Department of Computer Science
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Section – A

Title of Project:

Fluentz: AI-Powered Language Learning and Exchange App

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Section – B

Title of Project:

Fluentz: AI-Powered Language Learning and Exchange App

Project No:

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Chapter 1: Introduction

This proposal is divided into three chapters. In this chapter, we will introduce the characteristics of the language learning, the chatbot system, and Fluentz software as well as our aims and objectives. Chapter two covers the project's background and literature review. Chapter Three will discuss our approach, methodology, resources, and ethical considerations.

1.1 Overview

In a globalized world where multilingual communication is increasingly valuable, acquiring a second language has become essential for personal, academic, and professional growth. Despite this importance, learners often struggle with challenges such as insufficient opportunities for real-time practice and difficulty using vocabulary in appropriate contexts (Solak, 2024). Traditional language learning applications tend to emphasize rote memorization and vocabulary drills, offering little support for natural conversation or context-based usage (Rebolledo & González, 2023). Fluentz addresses these limitations by enabling users to engage in real-time interactions with language partners while receiving instant, context-sensitive feedback through AI-powered tools. These tools assist with pronunciation, grammar, and appropriate language use in a way that adapts to each learner's needs. Research supports the use of artificial intelligence in education, highlighting its ability to enhance learner engagement and personalize the learning experience (Fitria, 2021). AI systems are also capable of simulating human-like interactions, making language learning more scalable and accessible (Harry, 2023).Through gamification, immersive roleplay, and cultural exchange, Fluentz creates a dynamic environment that promotes effective, confident language acquisition.

1.2 Problem Statement

Current language learning platforms often fall short in helping users engage in meaningful, interactive conversations. While many applications offer vocabulary lists and grammar drills, they rarely provide real-time communication or access to language partners. As a result, learners frequently struggle to find someone to practice with, which limits their ability to apply what they've learned in authentic, conversational settings. This lack of interaction hinders the transition from passive knowledge to active language use, especially in social or professional contexts. Additionally, most platforms fail to incorporate context-specific learning scenarios or AI-powered feedback, leaving learners without the personalized guidance necessary for improvement. The absence of these features creates a gap between language comprehension and real-world fluency, highlighting the need for a more immersive and socially connected learning experience.

1.3 Motivation

To address the disconnect between passive learning and active language use, Fluentz offers a solution built on real-time interaction, personalized feedback, and immersive learning experiences. By matching users with compatible language partners, Fluentz tackles one of the most common challenges in language acquisition—finding someone to practice with. The app creates a social learning environment where users can engage in live conversations, virtual roleplays, and culturally relevant scenarios that mimic real-world interactions. Integrated AI tools provide immediate, context-aware feedback on grammar, pronunciation, and vocabulary, enabling users to refine their language use as they practice. Gamification elements such as streaks, challenges, and leaderboards further boost motivation and consistency. By combining human connection with smart technology, Fluentz empowers learners to build fluency, confidence, and cultural understanding in a way that traditional apps do not.

1.4 Aim and Objectives

Aims

The aim of this project is to develop an AI-powered language exchange mobile application that intelligently matches users based on their language learning preferences, facilitates real-time communication through chat and voice, and enhances learning through personalized AI-assisted tools and immersive virtual environments.

Objectives

- Design and implement a smart matchmaking algorithm that suggests potential matches based on user profiles and preferences.
- Enable a request-accept matching system for user connections.
- Develop real-time communication features, including text chat and voice call capabilities, to allow users to practice language interactively.
- Design virtual environments with scenario-based keywords.
- AI Chatbot for grammar and pronunciation assistance.
- Create group chats community space for cultural conversations.
- Apply gamification to track progress, maintain streaks, and reward users with badges and ranked leaderboards.

Chapter 2: Literature review

2.1 AI Chatbots in education

Research interest in integrating AI chatbots into learning environments has grown, especially as educational institutions move toward digital and hybrid learning models. (Chee, et al.2023 ،) analyzed 25 peer-reviewed studies published between 2016 and 2021 as part of a systematic review to investigate the increasing use of chatbots in education. What encouraged the review was the need to learn more about the academic success of chatbots whether they serve as revolutionary teaching tools or are just technological innovations with little educational value.

According to the review, 68% of the research findings that were looked at showed improvements in student motivation, engagement, and academic performance. This implies that chatbots can actively support a number of learning process aspects when they are properly developed and deployed. One important finding was that 56% of the chatbots under review were used for tutoring or instruction, with the remaining ones being used for administrative support or to aid language learning, especially for vocabulary reinforcement or conversation practice.

