

<<< FIRST PRESENTATION

HUMAN-AI TEAMING FOR AN AUGMENTED INTELLIGENCE

Seminar Human Computer Interaction

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MY THEME



HUMAN MACHINE TEAM

H and M collaborate each with specific skills and expertise to achieve a common goal

EXISTING WORKS



METRICS

ARTIFICIAL INTELLIGENCE (AI)



<<< Paper 1



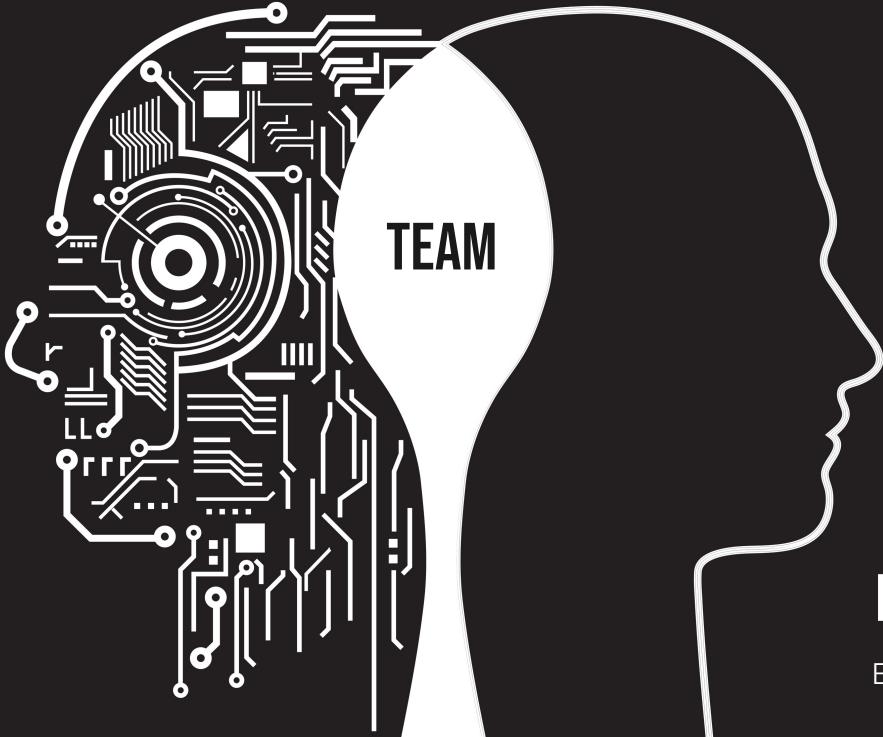
HUMAN-AI TEAMING

A Research Agenda for Hybrid Intelligence: Augmenting Human Intellect With Collaborative, Adaptive, Responsible, and Explainable Artificial Intelligence

Z. Akata et al., "A Research Agenda for Hybrid Intelligence: Augmenting Human Intellect With Collaborative, Adaptive, Responsible, and Explainable Artificial Intelligence," in Computer, vol. 53, no. 8, pp. 18-28, Aug. 2020, doi: 10.1109/MC.2020.2996587.



ARTIFICIAL INTELLIGENCE



MACHINE

Pattern recognition
Machine learning
Reasoning
Optimization

HUMAN

Experience
Ethics
Laws
Social concerns
Collaboration
Flexibility

HMT AGENTS



2005 – 3 chess grandmasters lose against team Zacks of 2
average players and an 3 computers



GOAL

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TEAMING IS FUTURE

Think like no human has ever thought and process data like no machine has ever done.

How can we amplify human intelligence rather than replacing it?

