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Intelligent AI Language Learning Companion: An Interactive Platform for Personalized Language Learning and Grammar Improvement

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Abstract - Developing language proficiency requires continuous practice, appropriate guidance, and timely feedback. However, conventional learning approaches may not always offer learners sufficient opportunities for immediate support and interactive activities. This paper describes the development of an AI-based Language Learning Companion designed to make language practice more accessible and engaging. The system integrates several learning features, including an AI conversational assistant, automated grammar correction, explanatory feedback, vocabulary exercises, interactive quizzes, daily challenges, and learning progress monitoring. Llama 3.2, accessed through Ollama, is employed to generate responses and provide grammar-related assistance. The web application is implemented using Next.js and TypeScript, with Supabase supporting user authentication and the storage of learning data. By bringing these technologies together, the proposed platform provides a unified environment for learners to practise language skills, identify grammatical errors, strengthen vocabulary, and review their learning progress. The developed application illustrates the potential of AI-driven web technologies in supporting self-directed and interactive language education.

Key Words: AI-Assisted Education, Intelligent Language Tutoring, Language Skill Development, Automated Grammar Feedback, AI-Based Conversation Practice, Adaptive Learning.

1. INTRODUCTION

Language plays an important role in sharing information, expressing ideas, and building communication between individuals. Good language skills are useful in academic activities, professional environments, and everyday situations. Learning a language involves more than understanding words; it also requires knowledge of grammar, vocabulary, sentence formation, reading, writing, listening, and speaking. Developing these abilities requires regular practice and proper feedback. However, learners may face difficulties when they do not have access to continuous guidance or opportunities to practise according to their individual learning needs.

Conventional language-learning methods generally depend on classroom instruction, textbooks, and practice exercises. Although these methods provide a foundation for learning, they may not always offer immediate responses to learners' questions or detailed explanations of their mistakes. Some learners also hesitate to practise because they are unsure about the correctness of their sentences. Therefore, digital learning solutions that provide interactive practice and timely assistance can be useful in supporting language development.

Artificial Intelligence (AI) has introduced new possibilities in the field of education by enabling computer systems to perform tasks that involve understanding information and generating suitable responses. One of its important areas, Natural Language Processing (NLP), focuses on enabling computers to process, analyse, and generate human language. These capabilities can be applied in educational applications to support text-based communication, grammar assistance, and interactive learning activities. AI-powered conversational systems can also provide learners with an environment where they can practise language through questions and responses.

The proposed AI Intelligent Language Learning Companion is a web-based application developed to make language practice more interactive and accessible. It brings different learning activities together within a single platform. The application includes an AI conversational assistant that allows users to communicate through text. It also provides grammar correction with explanations to help learners identify errors and understand how sentences can be improved. In addition, vocabulary exercises, interactive quizzes, daily learning challenges, and progress-monitoring facilities are included to encourage regular participation in learning activities.

For the conversational and grammar-assistance features, the application uses the Llama 3.2 language model through the Ollama framework. This integration enables the system to generate responses and provide language-related assistance. The frontend of the application is developed using Next.js and TypeScript, which support the development of an interactive web interface. Supabase is used to manage user authentication and store relevant learning information. These technologies work together to provide a common environment for accessing the application's learning features.

The main purpose of this project is to support learners in practising language skills independently and understanding common grammatical mistakes through AI-generated assistance. By combining conversational practice with vocabulary activities, quizzes, daily challenges, and progress tracking, the application aims to make the learning process more organised and engaging. It provides an additional digital learning resource that can be used alongside conventional language-learning methods.

1.1 OBJECTIVES

The primary objective of the AI Intelligent Language Learning Companion is to develop an interactive web-based platform that supports users in improving their language skills through regular practice and AI-based assistance. The system aims to provide a conversational environment where learners can communicate with an AI assistant and receive responses to their queries. It is designed to identify grammatical errors in user-entered sentences and present corrected versions along with simple explanations, helping learners understand and avoid similar mistakes. The application also focuses on vocabulary development by providing learning exercises that encourage users to become familiar with new words and their usage. Interactive quizzes and daily challenges are included to make language practice more engaging and motivate learners to participate regularly. Another objective is to maintain relevant learning information so that users can view and review their progress over time. By combining these features in a single application, the project aims to provide a convenient learning environment that encourages independent practice, improves grammatical awareness, and supports continuous language development.

II. LITERATURE SURVEY

The use of Artificial Intelligence (AI) in language education has created new opportunities for learners to improve their communication and language skills. AI-based educational applications can support language practice through text-based interaction, automatic error identification, feedback, and digital learning activities. Previous studies have examined how these technologies can assist learners and improve access to language-learning resources. Based on these developments, the AI Intelligent Language Learning Companion is designed as a unified platform that combines AI conversation, grammar assistance, vocabulary exercises, quizzes, daily challenges, and progress-related features.

