



Curiokids: An AI-Based Web Application for Supporting Children with Dyslexia

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Abstract : This paper presents “Curiokids”, an AI-based web application designed to support children with dyslexia through personalized and interactive learning. Dyslexia is a learning disorder that affects reading, writing, and comprehension abilities, making conventional teaching methods less effective. The proposed system utilizes artificial intelligence to analyze user interactions, provide real-time feedback, and assist in improving reading and pronunciation skills. The application includes features such as an AI-powered chatbot for doubt clarification, progress tracking, reward-based motivation, and engaging learning activities. The system is developed using modern web technologies and integrated AI services to ensure accessibility and scalability. Experimental observations indicate improved engagement and learning outcomes among users. This work demonstrates the potential of AI-driven educational platforms in enhancing inclusive learning for children with dyslexia.

Keywords - : Dyslexia, Artificial Intelligence, Web Application, Chatbot, Personalized Learning, Education Technology

I. INTRODUCTION

Dyslexia is one of the most common learning disabilities that affects a child’s ability to read, write, and process language efficiently. Children with dyslexia often face difficulties in recognizing words, understanding text, and maintaining proper spelling, which can negatively impact their academic performance and confidence. Traditional teaching methods are generally designed for average learners and often fail to address the specific needs of children with learning disabilities, resulting in reduced engagement and slower learning progress.

With the rapid advancement of technology, particularly in the field of artificial intelligence, there is a growing opportunity to develop intelligent systems that can provide personalized learning experiences. AI-based educational platforms can analyze user behavior, adapt to individual learning patterns, and provide real-time feedback, making them highly effective for supporting students with special learning needs.

This paper presents “Curiokids”, an AI-based web application developed to assist children with dyslexia through interactive and adaptive learning. The system provides a user-friendly environment where both children and parents can actively participate in the learning process. The application allows users to register and log in, after which they can choose different learning paths. Children can engage in activities such as games, letter recognition, number learning, and practice sessions, while parents can access a dashboard to monitor their child’s progress.

The platform integrates artificial intelligence to enhance learning through features such as chatbot interaction, personalized feedback, and adaptive content delivery. As children interact with the system by

playing games, practicing skills, and completing tasks, they earn rewards such as stars and badges, which serve as motivational elements to improve engagement.

All user interactions, including login, activity participation, and reward achievements, are stored in a database, enabling continuous tracking of user progress. This data-driven approach allows the system to provide customized recommendations and insights for both children and parents.

The proposed system aims to create an inclusive and engaging learning environment by combining artificial intelligence, interactive design, and gamification techniques. By addressing the limitations of traditional learning methods, “Curiokids” provides an effective solution for improving the learning experience of children with dyslexia.

II. OBJECTIVES

The main objectives of the proposed system are:

- To develop an AI-based web application to support children with dyslexia.
- To provide personalized learning experiences using artificial intelligence.
- To improve reading and pronunciation skills through interactive learning.
- To implement a chatbot for real-time doubt clarification.
- To incorporate progress tracking and reward mechanisms to enhance motivation.
- To create an accessible and user-friendly platform for inclusive education.
- To integrate text-to-speech and speech-to-text functionalities to enhance reading and pronunciation support.
- To design a dyslexia-friendly user interface with suitable fonts, colors, and layouts to improve readability and reduce cognitive load.
- To enable continuous performance analysis using AI to provide adaptive feedback and personalized recommendations.

III. LITERATURE SURVEY

Dyslexia is one of the most common learning disabilities affecting children worldwide, primarily impacting reading, writing, and language processing skills. Several research studies have explored different approaches to support dyslexic learners using technology. Traditional assistive tools such as text-to-speech (TTS) systems and phonics-based learning applications have been widely adopted to improve reading abilities. These tools help users by converting written text into spoken words and providing structured learning techniques. However, such systems often lack adaptability and fail to provide personalized learning experiences.

In recent years, artificial intelligence has significantly influenced the field of education by enabling intelligent and adaptive learning systems. AI-based educational platforms utilize machine learning algorithms to analyze user behavior, identify learning patterns, and provide customized feedback. These systems have demonstrated improved engagement and better academic performance compared to conventional learning methods.

Several applications have also incorporated speech recognition technologies to assist in pronunciation and reading improvement. These systems analyze spoken input and provide corrective feedback to users. While effective, many of these applications are limited in terms of integration, as they focus only on specific functionalities without offering a complete learning environment.

Moreover, gamification techniques such as reward systems and progress tracking have been introduced in modern educational platforms to increase motivation and user engagement. Studies have shown that incorporating rewards and interactive elements can significantly enhance learning outcomes, especially for children with learning disabilities.

Despite these advancements, there is still a need for a comprehensive system that combines AI interaction, personalized learning, speech analysis, and motivational features within a single platform. The

proposed system, “Curiokids”, addresses these gaps by integrating all these components into a unified web application, providing an effective and engaging solution for supporting children with dyslexia.

IV. METHODOLOGY

The proposed system, “Curiokids”, follows a structured methodology to provide personalized learning support for children with dyslexia using artificial intelligence and web technologies. The system is designed as a web-based application consisting of multiple interconnected modules.

Initially, the user interacts with the system through a user-friendly interface developed using modern web technologies. The frontend of the application is responsible for displaying learning content, capturing user inputs, and providing an engaging experience for children.

The backend of the system processes user requests and manages data efficiently. It communicates with the AI module through APIs to analyze user inputs and generate appropriate responses. The AI module utilizes natural language processing techniques to understand user queries and provide real-time assistance through a chatbot.

The system also includes a learning module that presents interactive activities aimed at improving reading and pronunciation skills. User performance is continuously monitored, and relevant feedback is provided based on their progress.

A database is used to store user information, progress data, and activity results. This enables the system to track user performance over time and provide personalized recommendations.

The overall workflow of the system involves user input, AI-based processing, feedback generation, and performance tracking. This structured methodology ensures that the system adapts to individual learning needs and provides an effective learning environment for children with dyslexia.

The system is also designed with a strong emphasis on accessibility and usability. Special attention is given to creating a dyslexia-friendly interface by incorporating readable fonts, appropriate color contrasts, and minimal visual distractions. Features such as text-to-speech and guided reading assistance help users better understand content and improve their learning experience. This ensures that children can interact with the system comfortably without feeling overwhelmed.

Furthermore, the application incorporates adaptive learning techniques to personalize the educational content based on each user’s performance. The system analyzes user interactions, identifies strengths and weaknesses, and dynamically adjusts the difficulty level of activities. This personalized approach enhances engagement and ensures that learners progress at their own pace, making the system more effective compared to traditional learning methods.

Security and data privacy are also considered in the system design. User data, including personal information and learning progress, is securely stored and managed using reliable database technologies. Proper authentication and access control mechanisms are implemented to ensure that only authorized users can access the system. This helps maintain user trust and ensures compliance with basic data protection practices.

V. EXISTING SYSTEM

1. Dyslexia Quest

How it works:

Dyslexia Quest is a game-based learning application designed to improve memory, sequencing, and phonological skills in children with dyslexia. It uses interactive games and activities to engage users and enhance cognitive abilities.

Drawbacks:

Although it provides engaging activities, it lacks real-time feedback and does not offer personalized learning based on user performance. It also does not include AI-based interaction or progress tracking features.

2. Ghotit Real Writer**How it works:**

Ghotit Real Writer is a web-based assistive tool that helps individuals with dyslexia improve their writing skills. It provides advanced spelling and grammar correction by analyzing user input and suggesting appropriate corrections.

Drawbacks:

This system mainly focuses on writing assistance and does not support reading improvement or interactive learning. It also lacks chatbot interaction, gamification, and progress tracking features.

3. ClaroRead**How it works:**

ClaroRead is a text-to-speech software that converts written text into spoken words, helping users improve reading comprehension and understanding.

Drawbacks:

While effective for reading support, it lacks interactivity and personalization. The system does not provide feedback, adaptive learning, or motivational features such as rewards.

VI. PROPOSED SYSTEM

The proposed system, “Curiokids”, is an AI-based web application designed to provide personalized learning support for children with dyslexia. The system aims to overcome the limitations of existing assistive technologies by integrating artificial intelligence, interactive learning modules, and motivational features into a unified platform. It focuses on improving reading, writing, and comprehension skills through adaptive and engaging learning techniques.