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AI

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RESULTS

4 central properties required for hybrid intelligent systems



COLLABORATIVE

H and M work together in a coordinated and synergistic way to solve problems

ADAPTIVE

AI system learns and evolves based on feedback and experience

RESPONSIBLE

AI system operates ethically, considering its impact on society

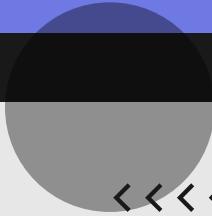
EXPLAINABLE

AI system provides clear explanations for its decisions and actions



Gain deeper understanding of the subject





<<< Paper 2



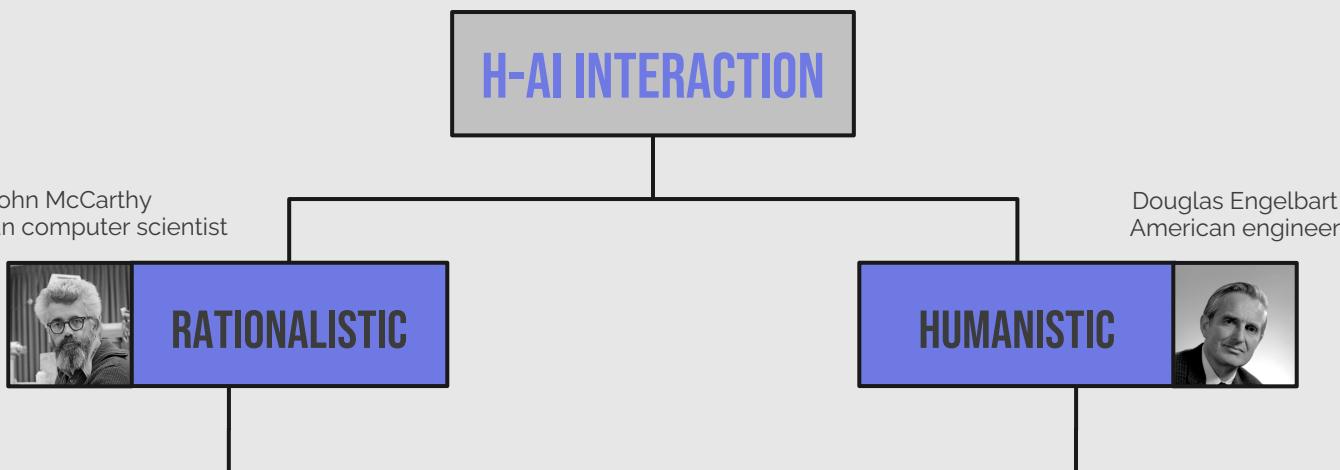
HUMAN-CENTERED AI

Human-Centered AI: The role of Human-Centered
Design Research in the development of AI

Auernhammer, Jan. (2020). Human-centered AI: The role of Human-centered Design
Research in the development of AI. [10.21606/drs.2020.282](https://doi.org/10.21606/drs.2020.282).



LIMITED PERSPECTIVES



John McCarthy
American computer scientist



RATIONALISTIC

Douglas Engelbart
American engineer



HUMANISTIC

Human seen as 'cognitive machine'.
AI imitates human's ability and solve
tasks intended for humans.

AI is a problem-solving tool to
advance human capabilities and
conditions.

GOAL

How Human-Centered designs contribute to the development of Human-Centered AI?

Person

backgrounds, needs, desires, ambitions, interests, irrational decision-making processes, lifestyles embedded in specific cultural contexts

Approach	HCD research in AI	Ethical contribution	Authors
Human-centered System (HCS)	Implementation and use of AI systems and the impact on social systems such as organizations	Examination of moral and ethical consequences for all participants of the AI system design	(Cooley, 1980; Kling, 1973; Kling & Star, 1998)
Social Design (SD)	Socio-economical systems and designers' ideologies and responsibilities that give rise to specific AI systems	Identification of socio-economical dynamics and ideologies that drive the design of unethical AI systems	(Margolin & Margolin, 2002; Papanek, 1973)
Participatory Design (PD)	The democratization of the design and development of AI systems by including different user groups	Discovery of different ethical perspectives in the participant groups in the design of the AI system	(Bodker, 1996; Ehn & Kyng, 1987; Neuhauser & Kreps, 2011)
Inclusive Design (ID)	Inclusion of typically excluded communities to explore alternatives in the design of AI systems	Identification of, e.g., machine biases that disadvantages or discriminates a specific group of people	(Abascal & Nicolle, 2005; Benyon et al., 2000; Spencer, Poggi, & Gheerawo, 2018)
Interaction Design (IxD)	Interface and interaction design to provide a useful and usable AI system	Examination of usability, accessibility of the AI system and potentially harmful people's behavior and experience in the interaction with the AI system	(Norman, 2013; Norman & Draper, 1986; Winograd, 1996, 2006; Xu, 2019)
Persuasive Technology (PT)	AI systems that persuade people towards an intended behavior	Identification of ethical questionable behavioral triggers of the AI system	(Berdichevsky & Neuenschwander, 1999; Fogg, 1998, 2003)
Human-centered Computing (HCC)	Adaptation and organization of everyday life around AI systems that produces a capability between human and computer system	Examination of interspaces enabled by the AI system that replaces or constrains people's capability and lifestyle	(Brezillon, 2003; Ford et al., 2015; Hoffman et al., 2004; Jaimes et al., 2006)
Need-Design Response (NDR)	Design and development of AI systems for physical, intellectual and emotional needs of people	Identification of unethical AI systems design based on needs such as addiction	(Faste, 1987; Gilmore et al., 1999; McKim, 1959, 1980)

