Wearable Memory Augmentation: Moving Cued Recall out of the Lab

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Place: LCI Lab: https://lci.idi.ntnu.no/
Suitable for: One student

Introduction

Cued recall is a popular method in Cognitive Psychology for improving the recall of past experiences or once-acquired knowledge. In the context of this project, a memory cue could be anything from a word, to an image, or a sound. This thesis will evaluate the ability of typical smartphones, smartwatches and smart-glasses in delivering memory cues in the wild for increasing one's memory recall out of the lab.

Thesis Description

From the outset, the student will review the related literature in the field of human memory theory to familiarize oneself with the fundamentals of human memory augmentation and the state of the art. Next, the student will develop 3 mobile and wearable application prototypes (in Android) that are able to deliver memory cues, and receive feedback by employing the Experience Sampling Method (ESM) on (a) a *typical mobile phone*, (b) *a smartwatch*, and (c) a pair of *smart-glasses*. The student will also develop the required back-end (e.g., in PHP/MySQL or Node.js) for collecting and storing the ESM data, and any additional metrics. The student will test the effectiveness of the 3 application prototypes in real-life settings by recruiting a sufficient number of participants (> 20) in a longitudinal study (i.e., field deployments). As a final step, the student will analyse the collected data and write up his/her thesis.

Requirements

The ideal candidate will have a strong background in Android application development and a strong will to develop for wearable platforms such as smartwatches and smart-glasses. Solid back-end programming skills (PHP/MySQL or Node.js), and an interest in hands-on development and experimentation is also a requirement. The recruitment of participants that will use the application prototypes for a substantial duration (2-4 weeks) is a strong requirement.

Programming skills: Android, and PHP/MySQL or Node.js.

Expected Project Work Packages (WP)

- **WP1:** Literature study on human memory theory and memory augmentation.
- **WP2:** Develop 3 functional Android prototypes that deliver memory cues on a typical smartphone, a smartwatch, and a pair of smart-glasses.
- **WP3:** Implement ESM mechanics for collecting users' feedback in situ.

- **WP4:** Recruit participants, conduct user studies, collect data and analyze it.
- **WP5:** Write-up the thesis.

Thesis grading scheme

Grade	Description of the evaluation criteria
A	The candidate demonstrates excellent judgement and a high degree of independent thinking. **Significantly exceeded expectations** with original contribution.
B	The candidate demonstrates sound judgement and a very good degree of independent thinking. A very good performance, **the candidate has exceeded expectations.**
C	A good performance in most areas. The candidate demonstrates a reasonable degree of judgement and independent thinking in the most important areas, **the expectations are met but not surpassed.**
D	A satisfactory performance, but with significant shortcomings. The candidate demonstrates a limited degree of judgement and independent thinking.
E	A performance that meets the minimum criteria, but no more. The candidate demonstrates a very limited degree of judgement and independent thinking.
F	A performance that does not meet the minimum academic criteria. The candidate demonstrates an absence of both judgement and independent thinking.