Overview of the Netherlands AI, Media and Democracy Lab (Extended Abstract)

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Abstract

This extended abstract introduces the work of the Netherlands AI Media and Democracy lab, especially focusing on the research performed from an AI/computer science perspective at CWI, the Netherlands National Research Center for Mathematics and Computer Science in Amsterdam. We first provide an overview of the general aims and set-up of the lab, and then focuses in on the research areas of the 3 research groups at CWI, outlining there are of research and expected research contributions in the areas between AI and media & democracy.

1. Introduction

Artificial Intelligence (AI) can play an important role in strengthening the democratic power of media. AI could contribute to new ways of informing and engaging with citizens, creating a resilient public sphere and tackling problems such as disinformation, polarization and fake news - provided we are able to design AI-driven applications with public values and the needs of citizens in mind. AI research can make an important contribution to this goal. The Netherlands AI, Media and Democracy Lab (AI4DEM) aims both to create fundamental models to study how rapid developments in AI will transform the media and democracy area, and to set up testbeds for applying AI in the media.

Journalists, media professionals, designers, citizens, researchers and public and societal partners bring in their challenges in using AI in the media. The fast development of AI can help the media fulfill its democratic role, for example by keeping users engaged in the stories they are presented with, or by assuring that a diverse set of voices and viewpoints are covered. But, without careful design, it can also have considerable negative effects. For instance, disinformation, polarization, fake news, algorithmic bias, and filter bubbles could undermine democratic processes by influencing public opinion, distorting facts, and corrupting electoral integrity.

The lab investigates possible and current uses of AI and explores its social, ethical, and legal implications. We will develop and test new conceptual models and AI-applications in actual media production spaces. The lab involves the entire knowledge creation value chain: from deeply conceptual research to participatory design, field testing and using the results as input for (theoretical and applied) research in computer science, law, ethics, social sciences and the humanities. The result will be cutting-edge research on how AI-driven applications in the media change the public sphere, and how it can help solve problems such as disinformation, algorithmic bias and filter bubbles. Ultimately, the lab aims at strengthening AI-driven innovation in support of Dutch national and local media's democratic function.

In this abstract, we will first give a brief overview of the lab composition and its activities, then focus in on 3 computer science and AI-related research areas covered by AI4DEM research.

2. Overview of the lab & different types of expertise

The Netherlands AI, Media and Democracy Lab is uniquely equipped to AI in the Media challenges, as different, **multi-disciplinary** expertise domains are included in the consortium:

Social and behavioural sciences: With a strong rooting in research in political communication, the research group in political communication and digital communication at the University of Amsterdam

(UvA) brings expertise to research the media ecosystem from an individual and systemic approach, understanding AI's impact on the relation between the media and the public and its democratic role.

Legal sciences: The research group in information law at the UvA bring in the necessary expertise to address the legal framework and ethical considerations of AI in the media and how to develop new applications and practices that start from the legal and ethical framework, focused on public values.

Journalism studies: To address the specific role of news media and how innovation in journalistic practices can be stimulated, The Creative Media for Social Change bring in expertise and experience in research on news media production and the role of AI in the media's ability to fulfil its democratic function in society. The research group Journalism in the Digital Transition (HU) complement this with research projects on AI in journalism.

The **Responsible IT** at the University of Applied Science Amsterdam brings expertise and facilities to develop the applications and tools that will be tested in the lab, to gather data from users, and analyze user experience. The Computer Science and AI research in AI4DEM is represented by the work performed at CWI, the National Research Centre for Mathematics and Computer Science in Amsterdam. In the following section, we will go deeper into describing the 3 research groups and topic areas that CWI is contributing to the project.

3. Topics of CS and AI research covered

From a CS point of view, the work at CWI involves three research groups (Distributed & Interactive Systems, Human-Cantered Data Analytics, and Intelligent & Autonomous Systems) with expertise on multi-agent systems and complex networks, large-scale disinformation detection, transparent AI pipelines, responsible recommender systems, human-centered multimedia systems, and audience understanding. In the following we provide a brief overview of the main topics covered by each group.

