Universidad de los Andes

Faculty of Engineering
Undergraduate Program in Systems Engineering

Graduation Project
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Project Proposal
Accessible Automated Test Generation Using Eye-Tracking

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1 Abstract

This project explores the potential of eye-tracking technology as a novel means of interaction with computers, particularly focusing on its application in automated test generation for web applications. By harnessing eye movements to control a computer interface and incorporating natural language processing for interpreting user intentions, the project aims to develop an accessible tool that can be of assistance for individuals with motor disabilities. The ultimate goal is to demonstrate that eye-tracking can be effectively used not only as an assistive technology but also as an innovative approach to software testing.

Keywords: Eye-tracking, Automated Test Generation, Assistive Technology, Natural Language Processing, Web Applications, Accessibility, Human-Computer Interaction.

2 General Objective

The primary objective of this project is to leverage eye-tracking technology as a user input method for interacting with computers, thus establishing a new mode of human-computer interaction. By combining eye-tracking for pointer control and natural language processing for specifying commands, the project seeks to create an assistive technology that facilitates computer use for individuals with motor impairments. Additionally, the project aims to explore the potential of this interaction model for automating the generation of test scripts for web applications, thereby broadening the scope of its applicability.

3 Justification

This section will detail the rationale behind selecting eye-tracking technology as the focus of the project, without going into details of data and other details, those will be further discussed in the final project document.

The growing interest in inclusive technology and the need for more accessible computing solutions underscore the importance of this research. The project not only seeks to contribute to the field of assistive technologies, but also to introduce a novel approach to software testing.

By providing a dual-purpose tool, the project aims to address both accessibility challenges and the automation needs of software development.

4 Specific Objectives

The specific objectives of this project are as follows:

1. To develop an **eye-tracking** system that can be used as an alternative input method for computer interaction.
2. To integrate **natural language processing** capabilities for interpreting user commands and executing corresponding actions.
3. To design and implement a framework for **automated test generation** for web applications, utilizing the eye-tracking system as the primary input method.
4. To evaluate the effectiveness of the developed system in terms of **accessibility**, **usability** and accuracy in generating test scripts.

5 Methodology

The methodology section will outline the approach taken to achieve the project's objectives.

The project will begin with a comprehensive literature review on eye-tracking technology and its applications in assistive technologies and software testing.

Following this, the development phase will involve the creation of a prototype that integrates eye-tracking with natural language processing. The system will be tested and refined through iterative cycles, with user feedback guiding improvements.

Finally, the project will include a series of experiments to assess the usability and effectiveness of the system in real-world scenarios.

6 Activity Schedule

This section will present a detailed timeline of the project, breaking down the tasks and milestones into manageable phases.

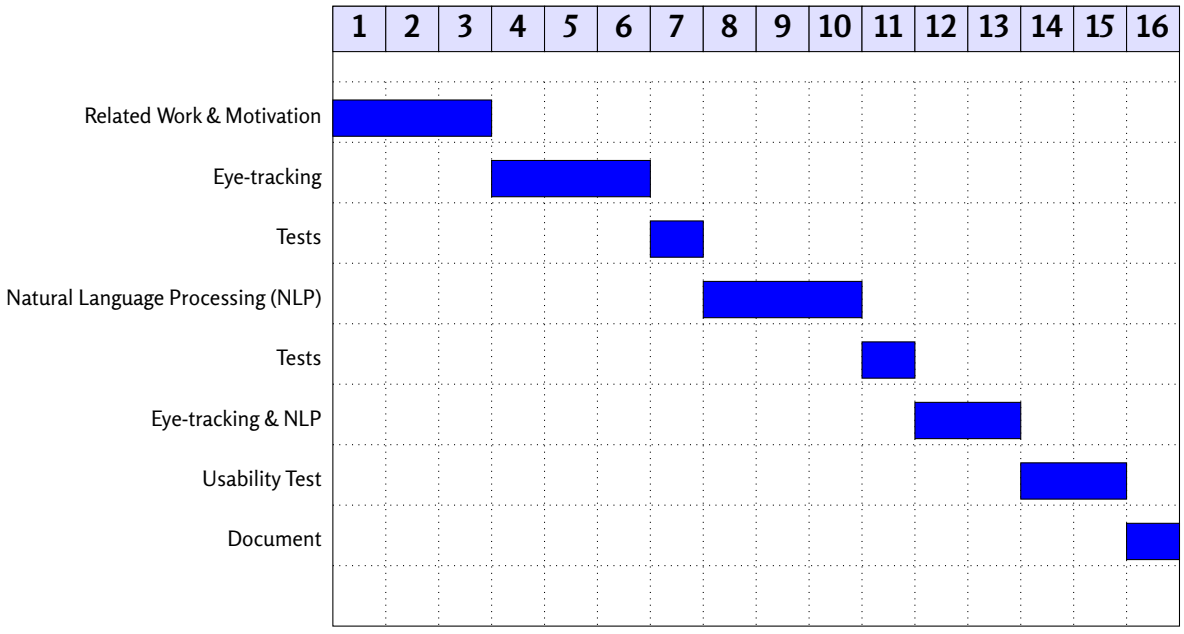

Figure 1: Project timeline (in weeks)

7 Expected Results

The expected outcomes of this project include the development of a functional eye-tracking-based system for computer interaction, the successful integration of natural language processing for action handling, and the creation of an automated test generation framework for web applications. Additionally, the project aims to produce a comprehensive evaluation of the system's effectiveness in terms of accessibility, usability, and accuracy. Finally, the expected outcome of this project is a possible research contribution that could be published in academic journals, with the goal of generating impactful citations within the fields of assistive technology, software testing, and human-computer interaction.