COMSATS University Islamabad (CUI)

Project Proposal

(SCOPE DOCUMENT)

for

Dyslexia Detectives

Version 1.1

By

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Application Evaluation History

Comments (by committee) ***include the ones given at scope time both in doc and presentation**	**Action Taken**
Scope is limited, not enough for FYP, major revision or change of project is recommended	Major scope revision with 3 more modules being added
UCs need updating, mostly FRs are stated as UCs, e.g. contact, share	All the UCs and FRs have been updated according to the revised scope, and the use case diagrams as well
Incorrect context diagram	New updated context diagram has been made
UCs do not match the presented scope	Now the UCs match the scope
Module 2 & 3 can be combined	Module 3 and 4 have been combined

Project Category:

☐ **A-**Web Application/Web Application based Information System
☐ **B-** Artificial Intelligence
☐ **C-**Machine Learning
☐ **C-**Problem Solving and Data Extraction

Abstract

Dyslexia Detectives is a revolutionary system designed to transform the diagnosis of dyslexia through advanced eye movement tracking technology and an engaging diagnostic game. This project aims to provide a precise, accessible, and enjoyable approach for early intervention and support for individuals with dyslexia. Traditional methods of diagnosing dyslexia are often time-consuming and fail to capture the complexities of the condition. Dyslexia Detectives addresses these challenges by integrating diagnostic assessments into an interactive game environment, enhancing the diagnostic experience for children. The key objectives include developing an accurate eye movement tracking algorithm, designing an engaging diagnostic game, and validating the system through rigorous testing. This innovative approach promises to revolutionize dyslexia diagnosis, offering a more accessible and enjoyable method that facilitates early intervention and support.

1. Introduction

Dyslexia, a neurodevelopmental disorder affecting reading and spelling skills, often goes undiagnosed in many children due to a lack of awareness, leading to frustration and hindered educational progress. Estimates suggest that dyslexia affect between 15 to 18% of the population. Recognizing the need for an improved and accessible diagnostic approach, the Dyslexia Detectives project aims to redefine the landscape of dyslexia diagnosis. This initiative addresses the shortcomings of traditional diagnostic methods, which are time-consuming and fail to capture the nuanced characteristics of dyslexia comprehensively. By introducing an innovative diagnostic game integrated with advanced eye movement tracking technology, the project aims to enhance the precision of dyslexia detection and transform the diagnostic experience into an engaging activity tailored for children. This proposal outlines the specific challenges addressed, the project's objectives, and the significance of Dyslexia Detectives, showcasing its potential to pioneer early and effective dyslexia identification, ultimately facilitating timely intervention and support for individuals affected by dyslexia.

2. Problem Statement

The development of Dyslexia Detectives is motivated by the prevalent challenges in the existing dyslexia diagnostic landscape. Traditional methods are time-consuming and often intimidating to children, contributing to many cases going undetected. Additionally, a lack of awareness among parents results in children not undergoing necessary assessments. These inefficiencies and potential inaccuracies in current diagnostic practices, especially concerning early detection, present significant challenges for educators, parents, and children. Typically, dyslexia is considered or diagnosed after two years of elementary school, which is often too late. Dyslexia Detectives aims to overcome these limitations by combining advanced eye movement tracking technology with an engaging diagnostic

game. This proactive approach ensures a broader reach, enabling the early identification of dyslexia and facilitating timely intervention. Dyslexia Detectives offers a crucial solution that improves the efficiency and accuracy of the diagnostic process and provides an accessible and enjoyable means to address dyslexia in its nascent stages.

3. Problem Solution/Objectives of the Proposed System

Dyslexia Detectives is designed to address the outlined challenges through the following objectives:

1. **Enhance Accuracy in Dyslexia Diagnosis:** Develop a robust eye movement tracking algorithm to improve the accuracy of dyslexia detection.
2. **Optimize Diagnostic Efficiency:** Design an interactive diagnostic game that integrates eye tracking data to reduce the time required for dyslexia assessments.
3. **Improve User Engagement, Especially for Children:** Create an engaging diagnostic experience within the game environment to mitigate potential anxiety and resistance.
4. **Enable Early Identification:** Provide a user-friendly system that facilitates early detection of dyslexia symptoms.
5. **Offer Holistic Dyslexia Assessment:** Ensure a comprehensive assessment that captures the diverse manifestations of dyslexia.
6. **Facilitate User-Friendly Interactions:** Develop an intuitive user interface to promote widespread adoption in educational settings.
7. **Integrate Accessibility Features:** Implement features to accommodate diverse learning needs.
8. **Minimize Dependency on External Resources:** Design the diagnostic game to be self-sufficient, reducing disruptions.
9. **Validate System Efficacy:** Conduct rigorous testing to ensure the system's accuracy and reliability.
10. **Promote Early Intervention Strategies:** Collaborate with educators to integrate early intervention strategies within the software.
11. **Enhance Collaboration Between Educators and Parents:** Facilitate communication by sharing diagnostic results and recommendations.
12. **Ensure System Security and Privacy:** Implement robust security measures to safeguard sensitive data.
13. **Provide Continuous System Updates:** Establish a framework for ongoing updates to stay aligned with advancements in dyslexia research and diagnostics.

3.1 Objectives

BO-1 Improve Dyslexia Detection Accuracy: Achieve a minimum accuracy rate of 95% in diagnostic assessments through an advanced eye movement tracking algorithm.
BO-2 Streamline Diagnostic Process: Reduce the average diagnostic time by at least 30% compared to traditional methods by integrating eye tracking data into an interactive game.
BO-3 Enhance User Engagement: Increase user participation and willingness to undergo dyslexia assessments by 20% through an interactive and enjoyable diagnostic experience.
BO-4 Facilitate Early Intervention: Increase the identification of dyslexia cases before the age of 8 by 25% through early detection capabilities.

4. Related System Analysis/Literature Review

Table 1 Related System Analysis with proposed project solution

Application Name	Weakness	Proposed Project Solution
NHS – UK, Diagnosis, Dyslexia	Diagnoses through the old traditions like, psychologist, questionnaires, and slow tracking progress(months).	Diagnosing dyslexia through eye tracking and machine learning and providing diagnoses with 97% accuracy within minutes.
Center for assessment and remedial education	Same old manual diagnosing ways with teachers that need to be adept at prescriptive or individualized teaching.	Automated Diagnosing in minutes, with little or no knowledge to operate this self-explanatory software.

