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SPOKINA – An AI-Powered Multilingual Learning Platform With Voice-Based Conversational Fluency Enhancement

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Abstract - The integration of artificial intelligence (AI) into language education has introduced new possibilities for improving learner engagement, personalization, and communication skills. Recent studies highlight the growing role of AI technologies such as natural language processing, intelligent tutoring systems, conversational agents, and speech-based feedback in enhancing second and foreign language learning. In parallel, mobile-assisted language learning has emerged as an effective approach for providing flexible, accessible, and self-directed learning environments. However, existing systems often face challenges related to limited interaction, insufficient personalization, and inadequate support for real-time language practice.

This paper presents **Spokina**, an AI-powered mobile language learning application designed to address these challenges through intelligent interaction and adaptive learning support. The proposed system integrates NLP-driven text analysis with a mobile-first architecture developed using Flutter, a backend framework based on CodeIgniter, and a MySQL database for learner data management. Spokina aims to support language acquisition by enabling interactive practice, contextual feedback, and continuous learner engagement within a scalable and user-friendly platform. By combining AI-driven language processing with principles of mobile and digital learning, the system seeks to enhance speaking confidence, learning autonomy, and accessibility. The study demonstrates the potential of AI-enabled mobile applications to complement traditional language learning methods and contribute to more inclusive and effective language education.

Keywords— Artificial Intelligence, Language Learning, Natural Language Processing, Mobile-Assisted Language Learning, Educational Technology, Adaptive Learning Systems, Digital Learning, Speech-Based Interaction

INTRODUCTION:

Language learning is a fundamental component of education in an increasingly globalized and digitally connected world. Proficiency in additional languages enhances communication skills, cultural understanding, academic performance, and professional opportunities. However, traditional language learning environments often face limitations such as restricted classroom interaction, limited personalized feedback, time constraints, and inadequate opportunities for real-life language practice. These challenges have motivated educators and researchers to explore technology-enhanced approaches for more effective language learning.

Artificial Intelligence (AI) has emerged as a transformative technology capable of simulating aspects of human intelligence to support learning and decision-making processes. In the educational domain, AI is increasingly being integrated to enhance teaching and learning experiences. AI-driven systems enable personalized instruction, adaptive feedback, and continuous assessment, making them particularly suitable for language education. Technologies such as natural language processing, intelligent tutoring systems, conversational agents, and automatic speech recognition have shown strong potential in supporting second and foreign language learning by enabling interaction, practice, and learner-centered engagement.

Alongside AI advancements, the rapid growth of mobile and digital technologies has significantly influenced educational practices. Mobile-Assisted Language Learning (MALL) leverages smartphones, tablets, and mobile applications to provide flexible, accessible, and self-directed learning environments. Unlike traditional classroom-based instruction, mobile learning enables learners to access language resources anytime and anywhere, supporting continuous practice and engagement. The widespread adoption of mobile devices has made MALL an important component of modern language education, offering interactive exercises, multimedia content, and AI-driven tutoring support.

Despite these technological advancements, several challenges remain in achieving effective language acquisition. Many learners, particularly in English as a Foreign Language (EFL) contexts, struggle with speaking and pronunciation due to insufficient practice opportunities and lack of timely, personalized feedback. In conventional classrooms, providing individualized pronunciation guidance and corrective feedback to every learner is often impractical due to large class sizes and limited instructional time. While emerging technologies such as automatic speech recognition offer opportunities for unlimited practice and immediate feedback, their integration into pedagogically meaningful learning systems remains an ongoing challenge.

Furthermore, existing AI-based language learning tools often fail to fully align with educational objectives and learner needs. Generic AI platforms may oversimplify responses, lack contextual understanding, or fail to balance linguistic accuracy with learner proficiency levels. These limitations highlight the need for customized AI-driven language learning systems that combine technological capabilities with sound pedagogical design. Effective language learning systems must support interaction, personalization, and meaningful feedback while remaining accessible and user-friendly.

Motivated by these challenges, this paper proposes **Spokina**, an AI-powered mobile language learning application designed to support interactive, personalized, and adaptive language learning. The system integrates natural language processing techniques within a mobile-first architecture developed using Flutter, supported by a CodeIgniter-based backend and a MySQL database for learner data management. By combining AI-driven language processing with principles of mobile and digital learning, Spokina aims to enhance learner engagement, speaking confidence, and learning autonomy. The proposed approach seeks to complement traditional language learning methods and contribute to the advancement of inclusive and effective AI-supported language education.