The architecture of the system is divided into three major components: frontend, backend, and AI module. The frontend is developed using modern web technologies and provides an intuitive and user-friendly interface where children can easily interact with the application. It includes features such as learning activities, chatbot interaction, and progress visualization, ensuring an engaging user experience.

The backend is responsible for handling user requests, managing data, and coordinating communication between different modules. It processes user inputs and sends them to the AI module through APIs. The backend also maintains user records, activity logs, and performance data in a database, enabling efficient tracking and analysis.

The AI module plays a crucial role in the system by providing intelligent and adaptive learning support. It uses natural language processing techniques to understand user queries and generate meaningful responses through a chatbot. The AI system analyzes user behavior, identifies learning patterns, and provides personalized feedback to improve performance. This adaptive mechanism ensures that each user receives customized learning experiences based on their needs.

The system incorporates interactive learning modules designed specifically for children with dyslexia. These modules include reading exercises, pronunciation activities, and simple tasks that help improve cognitive and language skills. The activities are designed to be engaging and easy to understand, ensuring that children remain motivated throughout the learning process.

A key feature of the proposed system is the progress tracking mechanism. The system continuously monitors user performance and records their achievements. Based on this data, it provides feedback and recommendations to help users improve their skills. Additionally, a reward-based system is implemented to motivate children by providing incentives such as points, badges, or levels, making learning more enjoyable.

The workflow of the system begins with user interaction through the web interface. The input is processed by the backend and analyzed by the AI module. Based on the analysis, appropriate feedback or responses are generated and displayed to the user. The system updates user progress and adapts future learning activities accordingly.

Overall, the proposed system provides a comprehensive solution for supporting children with dyslexia by combining artificial intelligence, personalized learning, and interactive features. The web-based nature of the application ensures accessibility across multiple devices, making it a scalable and effective educational tool.

VII. SYSTEM REQUIREMENTS

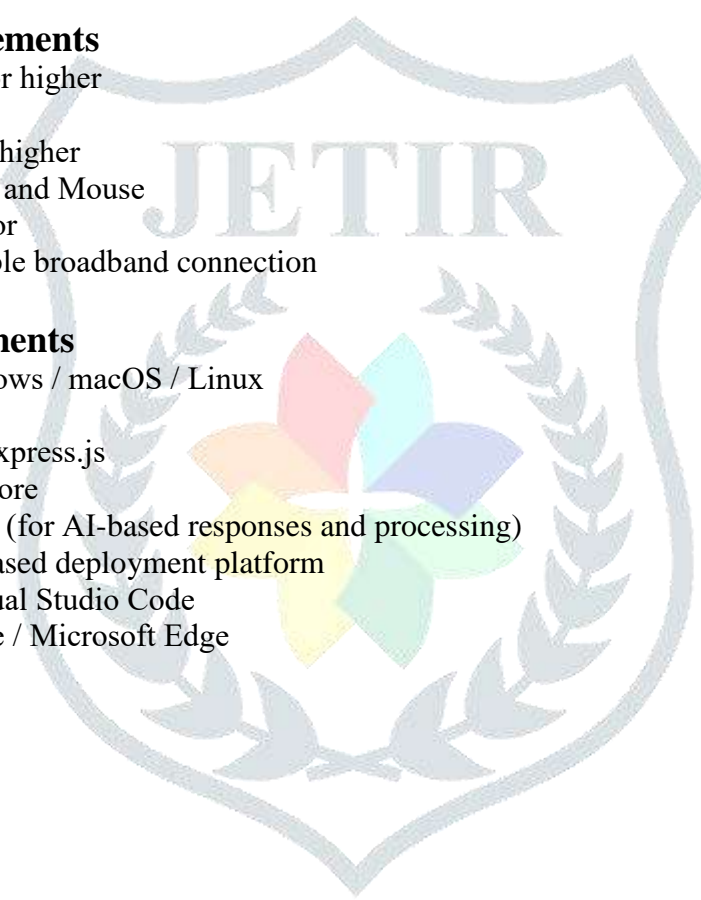
The proposed system requires both hardware and software components to ensure efficient performance and smooth functioning of the web-based application.

A. Hardware Requirements

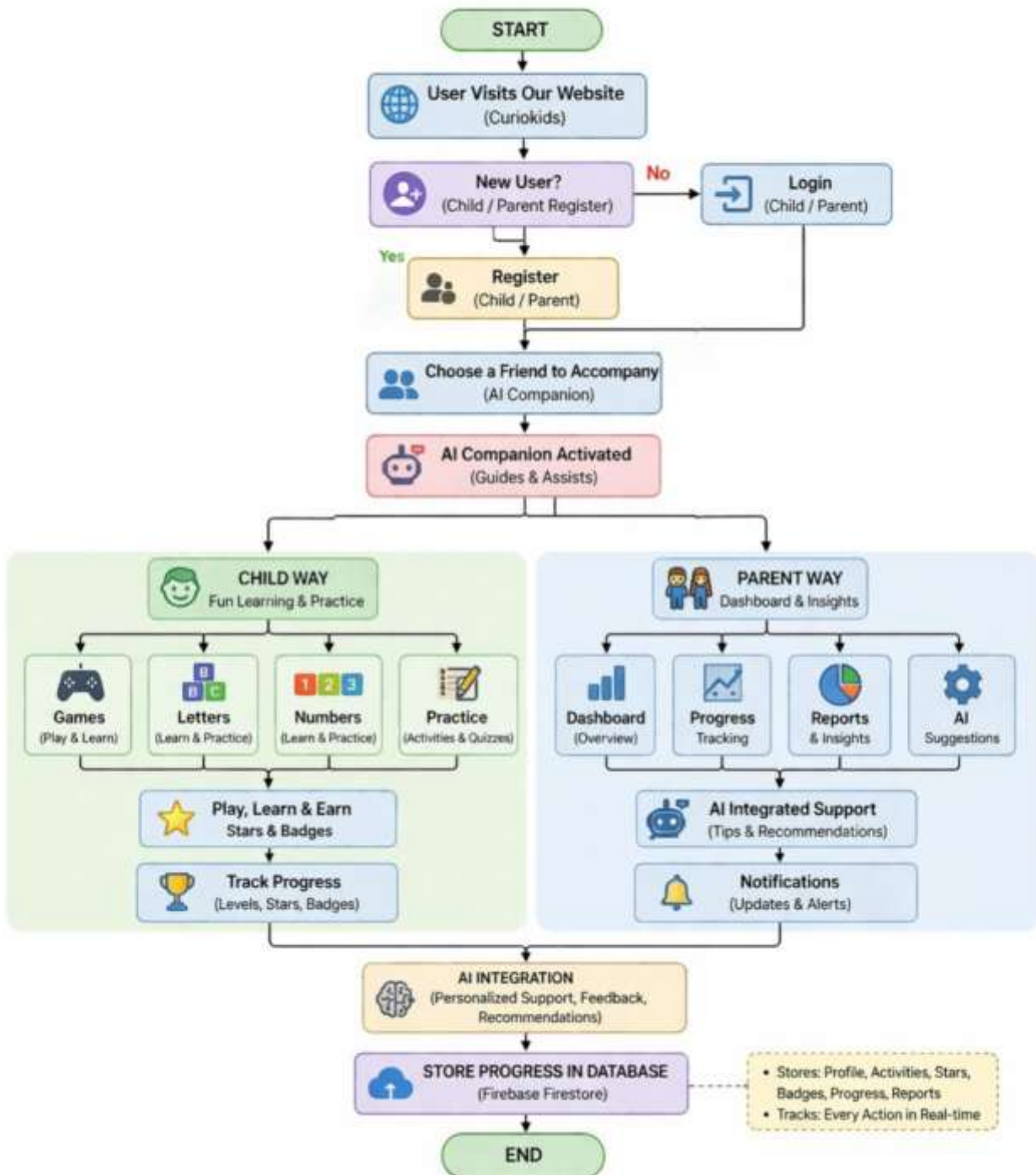
- Processor: Intel Core i3 or higher
- RAM: 4 GB or above
- Storage: 256 GB SSD or higher
- Input Devices: Keyboard and Mouse
- Display: Standard Monitor
- Internet Connection: Stable broadband connection

B. Software Requirements

- Operating System: Windows / macOS / Linux
- Frontend: React.js
- Backend: Node.js with Express.js
- Database: Firebase Firestore
- AI Integration: Groq API (for AI-based responses and processing)
- Cloud Services: Cloud-based deployment platform
- Development Tools: Visual Studio Code
- Browser: Google Chrome / Microsoft Edge



VIII. System Architecture of Curiokids Web Application



XI. Results and Discussion

The results of the proposed system demonstrate the effectiveness of the Curiokids web application in supporting children with dyslexia. The system was successfully implemented and tested across various modules, including the user interface, learning activities, chatbot assistance, and progress tracking features. The outputs obtained from the system highlight its ability to provide an interactive and user-friendly learning environment.