5. Vision Statement

***For** educators, doctors and parents **who** are seeking an efficient and engaging dyslexia diagnostic solution, the "**Dyslexia Detectives**" system is a technology-driven platform **that** combines advanced eye movement tracking with an interactive game environment. This innovative product transcends traditional diagnostic approaches, offering a comprehensive assessment of dyslexia-related challenges for children. **Unlike** conventional methods, **our product** streamlines the diagnostic process, reducing time constraints and fostering a more enjoyable experience for users. "**Dyslexia Detectives**" stands out as a user-friendly and accurate tool, facilitating early identification and intervention strategies. The product's primary differentiation lies in its seamless integration of cutting-edge technology with a child-friendly interface, ensuring a holistic and accessible approach to dyslexia diagnosis.*

6. Scope

The scope of the Dyslexia Detectives project is comprehensive, aiming to provide a holistic solution to the challenges associated with dyslexia diagnosis in educational settings. The main functionalities include:

- Advanced eye movement tracking technology integrated into an interactive diagnostic game environment.
- Development of a sophisticated algorithm for accurate dyslexia detection, leveraging eye tracking data to capture nuances in reading-related difficulties.
- An interactive game designed to engage users, especially children, making the diagnostic process more enjoyable and less intimidating.
- Optimization of diagnostic efficiency by significantly reducing the time required for assessments compared to traditional methods.
- Early and efficient dyslexia detection, allowing for timely intervention and support.
- Creation of a user-friendly interface to ensure ease of use for educators and students.
- Incorporation of accessibility features to cater to diverse learning needs.
- Validation processes to rigorously test the system's efficacy in real-world educational environments.
- Collaboration features to facilitate communication between educators and parents through result sharing and recommendations.
- Integration of early intervention strategies within the software, providing actionable insights based on diagnostic results.
- Continuous improvement with a framework for ongoing updates to keep the software aligned with emerging technologies and the latest advancements in dyslexia research and diagnostics.

Dyslexia Detectives seeks to redefine dyslexia diagnosis through a multifaceted approach addressing accuracy, efficiency, user-friendliness, inclusivity, collaboration, and ongoing adaptability.

7. Modules

Modules of ***"Dyslexia Detectives"*** are listed below:

7.1 Module 1: User Management:

7.1.1 System Administrator:

FE-1: Access to a comprehensive dashboard displaying key performance indicators and metrics for each school.
FE-2: Ability to generate school-specific reports detailing the number of dyslexia assessments conducted, identification rates, and intervention effectiveness.
FE-3: Real-time monitoring of user participation and progress within each school, tracking the number of assessments completed, game scores, and learning pathway advancements.
FE-4: Visualization tools to present school-wise data in graphical formats, allowing for easy interpretation and comparison of performance metrics.
FE-5: Integration of progress tracking mechanisms to monitor the effectiveness of early intervention strategies and the impact on dyslexia identification rates.

FE-6 Can apply all the CRUD operations on the admins.

7.1.2 Teacher

7.1.2.1 Registration and Login:

FE-1: Secure registration process for admins, requiring them to provide details like name, school affiliation, contact information, and a unique identifier (e.g., school ID).
FE-2: Admins can create their own login credentials (username and password) during registration.
FE-3: Option for admins to reset their password in case they forget it.

7.1.2.2 Dashboard:

FE-1: User-friendly dashboard that displays all the available modules and features accessible to admins.
FE-2: Included shortcuts or quick links to frequently used functions like student management, test administration, and report generation.

7.1.2.3 Student Management:

FE-1: Create a student database within the teacher dashboard to store student information, including name, age, grade, class and parent contact details.
FE-2: Teacher can manually add new students, especially those who are too young to register themselves.
FE-3: Provide options to edit student profiles, update contact information, and assign unique student IDs for easy identification.

7.1.2.4 Test Administration:

FE-1: Feature that enables teacher to initiate and monitor the reading test for students.
FE-2: Clear instructions and guidance for teachers on how to conduct the test, especially for younger students who may need assistance.

7.1.2.5 Report Generation and Sharing:

FE-1: Automatically generates comprehensive reports based on the test results, including the diagnosis outcome and recommended actions.
FE-2: Can review and edit the reports before sharing them with parents.
FE-3: Send reports directly to parents via email or messaging platforms like WhatsApp.

7.1.2.6 Game Progress Tracking:

FE-1: Dedicated section within the admin dashboard to track and review students' progress in the diagnostic game.
FE-2: Display game scores, accuracy percentages, and any notable improvements over time.
FE-3: Can export game progress reports for further analysis or to share with parents.

7.1.2.7 Learning Material Management:

FE-1: Interface for admins to upload and manage learning materials, such as interactive exercises, reading materials, and educational videos.
FE-2: Organize the materials based on difficulty levels, topics, or age groups to facilitate easy access and assignment to students.
FE-3: Implement version control and update mechanisms to ensure the materials remain current and relevant.

7.2 Module 2: HomeSurfer:

7.2.1 Registration and Login:

FE-1: Registration process for users, allowing them to create their own accounts.
FE-2: Options for users to update their profiles, including personal information and contact details.
FE-3: Login process is secure and straightforward, with options to reset passwords if needed.

7.2.2 Reading Test and Diagnosis:

FE-1: Reading test interface is engaging and user-friendly, especially for younger patients.
FE-2: Clear instructions and guidance throughout the test to help patients understand the process.
FE-3: Displaying the diagnosis outcome (dyslexic or non-dyslexic) in a clear and understandable manner.
FE-4: User can review Patients diagnoses their test reports, which should include detailed results and recommendations.

7.2.3 Cognitive skills diagnostic Game:

FE-1: Interactive and engaging game that assesses various cognitive skills related to dyslexia.
FE-2: Scoring system that provides immediate feedback and rewards to keep patients motivated.
FE-3: Tracking game progress and achievements, allowing user to review patients and their performance history.
FE-4: Options for users to share patients game progress and achievements with friends or family members.

7.2.4 Diagnostic Game Progress Tracking:

FE-1: Tracking and displaying patients' progress in the diagnostic game, including scores, achievements, and improvements.
FE-2: Provide rewards and feedback based on game performance to motivate and engage patients.
FE-3: Save game progress and reports in the patient's database for future reference and analysis.

7.2.5 GPS-based Facility Locator:

FE-1: Can locate the nearest dyslexia treatment facilities based on their location.
FE-2: Displaying facility details, contact information, and directions for easy access.
FE-3: Can save preferred facilities and receive reminders for appointments.

7.2.6 Learning Pathways and Progress Tracking:

FE-1: Personalized learning pathways based on each patient's game diagnosis and needs.
FE-2: Track progress and achievements within the learning pathways, providing feedback and recommendations.
FE-3: Setting learning goals, monitoring progress, and offer rewards for goal achievement to motivate patients in their learning journey.

7.2.7 Community Forum:

FE-1: Secure and moderated community forum where users can connect with each other, share experiences, and seek support.
FE-2: Can start discussions, ask questions, and provide answers to help build a supportive community.

7.2.8 Buddy Module with TTS and STT Integration:

FE-1: Text-to-Speech (TTS) and Speech-to-Text (STT) functionalities for enhanced user interaction.
FE-2: TTS feature to convert extracted text into spoken language for accessibility.
FE-3: STT feature for efficient dictation and input methods, enhancing user experience.
FE-4: Document and Picture text extraction and automated dictation available.