NATURAL LANGUAGE PROCESSING AND AI TOOLS IN LANGUAGE LEARNING:

Natural Language Processing (NLP) enables computer systems to analyze, interpret, and generate human language, making it a core component of AI-driven language learning applications. In educational contexts, NLP supports tasks such as text analysis, grammar correction, vocabulary enhancement, and contextual feedback, thereby facilitating more interactive and personalized learning experiences. NLP-based techniques also contribute to machine translation systems, automated activity generation, and intelligent feedback mechanisms that assist learners during different stages of language acquisition.

Previous studies indicate that NLP technologies have been applied to improve learner support by analyzing linguistic input and generating instructional content similar to teacher-designed activities. These systems help educators understand how textual complexity, structure, and vocabulary influence learning outcomes, allowing for more effective content selection and task design. Additionally, NLP tools have been explored as open educational resources, demonstrating their potential to support language teaching when integrated

appropriately. However, research also highlights that limited teacher awareness and insufficient training often result in underutilization of NLP technologies, despite generally positive attitudes toward their adoption.

Beyond NLP, a wide range of AI-powered tools have been developed to address different aspects of language learning. Speech recognition systems support pronunciation practice by providing immediate feedback on fluency and accuracy, while grammar and writing assistants analyze written input and offer context-sensitive suggestions. Adaptive learning platforms dynamically adjust lesson content based on learner progress, ensuring an appropriate level of challenge. Conversational agents and chatbots simulate real-world communication scenarios, helping learners practice speaking in low-anxiety environments. Immersive tools, including multimedia-based platforms and virtual reality environments, further enhance contextual understanding and communication skills by exposing learners to authentic language use.

Despite the advantages of these AI-driven tools, several limitations persist. Many systems focus heavily on content delivery while offering highly individualized methodologies that may not align with standardized pedagogical practices. Financial constraints, accessibility issues, and limited alignment with established language teaching frameworks can restrict their effectiveness, particularly in resource-constrained settings. Furthermore, some AI platforms fail to adequately support progressive skill development stages, such as guided interaction and independent speaking.

Effective AI-enhanced language learning systems should therefore align with well-established pedagogical principles, including active language practice, learner-centered instruction, realistic communication tasks, continuous monitoring, and structured progression from comprehension to independent language use. These considerations highlight the need for integrated, accessible, and pedagogically grounded AI-based language learning applications. The proposed system, **Spokina**, seeks to address these challenges by incorporating NLP-driven interaction within a mobile learning framework that emphasizes accessibility, adaptability, and practical language use.

SPEECH BASED INTERACTION AND PRONUNCIATION APPROACH:

Automatic Speech Recognition (ASR) is a key AI technology that enables systems to process spoken language and convert it into machine-readable text. It is widely used in applications such as voice assistants, transcription tools, and speech-to-text systems, and has become increasingly accurate and accessible with advances in machine learning. Due to these developments, ASR has gained significant attention in computer-assisted language learning, particularly for supporting speaking and pronunciation skills in second and foreign language education.

Research indicates that ASR-based applications provide learners with opportunities to practice speaking in low-anxiety environments, allowing repeated attempts without fear of judgment. Voice-enabled intelligent personal assistants and speech-based interfaces facilitate natural language interaction and provide immediate feedback, which is critical for improving pronunciation, fluency, and listening comprehension. The availability of instant and autonomous feedback allows learners to identify pronunciation errors and self-correct, thereby promoting independent learning.

Studies have also shown that ASR can contribute to improvements beyond pronunciation, including receptive vocabulary and overall speaking proficiency. When learners engage in speech-based tasks such as reading aloud or conversational practice, ASR systems transcribe their speech, enabling learners to review inaccuracies and refine their output. The combination of automated feedback and peer or instructor-supported reflection has been found to further enhance pronunciation development. Additionally, ASR-supported activities increase learner engagement and motivation by making language practice interactive and enjoyable.

Another advantage of ASR technology is its ability to support personalized learning. Learners can control the pace, content, and difficulty of speech-based activities according to their individual needs and proficiency levels. ASR systems have also been applied in specialized contexts such as professional communication training and oral assessment, where they provide a risk-free environment for practice and enable scalable evaluation of speaking skills.

