Focus Area: Human-Computer Interaction

Introduction

Human-computer interaction, also known as HCI, is an interdisciplinary branch of research devoted to computer technology design, specifically, the interaction between people (the users) and computers. [1] Since its development, HCI has extended to embrace nearly all kinds of information technology designs, having initially focused on computers. HCI came to prominence in the 1980s when personal computing introduced the need for make technology more friendly for less-experienced users. From its upbringing, HCI has begun incorporating multiple disciplines, such as computer science, cognitive science, human-factors engineering, and artificial intelligence (AI). Specifically, machine learning (ML) technology in HCI has contributed to the increased intelligence and efficiency in machines. Over the years, applications of ML and HCI have complemented one another.

Background

Although HCI began by studying generic user behaviour, it soon broadened its horizons to be more inclusive of users with varying abilities and experiences. It added thought to social and organizational computing. [2] The intersection of HCI and machine learning has seen impressive innovations, complementing both the advancements of technology and our everyday lives. For instance, gesture and motion recognition shapes how we interact with mobile devices, from unlocking your phone to interacting with virtual assistants. In the retail industry, AI-powered shelf monitoring significantly improves product sales [3]. In healthcare, deep learning models for medical image reconstruction, restoration, and registration has contributed to better understanding and knowledge in medical research. [4] AI-enabled wearables aid in measuring health data and illness diagnoses: a team of scientists at Google Brain sought to utilize deep learning to preven diabetic-related blindness [5] [6]. Furthermore, AI increases accessibility: autonomous vehicles, real-time captioning, and even braille AI tutor are all at the service of people with disabilities.

With AI enhancing our interaction with technology, technology itself becomes more accessible and impactful. The advancements in the fields of HCI and AI undoubtedly introduces significant improvements in our lives, and will continue to do so given the increasing availability of high quality datasets and modern ML tools. Applications of AI to HCI are almost endless, and we hope that your research will once again enrich the way technology benefits humans.

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[1] https://www.interaction-design.org/literature/topics/human-computer-interaction
[2] https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/human-computer-interaction-brief-intro
[3] https://aisel.aisnet.org/icis2020/hci_artintel/hci_artintel/16/
[4] https://www.hindawi.com/journals/cmmm/si/740267/
[5] https://about.google/intl/ALL_us/stories/seeingpotential/
[6] https://jamanetwork.com/journals/jama/fullarticle/2588763

Focus Area: Human-Human Interaction

Introduction

Human-human interaction describes the way humans interact and communicate with each other in day-to-day life; it is the foundation of how the world we know today came to be. Over the last two years, the world has witnessed how crucial human interaction is for our mental and physical well-being and the well-being of our society as a whole. Humans are a naturally social species; we rely on each other in every aspect of life, whether we realize it or not. Human-human interaction is not limited to direct communication but could also be extended to interaction through a means of technology with things like texting, calling, and email and other forms of digital communication that have seamlessly integrated themselves into modern-day society. These events often tend to appear biased or judgemental based on people's perceptions of events. Employing AI-based communication tools mitigates such biases, allowing for a more objective understanding of the events. The COVID-19 pandemic was a true turning point for technology, one that fundamentally changed the basis of human-human interaction and paved the way for more digital communication. The need and demand for corresponding ML algorithms and implementations complimented this rise, where now more than ever, AI-based communication is being used for facial recognition, automatic scene detection in videos, email-spam filtering, and detecting social gestures and cues as a result of heightened communication online.

Background

Concerning technological advancements, human-human interaction has been used to develop automatic scene detection in videos. This involves exploring the field of computer vision and utilizing tools like convolutional neural networks (CNNs) to analyze various types of human interaction. This type of technology can be vital to the improvement of security and surveillance. [7] We can use social signal processing (SSP), a rising technology that can recognize non-verbal social signals such as body language and facial expressions, to analyze social interactions. [8] Natural language processing (NLP) is also utilized for opinion mining as a form of emotional AI, utilized to determine the opinion of text data. This can be useful in the broader spectrum of human-human interactions as another form of an analysis technique of social interactions. It can begin to detect from the behaviour users, by inspecting their texting habits, and can even begin to spot sarcastic opinions with high accuracy through ML.

Machine Learning can also used to further classify human interactions contained in video sequences. Efficient frameworks have been developed to recognize human interactions based on deep learning architecture, utilizing feature extraction as well as a deep network-based classifier. One of the more successful frameworks even has recognition rates of up to 95% (based on the benchmark UT interaction data-set). [9] These results speak to the potential of the uncharted territory that is the analysis of Human-Human Interaction utilizing Machine Learning tools.

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[7] https://www.sciencedirect.com/science/article/pii/S1077314219301158

[8] https://www.frontiersin.org/articles/10.3389/fnhum.2012.00057/full

[9] https://www.researchgate.net/publication/312485498_Human_interaction_recognition_through_deep_learning_network