



Do-It-Yourself Ethics of Sensor Networks

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Abstract

Increasingly, sensors are integrated in the Internet-of-Things, allowing for the aggregation of big data on the functioning of household electronics including smart meters, fridges, and televisions. Likewise, medical sensors and lifestyle sensors integrated in smart phones contribute to aggregation of health data. These sensors offer benefits to the users, but also raise challenges to privacy, data protection, and security. Three types of solutions are envisaged: technical, legal, and social fixes. I present a framework for Do-It-Yourself Ethics where stakeholders combine solutions in a common responsibility for ethically sound development of sensor networks in daily life. In Future Technologies We Want (forthcoming), I have developed this approach. Here, I explore its relevance to sensor networks.

3-D framework for DIY ethics

Figure 2: Governments, researchers, industry, civil society and citizens should take common responsibility, combining: technical, legal and social fixes.

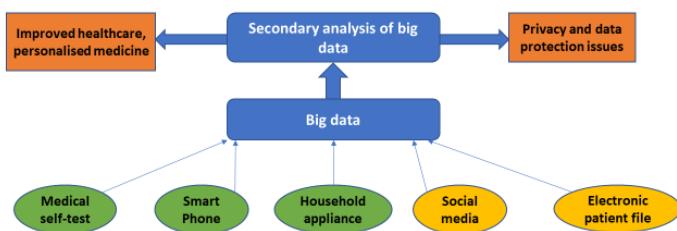
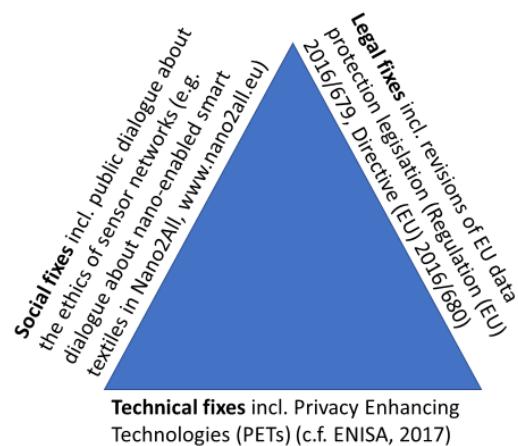


Figure 1: embedded sensors in smart phones, medical self-tests and household appliances including smart meters, fridges, etc. collect data on health, location and other aspects of people's private life. These can be combined with data from social media and electronic patient dossiers in initially anonymised big data, which are sold to other companies for secondary analysis of recombined data. This may contribute to improved healthcare and personalised medicine. However, major privacy and data protection issues have been identified.

Pros and cons of sensor networks in daily life

Benefits include:

- Remote control of household appliances
- Energy and cost saving
- Facilitate police work
- Improved healthcare through telemedicine, personalised medicine (c.f. STOA, 2017)



Challenges include:

- Invisible surveillance by public and private parties
- Privacy and data protection issues through recombined big data from different sources (c.f. STOA, 2017)
- Unforeseen consequences of a paradigm shift from "health for all" to "all for health" due to new health technologies and citizen participation (c.f. EGE, 2015)

Impact on Responsible Research and Innovation

- PETs can help limit storage or sharing of personal data. However, quality control of PETs and their providers is lacking.
- Laws are geographically restricted, and lag behind technological progress. Regulatory regimes in the USA, EU and other countries differ.
- Public and stakeholder dialogue helps articulate value conflicts and may contribute to harmonised international norms. It is time consuming and hard to enforce.



Conclusion

Technical, legal and social fixes to challenges posed by sensor networks in daily life each offer pros and cons. A combined 3-dimensional approach promises the most optimal solution to these challenges.

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