METHAD.
Toward a Medical ETHical ADvisor System for Ethical Decisions.

The aim of this project is to develop an algorithm that can help make ethically relevant decisions in the clinic – a machine that roughly does what clinical ethics committees usually do. If successful, this will not only relieve the incresing burden on these committees, but also allow for quicker decision making in medically overwhelming situations such as the situation the world is currently witnessing - the COVID-19 pandemic. The project is a collaboration between the Institute of History and Ethics of Medicine and Department of Electrical and Computer Engineering at TUM.

In 2020, the research team completed a framework for converting a wide range of ethics cases into machine-readable form, as well as a training data set of medical ethics textbook-cases and counter-factually augmented data. From this, they implemented pipelines for machine learning models and are currently working on developing a user interface.

The initial outcomes of this research include

▷ The development of an algorithm that reaches an accuracy of ~0.9 on the collected data set (subject to further external validation going forward).
▷ Promising simulation outputs (using qualitative inspection) with regard to human comprehensibility of the model's internal dynamics. This is particularly important since in the domain of clinical ethics trans parency as to how a certain decision was reached is of paramount importance.

Plans for 2021

As the project wraps up in Spring 2021, the team will be creating a user interface for the algorithm that is con-ducive to clinical use and evaluating the algorithm's performance using clinical cases that were not included in the original training data set. They also plan to explore the possibility of modifying the algorithm in a way that permits its application in COVID-19-related decision-making in the clinic and will test the algorithm in clinical practice if time permits …

Simulation results for case 4

Legend:
- Nom-maleficence
- Beneficence
- Autonomy
- Accept decision
- Patient state short term
- Patient state long term

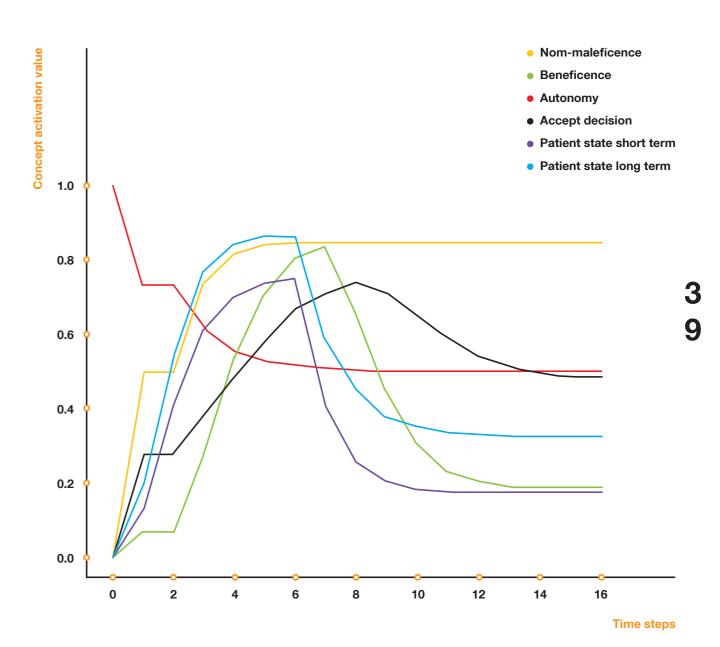Concept activation value / Time steps

2020 Papers and Projects Highlights

▷ Artificial Intelligence for Clinical Ethics Decisions: Ethical and Technological Challenges of Algorithmic Implementation (under review)
▷ Fuzzy Cognitive Maps with Flexible Activation Functions for Support in Decision Making in Medical Ethics (working paper)
▷ Artificial Intelligence for Clinical Ethics Committees (working paper)

2020 Conferences

▷ The Responsible AI Forum (TRAIF) Preview 2020, November 2020

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