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Terraforming Time: Speculative Futures as Design Blueprints for Human–AI Collaboration Title

Abstract

This paper introduces Terraforming Time as a speculative design framework for exploring long-term collaboration between humans and artificial intelligence. Drawing on the metaphor of terraforming, traditionally the transformation of hostile planetary environments into habitable worlds, the approach reframes extreme future scenarios as laboratories for testing ethical, social, and design assumptions embedded in present-day AI systems. By translating speculative foresight into structured design inquiry, Terraforming Time enables the examination of sustainability, adaptability, and human–machine interaction across extended temporal horizons. The paper outlines methodological principles for integrating science-fiction prototyping, ethical foresight, and systems thinking into AI and HCI research. Through illustrative cases such as climate-adaptive infrastructure and resilient urban systems, it argues that speculative futures can inform practical design strategies, revealing hidden biases and value frameworks within emerging intelligent technologies.

The contribution bridges speculative imagination and design practice, offering a conceptual model for developing more adaptive, transparent, and ethically aligned AI systems.