

THE DISAPPEARANCE OF THE PRESENT

Intelligent Machines and the Anticipation of the Future: Temporal Relations in Machine Learning Networks and Beyond

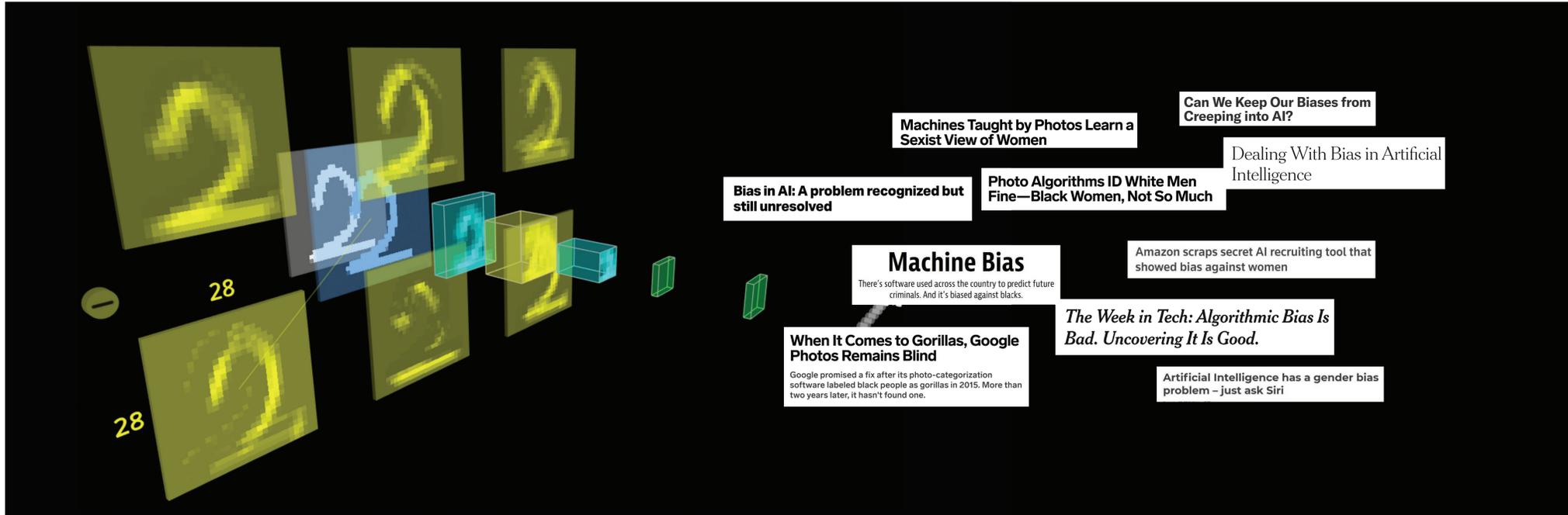


Fig. 1 3D-visualization of character recognition based on the LeNet model, made with TensorSpace.js.

Fig. 2 A collection of headlines on algorithmic bias.

The project

The project centers around the question of machine learning and time and asks, what kind of temporal frameworks are at work in machine learning systems like neural networks and how the creation of and the interaction with these networks influences and creates temporal relations. Code, data, hardware and user input intertwine and engage in mutual world-making, shaping human and computational epistemology on the way. With regard to artificial intelligence and its technical manifestation in the form of machine learning and deep learning I will

explore this topic by juxtaposing current technological developments and research findings from computer science to a media studies point of view. It is an interdisciplinary approach, which can be located in the field of critical code and software studies. With this approach I want to stress the importance of including technical structures and computer code into the analysis, because code is more than a set of logical instructions and can therefore be read and interpreted beyond its pure functionality.