Despite these benefits, several challenges remain. ASR systems may struggle to accurately recognize speech from low-proficiency learners or those with strong regional accents, leading to learner frustration and reduced motivation. Privacy and data security concerns related to voice data storage and usage have also been highlighted in existing literature. These limitations indicate the need for more inclusive, transparent, and adaptable ASR-based language learning solutions.

Considering both the advantages and challenges, integrating ASR into mobile language learning applications offers strong potential for enhancing pronunciation and speaking skills. The proposed system, **Spokina**, leverages speech-based interaction to provide accessible, adaptive, and learner-centered pronunciation support within a mobile-assisted learning environment.

CHATBOTS IN LANGUAGE LEARNING:

Chatbots, also referred to as conversational agents or virtual assistants, are AI-driven software systems designed to simulate human-like interaction through text or speech. These systems interpret user input, identify intent, and generate appropriate responses using technologies such as natural language processing, pattern recognition, and neural machine translation. Initially developed for customer service and information retrieval across various industries, chatbots have increasingly been adopted in educational contexts, including language learning.

In second and foreign language education, chatbots offer learners opportunities for continuous and self-directed interaction. Unlike human interlocutors, chatbots provide unlimited practice, immediate responses, and a non-judgmental environment, which can reduce anxiety and increase learners' willingness to communicate. Dialogue-based chatbots allow learners to practice real-life scenarios such as ordering food, casual conversations, or topic-specific discussions, helping reinforce recently learned language structures and vocabulary.

Empirical studies suggest that chatbot-supported learning can positively influence language production and speaking performance. Pre-task interactions with chatbots have been shown to increase learner output and enhance preparedness for speaking activities. Voice-based chatbots, in particular, appear to be more effective than text-based interactions, as they promote pronunciation practice and oral fluency. Additionally, chatbot interactions can foster critical thinking skills by encouraging learners to reflect on responses before engaging in group discussions or formal speaking tasks.

Another pedagogical advantage of chatbots is their potential to support teachers. Conversation logs generated by chatbot interactions can be analyzed to identify common learner errors, enabling instructors to design targeted lessons and interventions. Chatbots can also facilitate learner-centered instruction by allowing students to focus on specific topics or language skills at their own pace.

Despite these benefits, several limitations have been identified. Some studies report a decline in learner motivation after the initial novelty of chatbot use diminishes. Chatbots may also exhibit mechanical behavior, limited contextual understanding, or produce grammatically inaccurate or semantically weak responses. These shortcomings highlight the need for careful instructional design and pedagogical guidance when integrating chatbots into language learning environments. Furthermore, large-scale and long-term empirical studies examining the effectiveness of chatbots in language learning remain limited.

Recent advancements in generative AI, particularly large language models such as ChatGPT, have renewed interest in chatbot-based language learning. These models are capable of generating coherent and contextually relevant responses, making them promising tools for writing support, idea generation, and interactive language practice. However, concerns regarding factual accuracy, over-simplification, and dependency on AI-generated content emphasize the importance of using such tools thoughtfully to promote learners' creativity and critical thinking.

Overall, chatbots represent a valuable component of AI-enhanced language learning when integrated strategically. In the context of **Spokina**, chatbot-based interaction can support conversational practice, reduce learner anxiety, and complement speech-based pronunciation training, contributing to a more engaging and accessible mobile-assisted language learning experience.

CHALLENGES IN AI SUPPORTED AND MOBILE ASSISTED LANGUAGE LEARNING:

Despite the growing adoption of AI-supported and mobile-assisted language learning (MALL), several challenges continue to limit its effective implementation. One of the most critical barriers is the presence of technical and infrastructural constraints. The digital divide remains a persistent issue, particularly in rural and underdeveloped regions, where learners and educators often lack access to reliable internet connectivity and compatible digital devices. In such contexts, inconsistent access to technology restricts continuous engagement with mobile learning platforms and reduces their overall effectiveness.

Even in regions with adequate technological access, compatibility issues between hardware and software systems present additional difficulties. Educational institutions frequently rely on a combination of legacy infrastructure and modern digital tools, which may not integrate seamlessly. As a result, technical disruptions such as system incompatibility, software malfunctions, and connectivity failures can interrupt learning activities and negatively impact learner motivation. Security vulnerabilities and privacy risks further complicate digital learning environments, as the increased collection and storage of student data raise concerns related to data breaches and unauthorized access. Many institutions, particularly those with limited financial resources, struggle to implement advanced cybersecurity measures, making data protection a significant challenge.

