Multi-Human Assisted Learning for Multi-Agent Systems using Intrinsically Generated Event-Related EEG Potentials

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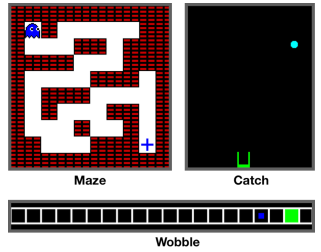
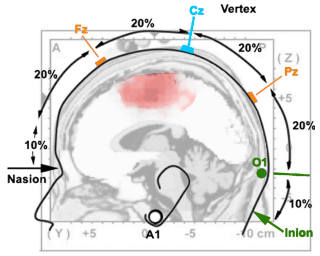
Challenges:

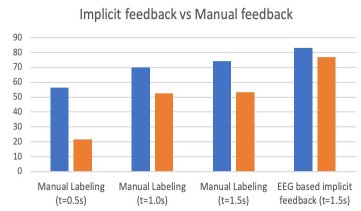
- Capturing/Decoding intrinsic EEG feedback
- Generalizing ErrP over unseen environments
- Data-efficient RL assisted by ErrP
- Reducing stochasticity of decoded ErrP
- Diminishing the effect of wrongly decoded ErrP labels on the RL algorithm

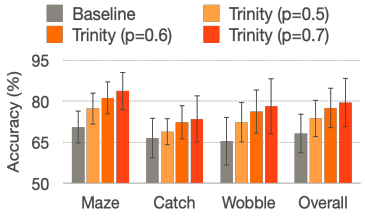
Solution:

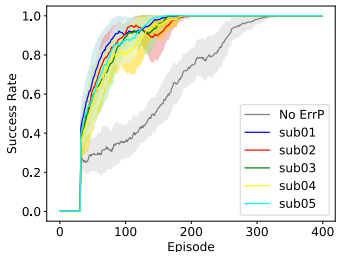
- Leveraging the spatial, temporal, and frequency characteristics of ErrP signals to create a robust ErrP decoder
- Reduction in stochasticity of ErrP decoding by utilizing prediction confidence intervals
- Using a feedback attenuation coefficient to mitigate the impact of wrongly decoded ErrP labels

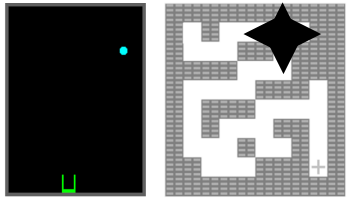












Known/Seen Environment

Novel/Unseen Environment

Scientific Impact:

- The use of game proxy will considerably speed up the pace of CPS research
- Accelerating the training of RL algorithms deployed in CPS

Broader Impact:

- Human-assisted CPS
- Improve machine intelligence through intrinsically generated human-feedback
- Commercialization through CREATE-X

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