7.3 Module 3: Feature Extractions and Digital Diagnoses:

7.3.1 Data Acquisition:

FE-1: Raw eye movement data is collected using an eye tracker during the reading task.

7.3.2 Preprocessing:

FE-1: Dyslexia Detective will filter the raw data to remove noise or artifacts introduced by the eye-tracking technology.
FE-2: Dyslexia Detective will identify, and extract fixation points and saccadic movements based on the raw gaze data.
FE-3: Dyslexia Detective will calculate relevant metrics such as fixation duration, saccade length, and the number of fixations.

7.3.3 Feature Extractions:

FE-1: Define a set of features that characterize the eye movement patterns during reading such as
- *Mean and median fixation duration.*
- *Mean and median saccade length.*
- *Number of fixations.*
- *Number of forward and backward saccades.*
- *Number of fixations on specific words or regions of interest (ROIs).*
- *Other statistical properties of fixations and saccadic movements.*

FE-2: Dyslexia Detective will use techniques like LASSO (Least Absolute Shrinkage and Selection Operator) to perform dimensionality reduction and identify the most relevant features while discarding less informative ones.

7.3.4 Data Representation:

FE-1: Dyslexia Detectives will create a feature vector for each reading session, combining the extracted features into a structured format suitable for machine learning algorithms.

7.3.5 Data Collection:

FE-1: Dyslexia Detective will gather eye-tracking data from individuals, particularly children, as they engage in reading tasks or use a public dataset of Eye trackers.

7.3.6 Data Preprocessing:

FE-1: This module will further process and clean the collected data to prepare it for analysis.

7.3.7 Machine Learning Model Development:

FE-1: Dyslexia Detectives will further implement and train the machine learning algorithms on datasets.
FE-2: Dyslexia Detectives will test the model by applying it on the extracted features from the 7.3 (module: Feature Extraction) and classify individuals as dyslexic or non-dyslexic.
FE-3: Dyslexia Detectives Accuracy would be up to 97% based on ML models SVM, Naïve Bayes, KNN, K-means, CNN etc.

7.4 Module 4: Cognitive Skills Challenge

The Cognitive Skills Challenge - Game Edition (CSCGE) module integrates various cognitive tasks into an engaging game format, designed to test and improve users' cognitive abilities. The game consists of multiple stages, each focusing on different cognitive skills and age-appropriate challenges.

7.4.1 Memory Testing:

FE-1: Display a series of images, including a target image, to the user for 30 seconds.
FE-2: Automatically transition to the next screen presenting six images, one being the target image, and five distractors.
FE-3: Prompt the user to select the correct image matching the target from the previous screen.
FE-4: Implement a confirmation prompt for user selection, followed by scoring and rewards for correct answers.

7.4.2 Reading and Understanding:

FE-1: Present sentences with age-appropriate complexity, followed by three image options.
FE-2: Design options to include visually similar choices, challenging users' comprehension abilities.
FE-3: Introduce longer passages for older age groups, followed by multiple-choice questions to assess comprehension.
FE-4: Assign scores based on correct responses, with rewards for achieving target scores.

7.4.3 Additional Cognitive Challenges:

FE-1: Include arithmetic problems and object counting tasks with varying difficulty levels.
FE-2: Provide feedback and rewards based on accuracy and speed in completing tasks.

7.4.4 Phonological Sound and Listening Ability:

FE-1: Require users to pronounce displayed words, utilizing voice recognition technology for assessment.
FE-2: Present spoken sounds or words, followed by multiple-choice options for correct spellings.
FE-3: Score users based on pronunciation accuracy and spelling selection, offering rewards for proficiency.

7.4.5 Focus Stage:

FE-1: Display moving objects through checkpoints for a designated duration.
FE-2: Prompt users with questions about the objects' positions at specific intervals.
FE-3: Evaluate users' ability to maintain focus and attention throughout the task.
FE-4: Allocate scores based on accuracy in recalling object positions, with rewards for sustained focus.

7.4.6 Score Tracking and Rewards:

FE-1: Implement a scoring system across all stages, with points awarded for each correct response.
FE-2: Track users' progress and performance throughout the game.
FE-3: Offer rewards, such as badges or virtual prizes, for achieving specific milestones or high scores.

7.5 Module 5: Support Service:

Dyslexia Detectives will provide a location-based-support to the Dyslexic Positive Diagnosed Patients from this platform using their current location to the nearest Treatments centers with basic information such as Center names, Phone numbers, location/address vice versa and take the patient there.

7.5.1 Geolocation Integration:

FE-1: Dyslexia Detectives will use the Geolocation API to retrieve the user's current location during the diagnoses phase.
FE-2: Dyslexia Detectives will develop a user consent mechanism to request and obtain permission for accessing location information.

7.5.2 Dyslexia Treatment Database/ External API:

FE-1: Dyslexia Detectives will set up a database or integrate with an external API containing information about dyslexia treatment centers, including names, addresses, and contact details.

7.5.3 User interface enhancement and Interactive Map:

FE-1: Enhance the user interface to seamlessly incorporate dyslexia diagnosis results and display information about nearby treatment centers.
FE-2: Dyslexia Detectives will visually show the locations of nearby dyslexia treatment centers.

7.6 Module 6: Personalized Learning Pathways and Progress Tracking:

7.6.1 Learning Profile Creation:

LP-1: Upon user registration, Dyslexia Detective prompts users to complete a comprehensive learning profile, including information on their dyslexia diagnosis, language skills, educational background, and personal interests.

7.6.2 Personalized Learning Pathways:

FE-1: Utilizes the information from the user's learning profile and the progress of the user from the games to generate personalized learning pathways tailored to their specific needs and goals.
FE-2: Include a combination of interactive games, exercises, reading materials, and interventions aimed at improving reading fluency, comprehension, and other language skills affected by dyslexia.
FE-3 Upload Doc and automated voice will extract text and read it to user, with words being highlighted.

7.6.3 Progress Tracking and Feedback:

FE-1: Dyslexia Detective tracks the user's progress through their personalized learning pathway, recording performance data and completion metrics for each activity.
FE-2: Users and caregivers can access visual progress dashboards, which provide insights into the user's development over time, including improvements in reading speed, accuracy, and comprehension.
FE-3: Dyslexia Detective provides personalized feedback and recommendations based on the user's performance, highlighting areas of strength and areas for improvement.

7.6.4 Adaptive Learning:

FE-1: Dyslexia Detective employs adaptive learning algorithms (such as Item Response Theory IRT, Bayesian Knowledge Tracing BKT, Reinforcement Learning RL etc) that adjust the difficulty level and content of activities based on the user's progress and performance.
FE-2: As users demonstrate mastery in certain areas, the system introduces more challenging exercises or focuses on addressing remaining weaknesses, ensuring an optimal learning experience tailored to everyone's needs.