Another major limitation in the adoption of MALL is the lack of adequate teacher training. Many educators report insufficient professional development opportunities related to the pedagogical use of mobile and AI-based tools. Without proper training, instructors often feel unprepared to integrate MALL applications into their curriculum effectively. The absence of structured guidelines and instructional frameworks further restricts teachers' ability to design meaningful learning activities using mobile technologies, reducing the potential benefits of AI-driven language learning systems.

Learner-related challenges also affect the success of MALL. While mobile applications can enhance engagement through gamification and interactive features, excessive reliance on technology may lead to distraction and superficial learning. The presence of non-academic applications on mobile devices, such as social media, can divert learners' attention away from language learning tasks. Additionally, some learners may prioritize earning rewards or completing levels over developing deep linguistic competence, limiting long-term language acquisition outcomes.

From an AI perspective, the use of general-purpose language models poses further challenges. During initial implementation phases, generic AI systems often fail to generate responses that align with specific language learning objectives. Such models may oversimplify content, lack contextual relevance, or ignore established pedagogical principles of language learning. These limitations highlight the necessity of customized and domain-specific AI models that are trained to address learners' linguistic needs, proficiency levels, and educational goals.

Addressing these challenges requires coordinated efforts from educators, developers, and policymakers. Investments in digital infrastructure, targeted teacher training programs, learner-centered instructional design, and the development of customized AI models are essential to maximize the effectiveness of AI-supported and mobile-assisted language learning platforms. In the context of **Spokina**, overcoming these challenges is crucial to delivering an accessible, pedagogically sound, and learner-focused language learning experience.

RESEARCH OBJECTIVES:

The objectives of this research are as follows:

1. To investigate the role of Mobile-Assisted Language Learning in enhancing second language acquisition.
2. To analyse the effectiveness of Mobile-Assisted Language Learning in comparison with traditional language learning methods.
3. To identify the challenges faced by learners and educators in the implementation of Mobile-Assisted Language Learning -based language learning systems.

4. To examine emerging trends and future opportunities in mobile-assisted and AI-supported language learning environments.

PROPOSED SYSTEM- SPOKINA:

Spokina is an AI-powered mobile language learning application designed to enhance second language acquisition through Mobile-Assisted Language Learning (MALL). The system integrates artificial intelligence, natural language processing (NLP), and speech-based technologies to provide a personalized, interactive, and learner-centered language learning experience. Unlike traditional classroom-based instruction, Spokina enables learners to practice language skills anytime and anywhere using a mobile-first approach.

System Architecture :

The proposed system follows a client–server architecture. The frontend is developed using **Flutter**, enabling cross-platform compatibility for Android and iOS devices. The backend is implemented using **CodeIgniter**, which manages application logic, API handling, and communication between system components. **MySQL** is used as the database to store user profiles, learning progress, assessment records, and interaction logs.

The AI layer integrates NLP models, Automatic Speech Recognition (ASR), and conversational AI to support language comprehension, pronunciation practice, and real-time interaction. This architecture ensures scalability, modularity, and efficient handling of user requests.

Core Functional Modules :

1. NLP-Based Language Understanding
Spokina employs NLP techniques to analyze learner input in both text and speech formats. The system interprets grammatical structure, vocabulary usage, and contextual meaning to provide meaningful feedback. NLP also enables intelligent content delivery, adaptive exercises, and contextual sentence generation aligned with learner proficiency levels.

2. Speech-Based Interaction and Pronunciation Support
The application integrates Automatic Speech Recognition (ASR) to support pronunciation training and speaking practice. Learners can speak into the application, receive instant feedback, and compare their speech output with system-generated transcriptions. This feature promotes autonomous learning, reduces speaking anxiety, and allows repeated practice in a low-pressure environment.

3. Conversational AI and Chatbot Support
Spokina includes an AI-driven chatbot that simulates real-life conversational scenarios. The chatbot allows learners to practice dialogues related to daily communication, academic contexts, and professional interactions. By offering unlimited interaction, immediate responses, and topic-focused conversations, the chatbot enhances fluency, confidence, and willingness to communicate.

4. Adaptive and Personalized Learning
The system dynamically adapts learning content based on learner performance, progress history, and interaction patterns. Difficulty levels, lesson recommendations, and feedback are personalized to ensure optimal learning without cognitive overload. This learner-centered approach aligns with Outcome-Based Education (OBE) principles.

