Towards Fair Performance Evaluation in User Interfaces through Simulated Users with Diverse Abilities

Open Master Thesis

Background

User interfaces (UIs) are often optimized based on performance metrics derived from average users, potentially neglecting the needs of individuals with diverse physical, sensory, or cognitive abilities. Simulated users offer a promising approach to systematically evaluate UI performance under varied user conditions. Reinforcement learning (RL) agents—particularly in physics-based environments like MuJoCo—allow us to model motor interactions realistically. By incorporating perceptual models and impairment simulations, such agents might emulate users with a wide range of abilities, including those with visual or motor impairments.

Research Goal

Our goal is to develop and validate a framework for measuring task performance times in user interfaces using simulated users with diverse ability profiles. We aim to: Train RL agents. Then extend these agents with perceptual and impairment models to simulate different user capabilities. Finishing with a comparison of the simulated performance times with empirical data from human participants, including users with and without impairments.

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