A. AI-Based Conversational Learning

AI-powered conversational tools provide learners with an opportunity to practise language through text-based communication. Instead of depending entirely on classroom interaction, users can enter questions or messages and receive computer-generated responses. Liu [1] discusses the growing role of AI applications in foreign-language education and their potential to support interactive learning. Following this approach, the proposed application incorporates an AI conversational assistant using the Llama 3.2 model with Ollama. It enables users to communicate with the system and obtain responses to their messages.

B. Grammar Correction and Feedback

Developing grammatical accuracy requires learners to recognize sentence errors and understand how to correct them. AI-based language tools can assist this process by examining written input and providing feedback that helps users improve their language usage. Yang and Kyun [2] reviewed research on AI-supported language learning and highlighted the importance of effective interaction

between learners, teachers, and technology. In the proposed application, the AI assistant examines sentences entered by users and provides corrections with brief explanations when grammatical issues are identified.

C. Vocabulary Development

A good vocabulary is essential for understanding information and expressing thoughts clearly. Digital learning applications can support vocabulary improvement by offering structured word-learning activities and opportunities for repeated practice. Rebolledo Font de la Vall and González Araya [3] examined the benefits and challenges associated with AI-based language-learning tools. Their discussion provides a basis for considering how technology can support different aspects of language development. The proposed application includes vocabulary-related exercises to help learners become familiar with words and practise their usage.

D. Interactive Quizzes and Daily Challenges

Assessment activities are useful in language education because they give learners opportunities to revise concepts and check their understanding. Online quizzes and short practice tasks can make learning more active by allowing users to participate regularly. Research on AI-supported language education discusses the value of interactive learning activities and feedback in the learning process [2], [4]. In accordance with this approach, the proposed system provides quizzes and daily challenges that encourage users to practise language concepts and maintain regular learning habits.

E. Learning Progress Monitoring

Reviewing learning activity over time can help learners understand their improvement and identify areas that may need further practice. AI-supported educational platforms can use learning-related information to examine progress and support the evaluation of learning activities. Dou et al. [4] discuss the development of AI in language learning, including its potential to support learner assessment and progress-related analysis. The proposed application provides progress-monitoring features through which users can review their learning activities and follow their development.

F. AI and Web-Based Learning Technologies

The development of web-based educational applications involves combining suitable software technologies to provide accessible and organized learning features. Natural Language Processing (NLP) enables computer systems to work with human language, while language models can generate responses to user input. The proposed application uses the Llama 3.2 model through Ollama to support conversational responses and grammar-related assistance. The frontend is developed using Next.js and TypeScript, while Supabase is used for user authentication and the storage of learning-related information.

G. Research Gap and Proposed Approach

The reviewed studies indicate that AI technologies can contribute to language education through conversational interaction, automated feedback, and digital learning activities. However, learners may need to use separate applications to access different language-practice functions. Yang and Kyun [2] also point out the need for further development of communication-focused activities and effective integration of AI-supported tools into learning environments. To address this need, the proposed AI Intelligent Language Learning Companion combines conversational assistance, grammar correction, vocabulary practice, quizzes, daily challenges, and progress monitoring within one web application. The system integrates Llama 3.2 with Ollama, Next.js, TypeScript, and Supabase to provide a centralized environment for language practice and independent learning.

III. METHODOLOGY

The AI Intelligent Language Learning Companion is developed using a structured approach that combines artificial intelligence and web development technologies to support language practice. The development process involves identifying user requirements, designing the application structure, developing the user interface, integrating the AI model, implementing learning activities, managing user information, and checking the functionality of the application. Each component is designed to contribute to a convenient and interactive language-learning environment.

A. Requirement Analysis

The first stage involves identifying the common difficulties faced by language learners, such as grammatical mistakes, limited vocabulary, and insufficient opportunities for regular practice. Based on these requirements, the application is designed to provide an AI chat assistant, grammar correction with explanations, vocabulary exercises, interactive quizzes, daily challenges, and learning progress monitoring. The selected technologies are Next.js, TypeScript, Ollama, the Llama 3.2 model, and Supabase.

B. System Architecture Design

The application follows a modular structure in which different features work together through a common user interface. Users interact with the application through the frontend, where they can access the available learning activities and enter messages. When a user submits a message to the AI assistant, the application sends the input to the AI service running through Ollama. The Llama 3.2 model processes the input and generates a response, which is displayed to the user. Supabase is used to support authentication and the storage of relevant learning information.

C. User Interface Development

The frontend of the application is developed using Next.js and TypeScript. The interface is organized to provide access to the main learning features, including AI chat, grammar assistance, vocabulary practice, quizzes, daily challenges, and progress-related sections. The design aims to make navigation simple so that users can access the required learning activities without difficulty. Input fields and response areas are provided to support interaction between the learner and the AI assistant.