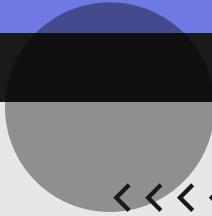


Progress of ethical Human-Centred AI for society needs **pan-disciplinary** approach: technical challenge (rationalistic), beneficial technology (humanistic), and policies (judicial)

RESULTS ...vague ?

Crucial to involve people in the design of AI systems intended for humans





<<<< Paper 3



METRICS

The machine as a partner: Human-machine teaming design using the PRODEC method

Boy GA, Morel C. The machine as a partner: Human-machine teaming design using the PRODEC method. *Work.* 2022;73(s1):S15-S30. doi: 10.3233/WOR-220268. PMID: 36214030.



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GOAL

Trust and collaboration are important concerns to assess HMT performance.
But how can we measure them?



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RESULTS



EFFECTIVENESS

Task completion, resource consumption, risk management, number of interactions

EFFICIENCY

Interaction time

RELIABILITY/ROBUSTNESS

Bugs

SITUATION AWARENESS/MENTAL WORKLOAD

Human workload index (may be complex to formalize)



Further analyse and adapt metrics to my experiment



LIMITATIONS



WORK IN PROGRESS

HMT is a new field, these are preliminary results

Trust and collaboration must be adapted to HMT applications

METRICS



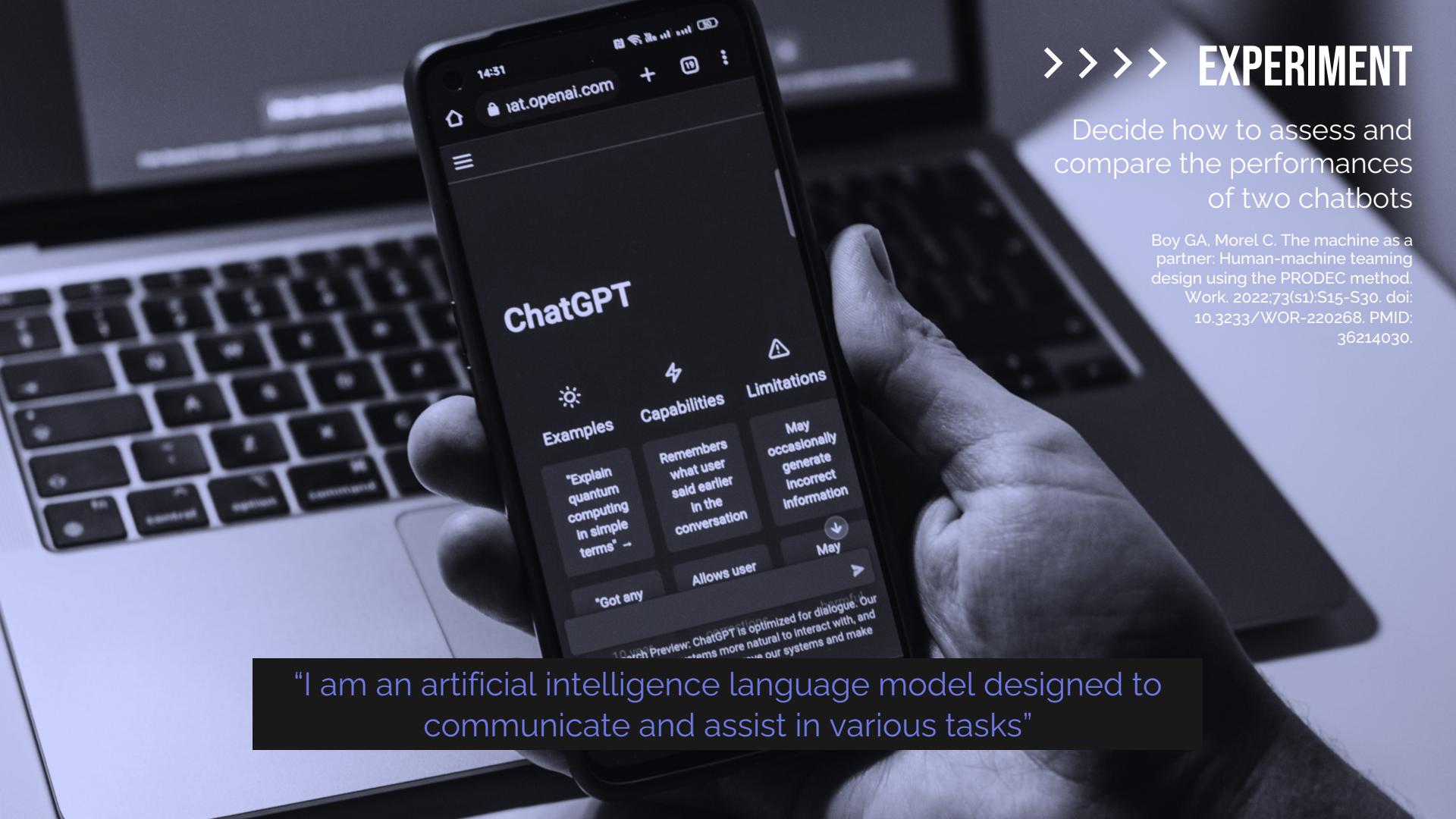
ARTIFICIAL INTELLIGENCE (AI)

