

**A study of the Impact of Technology
on Journalism and the News
Industry**



Angshumita Deka



Abstract

The evolution of technology has impacted the functioning of almost all the different disciplines of life. Print media and journalism too have been influenced by the mark of technological advancements. This paper deals with technology's impact on the media industry, particularly the news industry, as it tries to thrive in the times of social media and digital news sites. It tries to connect the dots between the traditional news industry and the digitalized platforms of news, to figure out whether computational journalism would be able to boost this industry, instead of wiping it out. This paper attempts to understand the combined socio-technical aspect in the field of current journalism and determine the direction towards which it is headed. It aims at defining the pros and cons of the impact of technology in the field of journalism and figuring out possible solutions for the vulnerable areas like news accountability, verification of facts and the impact of a news circulated on social media versus that of a newspaper report.

Keywords

Computational Journalism, Technology, News Industry, Media, Digital Communication

1. Introduction

With the increasing associations of computer science with social sciences, the emergence of a new discipline known as computational journalism has started to run in the veins of major news organizations in the advanced countries. Some such notable news organizations are The New York Times, The Wall Street Journal and The Guardian among others. Interestingly,

Negroponte in his 1995 book 'Being Digital' wisely predicted the advent of the digital age in the newspaper industry "as if The New York Times were publishing a single newspaper tailored to your interests. The bits are filtered, prepared, and delivered to you, perhaps to be printed in the home, perhaps to be viewed more interactively with an electronic display" (Negroponte, 1995, p. 20).

Print media has always been a major source of knowledge ever since the time Johannes Gutenberg established the first printing press in the 15th century (Rees, 2008). Newspapers have been revolutionary in bringing information to societies and playing an important role in the field of establishing democracy and freedom in nations across the world. The dawn of the World Wide Web (WWW) was a major technological leap in the field of digital communication, which was "developed through government-subsidized-and-directed research during the post-World War II decades, often by the military and leading research universities" (McChesney, 2013, p. 99). This advent of the WWW led to the diffusion of the Internet into the society, allowing easy access of information for the common people (Castells, 2010). As a result, there has been a shift in the ways people accept and respond to information, as "the Internet promises interactive global communication" (Bolaño, 2015, p. 182).

Napoli (2011) believes that the technological changes have, so far, "been a fundamental driver of media evolution" (p. 27). These technological upgrades have changed the way various processes involved in the news production industry take place – from large online or offline databases that store huge amounts of information to platforms for reading news that are no longer confined to the limited pages of the morning dailies.

As the debate goes on about whether these technological advancements will wipe out traditional disciplines, it is going to be a task to determine whether journalism practices can be enhanced with such technology rather than being nullified.

2. Computational Journalism

In simple terms, Computational Journalism is basically the enhanced unification of computer science and technology with the activities of journalism. It is a vast subject that revolves around the development, implementation and usage of computer software and tools to the various stages of journalism, starting from newsgathering and verification, up to the dispersion of the news reports. All these are performed while keeping in mind the maintenance and improvement of the core journalistic values such accuracy and reliability. It involves various areas of computer science such as artificial intelligence, data mining, content analysis and data visualization among others.

Broadly defined, it [Computational Journalism] can involve changing how stories are discovered, presented, aggregated, monetized, and archived. Computation can advance journalism by drawing on innovations in topic detection, video analysis, personalization, aggregation, visualization, and sensemaking [...] Building on the experience of an earlier generation of computer-assisted reporting, journalists and computer scientists are developing new ways to reduce the cost and difficulty of in-depth public affairs reporting. (Cohen et al., 2011, p. 66).

Computer-assisted reporting (CAR), data journalism and the more recent computational journalism are forms of journalistic practices that have emerged as a result of an increasing collaboration between programmers and journalists “as more programmers have begun to move into professional newsrooms and professional journalists have become increasingly drawn to programming’s technical capabilities and cultural norms, which have been heavily influenced by the open-source movement” (Coddington, 2016, pp. 332-333).

While the use of technology has always been embedded in the field of news publication, Computational Journalism explores the deeper growth of technology into the field of journalism by studying the building and use of new enhanced software and algorithms to gather and authenticate news information. Additionally, it helps journalists, reporters and editors to work easily with monstrosly exploding amounts of structured and unstructured data, to make sense of the public sentiments and the spreading of information on social networks. It also tries to engage in the efficient dissemination of the news articles through a multiple range of communication media, and in advanced cases, it involves the use of automation techniques to develop and edit news stories.