D. AI Conversational Assistant

The conversational assistant is implemented using the Llama 3.2 language model through the Ollama framework. When users enter a message, the application forwards the input to the locally running AI model for processing. The model generates a text-based response according to the submitted message, and the application displays the result in the chat interface. This feature provides users with an opportunity to ask questions and practise language through regular interaction.

E. Grammar Correction Module

The grammar assistance feature is designed to help users identify and understand errors in their written sentences. The sentence entered by the user is processed by the AI model, which examines its grammatical structure. If an error is identified, the application presents a corrected sentence along with a simple explanation. If the sentence is grammatically acceptable, the system provides positive feedback. This approach helps learners understand corrections instead of simply receiving a replacement sentence.

F. Vocabulary and Practice Modules

The vocabulary section provides activities that support the learning and revision of words. Users can practise vocabulary through the available exercises and strengthen their understanding through repeated participation. The application also includes interactive quizzes that allow learners to check their knowledge of language concepts. Daily challenges are provided to encourage regular engagement and make the learning process more activity-oriented.

G. User Authentication and Data Management

Supabase is integrated into the application to manage user authentication and learning-related information. Authentication allows users to access the application through their accounts. Relevant learning data can be stored and retrieved through the database services, supporting features that depend on maintaining user information and learning history. This integration helps organize user-related information within the application.

H. Learning Progress Monitoring

The progress-related feature is intended to help users review their learning activities over time. Information associated with learning tasks and user activity can be used to present a view of their progress. This allows learners to revisit their activities and understand their participation in the different sections of the application. Progress monitoring also encourages users to continue practising regularly.

I. Testing and Evaluation

The application is checked to verify whether its main features operate as expected. Testing includes entering messages into the AI chat assistant, checking the generated responses, submitting sentences for grammar correction, and accessing the available vocabulary exercises and quizzes. User authentication and the handling of learning-related information are also checked. Identified issues are reviewed and corrected to improve the reliability and usability of the application.

J. Methodology Outcome

The methodology brings together AI-based language assistance and web application development in a single learning platform. The integration of Llama 3.2 through Ollama, Next.js, TypeScript, and Supabase supports the development of conversational interaction, grammar assistance, learning activities, and user-related data management. The resulting application is intended to provide learners with an accessible environment for practising language skills and supporting continuous learning.

IV. EXISTING SYSTEM

Traditional language-learning methods mainly depend on classroom instruction, textbooks, written exercises, and guidance from teachers. Online learning platforms have also made language-related materials available through

websites and mobile applications. These resources help learners study grammar, improve vocabulary, and practise different language skills. However, the available learning facilities may be distributed across separate platforms, making it difficult for users to manage all their learning activities in one place.

A. Traditional Language Learning Methods

Traditional methods generally involve learning through textbooks, classroom explanations, written assignments, and teacher guidance. These approaches provide structured instruction, but learners may have limited opportunities to practise independently and receive immediate feedback whenever they make mistakes.

B. Online Language Learning Platforms

Online platforms provide digital lessons, grammar exercises, vocabulary materials, and language-practice activities. They make educational resources easier to access, but the features and learning methods available can differ from one platform to another. Users may need to access multiple services to meet their different learning requirements.

C. Grammar Checking Tools

Grammar checking applications examine written sentences and identify possible spelling, punctuation, and grammatical errors. They can help users improve sentence accuracy. However, some tools mainly concentrate on displaying corrections and may not provide the conversational practice and learning activities required for continuous language development.

D. Vocabulary Learning Applications

Vocabulary applications provide word lists, meanings, examples, and revision activities to help learners expand their vocabulary. Although these tools support word learning, they may not include other features such as AI-based conversation, sentence correction, and integrated learning progress monitoring.

E. Online Quiz and Assessment Platforms

Digital quiz platforms allow learners to answer questions and evaluate their understanding of different subjects. They are useful for revision and self-assessment. However, quiz-based applications may focus mainly on testing knowledge rather than combining assessment with conversational practice and grammar assistance.

F. Limitations of the Existing System

The major limitations of the existing approach include:

- Language-learning activities may be distributed across different applications.
- Immediate explanations for grammatical mistakes may not always be available.
- Conversational practice and vocabulary exercises may be offered separately.
- Learners may need to switch between multiple platforms to practise different skills.
- Reviewing learning activities and monitoring progress may require separate tools.

G. Summary

Existing language-learning methods provide useful resources for improving grammar, vocabulary, and general language knowledge. However, depending on separate tools for different activities can make the learning process less convenient. The proposed AI Intelligent Language Learning Companion aims to reduce this fragmentation by providing conversational assistance, grammar correction, vocabulary practice, quizzes, daily challenges, and progress-related features through a single web-based application.