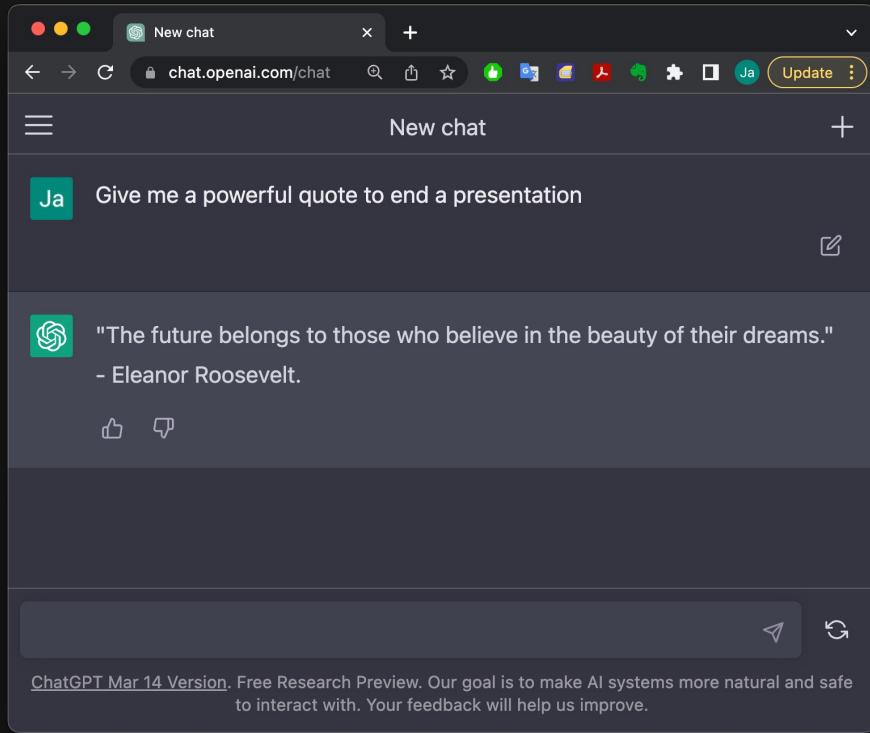
>>> EXPERIMENT

Decide how to assess and compare the performances of two chatbots

Boy GA, Morel C. The machine as a partner: Human-machine teaming design using the PRODEC method. Work. 2022;73(s1):S15-S30. doi: 10.3233/WOR-220268. PMID: 36214030.

"I am an artificial intelligence language model designed to communicate and assist in various tasks"





Thank you

Do you have any questions?
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