

Novel EEG-based Attention Calibration Protocol

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Project Objectives

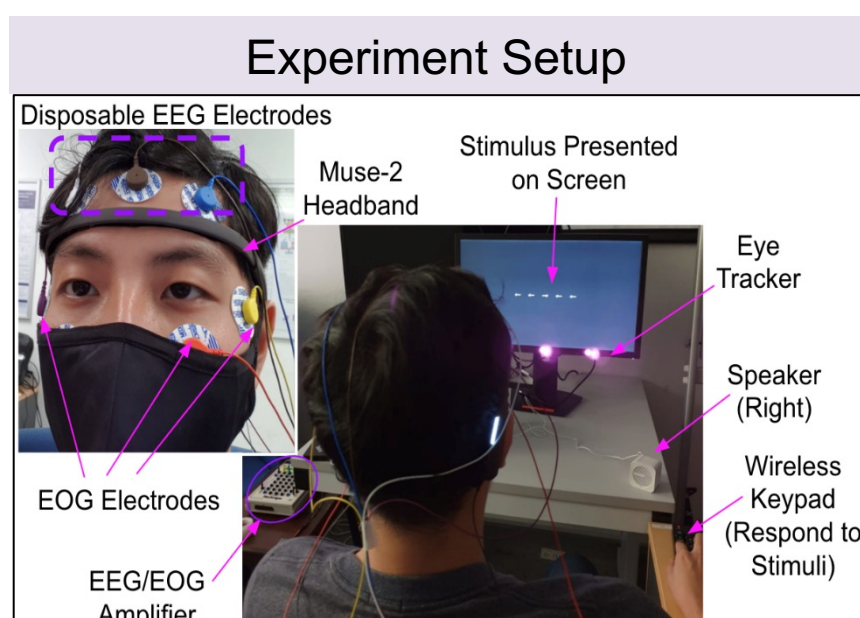
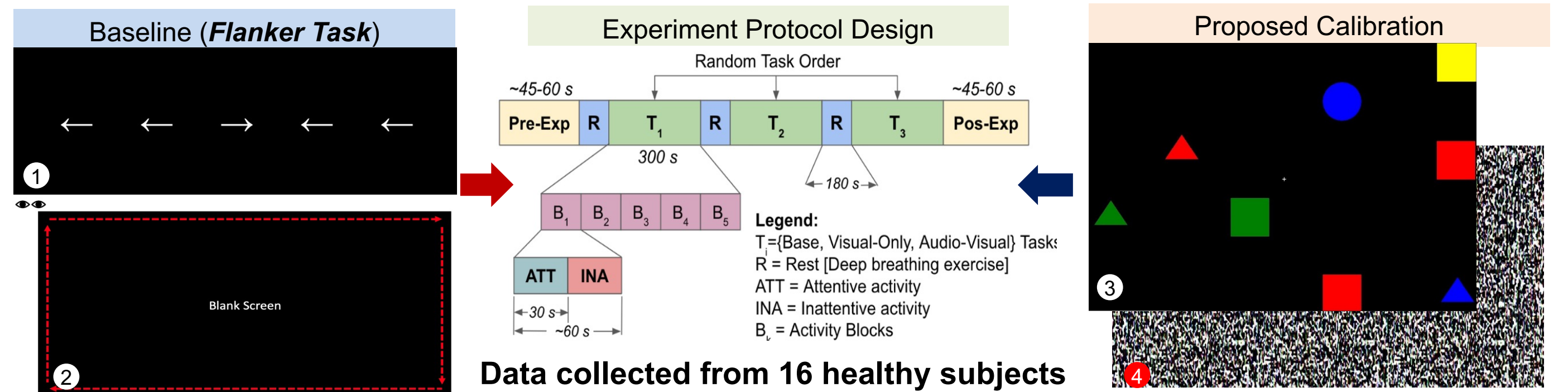
Research Goals:

- To enhance usability and surrogate ground-truth in EEG attention modelling
- To improve the performance of attention states classification
- To validate proposed calibration protocol with baseline cognitive task

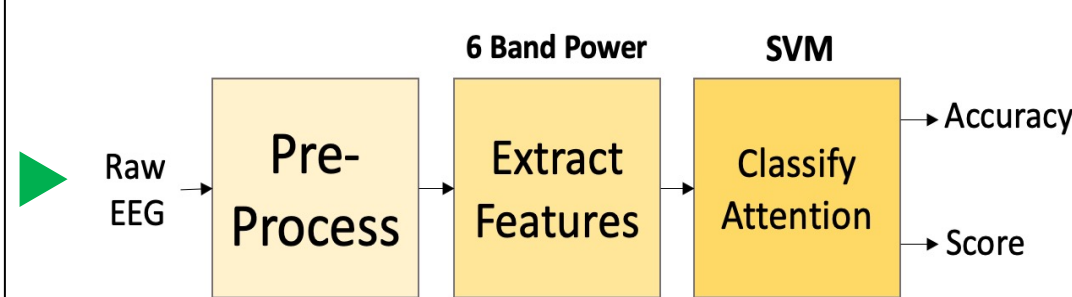
Technical Contributions:

- Develop calibration protocol to get surrogate ground-truth data to train EEG-based attention classification model
- Implement shape-colour conjunctive Visual Search as "Attentive task" and TV white noise as "Inattentive task"
- Design validation experiment and analyse EEG to evaluate attention classification performance with baseline design

