Ethics Case Study: Social Machines

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What are social machines, how do they differ from social media and what new sociological phenomena do they represent?

Networked digital technologies and devices are now ubiquitous in many societies, providing new channels through which individuals and communities can connect, share information, co-create solutions, distribute tasks, support one another, play and socialise. While online groups and social media are now familiar concepts, and have been the subject of much sociological research, an arguably new phenomenon has emerged which bears closer scrutiny as part of the broader Digital Society research agenda. This has been characterised as the ***Social Machine***. The scope and boundaries of this concept are still being defined and taxonomies for describing and differentiating social machines are evolving. In essence, however, the term 'social machines' represents a set of unique socio-technical systems whose existence and functionality depend on a synergistic blend of human and computational 'engineering'.

Social machines are conceptually related to, but qualitatively different from, *social media*, information and communication channels or platforms, and the *social web,* a broader term describing web-mediated social interactions. It is closely associated with the concepts of *Collective Intelligence, Distributed Computing and Crowdsourcing*, which rely on the effort and cognition of large numbers of individuals, mediated by digital systems, to generate information or solve problems that would be impossible for computers or people to do alone. Inevitably the term has also become associated with the *Big Data* movement, particularly in relation to the mining of large corpuses of social media and open data.

Social machines appear when other ingredients of *sociality* are added; for example, the EyeWire project – involving massive numbers of distributed '*citizen scientists'* examining digital images of brain tissue to find and mark-up cancer cells, has a sociality layer, in the form of an entertaining and competitive gaming format and a community support forum. Likewise, the crowdsourcing platform Ushahidi builds new knowledge (annotated maps) gathered from objective (location) and socially derived or curated data (e.g. outbreaks of violence or disease) and, like other ICT for Governance innovations, was designed to leverage societal power as a catalyst for change. Another example is the ReCAPTCHA system, which crowdsources human judgement by asking service users to type the letters they see in distorted image files in order to determine whether they are humans or computers bots. These behavioural data, in turn, feed a machine learning algorithm that incrementally improves the quality of automated text conversion software for digitising books (most users are unaware of this).

Ethical Issues Presented by Social Machines

Social machines pose a number of ethical and societal challenges. In his original vision for social machines from his book *Weaving the Web*, Tim Berners-Lee argued that social machines on the web would release *"people [to] do the creative work and machines [to] do the administration"*. While this has happened in some cases, in others the reverse is true. Indeed many *intentional* crowdsourcing

applications involve humans doing the dull, repetitive tasks while the machines do the creative work, raising issues for trust and equity. *Unintentional* crowdsourcing takes this one step further, such as with facial recognition bots integrated into social software, or online professional collaboration tools, where users become both the data and the first-line data processors (through their choices), feeding predictive algorithms which may then curtail their options in the interests of greater 'precision' and 'efficiency'.

In the following section, we look at one cluster of social machines which are themselves used to study social machines, the Web Observatory, as developed and researched within the UK project SOCIAM (The Theory and Practice of Social Machines).

Example: The Web Observatory

The Global Web Observatory is a research tool for harvesting, organizing, archiving and distributing data about the web, in linked, geographically-distributed and autonomously-managed nodes. The primary role of the nodes is to manage *catalogues* of resources about data (meta-data) and software apps that enable these data to be analysed and visualised, both retrospectively and in real-time. The catalogues may describe open data, research datasets, or corpuses of social media data available free or at a charge. Individual nodes often contain their own research datasets, although typically they act as intermediaries between the originating organisation and researchers wishing to undertake web analytics. Individual nodes contribute their catalogues, datasets, and apps to the master catalogue maintained by the Global Web Observatory, which mediates research involving each of the nodes. Such heterogeneous, distributed ('broad') data is a *sine qua non* of social machines research, yet its collection and aggregation can be ethically challenging.

The Web Observatory passively monitors open streams of web data, rather than seeking to modify these data or influence the web, but although it is not interventionist in the way that some other social machines are, it still raises important questions about the responsibilities and ethical obligations of observers and data holders. Today, Web Observatories operate under the tacit assumption that all data sources have been ethically pre-screened by the organisations releasing them, but whether this is tenable in the long term, at scale, and in light of new Data Protection regulations, is an open question.

At its current state of development, the Web Observatory has a light touch ethical regime premised on good faith participation, but as it matures, the infrastructure is likely to incorporate techniques or formalisms to negotiate and verify the ethical commitments of participating data controllers. Following the lead of administrative and medical data linkage initiatives, a proportionate and principles-based approach is likely to be most successful. The standards expected for participation in the Global Web Observatory also deserve extension from data and systems interoperability, to interoperable ethics and governance, and work in this area is ongoing.

The Web Observatory, as a global resource, is a work in progress, and will need to respond quickly to such issues as they arise. Furthermore, as a decentralised network of autonomous nodes, whose governance is distributed institutionally and geographically, jurisdictions and cultural assumptions will vary across nodes. Attempting to centralise the ethical discourse surrounding a global distributed network such as this may itself prove ethically problematic, but responsible leadership,

shared high level ethical principles, supported by a system of distributed and collaborative governance (ironically, one of the key benefits of social machines), will help to manage these challenges in a changing environment.