Introduction to HICSS-55 Minitrack on The Technical, Socio-Economic and Ethical Aspects of AI

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1. Introduction

Augmented Intelligence is a new perspective to look at artificial intelligence (AI), social computing, machine learning, big data, data mining, and related areas. It describes a system that consists of both artificial intelligence agents and human agents. Compared to the traditional AI whose ultimate goal is to replicate human intelligence [1], Augmented Intelligence aims to augment human intelligence, which includes not only the cognitive intelligence, but also emotional, social, and physical intelligence. It has a clear emphasis that humanity, not machines, is the core of this scientific inquiry. In recent years, more and more practitioners and researchers start to accept this more holistic view of AI [2] and to demonstrate that the ultimate goal of AI is not to replace human but to augment human. Augmented Intelligence describes a hybrid system not only the *artificial intelligence* agents, but also the *human* agents, therefore opening up new research opportunities not only for researchers in technical areas such as artificial intelligence, machine learning, big data, and data mining, but also for researchers in behavioral science, social science, organization science, human-computer interaction and many other areas.

1.1. The Technical Aspect of AI

The technological advancements in computer science and information systems have presented AI as a new type of aid to human workers. AI can automate simple, repetitive tasks and allow human workers to work on creative tasks. In the business setting, by applying machine learning to natural language processing (NLP), AI can help its human counterparts improve the workflows in sales and customer sales management by analyzing the tone of voice and verbiage used on a call. The International Data Corporation (IDC) forecasts that AI will unleash unprecedented levels of workplace productivity, boost global revenues by \$121 billion over the next

five years and generate more jobs than it will replace. In healthcare, AI assists radiologists with image interpretation by bringing the relevant information out of the electronic medical record and presenting it to them in a meaningful way to better inform their clinical judgment [3]. AI also facilitates innovations and the creation of intellectual products. For example, IBM Watson helped musician Alex Da Kid to create a popular song named “Not Easy” by uncovering and visualizing the most pervasive themes in people’s deep emotions hidden past five years’ culture data [4].

1.2. The Socio-Economic Aspect of AI

In today’s digital economy, business practitioners are increasing scrutiny on socio-economic aspects of AI and exploring new opportunities through innovation spillovers. For instance, when AI is used in combination with experienced farmers, could prevent unpredictability of weather or soil conditions, thereby reducing farmers’ costs and boosting profits. In the financial sector, AI robot-enabled service helps consultants to complete repetitive tasks, allowing them to concentrate on more judgement-based proceeding and customer service. As the needs for computing continues to grow, researchers should continue to study how AI can drive the digital economy while at the same time satisfying human’s needs by offering solutions to societal issues.

AI is also enhanced by a novel computing paradigm [5], the social computing. Social computing artifacts such as social media, blog, social bookmarking, and wiki generates enormous amount of data, the “big data,” which enhances the human intelligence in acquiring, assimilating, and/or sharing (i.e., storage/retrieval, transmission features) information. It also provides valuable training data set for the artificial intelligence agents.

AI will continue to penetrate in people’s life. In the workplace, people will see more and more AI software programs and AI-enabled robots as their teammates. In people’s daily life, AI assistants such

as Siri, Amazon Echo & Alexa, Google assistant, AI-enabled smart home are becoming a significant member of people's family. Human-AI collaboration and trust are important research topics in these contexts.

1.3. The Ethical Aspect of AI

Computer and data scientists have encountered ethical issues such as algorithmic biases, stereotypes, and lack of informed consent in building machine learning models or robotic automation. In developing an AI system, we still face challenges such as a) how can we ensure our data is not biased, b) how are biases measured and prevented, and c) how are human values incorporated fairly into system design.

Value sensitive design is a value-oriented design framework commonly adopted in human-computer interaction; it seeks to understand how human values (e.g., welfare, accountability, autonomy, freedom from bias) can be accounted for in the design of computer technologies [6,7]. While Augmented Intelligence brought us the promising prospect to use the power of machine learning to uncover creative insights in fields such as science and healthcare, it's important for us to consider and incorporate human values in the design of AI systems. Value sensitive design (VSD) framework has been proposed in the ethical considerations of micro-task crowdsourcing platform design [8]. Likewise, we should not underestimate the potential ethical concerns arising in the adoption and use of AI for intelligence augmentation. Researchers should continue to study how to avoid the risk of constructing machine intelligence that mirrors a narrow and privileged vision of society with its biases and stereotypes.

2. Summary of Articles

This mini-track presents three papers in HICCS-55. We introduce them briefly below.

Jos'e Cerqueira, Anayran Azevedo, Heloise Tives, and Edna Canedo [9] develop a framework (RE4AI Ethical Guide) for ethical AI development, using the design science methodology. The evaluation shows that the proposed framework is both useful and practical in helping the elicitation of ethical requirements for AI development.

Sumaiya Tanu, Lu Zhang, Dinesh Gauri, and Zhenghui Sha [10] argue that historical data embedded with unfairness may reinforce discrimination towards minority groups when training data-driven AI systems. In the paper, they introduce a fairness-aware design for such systems

using disparate impact and fair-test analyses which were shown to have desirable results.

Isabel Gan and Sara Moussawi [11] classify AI-related biases and propose strategies to tackle them. They identify three categories of AI biases: pre-existing, technical, and emergent. Then they map the AI biases to the three phases (conceptual, empirical, and technical) of the VSD framework. Their analysis shows that both conceptual and empirical investigations are helpful for addressing AI biases.

3. Reference

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