Initiative D21

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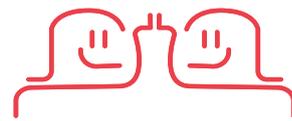
#ALGOMON:
Guidelines for monitoring algorithmic systems

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DISTRIBUTE AND LOCATE RESPONSIBILITIES
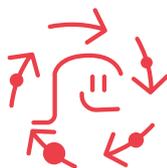
DEFINE STANDARDS

RECOGNIZE AND EVALUATE BIASES

EXCHANGE KNOWLEDGE ACROSS DISCIPLINES

ENABLE TRANSPARENCY

GENERATE BENEFITS FOR THE COMMON GOOD

ENSURE EXPLAINABILITY

CONTINUOUSLY REVIEW GUIDELINES

APPLY EXISTING REGULATIONS

Distribute and locate responsibilities

Many actors are involved in algorithmic systems, from commissioning to development to use and evaluation. Responsibilities must be shared between the actors involved, so that those responsible can clearly be identified by users and those indirectly affected. Actors involved in the design of algorithmic systems must be supported by an error culture and complaints management system in organizations and companies. The acceptance of responsibility for the various phases of algorithmic system development must be explicit and legally binding.

Recognize and evaluate biases

The social, cultural-historical and economic background shapes human perceptions and decisions. These are unconsciously introduced as biases at every stage of the development of an algorithmic system. Previously hidden subjective evaluations can become more visible by transferring them into algorithmic structures. Through this process, they can be tested, evaluated and re-designed. As there are no algorithmic systems without biases, definitive and binding guidelines for dealing with them must be formulated.

Enable transparency

Transparency is a necessary basis for verifiability. Therefore, the data entered (input), the methods used and the presented results (output) of algorithmic systems should be transparent to auditors. The implementation of transparency in algorithmic systems must be context specific.

Ensure explainability

Algorithmic systems must be designed from the start to include comprehensible processes. This is not an obligation to publish all outputs, but a criterion in the evaluation. Too much information can lead to people being overwhelmed and therefore limit understanding. Contextual representations of information about the system must be created with reference to different user groups.

Apply existing regulations

It is inadmissible to discriminate against people based on ethnic origin, gender, religion or belief, disability, age or sexual identity. This is true in both the analog and digital worlds. It is therefore recommended to apply existing legislation, subject it regularly to review and, where appropriate, adapt it for a digital application. Comprehensive legal regulations for algorithmic systems in the sense of a separate ordinance or specific law or even an amendment to the Basic Law of the Federal Republic of Germany are not necessary.

Define standards

The use of algorithmic systems must be subject to ethical principles, the observance of which must be transparent and comprehensible. This requires minimum standards. Algorithmic systems are more comparable to minimum standards. If compliance is verifiable, it can lead to greater trust and acceptance.

Exchange knowledge interdisciplinary

The quality of algorithmic systems is improved through continuous exchange and joint initiatives between companies, public administration, various research disciplines and civil society organizations. The development of additional professional ethics for people involved in the design of algorithmic systems is not productive. All actors have the responsibility to cooperate and to gain and develop digital skills.
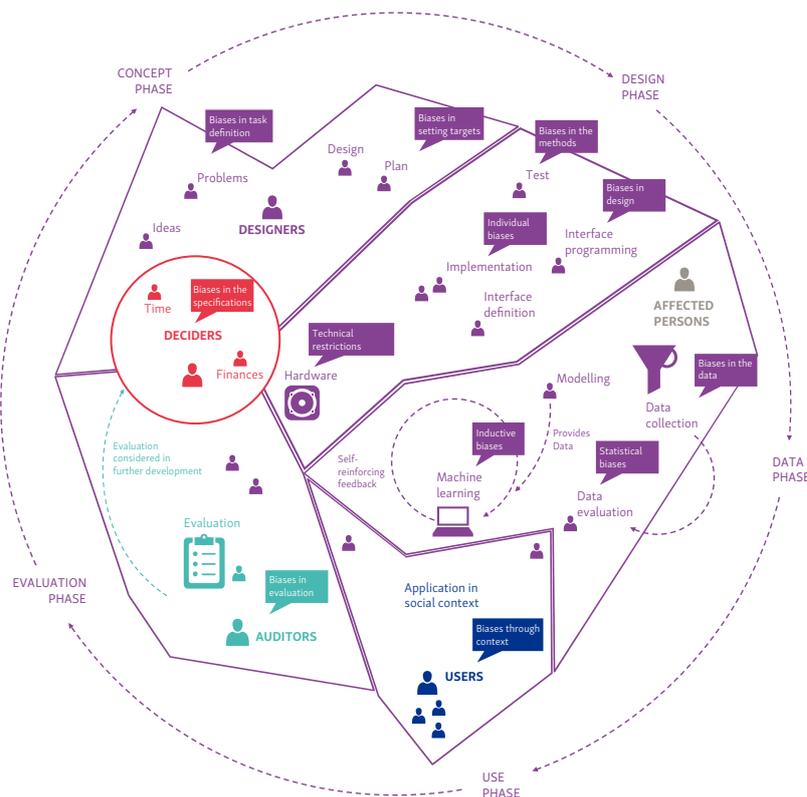
Generate benefits for the common good

The development of algorithmic systems – whether through companies, public authorities, or civil society organizations – must generate positive benefits for the common good. Only development oriented towards the common good and sustainable use of algorithmic systems can meet ethical requirements in the long term. This is the responsibility of the state, businesses and civil society alike.