The application delivers real-time responses through the AI-based chatbot and offers personalized learning experiences based on user performance. The implemented features, such as text-to-speech and

interactive exercises, contribute to improving reading and pronunciation skills. The following figures illustrate the key outputs of the system and validate its functionality and performance.



Figure 1: Home Page of Curiokids Web Application

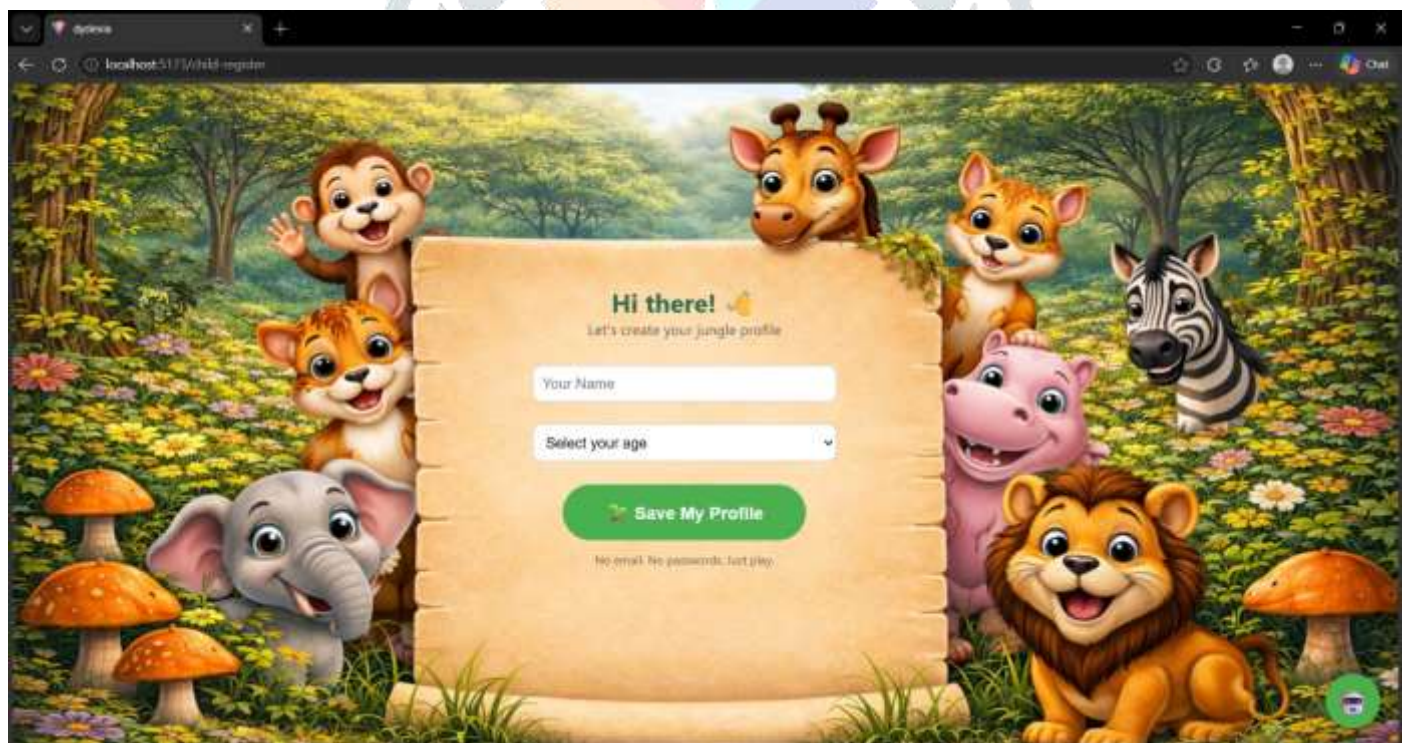


Figure 2: Register Page

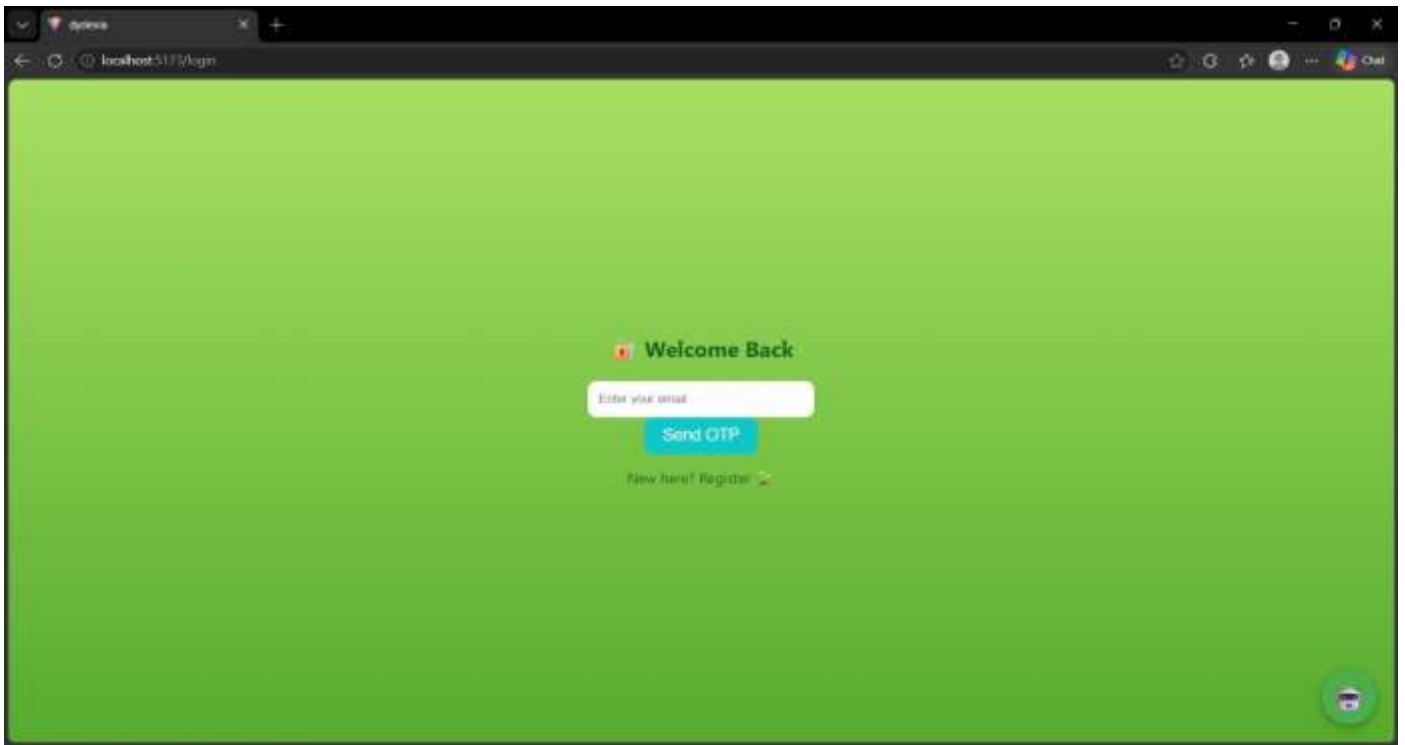