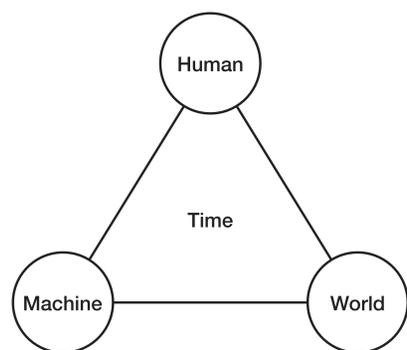


Fig. 3 The research horizon of this project can be marked out at the triangulation of humans, machines and world and explores how these entities are bound together on a temporal axis.

“The earmark of every predictive circuit is that if it has operated long uniformly it will persist in activity, or overshoot; otherwise it could not project regularities from the known past upon the unknown future. This is what, as a scientist, I dread most, for as our memories become stored, we become creatures of our yesterdays – mere hasbeens in a changing world. This leaves no room for learning.”

— Warren McCulloch, “Why the Mind Is in the Head” (1950)²

“Programming is the technique of providing a dynamic background to control the automatic evolution of a meaning.”

— Herman H. Goldstine and John von Neumann, “Planning and Coding of Problems for an Electronic Computing Instrument” (1947)¹

Starting point

The breakthrough of artificial intelligence not only lead to widespread usage, but also to some serious problems, like biased algorithms. But this project is not about algorithmic bias itself. It is more a study of human and machinic relations, of which bias can be viewed as symptom. In this thesis, I will look deeper into the epistemological and technical structures which fostered such developments in the first place: what can be observed is a distinct temporality and the trade-off of knowledge for data, which leads to a bottom-up process of inductive decision-making and reasoning.

Computation, neural networks and time

All computation is temporal. Computation can only exist when it unfolds in time, as do neural networks. They are generating an output through feedback and backpropagation. It is this feedback-driven and at the same time goal-oriented structure, which leaves its trace on temporal relations. Because what is looping inside the network is not only numbers and data, but also reasoning, logic and knowledge.

Stored memories and a predictable future

Machine learning is based on past data in all possible forms. You take what you know and predict what you want to know: pixel values predict the presence or absence of an object, words predict someone’s mood, movies you liked predict more movies you may like. The future is linked to the past by way of the present. Through algorithmic analysis and processing, the future becomes something that can be quantified, predicted and sold. Computers become memory machines, that are always already there, and leave the ‘I’ thrust into the collective memory of the ‘we’. The present becomes a neglectable part of this transitional process.

References
 1. McCulloch, Warren S.: Why the Mind is in the Head? In: *Inductica* 4 (3), 1950, pp. 192-205
 2. Goldstine, Herman H.; Neumann, John von: *Planning and Coding of Problems for an Electronic Computing Instrument. Report on the Mathematical and Logical Aspects of an Electronic Computing Instrument.* The Institute for Advanced Study, Princeton (N.J.), 1948

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 Fig. 1 TensorSpace, <https://github.com/tensorspace-team/tensorspace>, licensed under Apache License 2.0
 Fig. 2 In clockwise direction: Machines Taught by Photos Learn a Sexist View of Women: Wired, Tom Simonite, 2017 - Can We Keep Our Biases from Creeping into AI?: Harvard Business Review, Kirti Sharma, 2018 - Dealing With Bias in Artificial Intelligence, The New York Times, Craig S. Smith, 2020 - Amazon Scraps Secret AI Recruiting Tool That Showed Bias Against Women: Reuters, Jeffrey Dastis, 2018 - The Week in Tech: Algorithmic Bias Is Bad, Uncovering It Is Good.: The New York Times, Jamie Condliffe, 2019 - Artificial Intelligence Has a Gender Bias Problem - Just Ask Siri: The Conversation, Rachel Adams, 2019 - When It Comes to Gorillas, Google Photos Remains Blind: Wired, Tom Simonite, 2018 - Machine Bias: ProfPalicia, Julia Angwin, Jeff Larson, Surya Mattu and Lauren Kirchner, 2016 - Photo Algorithms ID White Men Fine - Black Women, Not So Much: Wired, Tom Simonite, 2018 - Bias in AI: A Problem Recognized But Still Unresolved: TechCrunch, Cyrus Rashtar, 2019
 Fig. 3 own illustration



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