Continuously review guidelines

The regular assessment of adjustments to legal regulations and their impact on the design of algorithmic systems must form part of the review. Existing national and international guidelines will be compared on a systematic basis. On this basis, the processes for developing guidelines can be continuously improved. A continuous review of guidelines and rules is the responsibility of the deciders and involves all actors in the review and further development of algorithmic systems.

Appendix: Explanatory illustrations of algorithmic systems

Figure: Location of potential biases in an algorithmic system[1]

Questions:

_Concept phase – area of creation: Which problems should be solved by an algorithm? What funding/time is available? What framework conditions have been set? How is the target defined?

_Design phase – scope of implementation: Which goals are defined for the algorithms? Which tasks can be implemented technically and how? What options are programmed? Are test phases planned? What hardware is available?
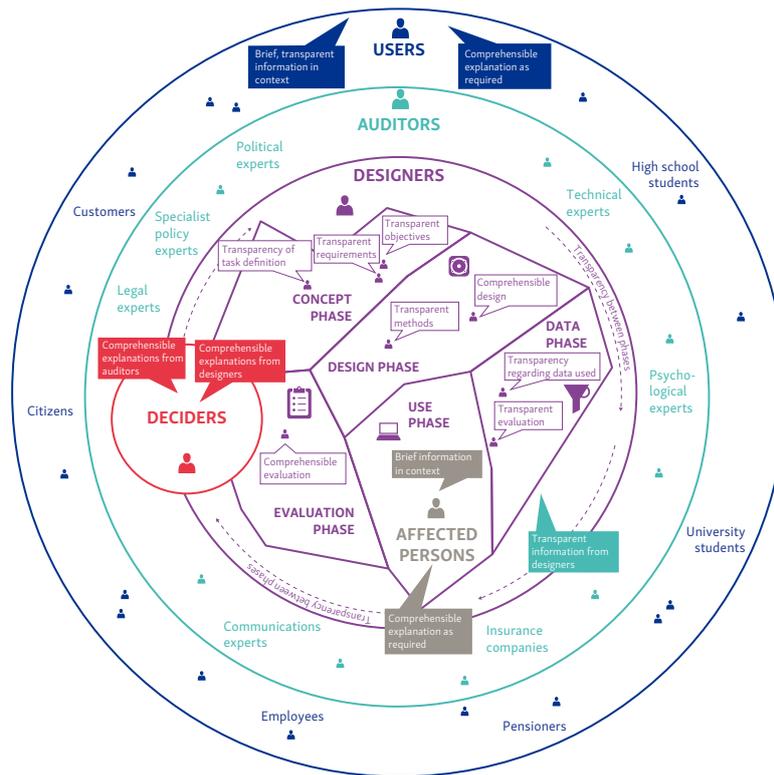
_Data phase – area of data collection and use: Which data are selected as relevant? Which records are prioritized? Are the data suitable and sufficient for the target of the algorithm? Is there a meaningful selection of training and test data? Are there statistical biases in the data?

_Use phase – area of social embedding: In what context is the algorithmic decision-making system used? Who uses the recommendations for their own decisions? Are impacts on social groups reviewed and tested?

_Evaluation phase – Area of evaluation and improvement: How is success assessed? What ways are there to evaluate feedback? How is feedback considered? Are there any ethically questionable effects?

[1] Balkow, Corinna; Eckardt, Irina (2019): Essays on Digital Ethics: Bias in Algorithmic Systems; online: https://initiatived21.de/publikationen/denkimpulse-zur-digitalen-ethik/(Last accessed: 30.01.2020)

Figure: Relationship between transparency and explainability within and outside an algorithmic system[2]

_**Designers: Designers** are involved in all stages of an algorithmic system. They need transparency within the system.