7.6.5 Goal Setting and Achievement:

FE-1: Dyslexia Detective allows users to set specific learning goals and milestones within their personalized pathways, such as improving reading speed by a certain percentage or mastering specific phonetic patterns.
FE-2: Users receive recognition and rewards upon achieving their goals, fostering motivation and engagement in their learning journey.

7.7 Module 7: Community Engagement and Peer Support:

7.7.1 Community Hub Creation:

FE-1: Dyslexia Detective establishes a centralized community hub within the platform, serving as a virtual space for users, caregivers, educators, and healthcare professionals to connect, interact, and share resources.
FE-2: Users can access the community hub via the platform's interface, where they can participate in discussions, ask questions, and seek support from peers and experts.

7.7.2 Peer-to-Peer Interaction:

FE-1: Dyslexia Detective facilitates peer-to-peer interaction through features such as forums, chat rooms, and messaging systems, allowing users to communicate with others who share similar experiences and challenges.
FE-2: Users can exchange tips, strategies, and personal stories, providing valuable insights and emotional support to one another.

7.7.3 Expert Consultation and Support:

FE-1: Dyslexia Detective offers access to expert consultation and support services within the community hub, where users can seek advice and guidance from qualified professionals, including educators, psychologists, and speech therapists.
FE-2: Experts can provide personalized recommendations, answer questions, and offer resources to help users navigate their journey with dyslexia more effectively.

7.7.4 Virtual Support Groups:

FE-1: Dyslexia Detective facilitates the formation of virtual support groups based on common interests, age groups, or geographic locations, allowing users to join communities of individuals who face similar challenges.
FE-2: Virtual support groups offer a safe and inclusive environment for users to share experiences, offer encouragement, and celebrate milestones together, fostering a sense of belonging and camaraderie.

7.7.5 Resource Sharing and Collaboration:

FE-1: Dyslexia Detective enables users to share helpful resources, such as educational materials, assistive technologies, and success stories, with the broader community.
FE-2: Users can collaborate on projects, initiatives, and advocacy efforts aimed at raising awareness and promoting inclusivity for individuals with dyslexia, harnessing the collective power of the community to drive positive change.

7.8 Module 8: Buddy:

7.8.1 Enhanced Document Interaction and Text Extraction:

FE-1: Implement document scanning capabilities using optical character recognition (OCR) technology to extract text from scanned documents.
FE-2: Develop algorithms to enhance text extraction accuracy, particularly for documents with varying layouts, fonts, and languages.

7.8.2 Advanced Speech Recognition Capabilities:

FE-1: Enable speech recognition functionality to accurately transcribe spoken words into text format.
FE-2: Implement real-time speech-to-text conversion to provide immediate feedback and enable users to dictate text efficiently.

7.8.3 Customized Text-to-Speech Integration:

FE-1: Integrate text-to-speech (TTS) functionality to convert extracted text into spoken language.
FE-2: Provide customizable TTS options, including voice type, speech rate, and pronunciation preferences, to cater to diverse user needs.

7.8.4 Reading Assistance:

FE-1: Implement TTS functionality to read out text extracted from uploaded pictures or documents, providing reading assistance to users with dyslexia.
.
FE-2: Combine OCR and TTS to create an automated reading system where users can upload documents, and the system extracts the text using OCR and reads it out using TTS.

7.8.5 Voice Commands:

FE-1: Implement STT to enable voice commands within the platform, allowing users to navigate the system, select options, or provide responses to questions using voice commands.
FE-2: Offer a dictation tool based on STT that allows users to dictate text instead of typing it, providing an alternative input method for users who struggle with writing or typing due to dyslexia.

7.8.6 Interactive Document Interaction:

FE-1: Develop a user-friendly interface for users to interact with scanned documents, including options for editing, sharing, and saving the extracted text.
FE-2: Enable seamless integration with existing Dyslexia Detectives features, allowing users to access scanned documents and their transcriptions across the platform.

8. System Limitations/Constraints

LI-1: Its system will not work when the kids are wearing glasses.
LI-2: The eye angle must be perfect.
LI-3: The lighting must be optimum as well.
LI-4: The processor must be of minimum core i7 generation:6th.

9. Data Gathering Approach

For the gathering of the data, we used:

- An eye tracking device to sample the eye moments and gather the data.
- A game that the subjects play.
- A control group samples their eye moments and compares our results with.
- Public datasets.
- Dyslexia thesis documents.

10. Tools and Technologies

Table 2: Tools and Technologies for Proposed Project

Tools And Technologies	**Tools**	**Version**	**Rationale**
	MS Visual Studio Code	1.84.2	IDE
	MongoDB	2022	DBMS
	Technology	**Version**	**Rationale**
	React JS	17	Front-end Development
	Node.JS	v20.6.1	Back-end Development
	Express	4.16.1	Framework
	python	3.11.6	Machine Learning

11. Project Stakeholders and Roles

Table 3 Project Stakeholders for Proposed Project

Project Sponsor	COMSATS University Islamabad, Islamabad Campus
Stakeholder	• Muhammad Ali Arshad (SP21-BCS-055) • Muhammad Ali Awan (SP21-BCS-056) • Project Supervisor Name: Ms. Gulmina Rextina • Final Year Project Committee: Evaluation of project

12. Module based Work Division

Table 4 Team Member Work Division for Proposed Project

Student Name	Student Registration Number	Responsibility/ Module / Feature
M. Ali Arshad	SP21-BCS-055	Module 4 – Module 7(Feature 1-2) All frontend, backend, and database tasks
M. Ali Awan	SP21-BCS-056	Module 1(Feature 3-4) – Module 4 All frontend, backend, and database tasks

13. WBS and Gantt Chart

Table 5 – WBS for Dyslexia Detectives

ID		Task	Duration	Resources
1	**Analysis**		**12 d**	**M.Ali Arshad, M.Ali Awan**
2		Requirement Meetings	4 d	M.Ali Arshad, M.Ali Awan
3		Communication with Stakeholders	4 d	M.Ali Arshad
4		Document Current System	4 d	M.Ali Awan
5		Analysis Finished		
6	**Design**		**15 d**	**M.Ali Arshad, M.Ali Awan**
7		Design Database	3 d	M.Ali Arshad, M.Ali Awan
8		Software Design	4 d	M.Ali Arshad
9		Interface Design	5 d	M.Ali Awan
10		Create Design Specifications	3 d	M.Ali Arshad
11		Design Finished		
12	**Development**		**150 d**	**M.Ali Arshad, M.Ali Awan**
13		Develop System Module	127 d	M.Ali Arshad, M.Ali Awan
14		Integrate System Module	20 d	M.Ali Awan
15		Perform Initial Testing	3 d	M.Ali Arshad
16		Development Finished		
17	**Testing**		**40 d**	**M.Ali Arshad, M.Ali Awan**
18		Perform System Testing	25 d	M.Ali Arshad
19		Document Issues Found	10 d	M.Ali Awan
20		Correct Issues Found	5 d	M.Ali Awan
21		Testing Finished		
22	**Implementation**		**15 d**	**M.Ali Arshad, M.Ali Awan**
23		On-Site Installation	10 d	M.Ali Awan
24		Support Plan for the System	5 d	M.Ali Arshad, M.Ali Awan
25	**Completion**		**10 d**	**M.Ali Arshad, M.Ali Awan**
26		System Maintenance	5 d	M.Ali Awan
27		Evaluation	5 d	M.Ali Arshad