Editors of Associated Press started testing simple algorithms from software provider Automated Insights in early 2014, that generated earnings reports on listed companies (Lindén, 2017, p. 66). These automatically generated reports were found to contain fewer spelling mistakes and calculation errors than man-made reports and thereby, helped in increasing the output from about 300 stories to more than 3700 stories per earnings season. This has allowed Associated Press to save financial resources (Lindén, 2017).

3. The Trending Impacts

Digital methods and algorithms are becoming crucial in the field of improving journalism methods, thereby giving rise to this field of Computational Journalism, which specifically deals with the involvement of technology with the news industry (Flew et al., 2012). Innovative technology is starting to get embedded in the processes like news gathering, fact verification to news dissemination. There are already algorithms that can generate news reports

relating to sports results, stock market news and weather forecasts. The New York Times' Interactive News Technology Department is a pioneer in using innovative data journalism tools, such as the 'Document Cloud' tool, based on cloud computing technology, to support the journalistic practices of processing and publishing unstructured information (Appelgren & Nygren, 2014). Quill, a Natural Language Generation platform, developed by Narrative Sciences, which generates machine-written reports, is another example of the progress being made in the field of computational journalism.

The thriving progress in digital technologies also reduces the costs associated with market coordination, thereby increasing the scope of activities associated with the product (Sundararajan, 2015). This can be seen in the instance of how social media platforms and blogging sites are increasingly becoming the sources of regular news and information. Social networking sites like Facebook and Twitter are increasingly being used for spreading information during times of natural disasters, other calamities and wars, even though the accuracy of the shared information is usually not clear (Sutton et. al., as cited in Westerman et. al., 2013).

In the case of authoritarian government regimes, "viral videos and blog posts are becoming the samizdat [referring to the reproduction of censored documents in the Soviet bloc] of our day" (Clinton, as cited in Morozov, 2011). WikiLeaks is an important example in the field of digitalized journalism, which is a platform dedicated to protect [by the means of secured storage] and expose controversial documents across the globe (Morozov, 2011).

As Benkler (2006) puts it "the networked economy provides varied alternative platforms for communication, so that it moderates the power of traditional massmedia model" (p. 18). Eventually, as the big news media companies are starting to understand the impact of the emerging ecosystem of new media, they are incorporating not just new technologies in the press, but also enhancing their trade values and networking potential. They are gradually providing platforms for citizen journalism and new bloggers who provide further information on their stories (Bruns, 2008). From the viewpoint of the users or the audience, such news applications are currently the most visible projects of journalism joint with programming (Stavelin, 2013).

4. Ethical Considerations

Human ethics and values play a great role in the field of journalism, without which, society would tend to go haywire. Integrity, along with quality and reliability of the available information, are the essence of both journalism and information technology, without which there can be a lot of misinterpretations and lack of sense and direction in the society (Flew et al.,

2012). “The transformation from facts to truth is in this perspective much like the transformation from data (collected symbols) to information (meaningful interpretations of data) – they both rely on a knowledgeable actor to do the transformation” (Stavelin, 2013, p. 78).

Good journalism is at the backbone of well-read news stories. It should be a form of enlightenment for the society to help citizens build wiser opinions, be able to discover truths in the cases it deals with, and if required, make a strong stand against unfair policies and authoritarianism (Dörr & Hollnbuchner, 2016).

As new technological innovations come into the picture, these innovations, if taken in the right direction can boost the accountability and trustworthiness of a newspaper. A simple question of interest in this case would be that if more people talk about an issue online, would it be more accountable, as these peers can form a public watchdog (Bruns, 2008). However, with the need to modify certain approaches for journalism in the age of computation (Anderson, 2012), more and more ethical challenges are on the rise with the entry of algorithms into professional news production. These challenges are identified on various levels, starting with the level concerning data input, source protection and privacy rights, leading to the management level concerned with data processing accuracy and transparency (Dörr & Hollnbuchner, 2016). Taking care of such challenges is of utmost importance at a time when social media and blogging is taking over the social as well as personal lives of people, thereby making it difficult to distinguish fake news from the real ones. The newspaper industry needs to tackle this challenge by equipping journalism with the right technological tools, as “media and life coevolve in ways governed by the many mixed and altogether messy ways in which machines and humans cocreate each other” (Deuze, 2012, p. 68).

