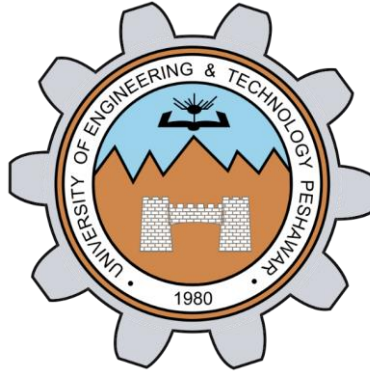# UNIVERSITY OF ENGINEERING AND TECHNOLOGY, PESHAWAR PAKISTAN

## *Main Campus*



**Software Engineering Lab**

**Project Proposal (Fall 2025)**

**Submitted By**

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# Website Accessibility Simulator

## Abstract

The efficient use of online platforms by those with impairments depends on web accessibility. Current technologies like WAVE, Axe, and Lighthouse mainly focus on rule-based compliance, which includes checks for color contrast or alt text etc. Although these technologies aid in achieving requirements, there are notable usability gaps because these do not accurately simulate the actual experiences of impaired individuals.

In order to enable developers to engage with their apps as though they were users with visual, motor, or cognitive limitations, this project suggests creating an online accessibility simulator. Effects like gray-scale or fuzzy vision, delayed mouse input, or cognitive distractions will be applied by the simulator, which will also offer actionable feedback and exportable reports. The initiative intends to improve inclusive design methods by bridging the gap between compliance and practical accessibility. A working prototype that increases developer awareness, encourages adherence to accessibility guidelines, and establishes the framework for scalable accessibility testing solutions is the anticipated result.

## Introduction

People with disabilities can be included in digital spaces thanks to accessibility. Even with improvements in accessibility tools, users continue to face difficulties interacting and navigating web applications. Globally, millions of people rely on easily accessible digital platforms. Making websites easy to use for special need groups enhances their user experience thus increasing website accessibility. Existing rule-based tools focus on compliance rather than actual usability. They do not allow developers to experience accessibility barriers firsthand. The system proposed here, performs a live simulation of how a person with a disability might interact with the website, thus providing much greater insight to the developer.

## Problem Statement

Current accessibility tools are unable to replicate the actual experiences of users with disabilities, but they are able to identify compliance issues. This leads to a gap where developers fulfill technical requirements while ignoring real usability issues. The project offers a simulation-based solution to close this gap.

## Objectives

- Develop a simulator to replicate visual impairments (color blindness, low vision, screen-reader navigation etc.).

- Implement motor impairment simulations (delayed/shaky cursor, restricted keyboard input etc.).

- Simulate cognitive impairments (delayed content reveal, distractions (for ADHD groups) etc.).

- Provide actionable accessibility feedback and exportable reports.

- Deliver an intuitive web interface for developers.

## Scope of the Project

In Scope:

- Development of a web-based simulator supporting at least three impairment categories during release
- live previews
- report generation

Out of Scope:

- Complete integration of advanced AI-based accessibility checks due to lack of time.

## Proposed Solution / Methodology

The system proposed here will comprise of a sandbox type web application, capable of running another web application within it. The application being run will be tested automatically or manually for greater control (optional), to check for various problems that may arise to disabled groups using the website the application will then produce a detailed report on the problems and export it to the developer in a pdf format.

The solution will follow a layered workflow:

- Input Layer: Developers provide a URL and select impairment type/severity.

- Simulation Layer: Effects applied using CSS filters, JavaScript, Web Speech API etc.

- Output Layer: Live preview of the impaired experience, a feedback panel with suggestions and an exportable PDF report.

## Technologies:

The technologies proposed are as follows.

- Programming Language: JavaScript
- Programming Stack: MERN
- Database: MySQL or MongoDB
- Platform: Web Application

## Stakeholders

- End Users: Developers testing their applications.

- Project Team: Student developers.

- Supervisor / Department: Oversight and evaluation.

- External Parties: Accessibility advocates and potential adopters.

**Expected Outcomes**

- A functional simulator demonstrating accessibility challenges.

- Exportable reports with actionable feedback.

- Improved developer awareness of accessibility issues.

- A scalable framework for future enhancements.

**References**

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