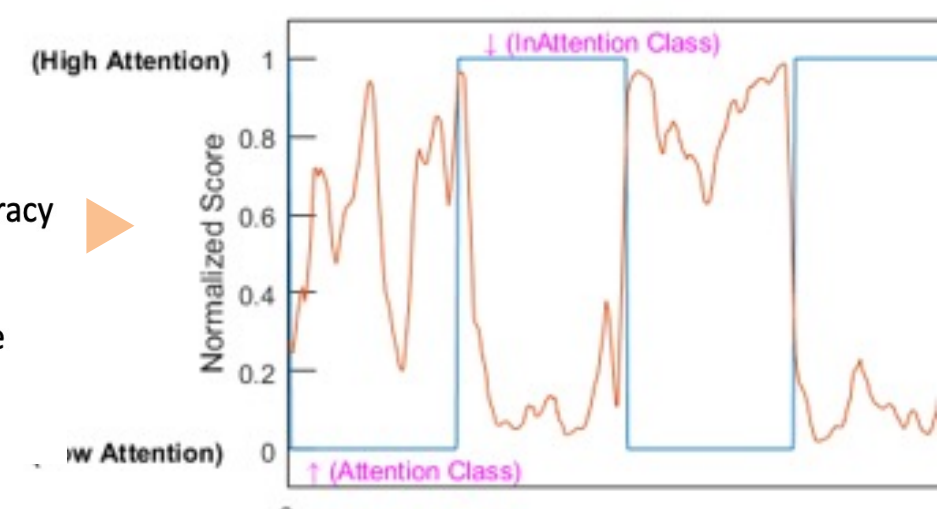
Attention Calibration Design & Evaluation



Data Processing Pipeline



Attention Levels



Images: 1 – Flanker task (ATT), 2 – Looking around blank screen (INA), 3 – Adapted visual search (ATT), 4 – TV static white noise (INA)

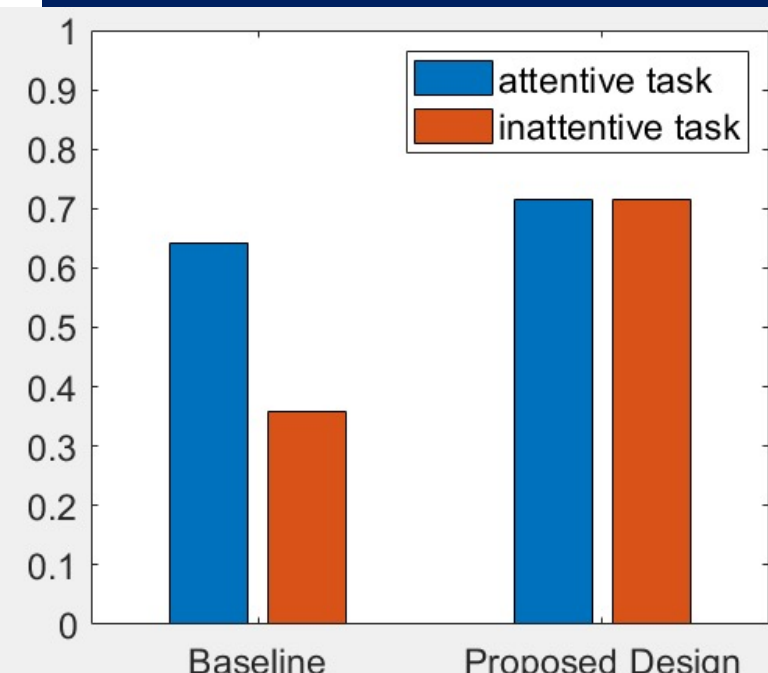
Performance Validation & Results

Subjective Outcomes

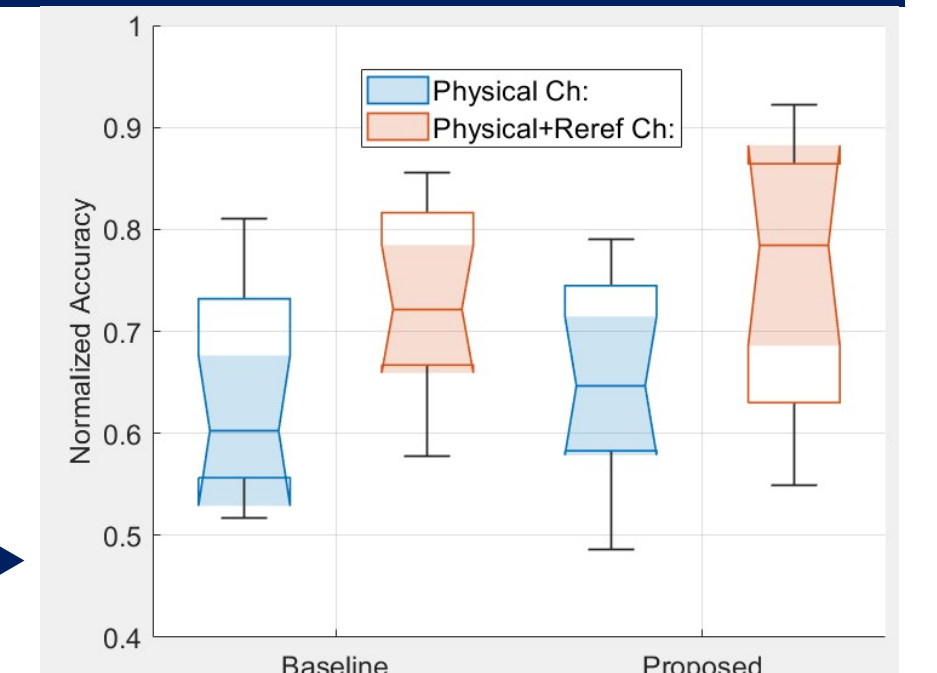
Users' feedbacks highlight the proposed protocol is more engaging and effective.

Objective Outcomes

Better attention classification performance achieved (~5 - 8 %) with the proposed protocol using different features inputs



User Rating on Perceived Effectiveness



Mean Subject Accuracy Comparison