Chatbots have demonstrated special promise in the context of online language learning. The review emphasizes how chatbot conversations, which mimic real-time communication, are highly beneficial for language learners due to their personalized and interactive features. These AI-powered resources can offer continuous language exposure, customized prompts, and immediate feedback, all of which are essential for language learning. Additionally, because chatbots offer consistent and nonjudgmental interaction, language learners who used them reported feeling more confident and less anxious.

However, the study also highlighted that the effectiveness of chatbots is not uniform. Factors like the chatbot's design, conversational capabilities, interaction style (text-based vs. voice-based), and degree of integration with the larger curriculum or learning management system were all blamed for the variation in results. This implies that a badly designed chatbot that lacks natural language processing or contextual understanding could actually make language learners more frustrated rather than better.

In the end, (Chee, et al.2023 ،) came to the conclusion that although AI chatbots have a great deal of potential to revolutionize online learning, their success largely depends on their deployment being contextually aware and adaptive. This implies that in the context of online language learning, chatbots should not only provide accurate language content but also adjust to the learner's level of proficiency, offer cultural context, and simulate real-world conversation situations. According to the study, chatbots can be used as additional resources in language learning ecosystems to help develop engaging, student-centered learning experiences that encourage longer-term participation and more in-depth language learning.

2.2 Virtual Communities for Teacher Growth

Technology's ability to support language teachers' ongoing professional development is becoming more and more important in the context of 21st-century education. Conventional in-person training approaches frequently fail to deliver ongoing assistance, teamwork, and creativity. In order to close this gap, (LAICHE, 2021) carried out an empirical investigation into how virtual Communities of Practice (CoPs), more especially, the "Algerian Association of English Language Teachers" Facebook group affect teacher preparation and foster cooperative professional development.

A mixed-methods explanatory design was used in the study, which included follow-up group interviews with 15 participants and an online survey given to 76 Algerian EFL teachers. The results showed that most teachers admitted to modifying their methods in response to community-shared ideas. Furthermore, all participants agreed that the Facebook group was a great place to get resources, support, and professional growth. In order to promote educational competency and a feeling of professional community, educators routinely shared resources, instructional techniques, advice, and criticism.

The CoP served as an environment for self-awareness teamwork, and problem-solving in addition to being a repository of resources. Teachers reported that these communities offered an environment for knowledge sharing and mutual support, as well as a way to resolving the sense of isolation that is frequently experienced in traditional educational settings. The growth of friendships among members was especially interesting; according to 75% of interviewees, they had developed deep bonds with coworkers they had never met in person.

Among the main advantages noted are:

- Exchange of materials and resources
- Sharing classroom experiences and expertise
- Encouraging self-reflection and innovative practices
- Enhancing the ability to teach

The study highlights the potential of Facebook-based CoPs to sustain meaningful professional development, particularly in low-resource or dispersed educational contexts, despite some concerns regarding online identity and trust—primarily because of anonymity and the use of anonymous identities.

The findings of this study are very relevant to the design of language learning applications. The advantages of these virtual CoPs could be duplicated by including community-based features like peer support groups, teacher forums, and discussion threads into a language learning app. An app may turn into an entire platform for students and teachers by enabling educators to interact, share lesson plans, solve problems with instruction, and share ideas for engaging students.

Additionally, as the Facebook group participants noted, integrating professional development resources into the app could enable language instructors to advance their abilities in real time. By enhancing the instructional strategies used within the app, these community features can also indirectly benefit students in addition to encouraging continued teacher engagement.

(LAICHE, 2021) conclude by confirming the potential of virtual communities to transform teacher professional development in language education, especially on widely accessible platforms like Facebook. Such community-focused elements can foster long-term educational innovation, lessen professional isolation, and improve teacher support when carefully incorporated.

2.3 Mobile-Assisted and Gamification-Based Language Learning

Traditional language learning environments often struggle to meet the evolving needs of learners, particularly in terms of flexibility, engagement, and personalization. The effectiveness of gamification-based and mobile-assisted language learning (MALL) strategies was assessed by (Azawi, et al., 2023) through a comprehensive systematic review of more than 60 peer-reviewed studies in response to these limitations. The review examines how these developments increase student autonomy, motivation, and interactivity, therefore revolutionizing the language learning process.

Because of its portability, real-time interactivity, and accessibility, the authors discovered that mobile-assisted language learning offers significant benefits, allowing students to interact with the material at their own pace and in a variety of settings. In order to make language learning more responsive and learner-centered, mobile applications usually incorporate features like interactive vocabulary drills, speech recognition, and adaptive feedback systems.

At the same time, it has been demonstrated that gamification features like leaderboards, levels, badges, points, and progress tracking greatly increase learner motivation and long-term engagement. Regular practice and deeper involvement are encouraged by these game-like mechanics, which appeal to users' both inner and outer motivators. Most importantly, gamification also encourages a sense of accomplishment and competition, which can be especially beneficial when learning a language, where consistent practice and reinforcement are essential.

