ARTIFICIAL 'EMOTIONAL' INTELLIGENCE FOR OPERA THEATRE: INNOVATING AUDIENCE ENGAGEMENT IN CONTEMPORARY SCIENCE-FICTION OPERA

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ABSTRACT
The surge in Artificial Intelligence (AI) has sparked debates about its impact on human expression and connection in the creative arts. This paper builds on my pilot study that explores how AI may complement and augment embodied dimensions of human artistic creativity in live music performance settings. It uses 'science-fiction opera' – an operatic subgenre that integrates sci-fi narratives with speculative technologies – as a pivotal case study to examine AI's potential and challenges in enhancing **audience engagement** in a digitally-mediated theatre. Leveraging opera's capacity for conveying nuanced emotions across artistic mediums, this study evaluates the dynamics of **human–machine affective and emotional interaction** (i.e., the ways in which performers or audiences engage, interact, and connect with intelligent machines) in contemporary sci-fi opera performances. By employing **critical media theories** to analyse sci-fi opera's performance designs, I aim to identify strategies that utilise AI & data-driven technologies to enable real-time, multimodal emotional exchange between the audience and on-stage action at opera events. Based on theoretical insights, I will then develop a **conceptual framework** to integrate audience-centric emotional feedback into performance settings, thereby pioneering interactive & immersive designs in an 'emotionally responsive' opera theatre.

Building on the state-of-the-art in opera studies, intermediality, digital performance, and AI ethics, this study offers interdisciplinary methodologies in exploring AI & musical creativity, advancing these fields by:

1) It develops an AI-driven opera theatre framework that meets contemporary digital cultures' demands for audience engagement and accessibility. This framework, integrating **participatory design** in multimedia arts with **intermediality theories**, pioneers AI-mediated emotional feedback mechanisms for future opera. It addresses the gap of **limited audience agency** in digital theatre studies, while transitioning the traditional art form of opera into an economically viable, increasingly AI-led future.

2) It highlights **human–artificial co-creativity** to advance AI-based opera. It synthesises traditional Humanities' ethnographical & theory-based approaches with innovative digital methods to explore AI's links with human emotions through the lens of opera. It demonstrates how 'emotion AI' and 'affective robotics' can foster new **performative processes** and enrich **creative outputs** in opera theatre, presenting

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their use in operatic settings as a novel form of **computational creativity** for the performing arts, thus highlighting the symbiosis between artificial and human creativity.

3) This study not only analyses AI's potential benefits for the performing arts, but also exemplifies **how humanistic & artistic research can deepen our understanding of AI**. The case studies probe into other forms of intelligence (e.g., emotional, sensory, creative) via sci-fi operas' experimental practices, broadening discourses in posthumanism and AI ethics that traditionally prioritise AI's 'computational intelligence' and 'scientific objectivity'. It illustrates how opera studies can uncover AI's opportunities and implications that have never been considered before.

Overall, this study will prototype new critical perspectives for using AI in enhancing audience emotional engagement, making opera more *accessible* and *desirable* for 21st-century audiences. It is a crucial step towards gathering and analysing the essential data necessary for my broader future endeavour—developing an 'opera metaverse' that *implements* the technical & artistic concepts from this study. It will also address ethical considerations to ensure that integrating technology in the arts enables us to reimagine creativity and the ethics of creative work in a progressively AI-driven society.

Keywords: science-fiction opera, audience engagement, audience agency, human–machine affective or emotional interaction, human–artificial co-creativity, artificial emotional intelligence