VR Polyglot Garden: Multilingual Kids Learning App with VR-Inspired Interface

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Abstract- This project presents the design and development of a multilingual learning application specifically created for children between the ages of three and four years. The application focuses on teaching the basic alphabet in English, Hindi, and Marathi through an interface. Although the original idea was to build a complete virtual reality (VR) environment, technical constraints and the need for advanced AI integration led to the development of a VR- inspired interface instead. The system uses animations, colorful backgrounds, and interactive cards to simulate an immersive experience. Each letter of the alphabet is supported by images, speech synthesis for pronunciation, and meaningful examples to enhance understanding.
Additionally, a quiz module is included to test the child's learning using both text-based and question-based content. A dedicated Marathi Mulakshare module is also implemented for regional language learning. Overall, the application aims to provide a simple, engaging, and effective learning platform for early childhood education.

I.INTRODUCTION

Early childhood is a crucial stage for cognitive and language development, where children begin to recognize sounds, letters, and words. Traditional learning methods, such as textbooks and rote memorization, often fail to hold young learners' attention. With the growing use of digital devices, interactive applications have become an effective alternative for teaching basic concepts more engagingly.

This project was initially conceptualized as a VR-based learning system to provide an immersive educational experience. However, due to limitations such as the need for specialized hardware and advanced programming, the project was adapted into a VR-based web application using HTML, CSS, and JavaScript. The developed system creates a playful and interactive environment where children can learn the alphabet through visuals, sounds, and simple interactions. It also supports multiple languages, including Marathi, making it more inclusive and regionally relevant. [2][5]

II.LITERATURE REVIEW

Existing platforms such as Duolingo and YouTube provide extensive resources for language learning. These platforms offer structured lessons, videos, and exercises that cater to a wide range of users. However, there generally designed for older learners and may not be suitable for children in the early learning stage. They often lack localized content, such as Marathi Mulakshare, and may include distractions due to advertisements or unrelated content. Moreover, their interfaces can be complex for very young users. The present project addresses limitations by focusing on simplicity, direct activity, and age-appropriate design. Audio support and regional language inclusion are essential for effective childhood education. [3]

III.PROBLEM STATEMENT

Young children often face difficulty in maintaining attention when exposed to traditional or text-heavy learning methods. Many existing digital learning platforms are either not tailored to the needs of early learners or not designed to advance them. Additionally, there is a lack of applications that support regional languages such as Marathi in a structured, interactive manner. There is a need for a simple, engaging, and multilingual learning application that provides a distraction-free environment, incorporates corporate visual and audio elements, and includes both learning and evolution features suitable for young children. [2][8]

IV.OBJECTIVES

The primary objective of this project is to develop an interactive and user-friendly learner application for young children. The system AIIMS to teach the alphabet in multiple languages, including English, Hindi, and Marathi, while providing audio pronunciation and usual support for better understanding. Another important objective is to create a gamified and engaging interface inspired by VR concepts to enhance the user experience. The project also includes a quiz module to evaluate learning outcomes and reinforce knowledge through practice. Furthermore, it seeks to promote regional language learning by incorporating Marathi Mulakshare with meaningful examples. [1][7]

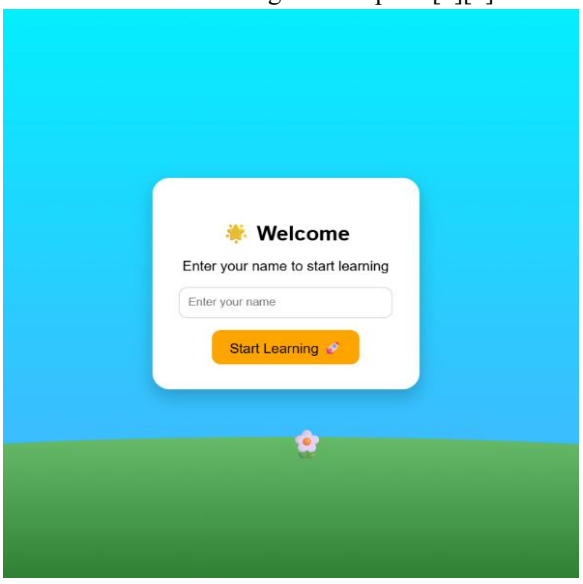

Fig. Login page

V.SYSTEM DESCRIPTION

The system is the best application developed using HTML, CSS, and JavaScript, and it consists of multiple interconnected modules. The login module allows the user to enter their name, which is stored locally to provide a personalized experience. The language selection module enables the user to choose between English, Hindi, and Marathi, followed by an option to select either learning mode or quiz mode in the learning module. The learning module alphabet is displayed along with the images, meaning, and audio pronunciation, making the learning process interactive and engaging. The Marathi modules specifically present marks in a structured flex format with corresponding examples that the quiz module includes both text-based and image-based questions, providing instant feedback and displaying the final score at the end. The overall interface is designed with animated backgrounds and interactive elements to stimulator we are like experience without requiring specialized hardware.[4][7]