ID	Name	Start Date	End Date	Duration	Progress %	Dependency	Resources
1	Analysis	Nov 27, 2023	Dec 13, 2023	12 days	50		M. Ali Asrhad,M. Ali Awan
2	Requirement Meetings	Nov 27, 2023	Nov 30, 2023	4 days	80		M. Ali Asrhad,M. Ali Awan
3	Communication with Stakeholders	Dec 01, 2023	Dec 06, 2023	4 days	50	2FS	M. Ali Asrhad
4	Document Current Situation	Dec 07, 2023	Dec 12, 2023	4 days	20	3FS	M. Ali Awan
10	Analysis Finised	Dec 13, 2023	Dec 13, 2023	0 days	50		M. Ali Asrhad,M. Ali Awan
5	Design	Dec 13, 2023	Jan 03, 2024	15 days	33		M. Ali Asrhad,M. Ali Awan
6	Design Database	Dec 13, 2023	Dec 15, 2023	3 days	0		M. Ali Asrhad,M. Ali Awan
7	Software Design	Dec 18, 2023	Dec 21, 2023	4 days	0	6FS	M. Ali Asrhad
8	Interface Design	Dec 22, 2023	Dec 28, 2023	5 days	100	7FS	M. Ali Awan
9	Create Design Specifications	Dec 29, 2023	Jan 02, 2024	3 days	0	8FS	
11	Design Finished	Jan 03, 2024	Jan 03, 2024	0 days	0		
12	Development	Jan 03, 2024	Jul 31, 2024	150 days	2		M. Ali Asrhad,M. Ali Awan
13	Develop System Module	Jan 03, 2024	Jun 27, 2024	127 days	0		M. Ali Awan,M. Ali Asrhad
14	Integrate System Module	Jun 27, 2024	Jul 24, 2024	20 days	0	13FS-1 days	M. Ali Awan
15	Perform Initial Testing	Jul 26, 2024	Jul 30, 2024	3 days	100	14FS+1 day	M. Ali Asrhad
16	Development Finished	Jul 31, 2024	Jul 31, 2024	0 days	0		
17	Testing	Jul 31, 2024	Sep 25, 2024	40 days	0		M. Ali Asrhad,M. Ali Awan
18	Perform System Testing	Jul 31, 2024	Sep 03, 2024	25 days	0		M. Ali Asrhad
19	Document Issues Found	Sep 04, 2024	Sep 17, 2024	10 days	0	18FS	M. Ali Awan
20	Correct Issues Found	Sep 18, 2024	Sep 24, 2024	5 days	0	19FS	M. Ali Awan
21	Testing Finished	Sep 25, 2024	Sep 25, 2024	0 days	0		
22	Implementation	Sep 25, 2024	Oct 15, 2024	15 days	0		M. Ali Asrhad,M. Ali Awan
23	On-Site Installation	Sep 25, 2024	Oct 08, 2024	10 days	0		M. Ali Awan
24	Support Plan for the System	Oct 09, 2024	Oct 15, 2024	5 days	0	23FS	M. Ali Asrhad,M. Ali Awan
25	Completion	Oct 16, 2024	Oct 29, 2024	10 days	0		M. Ali Asrhad,M. Ali Awan
26	System Maintenance	Oct 16, 2024	Oct 22, 2024	5 days	0		M. Ali Awan
27	Evaluation	Oct 23, 2024	Oct 29, 2024	5 days	0	26FS	M. Ali Asrhad