Algorithms have the power of autonomous decision-making, but it is still a matter of concern whether these algorithms or their creators will be accountable for any type of consequences of news reporting. However, human influence will always be at the background of any algorithmic function in the form of criteria selection, data training and the overall decision-making (Diakopoulos, 2016). These are the factors that motivate journalistic scrutiny of commercial and governmental algorithms, where the data and the processing of the information require some clear explanations (Stark & Diakopoulos, 2016).

5. Pros and Cons

With the increasing efficiency resulting from the use of computational power to speed up work in almost any field, the discipline of journalism is not an exception in this regard (Stavelin, 2013). Technological innovations in the areas of storing, processing, reproducing

and disseminating information, which form the main pillar of the news industry, are increasingly bringing in a compact workspace thereby harming employments (Schiller, 2007). As more and more workload gets shifted to the machines, the decreasing need for physical human productivity is a matter of concern. Perhaps, this can be tackled by equipping people with more interdisciplinary knowledge that allows them to deal with technologies in their respective fields.

The overshadowing of traditional news methods, fuelled by the Internet's power to shift from "the journalistic elite to bloggers, social networks and consumers" (Curran et al., 2016, p. 18) and the increasing ease of "accessibility of information technologies puts tools required to collaborate, create value, and compete at everybody's fingertips" (Tapscott et al., 2006, pp. 10-11). "User-generated content, such as data from Twitter, represents a fantastic opportunity to tap into public opinion and public voices to keep journalism close to readers" (Stavelin, 2013, p. 70). However, this brings along the concern of distinguishing which news is relevant and true from the news that is invalid.

Whenever there is a new shift in technology in the sector of journalism, it brings along a promise of better forms of journalism and communication, however "each new technology eventually reveals its flaws, kinks, and limitations" (Wu, 2010, p. 14). While on the positive side, this new age of digitalization that comes with a significant reduction of costs of storing, processing and communicating of information, the negative aspect to it is that it has resulted in worsening the income distribution during the process of adjustment (Mansell, 2012).

6. Conclusion

The required tools and skills for computational journalism or the digital future of journalism, in general, need to be enhanced from the existing practices of traditional journalism, while keeping the core values and goals intact (Karlsen & Stavelin, 2013). Online news platforms and blogging sites are enabling the participation of the general masses on news events like never before. "Much like open-source journalism, computational journalism and computational thinking are at their core collaborative processes" (Coddington, 2016, p. 339). While there are positive aspects to this, there is also a drawback that can lead to the dissemination and discussion of false information. Computational journalism has the ability to solve such issues by verifying news on the online news platforms and allowing people to participate in these.

To sum up, the Internet might not be undermining the existing news organizations, but rather enabling them to “extend their hegemony across technologies” (Curran et al., 2016, p. 19). Therefore, this merging of digitalization into the field of journalism would require news organizations to re-evaluate traditional methods and assumptions and reshape the organization’s programming (technology) and marketing decisions (Jenkins, 2006).

Media and journalism industries, in order to benefit from the digital age, should not just shield against “the harmful consequences of a technological innovation” (Lessig, 2004, p. 127). They should “build a foundation of data, information and customer relationship management” (Napoli, 2011, p. 158). As Tapscott et al. (2006) puts it that “the future, therefore, lies in collaboration across borders, cultures, companies and disciplines” (p. 61).

In the age of advancing digitalization, computational journalism has the potential to improve the ways in which news is gathered, stored, processed and reported, by supporting journalists in their work to tackle the day-to-day problems plaguing society (Flew et al., 2012) and not just allowing computers and algorithms to become the unaccountable sources of news generation.

The future of journalism lies not only in the hands of the journalists or people of the press, but also, in the hands of the tech-enthusiasts and algorithm-makers. This is where the two communities need to merge in order to build and maintain a platform that provides clear and verified news, in an age of information explosion. Armed with the right knowledge and digital tools, the news industry can go a long way to fight the circulation of fake news and be the first ones to reach the screens of the citizens. This is how Computational Journalism can help change and improve the way society is starting to consume news.

References

- Anderson, C. (2012). Towards a sociology of computational and algorithmic journalism. *New Media & Society*,15(7), 1005-1021. doi:10.1177/1461444812465137
- Appelgren, E., & Nygren, G. (2014). Data Journalism in Sweden. *Digital Journalism*,2(3), 394-405. doi:10.1080/21670811.2014.884344
- Benkler, Y. (2006). *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. New Haven, CT: Yale University Press.
- Bolaño, C. (2015). *The culture industry, information and capitalism*. Basingstoke: Palgrave Macmillan.
- Bruns, A. (2008). *Blogs, Wikipedia, Second life, and Beyond: from production to produsage*. New York: Peter Lang.