5. Gamification and Engagement Support
To enhance motivation and engagement, Spokina incorporates interactive tasks, progress tracking, and reward-based learning elements. These features encourage consistent practice while maintaining learner interest, addressing common challenges of learner disengagement in mobile learning environments.

Data Management and Security:

User data, including learning progress and interaction history, is securely stored in the MySQL database. The backend ensures controlled access to data, addressing privacy and security concerns commonly associated with AI-driven educational systems.

Educational Significance:

Spokina bridges the gap between traditional language learning and modern digital education by combining AI-supported instruction with mobile accessibility. By addressing limitations such as lack of personalized feedback, limited speaking practice, and rigid learning schedules, the proposed system provides an inclusive, scalable, and effective solution for second language learners.

IMPLEMENTATION DETAILS:

The Spokina application is implemented as a mobile-first, AI-supported language learning system using a modular and scalable architecture. The implementation focuses on seamless user interaction, efficient data handling, and intelligent language processing.

Frontend Implementation:

The frontend of Spokina is developed using **Flutter**, enabling a single codebase for both Android and iOS platforms. Flutter widgets are used to design interactive user interfaces, including login screens, learning modules, speaking practice interfaces, chatbot interaction windows, and progress dashboards. The frontend communicates with the backend through RESTful APIs using HTTP requests, ensuring smooth data exchange and real-time updates.

Backend Implementation:

The backend is built using the **CodeIgniter** framework, which manages business logic, user authentication, session handling, and API endpoints. CodeIgniter controllers process requests from the Flutter application, while models handle database interactions. This separation improves maintainability and system performance.

Database Management:

MySQL is used for structured data storage, including user profiles, learning history, assessment scores, chatbot interactions, and pronunciation practice logs. Relational tables are designed to ensure data consistency and efficient querying. Progress tracking enables personalized learning recommendations and performance analysis.

Natural Language Processing (NLP) Module:

The NLP module processes textual user input for grammar analysis, vocabulary evaluation, and contextual understanding. It supports sentence validation, keyword extraction, and content personalization. NLP-based feedback helps learners identify errors and improve language accuracy.

Automatic Speech Recognition (ASR) Integration:

Speech-based interaction is enabled through ASR services that convert spoken input into text. The system compares the learner's speech output with reference text to provide pronunciation feedback. This module supports repeated practice and real-time correction, encouraging autonomous and anxiety-free speaking practice.

Conversational AI and Chatbot Module:

Spokina integrates a conversational AI chatbot that allows learners to engage in simulated dialogues. The chatbot uses predefined intents, NLP processing, and contextual response generation to maintain meaningful interactions. Conversation logs are stored for further analysis and instructional planning.

Adaptive Learning Logic:

Adaptive learning mechanisms analyze learner performance data to adjust lesson difficulty, recommend learning paths, and personalize feedback. This ensures alignment with learner proficiency levels and Outcome-Based Education (OBE) principles.

Security and Privacy Considerations:

Basic security measures, including authentication control, role-based access, and secure API communication, are implemented to protect user data. Data handling practices aim to ensure privacy and reliability in compliance with digital learning standards.

RESULTS:

The Spokina system was evaluated through a pilot implementation involving second language learners using the mobile application over a defined learning period. The evaluation focused on learner engagement, pronunciation improvement, usability, and overall learning effectiveness compared to conventional learning practices.

Learning Performance:

The results indicate a noticeable improvement in learners' speaking and pronunciation skills after using Spokina. Learners demonstrated better articulation and increased confidence during speech-based activities enabled by the ASR module. NLP-driven feedback supported grammatical accuracy and vocabulary usage, contributing to overall language improvement.

Learner Engagement and Motivation:

High levels of learner engagement were observed due to the mobile-based and interactive nature of the system. Features such as conversational AI, instant feedback, and adaptive learning paths encouraged consistent practice. Gamified elements and personalized lesson progression helped sustain learner motivation and reduced learning anxiety.

Usability and Accessibility:

Users reported that the Flutter-based mobile interface was intuitive and easy to navigate. The anytime-anywhere accessibility of Spokina supported flexible learning schedules, which addressed common limitations of traditional classroom instruction. The chatbot and speech modules enabled learners to practice without fear of judgment, fostering self-directed learning.

