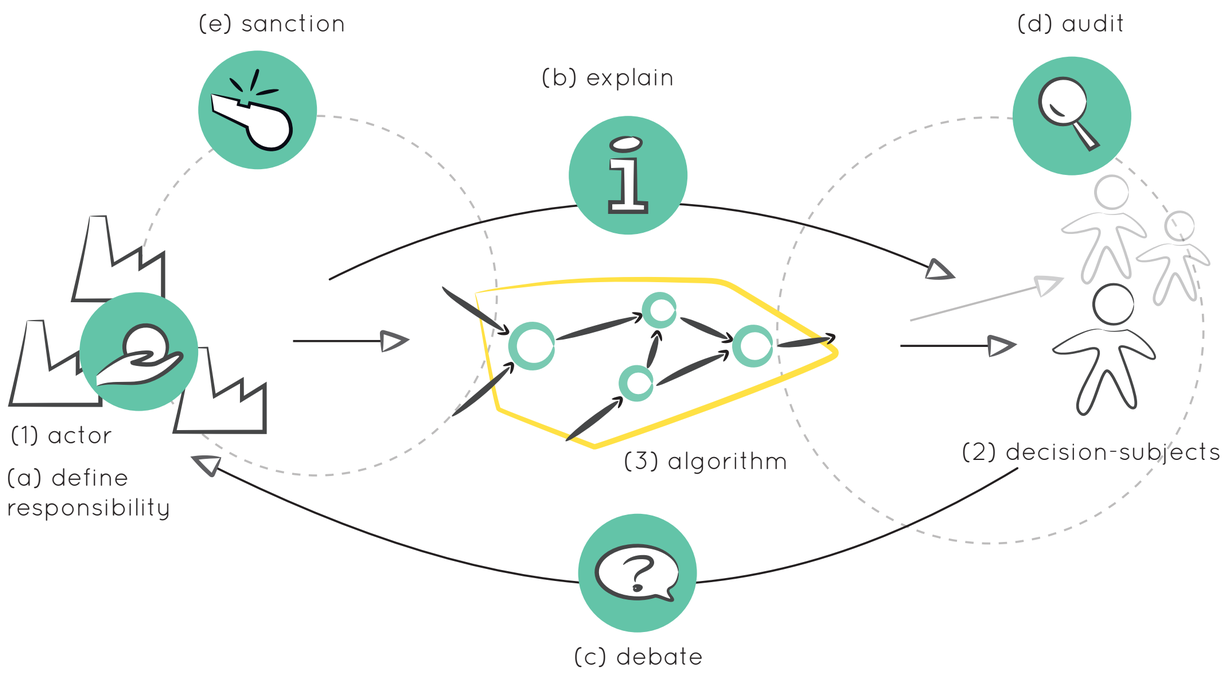
PASS THE BALL!

Designing accountability into the socio-technical context of algorithmic systems

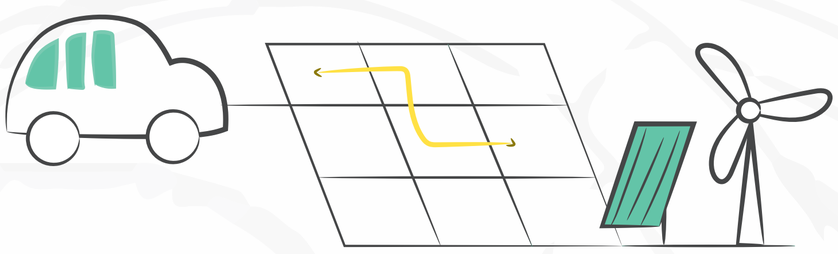


Algorithms are all around us. Based on large amounts of data and through automated decision-making processes, they increasingly exercise power over us. As a way of governing this power, we should be able to hold these algorithms and those responsible for implementing them accountable. But how might that work in practice?

How can algorithmic accountability be implemented by design?