Figure 2: WBS for Dyslexia Detectives

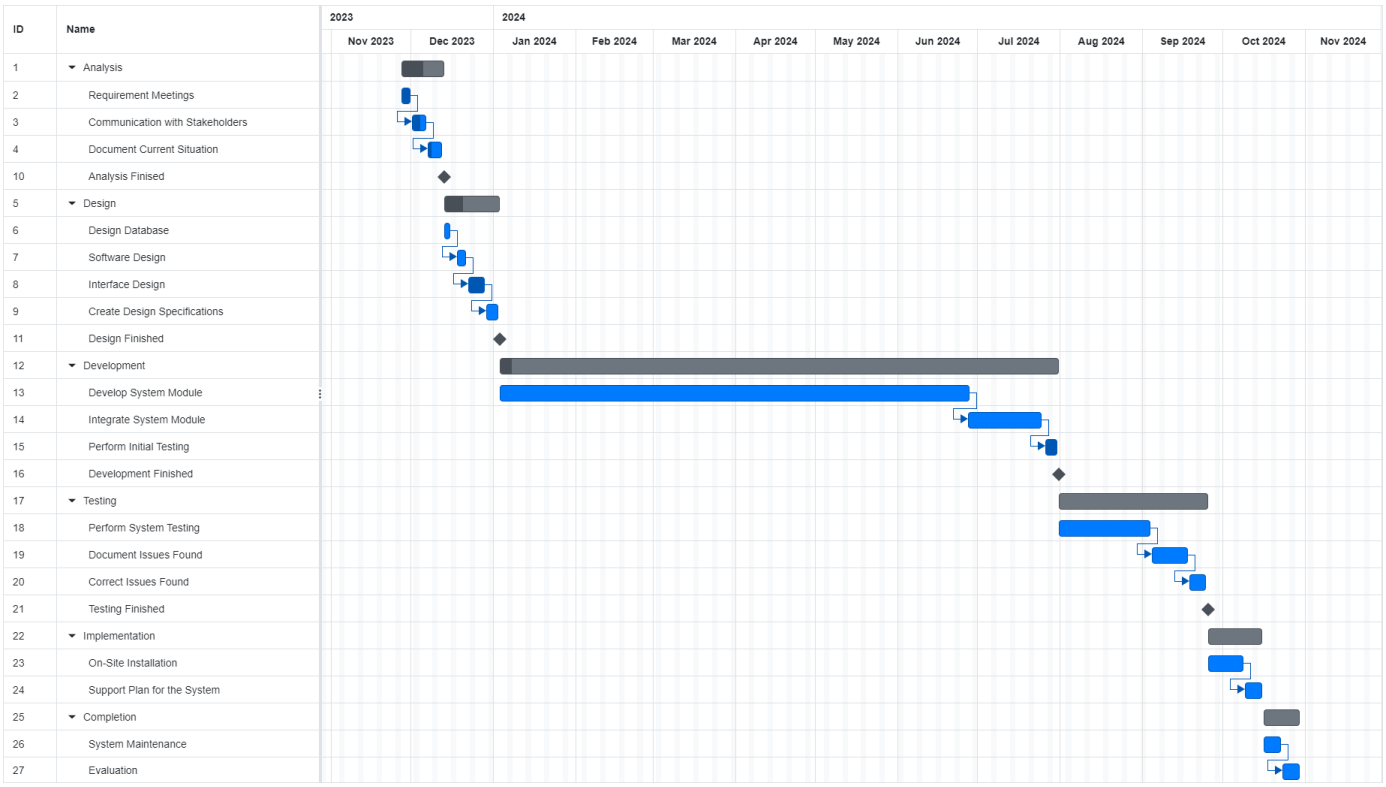

Figure 3: Gantt Chart

14. Mockups

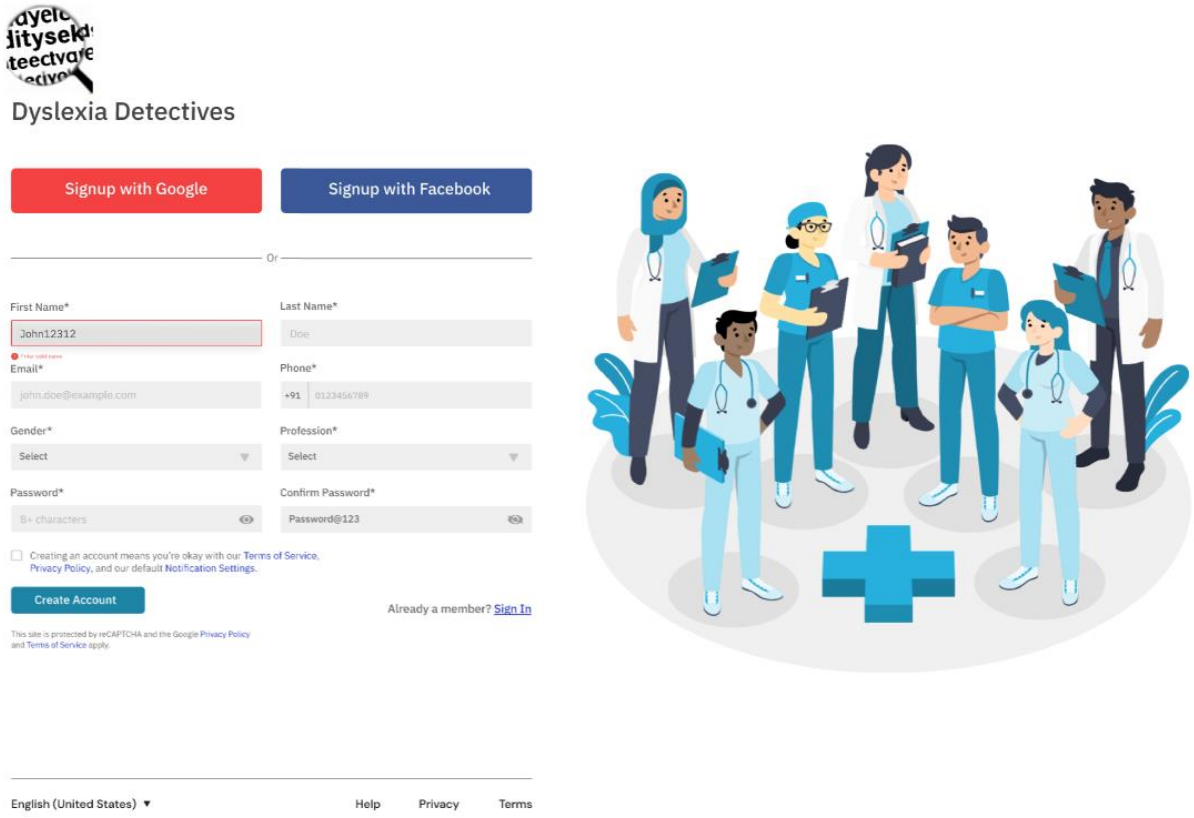

Figure 4: Admin Sign up Sub-module.

