

Effect of Physiological and Cognitive State on UX Laws in Mobile vs. Stationary Settings: The Case of Fitts Law

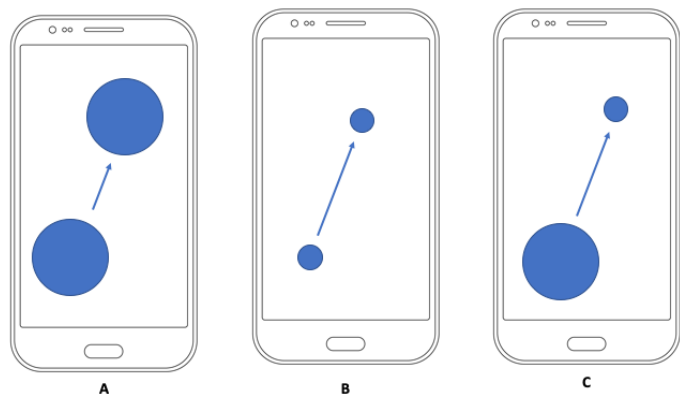
Supervisors: Michail Giannakos and Evangelos Niforatos

Place: LCI Lab: <https://lci.idi.ntnu.no/>

Suitable for: One student

Introduction

Fitts Law is a predictive model of human movement according which the time to acquire a target is a function of the distance to and size of the target. One's efficiency in completing even simple tasks varies greatly within the day as a result of circadian rhythm fluctuations. This thesis will model and compare how efficient mobile users are in completing mobile Fitts' Law tasks in the lab vs. in the wild while measuring their physiological responses with wearable sensors.



Thesis Description

From the outset, the student will review the related literature in the fields of human factors and human physiology to familiarize oneself with the fundamentals and the state of the art in both fields. Next, the student will develop a mobile application prototype (in Android or Swift for iOS) that implements the Fitts Law in the form of a mobile game. In situ feedback from mobile users will be collected by employing the Experience Sampling Method (ESM), implemented as a core component of the mobile Fitts Law game. 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 (e.g., game scores). The student will test the effectiveness of the the Fitts Law game in real-life settings by recruiting a sufficient number of participants (> 20) in a lab and 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 (or iOS) application development. 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 Fitts Law mobile game for a substantial duration (2-4 weeks) is a strong requirement.

Programming skills: Android or Swift (iOS), and PHP/MySQL or Node.js.

Expected Project Work Packages (WP)

1. **WP1:** Literature study on human factors theory and human physiology.

2. **WP2:** Develop a Fitts Law functional Android (or iOS) game that nudges mobile users to complete Fitts Law game sessions based on predefined criteria (e.g., hourly).
3. **WP3:** Implement ESM mechanics for collecting mobile users' feedback in situ before, during, or after a game session.
4. **WP4:** Recruit participants, conduct lab and field user studies, collect data and analyze it.
5. **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.