsworthy than other information. The information people prefer to view or take note of does not always have to be correct, complete, consistent and/or coherent. Profiles typically contain errors,[7] but they can be very useful as long as they improve the targeting of specific audiences.

Consequences

If not only the ways in which information is offered are customized on the basis of user preferences and attractiveness to consumers, but also the content of information is subjected to such customization, this has several consequences. The first consequence to discuss here is fake news, a phenomenon that is increasingly discussed these days.[8] It used to be called propaganda and was actually fairly easy to distinguish. Also in times of

[4] Calders T. & Custers B.H.M. (2013), What is data mining and how does it work?. In: Custers B.H.M., Calders T., Schermer B., Zarsky T. (red.) *Discrimination and Privacy in the Information Society.* nr. 3 Heidelberg: Springer.

[5] For a US perspective, see Klein, D. O., Wueller, J. R. (2017). Fake news: A legal perspective. *Journal of Internet Law*, 20(10), 1-13.

[6] Trilling, D., Tolochko, P., Burscher, B. (2017) From newsworthiness to shareworthiness: How to predict news sharing based on article characteristics. *Journalism & Mass Communication Quarterly*, 94, 38-60.

[7] Custers, B.H.M. (2003) *Effects of Unreliable Group Profiling by Means of Data Mining*. In: G. Grieser, Y. Tanaka and A. Yamamoto (eds.) *Lecture Notes in Artificial Intelligence, Proceedings of the 6th International Conference on Discovery Science (DS 2003)* Sapporo, Japan. Berlin, Heidelberg, New York: Springer-Verlag, Vol. 2843, p. 290-295.

[8] Tandoc, E. C., Lim, Z, W., Ling, R. (2018) Defining “fake news.” *Digital Journalism*, 6, 137-153.

severe propaganda, such as during World War II in Nazi Germany or during the Soviet Union regime, most people must have felt, somewhere deep down, that the reality presented to them on paper and the physical reality surrounding them, including daily life experiences, differed significantly. Perhaps in some situations at least a partial explanation for the acceptance of propaganda (if accepted at all) is that it may in certain situations offer a better, brighter looking perspective on the future than the (at times) rather disappointing reality.

If propaganda is considered as the influencing or tweaking of public opinions in the direction of specific (political and other) beliefs, it hardly differs from what is now referred to as fake news. Both propaganda and fake news campaigns can make use of disinformation or misinformation. The terms disinformation and misinformation are often used interchangeably, referring to false information, but sometimes disinformation is used for the intentional spreading of false information, whereas misinformation refers to the spreading of false information regardless of intent.[9]

However, fake news and propaganda do differ from each other nowadays. The big difference consists of the abovementioned diversification and personalization. Whereas propaganda is massive and uniform, fake news is often more subtle and tailored. People keep wondering why others do not see through the fake news, but they often forget that the fake news is projected exactly on someone's 'blind spot'. We all look at our own screens, but since we do not look at each other's screens, we do not see which information is fed to others. Many people do not realize that, when looking for the same information online, different people are provided with different search results.

It is remarkable that the term *fact checkers* was actually used on a large scale already before the term fake news became widely used. Fact checkers focus on truth and correctness of facts in statements and texts. For instance, when people mentioned figures, it is relatively easy to check whether these figures are correct. In fact, many people often confuse millions and billions, sometimes also due to translation mistakes.[10] Fact checkers focus on mistakes and unintentional misunderstandings on the one hand and on deliberate disinformation on the other hand. Fake news often concerns deliberate disinformation.

It is hard to mention fake news without mentioning US president Donald Trump, who is strongly connected with this term, both in being accused of and himself accusing others of creating and distributing fake news. Particularly via the use of short messages on Twitter, he succeeds in creating confusion and denying, questioning or distorting facts. That this is intentional is rather clear to everyone, but there is no consensus

[9] Fetzer, J. H. (2004). Disinformation: The use of false information. *Minds and Machines*, 14, 231-240. See also Ecker, U. K. H., Lewandowsky, S., Chang, E. P., Pillai, R. (2014). The effects of subtle misinformation in news headlines. *Journals of Experimental Psychology*, 20, 323-335.

[10] Note that in large parts of Europe the terms milliard and billiard are used, but not in the US and the UK, which is confusing, because a billion then can be either 10^9 or 10^{12}. Numbers of a trillion and upwards also have different meanings. See https://en.wikipedia.org/wiki/Names_of_large_numbers.

among critics whether he believes in this 'alternative reality' himself or that he only defends such points of view because they suit him better.