The review also emphasizes how well MALL and gamification work as a teaching tool, coming to the conclusion that this combination improves language outcomes in speaking, listening, reading, and writing. In addition to greater exposure and practice, learners gain from context-aware learning environments that adapt to their unique learning preferences and skill levels.

These results are directly applicable to language-learning programs like Fluentz, which seek to offer engaging and customized experiences. Learner disinterest, lack of motivation, and limited classroom interaction are just a few of the enduring issues in language education that Fluentz can address by implementing mobile-based delivery and gamified features. For instance, challenges, streaks, and peer competitions can promote consistent use and skill development, while real-time feedback systems and adaptive learning pathways can improve learner autonomy.

Furthermore, the availability of mobile apps enables users to participate in microlearning sessions, incorporating language learning into everyday activities with ease. This is a significant benefit for working professionals and adult learners.

To sum up, (Azawi, et al., 2023) confirm that gamification and mobile technology together constitute a powerful educational paradigm in language learning. When carefully incorporated into language learning applications, these resources not only improve student performance and motivation but also encourage long-term, independent learning methods that go beyond the conventional classroom setting.

2.4 Machine Learning in Education

The need for precision education, a new educational strategy that uses data and analytics to customize learning experiences to each student's needs, has increased as a result of the development of digital learning environments. In order to address this change, (Luan & Tsai, 2021) carried out a systematic review of 40 empirical studies that focused on the use of machine learning (ML) in educational settings, specifically in the areas of learning intervention optimization and student outcomeprediction.

According to the review, predictive modeling is the main way that machine learning is used in education. In online and blended learning settings, methods like decision trees, random forests, support vector machines, and neural networks were frequently used to predict behavioral patterns, dropout probability, and student performance. Cross-validation or other robust evaluation techniques were most commonly used to validate these models.

Surprisingly the majority of the studies focused on students studying computer science and STEM, fields where extensive learner data is frequently easier to obtain. The findings regularly showed that ML models could correctly identify students who were at risk, allowing for quick and focused interventions. Teachers and systems can use personalized learning strategies to reduce failure and boost performance by identifying patterns of disengagement or academic difficulty early on.

The review identifies a number of research gaps in spite of these encouraging results. The most notable issue is the lack of diversity in educational settings, which has little use in non-STEM domains like language instruction or the humanities. The authors also stress the need for better data integration procedures, especially when it comes to adding multi-source learning data (such as performance scores, text inputs, and behavioral logs) to enhance prediction accuracy and personalization depth.

The results of (Luan & Tsai, 2021) have important results for language learning apps such as Fluentz. Fluentz can provide adaptive learning experiences that react dynamically to user behavior and progress by incorporating machine learning models into the app's architecture.

ML, for example, can:

- Examine user interaction developments to predict skill gaps or learning levels.
- Adapt lesson plans according to data on student performance.
- To improve weak areas, suggest specific vocabulary or grammar exercises.
- Real-time content difficulty adjustments are necessary to maintain motivation and engagement.

Additionally, ML can be used to track learner progress over time and personalize feedback, giving users valuable insights into their way of learning and allowing them to visualize their progress.

In conclusion, (Luan & Tsai, 2021) confirm that machine learning has the ability to transform educational systems by promoting highly customized, data-driven learning experiences in addition to quick identification and intervention. ML has the potential to completely transform how students interact with content in language learning applications when used carefully, making learning more intelligent, effective, and user-centered.

References

Luan & Tsai, 2021. A review of using machine learning approaches for precision education.. *Educational Technology & Society.*

Chee, et al., 2023. Exploring the Trend and Potential Distribution of Chatbot in Education: A Systematic Review.. *International Journal of Information and Education Technology..*

Azawi, Al-Faliti & Al-Blushi, 2023. Gamification and game-based learning: A systematic review.. *The Electronic Journal of e-Learning.*

Solak, E., 2024. Revolutionizing language learning: How ChatGPT and AI are changing the way we learn languages. *International Journal of Technology in Education (IJTE).*

Rebolledo, R. & González, F., 2023. Exploring the Benefits and Challenges of AI-Language Learning Tools. *International Journal of Social Sciences and Humanities Invention.*

Fitria, T., 2021. ARTIFICIAL INTELLIGENCE (AI) IN EDUCATION: USING AI TOOLS FOR TEACHING AND LEARNING PROCESS. *Proceeding Seminar Nasional & Call For Papers.*

Harry, A., 2023. Role of AI in Education. *Injuruty: Interdiciplinary Journal and Humanity.*

LAICHE, S., 2021. Language teachers and Virtual Communities of Practice: The Case of Facebook. *Oran2 Journal University* .