- Castells, M. (2010). *The rise of the network society* (Second edition). Malden, MA: Wiley-Blackwell.
- Clinton, H. "Remarks on Internet Freedom." *The Newseum*, Washington, DC, January 21, 2010.
- Coddington, M. (2014). Clarifying Journalism's Quantitative Turn *Digital Journalism Journal*, Vol. 3, 2015, Issue 3, 331-348. doi: 10.1080/21670811.2014.976400
- Cohen, S., Hamilton, J. T., & Turner, F. (2011). Computational journalism. *Communications of the ACM*,54(10), 66. doi:10.1145/2001269.2001288
- Curran, J., Fenton, N., & Freedman, D. (2016). *Misunderstanding the Internet*. London: Routledge.
- Deuze, M. (2012). *Media life*. Cambridge: Polity Press.
- Diakopoulos, N. (2016). Accountability in algorithmic decision making. *Communications of the ACM*,59(2), 56-62. doi:10.1145/2844110
- Dörr, K. N., & Hollnbuchner, K. (2016). Ethical Challenges of Algorithmic Journalism. *Digital Journalism*,5(4), 404-419. doi:10.1080/21670811.2016.1167612
- Flew, T., Spurgeon, C., Daniel, A., Swift, A. (2012). The Promise of Computational Journalism, *Journalism Practice*, Vol. 6, No. 2.
- Jenkins, H. (2006). *Convergence culture: where old and new media collide*. New York: New York University Press.
- Karlsen, J., & Stavelin, E. (2013). Computational Journalism in Norwegian Newsrooms. *Journalism Practice*,8(1), 34-48. doi:10.1080/17512786.2013.813190
- Lessig, L. (2004). *Free culture: how big media uses technology and the law to lock down culture and control creativity*. Oslo: Petter Reinholdtsen.
- Lindén, C. (2017). Algorithms for journalism: The future of news work. *The Journal of Media Innovations*,4(1), 60. doi:10.5617/jmi.v4i1.2420
- Mansell, R. (2012). *Imagining the Internet: Communication, Innovation, and Governance*. Oxford, UK: Oxford University Press.
- McChesney, R. W. (2013). *Digital Disconnect, How Capitalism is Turning the Internet Against Democracy*. New York, London: The New York Press.
- Morozov, E. (2011). *The net delusion: the dark side of internet freedom*. New York: PublicAffairs.
- Napoli, P. M. (2011). *Audience evolution: new technologies and the transformation of media audiences*. New York: Columbia University Press.
- Negroponte, N. (1995). *Being digital*. New York: Knopf.
- Rees, F. (2008). *Johann Gutenberg: Inventor of the printing press*. Minneapolis, MN: Capstone.
- Schiller, D. (2007). *How to Think about Information*. University of Illinois Press.

- Stark, J.A., Diakopoulos, N. (2016). Towards Editorial Transparency in Computational Journalism, Computation+Journalism Symposium, September 30/October 1, Palo Alto, California, USA.
- Stavelin, E. (2013). Computational Journalism: When journalism meets programming (Doctoral dissertation). Retrieved from http://stavelin.com/uib/ComputationalJournalism_EirikStavelin.pdf
- Sundararajan, A. (2015). The Sharing Economy: The End of Employment and the Rise of Crowd-Based Capitalism. The MIT Press
- Sutton, J., Palen, L., & Sjklovski, I. (2008). Backchannels on the front lines: Emergent uses of social media in the 2007 Southern California wildfire. In F. Friedrich and B. Van de Walle (Eds.), Proceedings of the 5th International ISCRAM conference. Washington, DC.
- Tapscott, D., & Williams, A. D. (2006). Wikinomics: how mass collaboration changes everything. New York: Portfolio Penguin.
- Westerman, D., Spence, P. R., & Heide, B. V. (2013). Social Media as Information Source: Recency of Updates and Credibility of Information. Journal of Computer Mediated Communication, 19(2), 171-183. doi:10.1111/jcc4.12041
- Wu, T. (2010). The master switch: the rise and fall of information empires. London: Atlantic Books.

Biography of the author



Angshumita Deka, MSc, MSc has a Master in Digital Communication Leadership, additionally a Master in Computer Science. At the moment she is joining an Erasmus Scholarship program at the University of Salzburg as well as the Aalborg University Copenhagen.