The issue whether someone really believes in the fake news he or she is spreading or consuming,[11] is closely related to the phenomenon of filter bubbles and echo chambers. If algorithms determine which information a user wants to see, based on previous information on that user, this can lead to more and more information of the same nature. Users no longer receive information that contrasts with or contradicts their preferred information. As a consequence, users can become isolated in their own cultural or ideological *filter bubble*.[12] If the information supply is not merely a *self-fulfilling prophecy*, but also an amplifier, this is also referred to as *echo chambers*.[13]

Filter bubbles can start in relatively harmless ways. As a result of profiling and personalization, particular information is tailored and customized. For instance, when someone becomes more interested in news regarding geopolitics than sports and culture, the supply of information can be adjusted accordingly. This may lead to one-sided provision of information.[14] However, if the same person also becomes more interested in news on geopolitics from a specific political or cultural perspective, the algorithms can also take that into account when offering particular information. A typical example of this is the polarized reporting on US president Donald Trump. In the United States, several news channels (like CNN, The Washington Post and the New York Times) tend to be very critical on this president, whereas other news channels (like Fox News) report on his presidency as refreshing and are not that critical. These differences can be attributed to the preferences of the audiences they serve. In Europe, the media are almost unanimously critical on this president. A reason for that could be that Europeans prefer (or have some kind of need) for more critical reporting on president Trump. Europeans that are wondering why so many Americans voted for this president during the 2020 elections perhaps forget which types of information were fed to particular parts of the electorate in the US.

It is important to realize that filter bubbles can be in tension with or interfere with human rights. A detailed analysis of this is beyond the scope of this paper, but intuitively it will be clear that a highly personalized approach will be in tension with the equal treatment principle. This can result in discrimination, for instance, if the information offered is personalized on the basis of ethnic background. A typical example would be showing lower paid jobs to people from ethnic minorities. Although it is sometimes supposed that ethnic background is easy to hide when communicating online (and a person is not visible), but someone's ethnic background can

[11] Cf. Balmas, M. (2012) When fake news becomes real: Combined exposure to multiple news sources and political attitudes of inefficacy, alienation, and cynicism. *Communication Research*, 41, 430-454.

[12] Pariser, E. (2011), *The Filter Bubble: What the Internet Is Hiding from You*, New York: Penguin Press.

[13] Barberá, P., et al. (2015), Tweeting from left to right: Is online political communication more than an echo chamber? *Psychological science* 26.10 (2015), p. 1531-1542. See also Dylko, I., Dolgov, I., Hoffman, W., Eckhart, N., Molina, M., Aaziz, O. (2017) The dark side of technology: An experimental investigation of the influence of customizability technology on online political selective exposure. *Computers in Human Behavior*, 73, 181-190.

[14] Custers, B.H.M. (2004), *The Power of Knowledge: Ethical, Legal and Technological Aspects of Data Mining and Group Profiling in Epidemiology*. Tilburg: Wolf Legal Publishers.

easily be retrieved or predicted online, for instance, on the basis of preferences or clicking behavior.[15] Predicting discrimination and privacy sensitive characteristics, like gender, ethnicity, political preferences, religion, sexual preferences and even criminal records can also lead to interference with the right to privacy.[16] This can go very far, in the sense that also characteristics can be inferred or predicted that people do not even know about themselves, such as happiness, probability on a divorce, personalized life expectancies and the likelihood of attracting particular diseases. Obviously this can lead to privacy issues, but also to discrimination, stigmatization and polarization.[17]

The use of algorithmic decision-making can influence the freedom of expression and eventually also undermine democracy, as became clear in the case of Facebook and Cambridge Analytica.[18] These two companies cooperated during the 2016 US presidential election campaign of Donald Trump. Data on millions of Facebook users were analyzed and used to influence voters in their voting behavior. The data were mostly used without awareness and consent of these Facebook users.

Potential solutions

The problems related to fake news and filter bubbles are extraordinary complex. There are no simple solutions. The idea of several governments, including the EU,[19] to establish organizations that can act as fact checkers, at first sight seems to make sense and looks attractive. However, when this was put to practice, it immediately became clear that things are not that straightforward.[20] Early 2018, Dutch newspaper *De Gelderlander,* considered a mainstream reliable regional newspaper, was branded as a medium spreading fake news.[21] What some consider to be fake news, others consider to be practicing the right to freedom of expression. In principle, the right to freedom of expression in most jurisdictions allows for contradicting or denying facts.

Although initiatives regarding fact checking agencies are built on good intentions and will probably contribute to debunking fake news, it may also carry the risk of censorship, when more ambiguous information is under

[15] Kosinski, M., Stillwell, D. and Graepel, T. (2013), Private Traits and Attributes are Predictable from Digital Records of Human Behaviour, *Proceedings of the National Academy of Sciences*. 110(15):5802-5805.
[16] Custers, B.H.M. (2012) Predicting Data that People Refuse to Disclose; How Data Mining Predictions Challenge Informational Self-Determination, *Privacy Observatory Magazine*, Issue 3.
[17] Hart, P. S., Nisbet, E. C. (2011). Boomerang effects in science communication: How motivated reasoning and identity cues amplify opinion polarization about climate mitigation policies. *Communication Research*, 39, 701-723.