_**Deciders:** In order to be able to assess the different implications of algorithmic systems, deciders must communicate with each other as well as with the other actors. They need to be able to understand the effects and consequences of algorithmic systems.
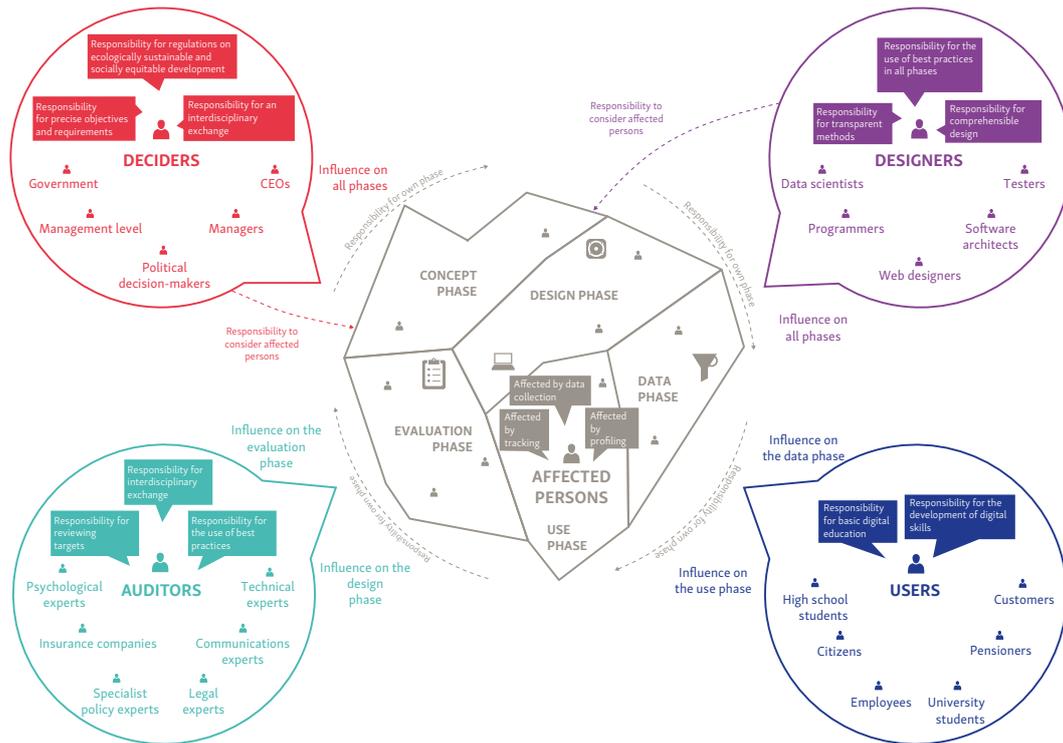
_**Auditors:** For a meaningful audit, auditors need transparency over the entire life cycle of an algorithmic system, the decision-making processes and the needs of those affected. By publishing audit reports, traceability can be achieved without complete transparency of the algorithmic system.

_**Users:** For users to be aware of when they encounter algorithmic systems, they need some kind of simple identification within the application.

_**Affected persons:** Affected persons are unknowingly part of the system because their analog data has been digitized or because they lack digital access. Consideration must be given to how information can be provided to those indirectly affected when algorithmic systems are used.

[2] Balkow, Corinna; Eckardt, Irina (2019): Essays on Digital Ethics: Transparency and Traceability; online: https://initiatived21.de/publikationen/denkimpulse-zur-digitalen-ethik/(Last accessed: 30.01.2020)

Figure: Division of responsibilities and influences[3]

_Deciders: Persons or organizations that, being legally, technically or politically responsible, determine which algorithmic systems are commissioned, used and how they are tested. They are responsible for the process design.

_Designers: Persons or companies that design, develop, test and/or distribute an algorithmic system. Designers of algorithmic systems bear the practical responsibility.

_Users: Everyone is expected to consider the benefits and risks before using algorithmic systems. To do this, there need to be sufficient services for basic digital education and training.

_Auditors: Auditors have a responsibility to test algorithmic systems fairly and impartially with the best knowledge and conscience.

_Affected persons: These are people who do not use an algorithmic system themselves. For example, they provide anonymized general motion data from mobile devices to display the current traffic density of a corresponding navigation software. Other examples include data collection from photos published for other purposes or the use of general facial recognition in public spaces.

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[3] Balkow, Corinna; Eckardt, Irina (2019): Essays on Digital Ethics: Responsibility for algorithmic systems; online: https://initiatived21.de/ publikationen/denkimpulse-zur-digitalen-ethik/(Last accessed: 30.01.2020)

Algorithm Monitoring working group at Initiative D21

Algorithms have immense potential, particularly with regard to their importance in technological developments. At the same time, algorithmic systems are becoming increasingly complex and non-transparent. This creates challenges and raises various questions. In light of this, at the beginning of 2018 the D21 initiative founded a working group to deal with questions relating to the topic of „monitoring algorithmic systems".

In the Algorithm Monitoring working group relevant issues were discussed by interdisciplinary experts from three perspectives: technological, socio-economic and ethical-legal. The technological perspective refers to the practical feasibility of algorithm monitoring and deals with the conditions, problems and possibilities. The socio-economic perspective determines the social and economic opportunities and challenges posed by the application of algorithmic systems and how risks can be counteracted. The ethical and legal perspective deals with the development of a legal framework to ensure the regulation of algorithmic systems.

Theses were derived from the discussions and published in three Essays on Digital Ethics: „Bias in algorithmic systems", „Transparency and Explainability" and „Responsibility for algorithmic systems". As a summary, 9 guidelines for monitoring algorithmic systems have been developed. They include basic questions for further discussion and serve as a call to action for continuous review and further development in this area.

MONITORING OF ALGORITHMS

Imprint

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