Figure 3: Login Page

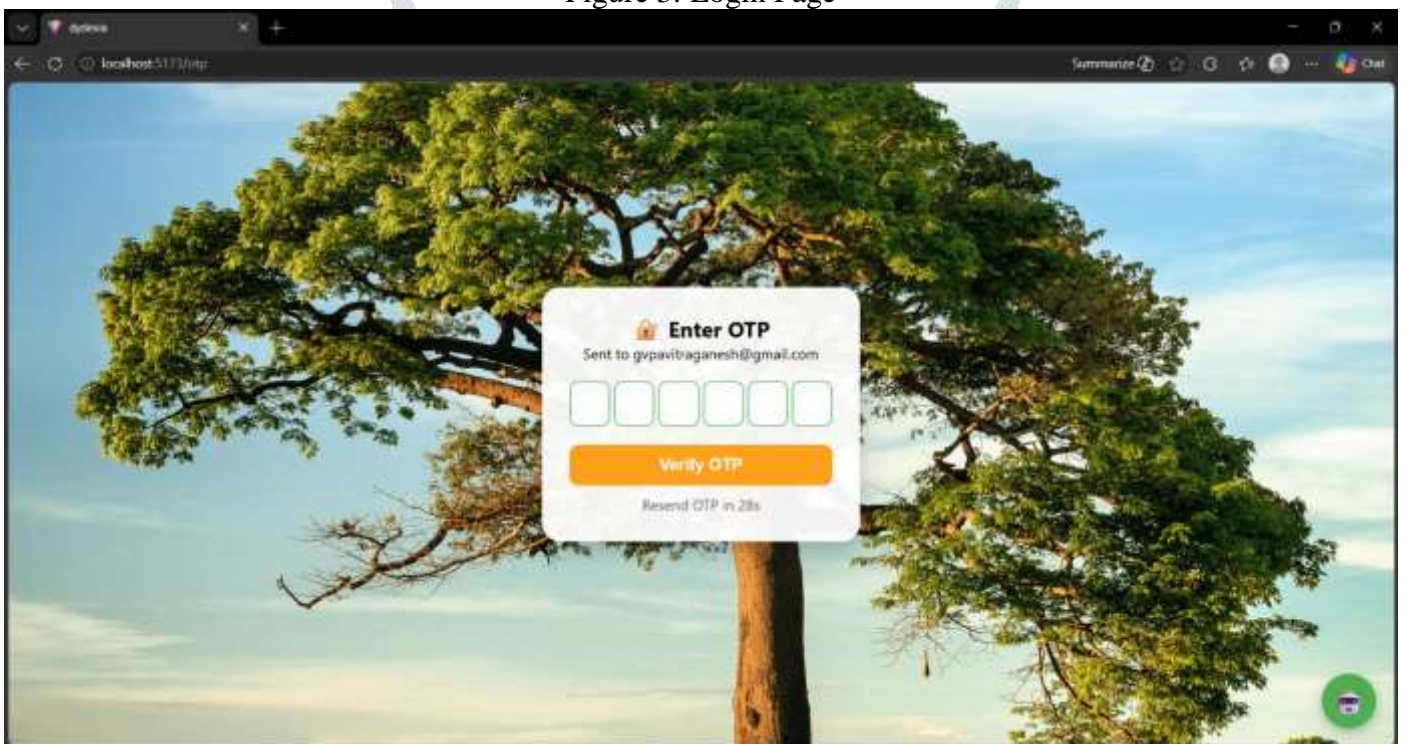


Figure 4: OTP-Page

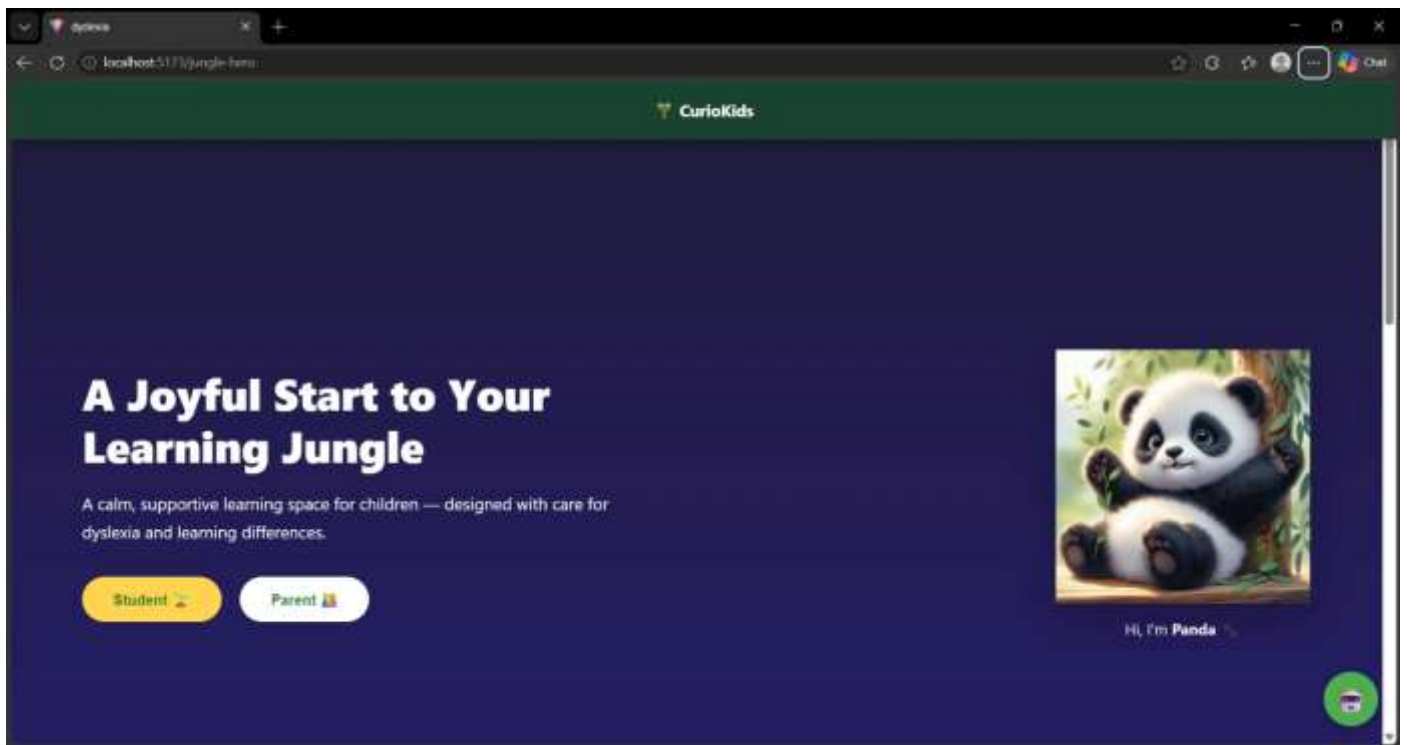


Figure 4: Home page

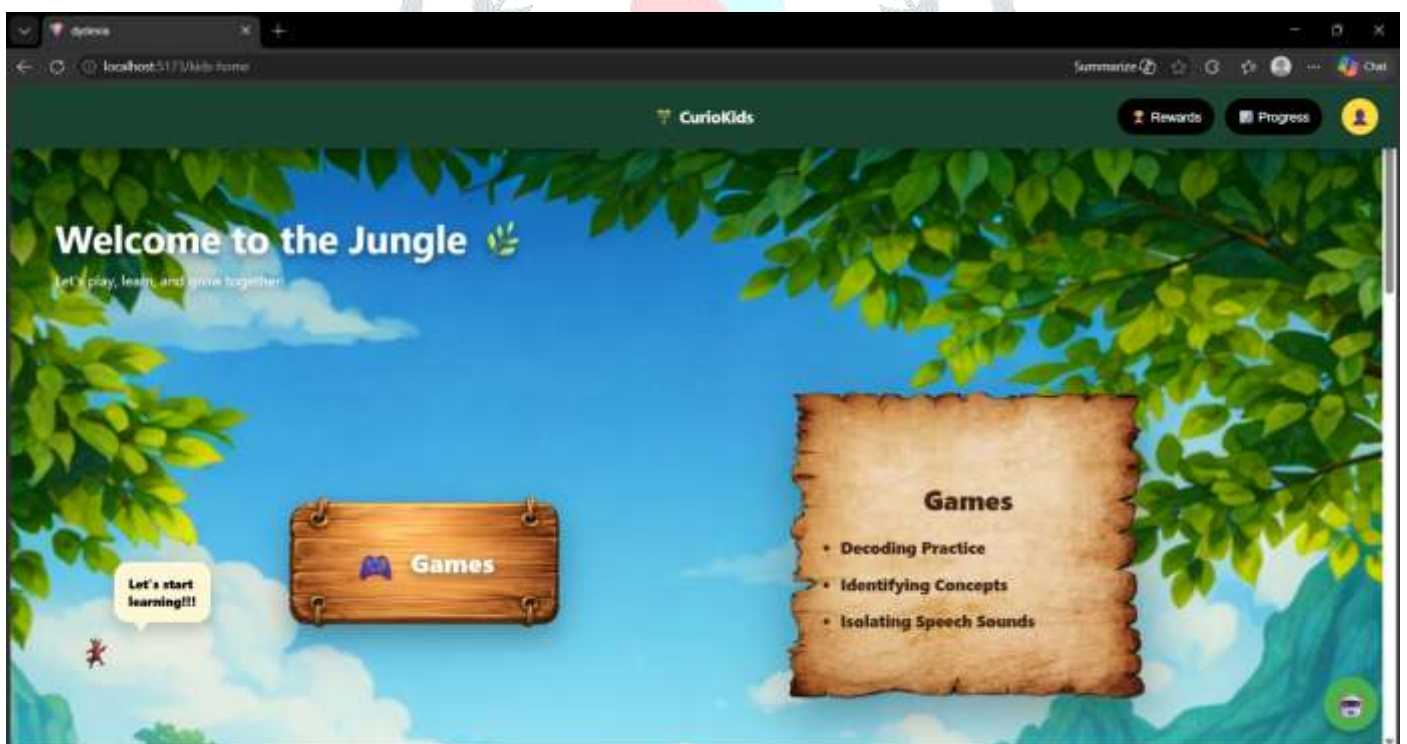
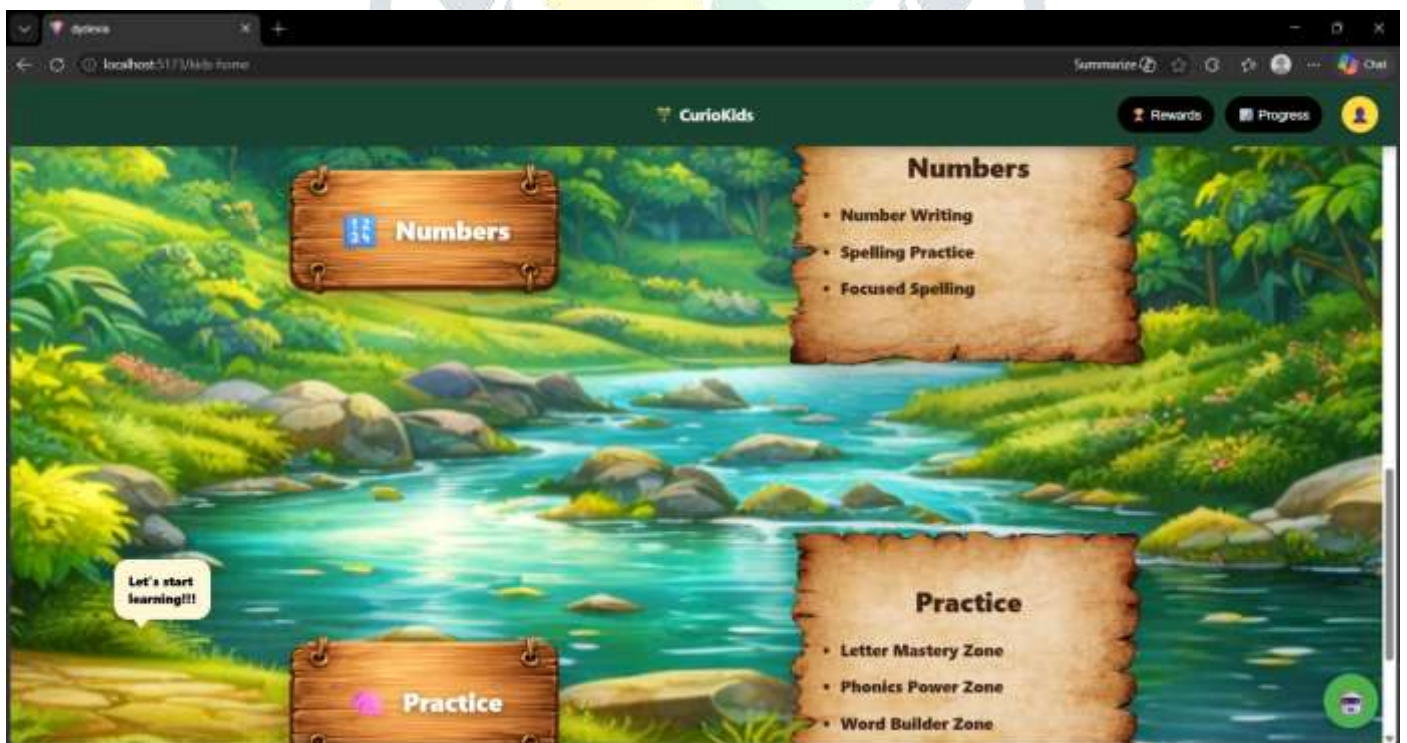
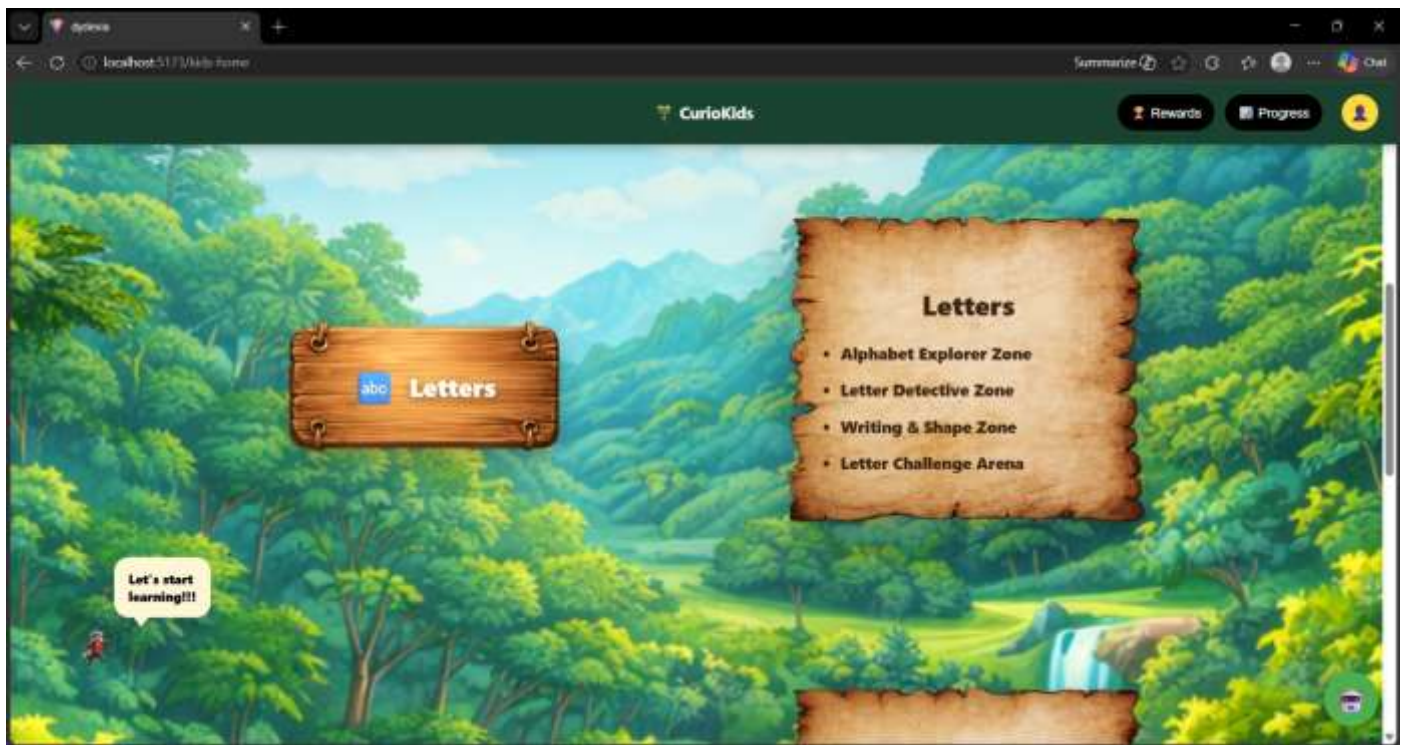