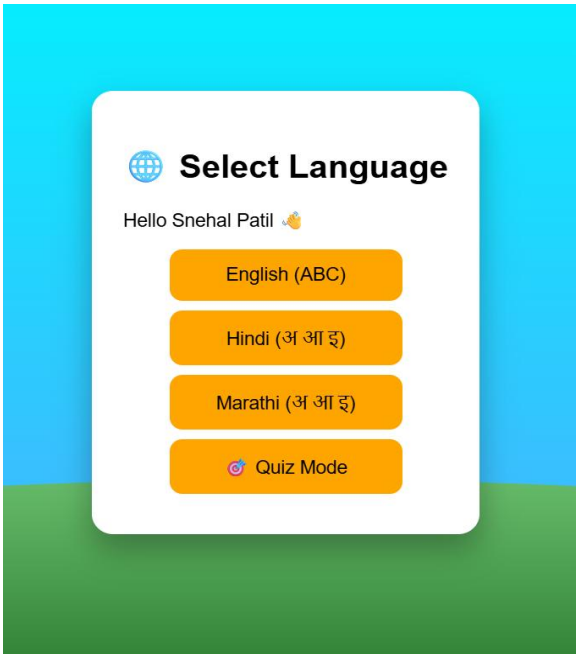

Fig. Index page or language selection

VI.METHODOLOGY

The development of this project followed a systematic approach, starting with requirement analysis to understand the needs of young learners. The user interface was then designed to be simple, colorful, and engaging insuring is of use for children. The core functionalities were implemented using HTML for structure, CSS for styling, and JavaScript for interactivity. Multilingual support was added by dynamically mapping content based on the selected language. Speech synthesis was integrated to provide audio pronunciation of the alphabet and words. The quiz module was developed to include both text and image best questions, along with score calculation and a feedback mechanism. Finally, the application was tested to ensure smooth functionality, usability, and responsiveness.

Fig. English language interface

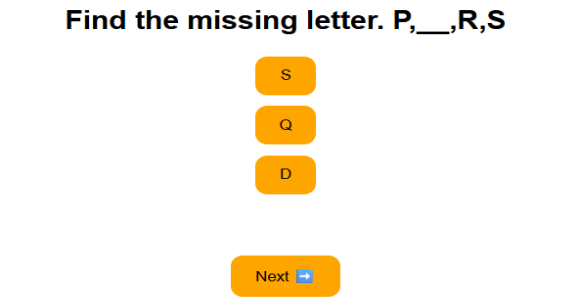

Fig. Text-based Quiz

VII.EXPERIMENTAL RESULTS

The developed application was tested for usability and effectiveness in a learning environment. It was observed that the use of images and audio significantly improved user engagement and helped children understand concepts more easily. The interactive interface encouraged more participation, while the quiz model of reinforced learning through practice and evolution, the Marathi module proved to be particularly useful in promoting regional language learning. Overall, the application demonstrated good performance in terms of functionality, user experience, and learning outcomes.

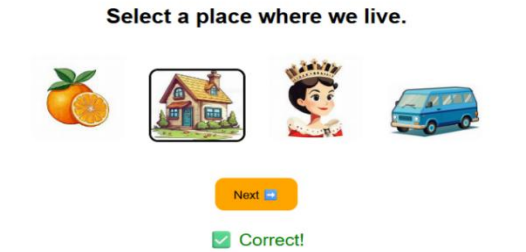

Fig. Image-based Quiz

Fig. Marathi language interface

VIII.LIMITATIONS

Despite its advantages, the system has certain limitations. The application does not implement full virtual reality; instead, it relies on a simulated VR-like interface. It requires manual addition of images and content, which can be time-consuming. The speech synthesis feature may vary depending on the device and browser compatibility. The quiz model currently has a limited number of questions and lacks adaptive difficulty levels. Additionally, the system does not include advanced features such as user progress tracking or cloud-based storage.[1][3]

IX.FUTURE SCOPE

The project can be further enhanced by integrating full-VR capabilities using dedicated hardware to create a more immersive learning experience. Artificial intelligence can be incorporated to provide personalized learning paths based on user performance. The quiz module can be expanded with multiple levels, timers, and rewards to increase engagement. Additional languages can be included to make the application more versatile. Features such as progress tracking, cloud storage, and user profiles can also be implemented to improve functionality. Furthermore, animations and sound effects can be added to make the application more interactive and game-like.[1]

X.CONCLUSION

In conclusion, the project successfully demonstrates the development of a multilingual learning application tailored for young children. By combining usual elements, audio feedback, and interactive design, the system creates an engaging and effective learning environment. Although full VR was not implemented,

the VR-inspired interface provides a similar immersive experience. The inclusion of Marathi Mulakshare and significant value by supporting regional language education, the application achieves its objective of making early learning simple enjoy able and accessible while also providing us a strong foundation for future enhancement.

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