3.1. Distributed and Interactive Systems

The DIS research group (https://www.dis.cwi.nl/) focuses on facilitating and improving the way people use interactive systems and how people communicate with each other. Research performed in the group combines data science with a strong human-centric, empirical approach to understand the experience of users. This enables us to design and develop next generation intelligent and empathic systems. Results are based on realistic testing grounds and data sets, and embrace areas such as ubiquitous computing, human-centered multimedia systems, and languages.

One of the key topics of research the group is pursuing in the AI4DEM lab are new methods for sentiment analysis and user physiological state. For example, DIS researchers have shown that higher level of emotional arousal (pupillary responses) with clickbait than with neutral headlines [1], while more physiological activation has been observed when users are presented with negative stories than with positive ones [2]. The group is also researching innovative interaction techniques, for example exploring adding vibrotactile and thermal stimulation to the news experience [3], as well as developing immersive techniques for VR/AR news consumption and experience.

3.2. Human-Centered Data Analytics

The Human-Centered Data Analytics group (https://www.cwi.nl/en/groups/human-centered-data-analytics/) develops methods and techniques to better support users in accessing information that is heterogeneous, subjective and potentially inconsistent. The group works together with social scientists and humanities researchers to evaluate how technology can be used to best interpret complex data, by modelling and comparing different assumptions underlying the interpretation. The group advocates the notion of transparency in all critical use of technology to improve trust assessments.

In AI4DEM, the group will address a number of topics related to content quality and metrics for fairness and diversity in automated news delivery. In terms of content quality, the focus will be on automated the fact-checking through crowdsourcing and/or machine learning. This involves extending existing approaches to analyze multiple aspects of quality, e.g. the soundness of opinionated pieces [4].

In terms of metrics - currently, user behaviour analysis often steers tailoring of content with clickbait as result. This can conflict with editorial values, such as diversity, non-discrimination, objectivity, and fairness. The group aims to develop evaluation metrics and approaches that go beyond superficial engagement [5]. The goal is to increase transparency with regards to the effect of certain automated methods – e.g. recommendation algorithms, configurations and training sets – on fairness and diversity of delivered news. This will allow media organisations to make informed choices with respect to the use of e.g. new recommender systems.

3.3. Intelligent and Autonomous Systems

The Intelligent and Autonomous Systems group (https://www.cwi.nl/en/groups/intelligent-and-autonomous-systems/) studies fundamental mechanisms that enable the emergence of various degrees of organization, intelligence and autonomy in complex cyber and cyber-physical systems, and apply them to concrete problems of societal relevance. IAS researchers have extensive experience in areas like complex and multiplex network analysis, multi-agent system design, automated markets, algorithmic game theory and electronic negotiation.

In AI4DEM, IAS researchers will focus on modeling the dynamics and prevention of disinformation and polarisation. This involves studying complex networks formed of both humans and automated agents, and model how agents in the network are susceptible to be influenced by the spread of fake news, and influence others [6]. This can lead to complex systems dynamics, such as cascade effects in which a particular piece of disinformation spreads rapidly through the social network (in past work, IAS researchers have studied such dynamics in collaborative tagging systems and sponsored search markets [7,8]). They also look at how different parameters influence these dynamics, and study how game theoretic methods can be designed to prevent spread of disinformation in social networks.

4. Outlook and Future Collaboration Opportunities

The Netherlands AI, Media and Democracy Lab is an ambitious long-term research initiative, that will bring a multi-disciplinary approach to the study all aspects of the effects that Artificial Intelligence on the media sector. In terms of applications, we plan to engage with top media organizations in the Netherlands and abroad, such as RTL News, DPG media, the BBC, etc. We are also eager to engage with the international research community working on this topic, by sharing our research at international conferences, but also by inviting distinguished researchers from abroad to speak at CWI, for example through CWI's semester programme (https://www.cwi.nl/en/education/semester-programmes/)

5. References

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