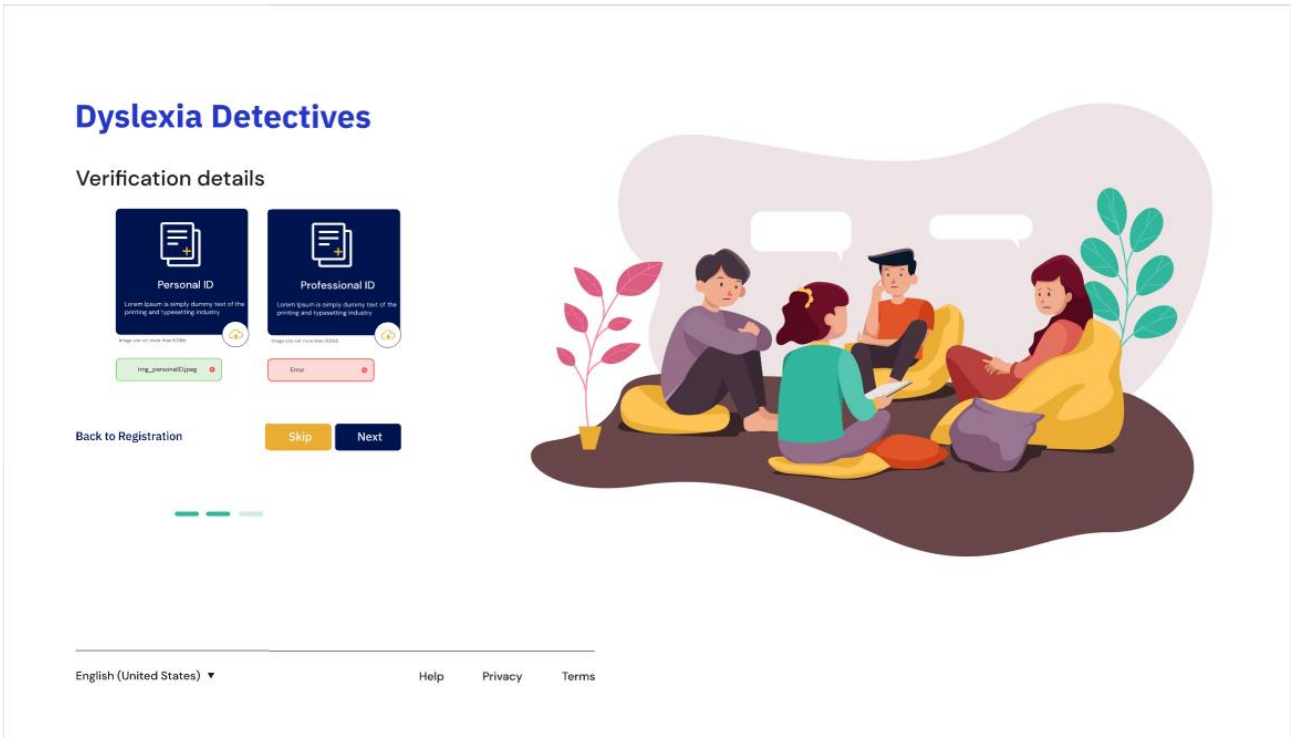

Figure 5: Verifications of admin

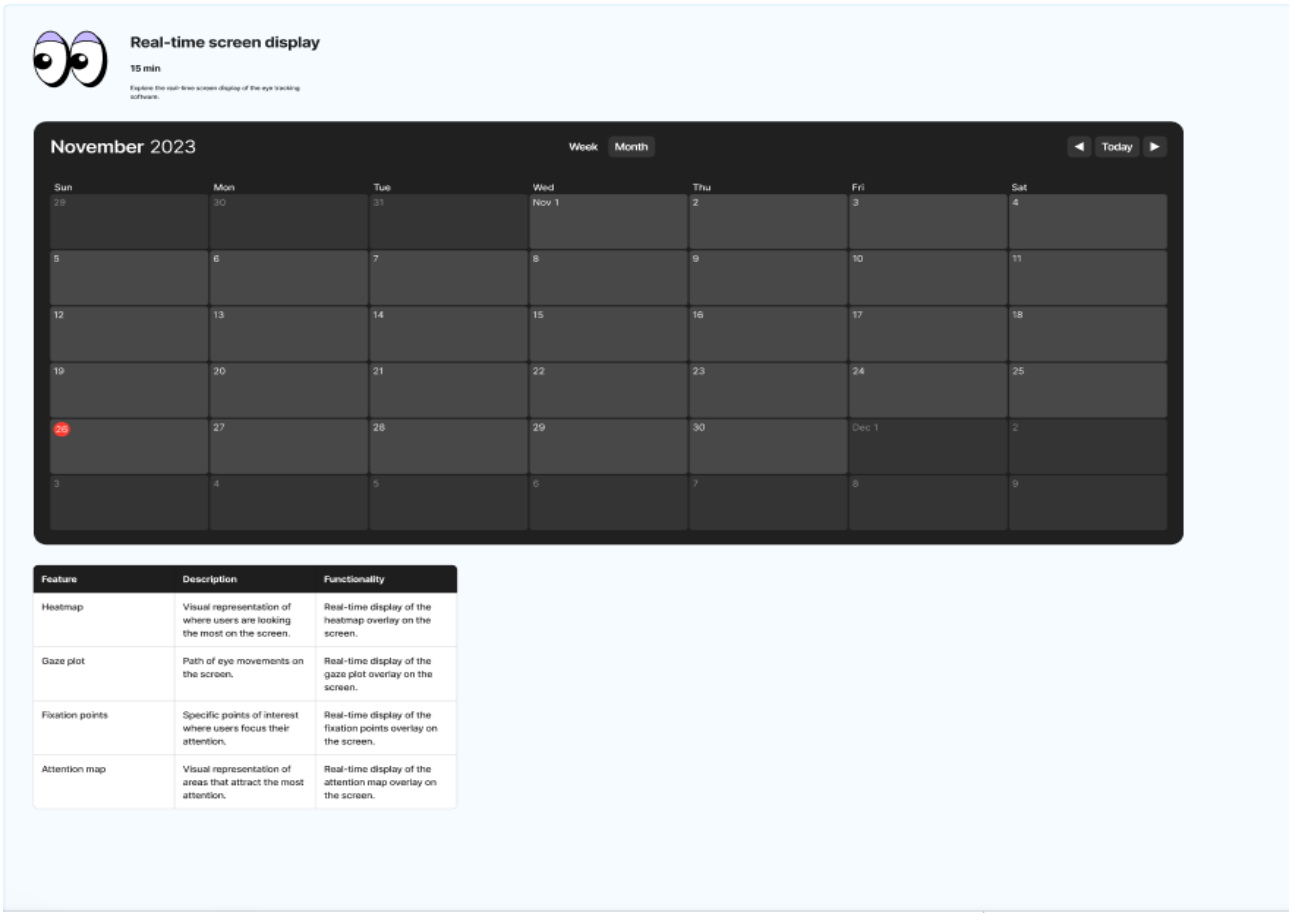

Figure 6: Game display of calendar

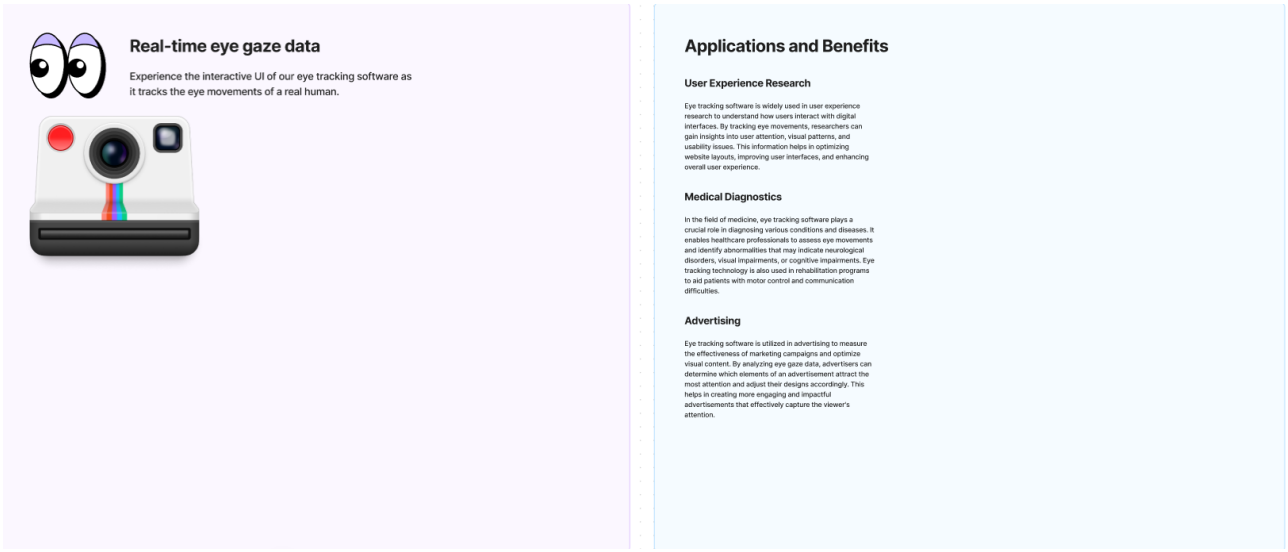

Figure 7: Eye tracking Diagnosis page

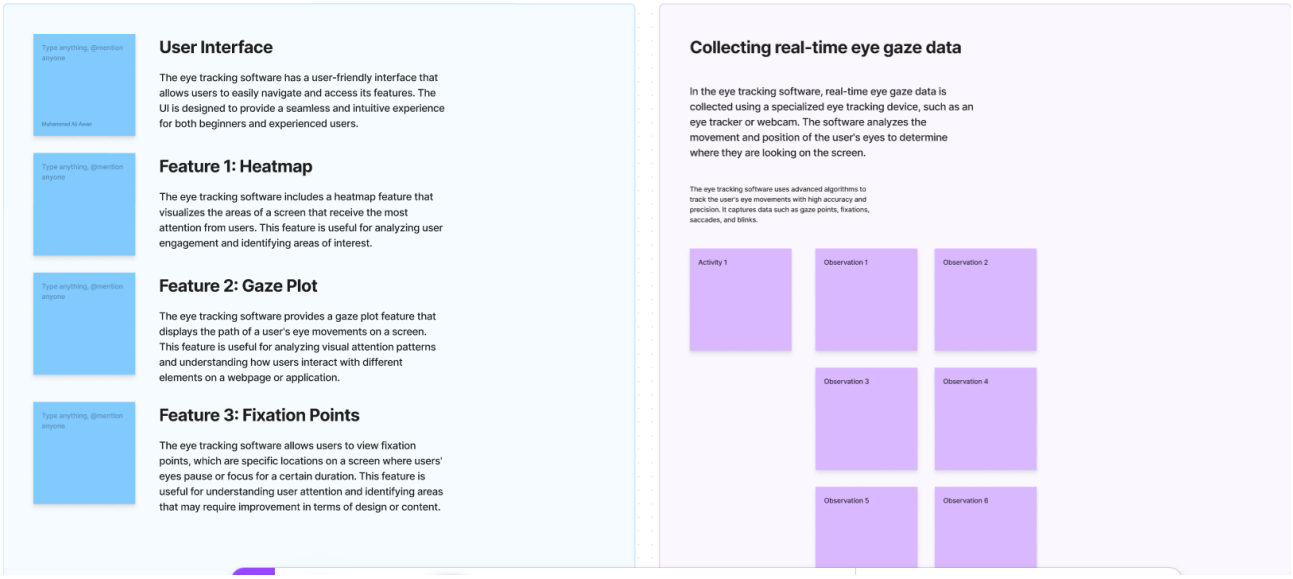

Figure 8: Software working and help page

15. References

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Serious Games for Early Identification of Developmental Dyslexia, www.math.unipd.it/~mciman/pubb/cie17.pdf Accessed 26 Nov. 2023.