[18] Rosenberg, M., Confessore, N., and Cadwalladr, C. (2018), How Trump Consultants Exploited the Facebook Data of Millions, *New York Times*, 17 March 2018.
[19] Vandenberghe, L., Van de Velde, Ch. (2018), EU gaat strijd aan met nepnieuws. vrtnws.be, 26 april 2018.
[20] Birnbaum, M. (2018), Europe wants to crack down on fake news. But one person's fake news is another's democratic dissent. *Washington Post*, 25 April 2018.
[21] Raalte, J. van (2018), EU-factcheckers bestempelen Nederlandse publicaties onterecht als 'desinformatie', *De Volkskrant*, 19 januari 2018.

scrutiny. This means that at least clear and objective rules are required for any fact checking procedures. Facts educate, while opinions influence. However, whether something is a fact or an opinion can sometimes be difficult to determine.[22] For instance, whether something is a defamatory statement (which might be either a fact or opinion) is determined by an objective, common sense perspective by an average member of the public.[23] This can become even more complicated with inferred data, such as profiles. These are not opinions, but characteristics derived from data analytics and ascribed to groups or individuals. Neither are inferred data facts, in the sense of directly observable characteristics or characteristics that can (easily) be checked for accuracy.[24]

Even if the fact checking mechanisms are fleshed out adequately, it is unlikely to be more than only a partial solution. Other parts of a potential solution addressing the major issues related to fake news, filter bubbles and echo chambers may perhaps be found in (increased) transparency and responsibility. Transparency is very important here, because research shows that only few people know how data on them is collected, how that data is analyzed and how it is subsequently used.[25] As long as people are not aware of the fact they are being fed fake news or are living in filer bubbles and/or echo chambers, it will be hard for them to defend themselves against this. In the EU, transparency is also highly relevant form a legal perspective, since the General Data Protection Regulation (GDPR) requires data controllers to obtain informed consent of data subjects before their personal data can be collected and processed in case there is no other necessity for the data processing, such as a contract or legal provision.[26] Apart from transparency regarding the data that is being used, it could also be helpful to increase transparency regarding the algorithms that are being used. Algorithms with the same functionality (i.e., doing essentially the same thing) can still be designed in different ways. Some designs will be more transparent, privacy-friendly, and/or less discriminating.[27] Only when this is transparent and under some form of scrutiny, more responsible designs can be selected.

Another complication is that the combination of large amounts of personal data and complex algorithms can yield unpredictable results. However, only transparency before and during data analyses may not offer sufficient safeguards. Not everything can be subjected to human supervision, in most cases there would not be sufficient time and people available. Therefore, also mechanisms may be required for accountability and perhaps even liability.

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[22] Even when information comes from scientists, see Jones, W. E. (2002). Dissident versus loyalist: Which scientists should we trust? *Journal of Value Inquiry*, 36, 511-520.

[23] Smolla, R. (2014) *Law of Defamation*, Thomson Reuters Legal.

[24] Cf. Leiser, M.R. and Custers, B.H.M. (2019) The Law Enforcement Directive: Conceptual Issues of EU Directive 2016/680, *European Data Protection Law Review*. Vol. 5, nr. 3, p. 367-378.

[25] Custers B.H.M., Hof S. van der & Schermer B. (2014), Privacy Expectations of Social Media Users: The Role of Informed Consent in Privacy Policies, *Policy and Internet* 6(3), p. 268-295.

[26] Custers B.H.M. (2016), Click here to consent forever; Expiry dates for informed consent, *Big Data & Society* : p. 1-6.

[27] Zliobaite I. & Custers B. (2016), Using sensitive personal data may be necessary for avoiding discrimination in data-driven decision models, *Artificial Intelligence and Law* (24), p. 183-201.

When establishing such mechanisms for a posteriori accountability, the underlying assumption is usually that those under scrutiny will consider in advance how to explain their behavior a later point in time. The threat of significant fines, such as those introduced in 2018 in the GDPR, has alarmed many companies to better check their ways of collecting and processing personal data. Many of the rules in the GDPR do not differ that much from the preceding 1995 EU Data Protection Directive. It is mostly because of the high fines (with fines up to 10 or 20 million euros, or in the case of an undertaking, up to 2 or 4 percent of the worldwide annual turnover – whichever is higher), that there is now considerably more attention for compliance.

If accountability mechanisms afterwards may lead to more reflection in advance, the same may apply to ethical considerations. After all, many rules need interpretation in order to assess whether these rules are actually complied with. In order to come up with clear and convincing explanations to users, customers or citizens, often more is needed than merely legal compliance. The interests of users, customers and citizens then get a prominent place in the balancing of interests.

Conclusions

The developments described in this paper show that there still is a lot (really a lot!) of work to do for lawyers and other researchers. The current legislation in most jurisdictions is often not clear, not adequate, not sufficient, or a combination of these things. How legislation should look like, requires more thinking and more research. New generations of lawyers will be working on this over the next decades and that is badly needed to deal with the issues caused by fake news, filter bubbles and echo chambers. The final outcome of these developments is not at all certain and that is why academia have a clear role in this. Lawyers can contribute to explaining to a broader audience why and how these developments can undermine democracy and examine potential solutions for this that do not interfere with the right to freedom of expression and other human rights. Academics of all kinds of backgrounds could also join the public debate if statements are made that scientific research has already proven wrong.