The social in the platform trap: Why a microscopic system focus limits the prospect of social machines

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"Filter bubble", "echo chambers", "information diet" – the metaphors to describe today's information dynamics on social media platforms are fairly diverse (Tufekci, 2016). People use them to describe the impact of the viral spread of fake, biased or purposeless content online, as witnessed during the recent race for the US presidency or the latest outbreak of the Ebola virus (in the latter case a tasteless racist meme was drowning out any meaningful content). This unravels the potential envisioned to arise from emergent activities of human collectives on the World Wide Web, as exemplified by the Arab Spring mass movements or digital disaster response supported by the Ushahidi tool suite.

Social machines: The story so far

Under the label *social machines*, researchers investigate this kind of socio-technical phenomena in order to understand the general characteristics that make up a purposeful and successful orchestration of humans and machines in a variety of application contexts. The term social machines stems from a vision articulated by the inventor of the World Wide Web, Sir Tim Berners-Lee, who stated in his book Weaving the Web (Berners-Lee and Fischetti, 2000): *"Real life is and must be full of all kinds of social constraint – the very*

processes from which society arises. Computers can help if we use them to create abstract social machines on the Web: processes in which the people do the creative work and the machine does the administration."

Early work on social machines put the individual systems such as Twitter, facebook, reddit, Zooniverse or Mechanical Turk at the center of the consideration. By classifying the socio-technical properties of those systems (e.g. incentive mechanisms, information sharing capabilities or general high-level system goals) researchers devised frameworks that provide developers with system design patterns that can be imitated or adapted in order to build new participatory Web-based systems successfully.

An alternative to this is the strongly qualitative work on narrative structures about purposeful collective processes (Tarte et al., 2015). The goal of this line of work is to account for sociality as an inherent property of social machines and to consider purposeful action that can range across the boundaries of individual platforms.

A third line of work is concerned with technologies to spin up autonomous agents to support humans in achieving goals collectively (Ahmad & Kamvar, 2013; Robertson & Giunchiglia, 2013; Chopra & Singh, 2016). This angle is sometimes also referred to as human-agent collectives (Jennings et al., 2015) and adds a constructive dimension to social machines research while the former two work areas were highly retrospective.

Engineering complex social systems or social engineering of complex systems?

Returning to our earlier examples, let us suggest that this social machines research is currently in a *retrospective platform trap*. The study of existing applications and past activities (work on classification and archetypes) carries the danger that we get locked in a state where we seek to understand complex social phenomena with data that is blurred by the particulars of the platform. And the attempt to attach agent-based technology to those containers in order to support emergent social processes is challenged by the fact that the self-organization principles that govern "how the agents' actions translate into an outcome"

(Dash et al., 2003) suffers from manipulation and deception by the economic goals of platform providers.

We recently confirmed these issues during the testing of a novel crowdsourcing system. Our prototype reacts upon bursts of activity occurring on different social media platforms and autonomously engages with human participants to support coordinated problem solving across the boundaries of a single system (Luczak-Roesch et al., 2016). The tool is intended to be applied in scenarios that are inherently broadcasting orientated and do not feature a pre-defined online community to engage with, such as disaster response using social media as well as citizen science. However, tests in which we linked our system to facebook and Twitter showed that the identified bursts only reflected the biased exhausted of the platforms and may even amplify those. The expected *socio-technical filtering* function got stuck due to a lack of reputation of the bot account, leaving the autonomous system repeating the messages it was trying to collect feedback for.

This reputational underachievement happened because we deliberately did not invest into building a reputation through strategies that exploit the filtering and ranking algorithms of the platforms (e.g. by buying followers or by building an artificial follower network for the bot account upfront). Hence we had to observe that both platforms, Twitter and Facebook, hindered the system from getting promoted or at least listed in public feeds. We conclude from this failure that an autonomous agent has hardly any chance to gain visibility if it does not aim to deceive the platform and consequently also other users on it.

The social machines dilemma and a call for non-positivistic engines of social action

The example shows our agent would have to rely on economic principles for coordination and adaptation. But this would limit its sociality to at most instrumental rationality according to Weber's theory of social action (Weber, 1978) and creates a critical dilemma for the social machines vision. If social machines are meant to cover the full non-positivistic spectrum of social action, system developers have to make sure that the technical components preserve this spectrum and do not overwrite it with a model dominated by economics.

Such an enriched view to computer and system design ethics responds well to the one presented by Spiekermann (2011). It calls for a general practice of an *open design of intelligent and ethical systems*, or, as Shadbolt et al. (2016) put it "*exploits the power of open – open source, open standards, open data, open licenses*". Both, the content and the infrastructure, are built by humans, which calls for similar ethics for the applications and systems that the World Wide Web brought to data: open, transparent, linked, owned and controlled by the creator.

All this gives rise to a grand challenge for social machines research that has the chance to ultimately demarcate the important and distinct positioning of this young area within the stress field of computer science, social science, psychology and cognitive science. This challenge is about winning the *incentivisation game*, which means not to try to mask the artificiality of technology – as in the famous task of Turing's *imitation game* (Turing, 1950) – but to develop intelligent and ethical technology that is resilient against continuous spam and deception by other human and machine peers interacting with it. This involves smart technology to separate irrelevant, misleading and harmful content, but also – and maybe even more importantly – strategies to incentivise human and machine peers on the Web, so that these decrease or even give up any potentially ill-intentioned action.

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