System Performance:

The backend system efficiently handled user requests and data storage, ensuring smooth interaction between the mobile application and server. Real-time feedback from NLP and ASR modules was delivered with minimal latency, contributing to a seamless learning experience.

Comparative Observations:

When compared with traditional language learning approaches, Spokina demonstrated advantages in personalization, immediate feedback, and speaking practice opportunities. Learners showed higher

participation levels and improved confidence in communication skills, highlighting the effectiveness of AI-supported systems.

APPLICATIONS:

The Spokina application can be effectively utilized in various educational and professional contexts due to its AI-driven and mobile-assisted design.

Second and Foreign Language Learning:

Spokina can be used by learners to improve speaking, pronunciation, vocabulary, and grammar in second or foreign languages. The integration of NLP and ASR enables learners to practice language skills independently with real-time feedback.

Academic Language Support:

The system can support students in higher education by enhancing academic communication skills, including speaking fluency and structured sentence formation. It is particularly useful for learners who require additional practice beyond classroom instruction.

Self-Directed and Remote Learning:

Spokina supports self-paced learning, making it suitable for remote and distance education environments. Learners can access language resources anytime, reducing dependence on physical classrooms and fixed schedules.

Teacher-Assisted Learning:

Educators can use Spokina as a supplementary tool to reinforce classroom teaching. Conversation logs and learner progress data can assist teachers in identifying learner difficulties and customizing instruction.

Skill Development and Professional Training:

The application can be used for professional communication training, including interview preparation, workplace communication, and customer interaction skills. Simulated conversational scenarios help learners gain confidence in real-world situations.

Inclusive and Lifelong Learning:

Spokina supports inclusive learning by providing flexible access to language education for learners from diverse backgrounds. Its mobile-based approach makes it suitable for lifelong learners seeking continuous skill enhancement.

FUTURE SCOPE:

The Spokina system provides a strong foundation for AI-supported mobile language learning; however, several enhancements can further improve its effectiveness and scalability.

Future versions of Spokina can incorporate **advanced deep learning models** to improve the accuracy of NLP and Automatic Speech Recognition, enabling more precise pronunciation assessment and contextual feedback. Multilingual support can be expanded to include additional languages and regional accents, making the system more inclusive for diverse learners.

The integration of **emotion-aware AI** and **sentiment analysis** can help detect learner frustration or confidence levels, allowing the system to adapt learning strategies accordingly. **Gamification elements** such as adaptive challenges, leaderboards, and reward systems can be further enhanced to sustain long-term learner engagement.

Spokina can also be extended with **virtual reality (VR) or augmented reality (AR)** features to simulate real-world conversational environments, improving immersive learning experiences. Additionally, the system may integrate **learning analytics dashboards** for educators, enabling data-driven instructional decisions.

From an infrastructural perspective, future development can focus on **offline learning capabilities**, improved data security, and integration with institutional Learning Management Systems (LMS). These advancements will support large-scale deployment and enhance the reliability of AI-assisted language learning solutions.

Overall, the future scope of Spokina lies in evolving as an intelligent, adaptive, and scalable language learning platform that aligns with emerging trends in AI-powered education.

CONCLUSION:

This research presented **Spokina**, an AI-powered mobile language learning application designed to enhance second language acquisition through Mobile-Assisted Language Learning (MALL). By integrating artificial intelligence, natural language processing, automatic speech recognition, and conversational AI, the proposed system addresses key limitations of traditional language learning methods, such as limited speaking practice, lack of personalized feedback, and rigid learning environments.

The implementation and evaluation of Spokina demonstrate that AI-supported mobile learning can significantly improve learner engagement, pronunciation accuracy, and confidence in language use. Features such as real-time feedback, adaptive learning paths, and chatbot-based interaction promote learner autonomy and self-directed learning. The mobile-first design further enhances accessibility, enabling learners to practice language skills anytime and anywhere.

Despite certain challenges related to infrastructure, digital literacy, and AI customization, the results highlight the potential of AI-driven MALL systems in creating effective and inclusive language learning environments. Spokina illustrates how intelligent educational technologies can support both learners and educators by offering personalized, scalable, and interactive learning experiences.

In conclusion, Spokina contributes to the growing field of AI-assisted language learning by demonstrating the practical application of emerging technologies in education. The system lays a strong foundation for future research and development in intelligent, learner-centered language learning platforms.

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