Figure 5: Kids-Home page



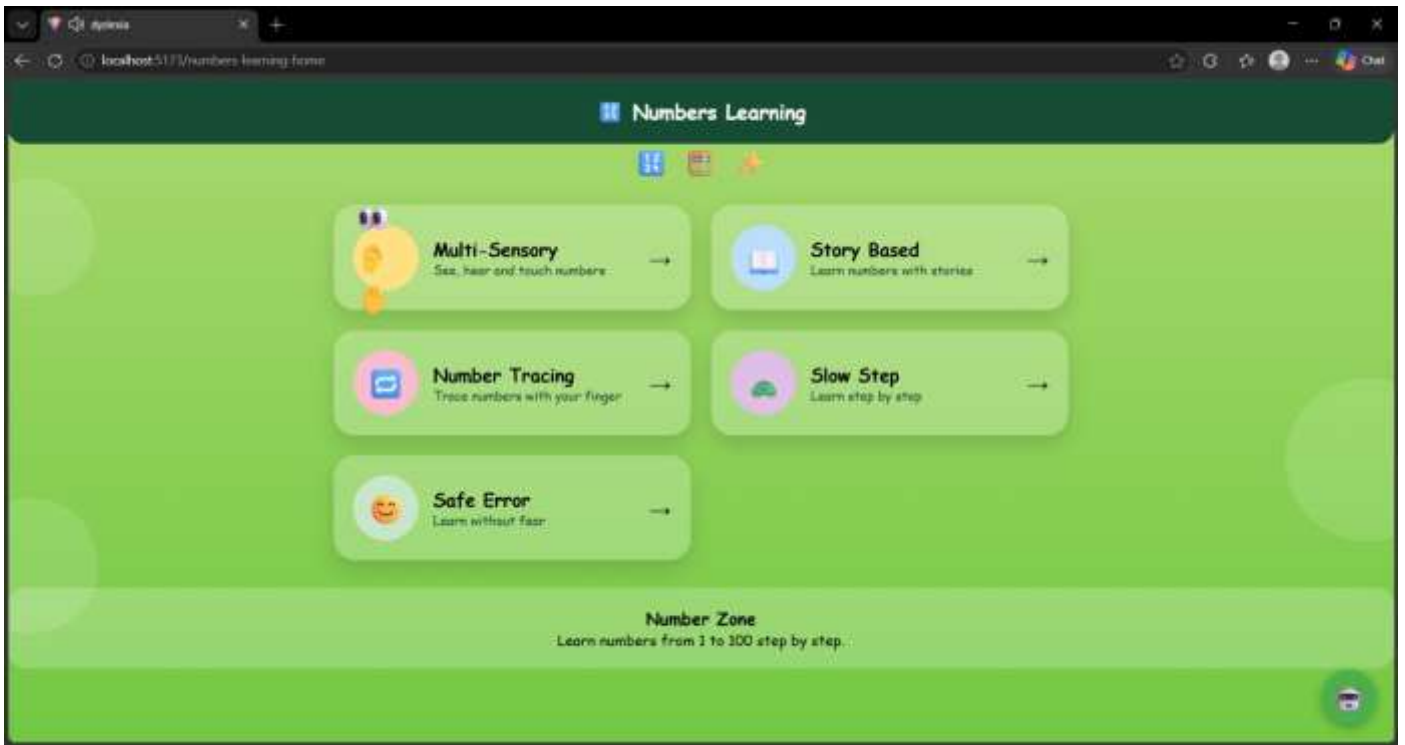


Figure 6: Number module

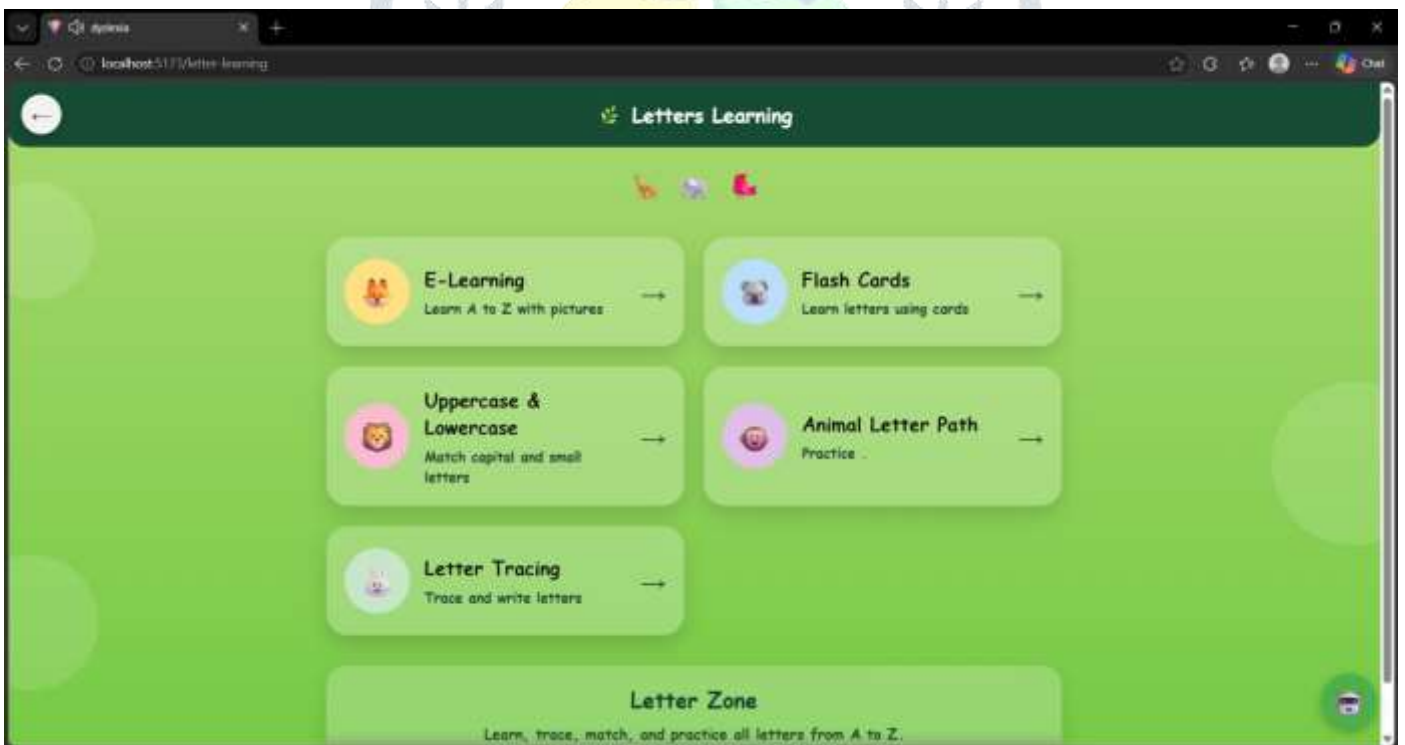


Figure 7: Letters-module

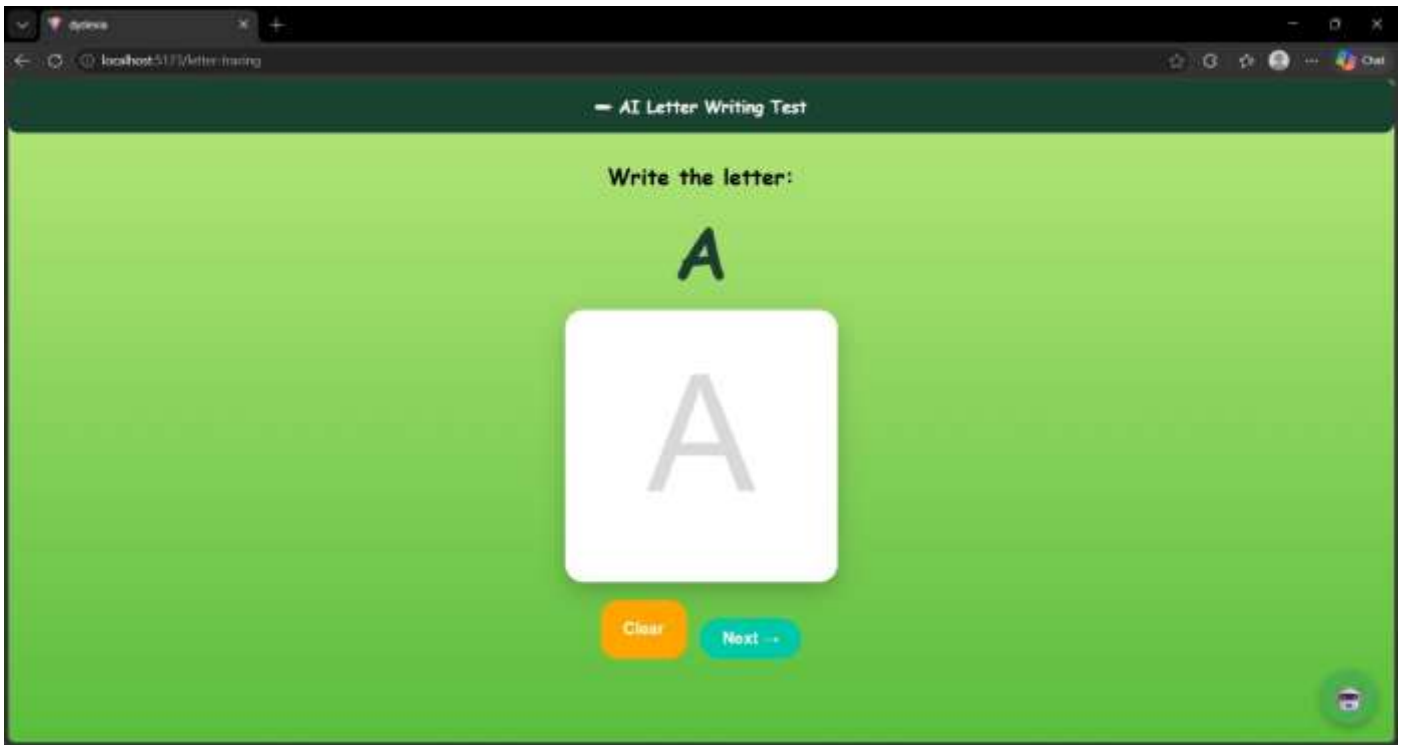


Figure 8: Learning-module

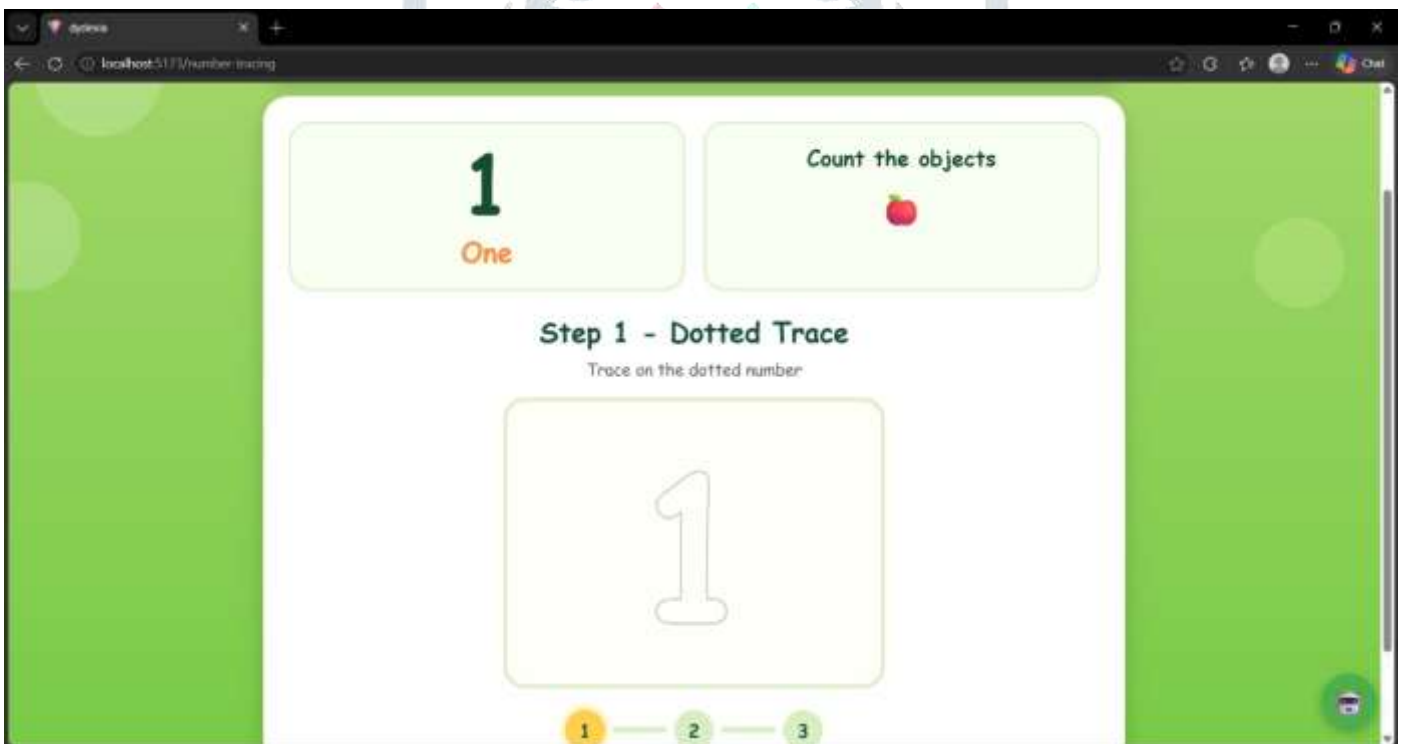


Figure 9: Numbers-learning module

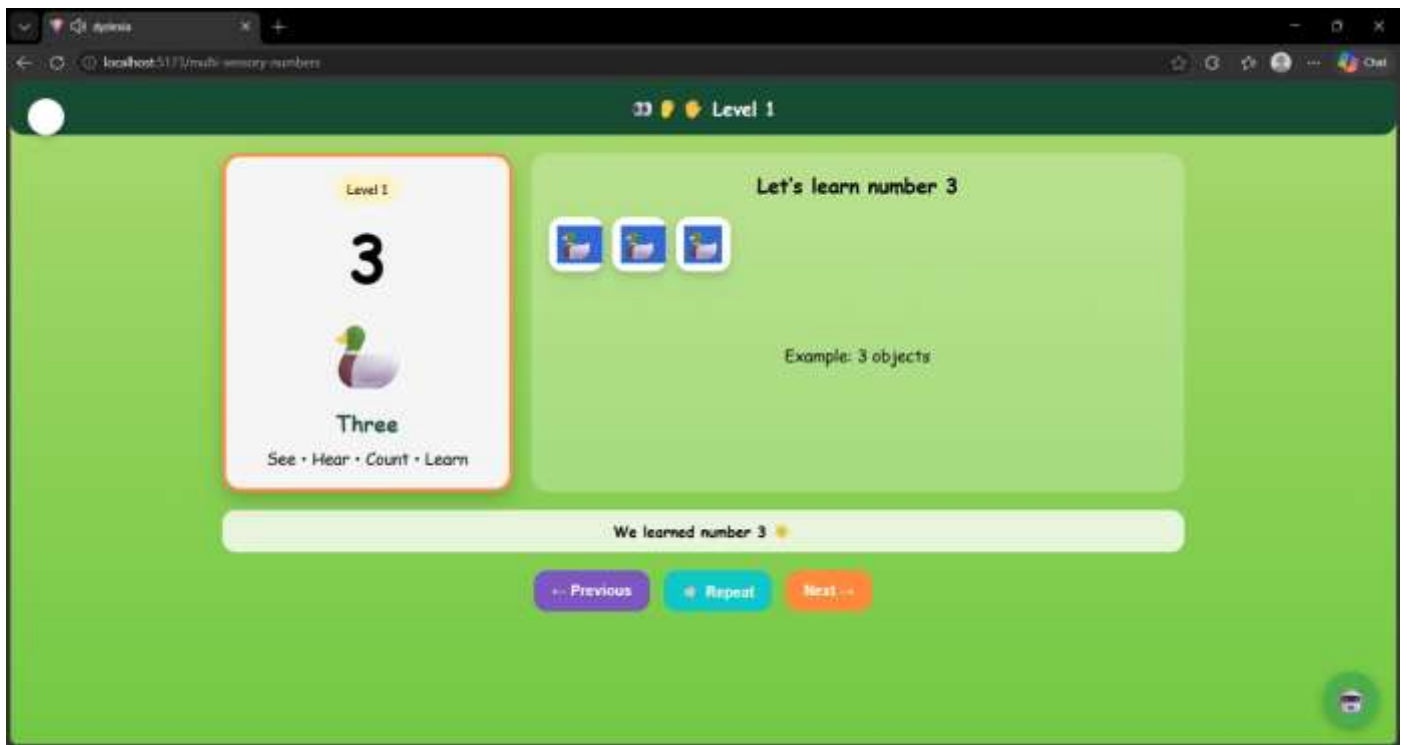


Figure 9: Letters-learning module



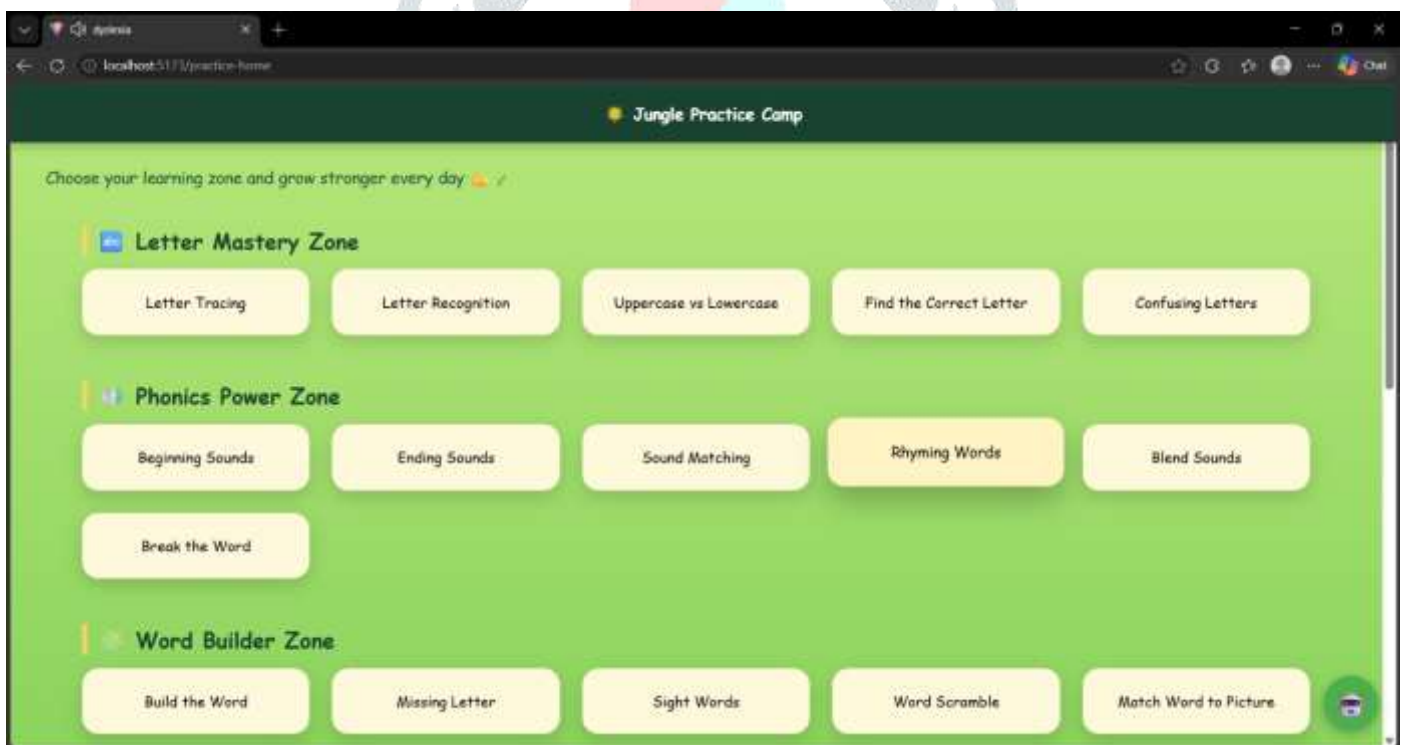


Figure 10: Practice-module

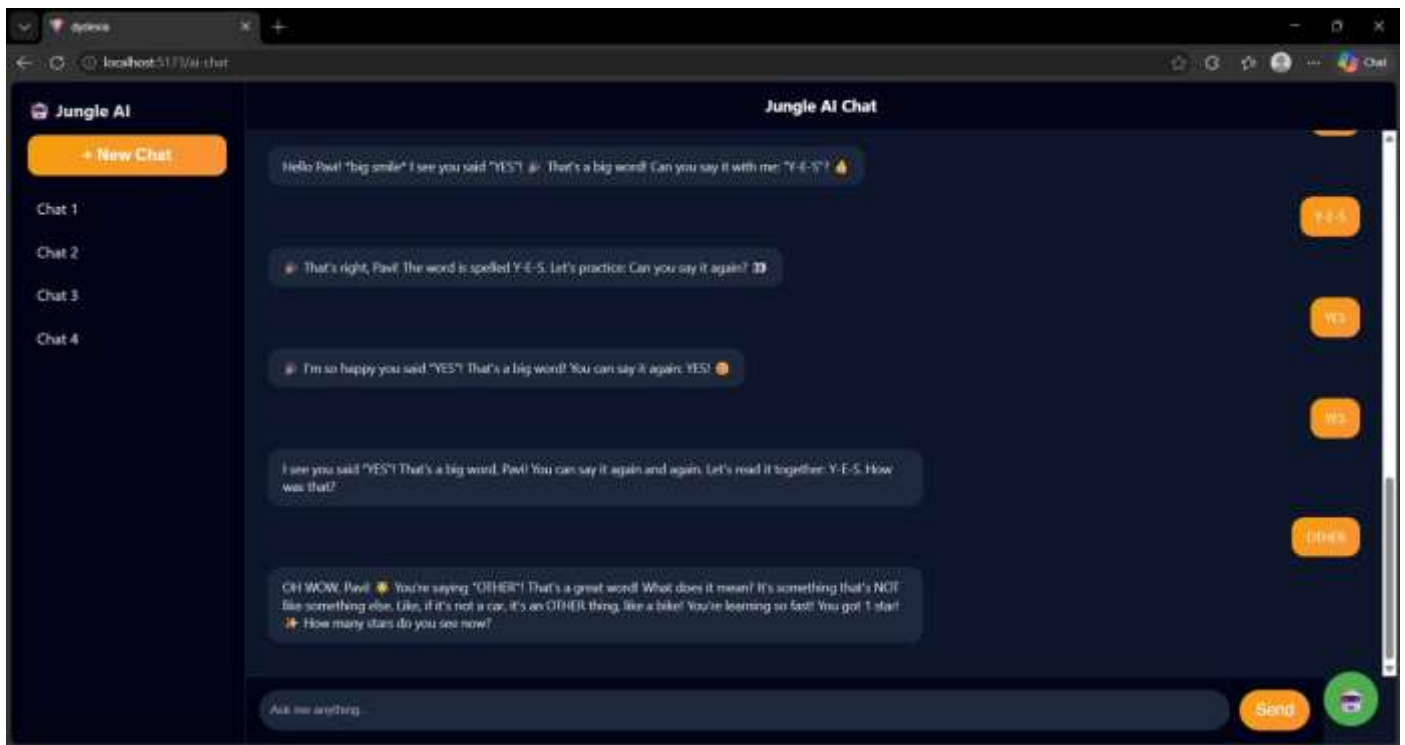


Figure 11: AI-Chat bot

As illustrated in the above figures, the Curiokids application provides a user-friendly and interactive platform for children with dyslexia. The home interface is designed with simplicity and accessibility in mind. The chatbot module effectively delivers real-time assistance, helping users understand concepts and resolve doubts instantly.

Conclusion:

In conclusion, the proposed system, Curiokids, presents an innovative and effective solution for supporting children with dyslexia through the integration of artificial intelligence and web technologies. The system successfully combines interactive learning modules, real-time chatbot assistance, and progress tracking features to create a personalized and engaging learning environment.

The implementation of dyslexia-friendly design principles, along with features such as text-to-speech and adaptive learning, enhances reading and pronunciation skills while ensuring accessibility and ease of use. The results obtained from the system demonstrate its ability to improve user engagement and provide meaningful learning support.

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