At the Human-Computer Interaction Group of Leibniz Universität Hannover, there is an opening for a

**Bachelor’s Thesis**

on the following topic

**Eye-Tracking based Information Systems for Public Libraries**

**Introduction**

In a previous thesis[^3], an augmented reality (AR) application for the smartphone was developed, which helps users finding specific books in larger bookshelves. For this an internal database was used, saving identifying color vectors for all books in addition to their metadata.

In this thesis, the application is to be expanded in a way that (1) it is no longer necessary to enter the data in a database beforehand, and (2) further information on individual books can be displayed in AR. For extension (2) eye-tracking should be explored and evaluated for its suitability as a selection method. For this, glasses[^2] with three integrated cameras will be used of which two point to one eye each, while the third camera faces forward and records the wearer’s field of view, allowing to determine the gaze point in 2D after calibration.

**Research Questions**

This work will focus on the following research questions:

- Is it possible to identify previously unknown physical books using only data available online?
- What circumstances improve or worsen such recognition?
- How reliable is a selection of single books on a bookshelf using eye tracking?
- What information should be displayed to the user of an AR application while viewing a book?

[^3]: Previous thesis
[^2]: Glasses
Tasks

While working on this thesis, the student will be expected to complete the following tasks:

- Extend an existing app to use the online database of the German National Library instead of a local database [1]
- Analyze and optimize the image recognition in different scenarios
- Connect eye-tracking glasses to the application and determine the gaze point
- Conduct a user study and/or a survey to examine the usability of such an application in everyday life

Basic Time Planning

- Get to know existing literature and related work. (2 weeks)
- Extend the application. (6 weeks)
- Plan, conduct and evaluate a user-study. (3 weeks)
- Write the final report. (3 weeks)

References


Requirements

To successfully complete the proposed thesis, the candidate should be a student of computer science with experience in human-computer interaction, android programming and basic machine learning. Prior knowledge of augmented reality applications is recommended but not a strict requirement.

Contact

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