An Investigation into the Role of Performance Feedback in a Human-AI Collaborative Environment

Why is Human-AI Collaboration useful?

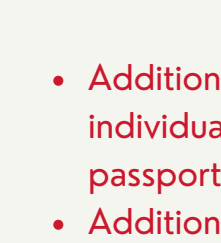
- Humans may have tacit knowledge that is difficult to articulate, while AI may have access to vast amounts of data and computational power to analyze that data.
- By combining these different types of knowledge, humans and AI can work together to solve complex problems more effectively than either could on their own.
- Through the mechanism of delegation, humans can delegate tasks to AI, which serves as an opportunity to facilitate improved productivity and outcomes.

What are the challenges to successful Human-AI collaboration?

- Previous research suggests than humans are not effective delegators to AI due to **poor metacognitive abilities** (Fuegner et al., 2022)

What is metacognition?

- Metacognition is commonly defined as "thinking about thinking" or the ability to supervise and direct one's cognitive processes (Dunlosky & Metcalfe, 2008).
- Measures of metacognition include metacognitive sensitivity and metacognitive efficiency.
- Studies have shown that giving feedback is an effective method for enhancing metacognition (Callender et al., 2016).



The Present Study:

The current study aimed to investigate the role of performance feedback in a human-AI collaborative environment, specifically focusing on a unfamilar face matching task where humans may delegate the task to an AI

Methodology

- Participants were tasked in determining whether two simultaneous presentations of a face belonged to the same person or different individuals.
- For each pair shown, participants had the option to delegate the task to a face recognition AI
- Throughout the experiment, for each face pair shown, participants were asked to provide confidence ratings using a 6-point Likert scale which allowed for the calculation of metacognitive sensitivity and metacognitive efficiency
- Participants in the feedback group (n = 84) received feedback for each question answered, while those in the no feedback group (n = 73) did not
- At the end of the experiment, all participants were asked to rate their trust in AI
- Mann-Whitney U tests were used to compare metacogntion and trust in AI between the two participant groups

Matching face pair

Non-matching face pair

Results

- The feedback group demonstrated significantly better task performance, metacognitive sensitivity, and efficiency than the no feedback group.
- The no feedback group delegated significantly more question to AI.
- No significant differences were found in trust in AI between the two participant groups.

Implications

- Additional training that incorporates the provision of feedback may assist individuals who perform daily unfamiliar face-matching tasks, such as passport officers at border control.
- Additional research is necessary to comprehend the factors that influence human decision-making regarding delegation to AI.
- Investigating the role of trust in the context of human-to-AI delegation warrants further investigation.