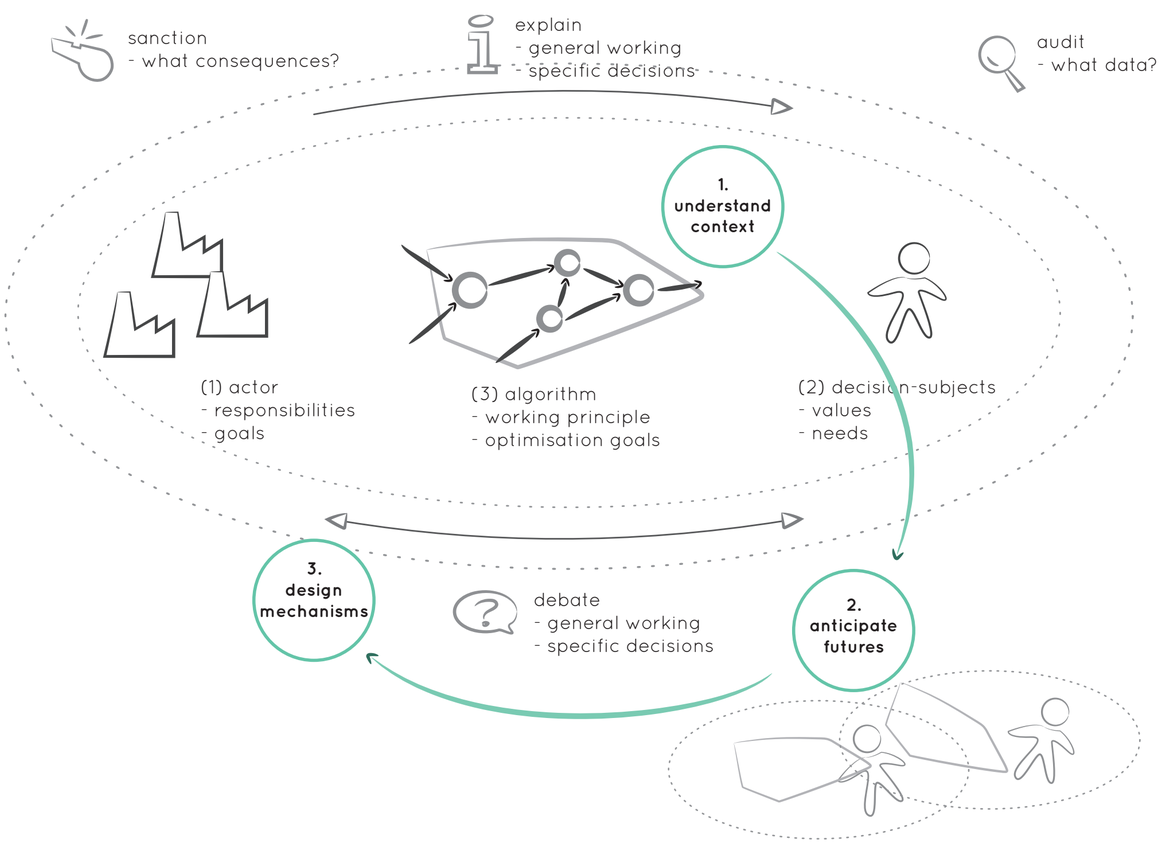
A literature review was done of the theory related to algorithmic accountability, which led to a framework of five aspects that are required for achieving it: responsibility, explainability, debatability, auditability and sanctionability. Within a design case study, the implementation of these five aspects was investigated.

Case study: Vehicle 2 Grid



In a Vehicle to Grid (V2G) system electric vehicles are regarded as driving batteries: when linked to the energy grid, EVs can help in balancing the energy supply and demand, by using the car battery to either store energy surplus or draw energy in case of a shortage of energy. This depends on an algorithm deciding what cars are charged and predicting when users will depart.

Through a design process, accountability mechanisms were designed for this algorithmic decision-making, leading to a design that offers the user a way of explaining his car's battery level and ways of debating the working of the system by changing the extent to which the algorithm automates its decisions. Moreover, the V2G system registers the battery level after a car ride, in order to audit whether each EV driver is provided the same opportunity to travel.



Conclusion

Based on the insights from research and design activities in this research, I have sought to answer the research question. I conclude that the following guidelines will structure the process of designing accountability mechanisms:

(1) Understand the context in which the algorithm is created and employed;
(2) anticipate unwanted developments or effects of the system;
(3) design context-specific accountability mechanisms based on these findings. There are four aspects to consider in designing these mechanisms: how to *explain* the decisions of the algorithm to the user, how to offer a course of action to *debate* the algorithmic outcomes, through what data and by whom *auditing* should take place and how to *sanction* the responsible parties when the account of the system's working doesn't suffice.

Recommendations

To further develop these guidelines, I propose treating them as a first iteration . By applying them in other design case studies, they can be further extended and detailed. In particular, more insights are required for how the accountability mechanisms might be further implemented and how the aspects of auditing and sanctioning might be established as a part of algorithmic accountability.

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Designing accountability into the socio-technical context of algorithmic accountability
September 20, 2018
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