Author links open overlay panelShahriar Kaisar, and AbstractDevelopmental dyslexia is a learning disability that occurs mostly in children during their early childhood. Dyslexic children face difficulties while reading. “Developmental Dyslexia Detection Using Machine Learning Techniques : A Survey.” *ICT Express*, Elsevier, 30 May 2020, www.sciencedirect.com/science/article/pii/S2405959520301016

16. Plagiarism Report

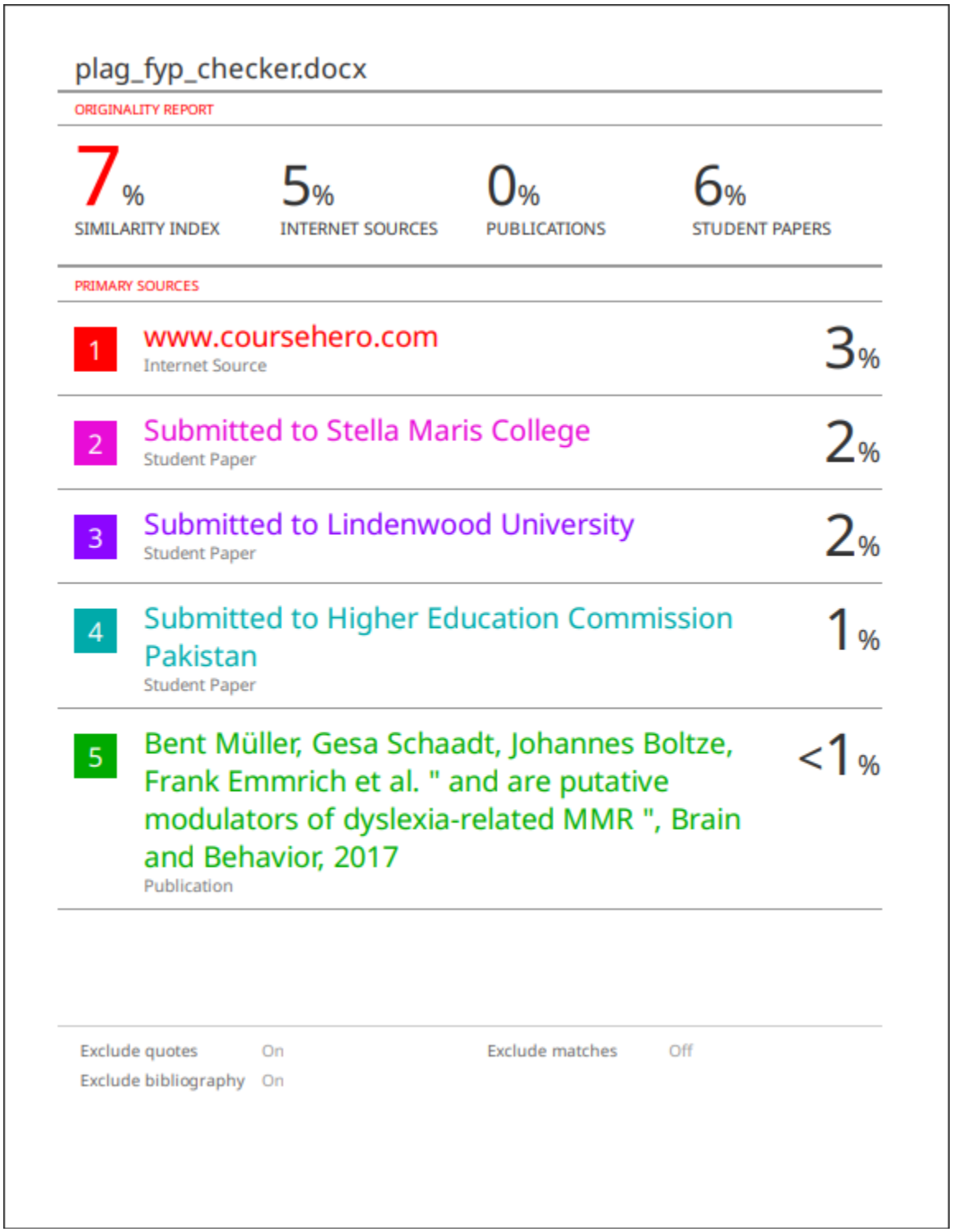

Figure 8: Plagiarism report of Dyslexia Detectives Scope Document