V. PROPOSED SYSTEM

The proposed AI Intelligent Language Learning Companion is an online learning application developed to help users strengthen their language abilities through continuous practice. It brings several learning activities together in one place, allowing learners to improve their communication, understand grammatical rules, expand their vocabulary, and evaluate their knowledge. The platform integrates artificial intelligence with interactive learning tools to create a convenient environment for self-paced language development.

A. Key Components

1. **Conversational Assistant:** Provides an interactive space where users can communicate with an AI assistant and practise forming sentences.
2. **Grammar Improvement:** Analyses sentences entered by learners and displays suitable corrections when grammatical mistakes are found.
3. **Vocabulary Building:** Supports the acquisition and revision of new words to improve users' word knowledge.
4. **Knowledge Assessment:** Offers interactive quizzes that allow learners to test their understanding of language topics.

5. **Daily Practice Activities:** Includes regular learning tasks that motivate users to continue practising.
6. **Account Management:** Handles user login and maintains information associated with learning activities.
7. **Learning History:** Enables users to revisit their previous activities and observe their learning progress.

B. AI-Driven Features

- **AI Conversation:** Integrates the Llama 3.2 model using Ollama to produce responses during user interactions.
- **Sentence Evaluation:** Processes submitted sentences to recognize possible grammatical issues and generate corrections.
- **Explanatory Feedback:** Presents easy-to-understand descriptions of grammar errors to support better learning.
- **AI-Assisted Practice:** Supports the learning process by combining conversational interaction and grammar assistance with other practice modules.

C. System Benefits

- **Unified Learning Environment:** Makes different language-practice facilities available through one application.
- **Grammar Improvement:** Helps users recognize sentence errors and learn from the suggested corrections.
- **Better Word Knowledge:** Encourages learners to acquire and revise vocabulary through practice.
- **Self-Paced Learning:** Gives users the flexibility to practise according to their available time.
- **Engaging Activities:** Uses quizzes and daily tasks to encourage learner involvement.
- **Activity Review:** Provides access to learning history so users can revisit their previous practice.
- **Convenient Access:** Organizes the learning facilities within a web-based application.

D. Summary

The proposed application brings AI-based language assistance and interactive practice activities into a common learning environment. It includes facilities for conversational practice, sentence correction, vocabulary development, knowledge assessment, and learning-history review. The integration of these modules is intended to simplify language practice, promote regular participation, and help users take greater responsibility for their learning.

VI. ADVANTAGES

The proposed AI Intelligent Language Learning Companion offers learners a unified platform that supports language development through AI-powered assistance and various practice activities. The major advantages of the application are outlined below:

1. **Combined Learning Facilities:** Provides access to conversation practice, sentence correction, vocabulary exercises, and quizzes through a single platform.
2. **Better Grammar Understanding:** Assists learners in recognizing sentence errors and understanding the suggested improvements.
3. **AI-Powered Communication:** Creates an opportunity for users to practise language through interactions with an AI-based assistant.
4. **Vocabulary Growth:** Helps learners expand their word knowledge through repeated learning and revision.
5. **Engaging Learning Activities:** Encourages active participation with the help of quizzes and regular practice challenges.
6. **Independent Practice:** Enables users to improve their language skills at their own pace and convenience.
7. **Learning Activity History:** Allows learners to access earlier practice activities and observe their learning progress.
8. **Simplified Platform Access:** Makes different language-learning resources available through an organized web interface.
9. **Reduced Application Switching:** Minimizes the effort of moving between multiple tools by providing several learning facilities in one place.
10. **Expandable Design:** Allows additional language-learning functions to be incorporated as future requirements arise.

3.CONCLUSION

The AI Intelligent Language Learning Companion introduces a web-based solution that brings artificial intelligence and interactive activities together to support language development. The application provides a common platform for conversational practice, grammar correction, vocabulary improvement, quizzes, and daily learning activities. These features are intended to help learners practise different language skills without depending entirely on separate learning tools.

The system uses the Llama 3.2 model through Ollama to support AI-generated conversations and grammar-related

feedback. Its development using Next.js and TypeScript, along with Supabase for user authentication and learning-data management, provides a foundation for organizing the different application modules.

The platform is designed to encourage regular practice and help users understand areas where their language skills can be improved. Further development may include additional vocabulary activities, more language options, pronunciation support, and detailed learning analytics. Future evaluation through functional testing and learner feedback can help assess its usability and effectiveness.

Overall, the AI Intelligent Language Learning Companion demonstrates an approach to making language practice more accessible through the integration of AI assistance and interactive learning facilities. It provides a foundation for supporting independent learning and continuous language development.

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