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INTEGRATING SPEECH RECOGNITION TECHNOLOGY IN DIGITAL LANGUAGE LEARNING TO IMPROVE PRONUNCIATION ACCURACY

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Abstract. Accurate pronunciation is a critical component of foreign language proficiency, yet traditional instructional methods often fail to provide timely, individualized feedback, leading to slow progress and lack learner motivation. This study explores the integration of speech recognition technology in digital language learning environments as a strategy to improve pronunciation accuracy. By providing immediate feedback on phonetic mistakes, enabling autonomous practice, and tracking learner progress, speech recognition systems offer both practical and motivational benefits. The study also considers the role of gamified features, such as points, badges, and progress tracking, in sustaining learner engagement. While these technologies demonstrate significant potential in enhancing pronunciation and supporting self-directed learning, their effectiveness depends on thoughtful implementation and balanced integration with traditional instruction.

Key words: speech recognition technology, pronunciation accuracy digital language learning, phonetics, learner motivation, autonomous learning, gamification in education, feedback in language learning.

Annotatsiya. To'g'ri talaffuz chet tilini egallashning muhim tarkibiy qismidir, biroq an'anaviy o'qitish usullari ko'pincha o'z vaqtida va individuallashtirilgan teskari aloqani ta'minlay olmaydi, bu esa o'zlashtirishning sekinlashishiga va o'rganuvchi motivatsiyasining pasayishiga olib keladi. Ushbu tadqiqot talaffuz aniqligini oshirish strategiyasi sifatida nutqni aniqlash texnologiyasini raqamli til o'rganish muhitiga integratsiya qilish masalasini o'rganadi. Fonetik xatolar bo'yicha lahzali teskari aloqa berish, mustaqil amaliyot o'tash imkoniyatini yaratish va o'rganuvchi natijalarini kuzatib borish orqali nutqni aniqlash tizimlari ham amaliy, ham motivatsion afzalliklarni taqdim etadi. Shuningdek, tadqiqotda o'rganuvchilar faolligini saqlab qolishda ochkolar, nishonlar va natijalarni kuzatish kabi o'yinlashtirilgan (gamifikatsiya) elementlarning roli ko'rib chiqiladi. Ushbu texnologiyalar talaffuzni yaxshilash va mustaqil ta'limni qo'llab-quvvatlashda katta salohiyatga ega bo'lsa-da, ularning samaradorligi puxta o'ylangan tatbiq etish hamda an'anaviy o'qitish usullari bilan muvozanatli integratsiyalashuviga bog'liqdir.

Kalit so'zlar: nutqni aniqlash texnologiyasi, talaffuz aniqligi, raqamli til o'rganish, fonetika, o'rganuvchi motivatsiyasi, mustaqil ta'lim, ta'limda gamifikatsiya, til o'rganishda teskari aloqa.

Аннотация. Точное произношение является важнейшим компонентом владения иностранным языком, однако традиционные методы обучения часто не обеспечивают своевременную индивидуализированную обратную связь, что ведет к замедлению прогресса и снижению мотивации обучающихся. В данном исследовании рассматривается интеграция технологии распознавания речи в

цифровую среду изучения языков как стратегия повышения точности произношения. Обеспечивая мгновенную обратную связь по фонетическим ошибкам, предоставляя возможность для автономной практики и отслеживая прогресс учащихся, системы распознавания речи предлагают как практические, так и мотивационные преимущества. В работе также рассматривается роль элементов геймификации, таких как баллы, значки и отслеживание прогресса, в поддержании вовлеченности учащихся. Хотя эти технологии демонстрируют значительный потенциал в улучшении произношения и поддержке самостоятельного обучения, их эффективность зависит от продуманного внедрения и сбалансированной интеграции с традиционными методами обучения.

Ключевые слова: технология распознавания речи, точность произношения, цифровое изучение языков, фонетика, мотивация обучающихся, автономное обучение, геймификация в образовании, обратная связь в изучении языка.

Introduction. Pronunciation plays an important role in foreign language learning, directly influencing learners' intelligibility, communicative competence, and confidence. Achieving accurate pronunciation, however, remains a persistent challenge. Traditional classroom methods, including repetition drills and teacher feedback, often provide limited individualized guidance and delayed correction, which can slower progress and reduced learner engagement. The advancement of digital technologies has created new opportunities to address these challenges. Speech recognition technology, in particular, has emerged as a promising tool for pronunciation training. By analyzing learners' spoken input, these systems provide immediate, automated feedback on phonetic mistakes, allowing learners to self-correct in real time. This immediate feedback supports consistent practice, promotes autonomy, and helps learners monitor their progress over time. In addition to accuracy, speech recognition platforms often integrate gamified features—such as points, badges, and progress tracking—that enhance learner motivation and encourage sustained engagement. Nonetheless, the effectiveness of these tools depends on careful design and implementation. Overreliance on automated feedback or poorly structured exercises may limit meaningful learning or fail to address complex phonetic nuances. This study examines how integrating speech recognition technology in digital language learning can enhance pronunciation accuracy. It explores the potential of these tools to support learner motivation, facilitate autonomous practice, and complement traditional instructional methods, while also considering their practical limitations.

1. The Importance of Pronunciation Accuracy in Foreign Language Learning

Pronunciation is a core component of foreign language proficiency, directly affecting learners' intelligibility and overall communicative competence. Accurate pronunciation enables learners to convey meaning clearly, avoid misunderstandings, and gain confidence in speaking. However, achieving high levels of pronunciation accuracy is often difficult, particularly for learners of languages with phonemes or intonation patterns unfamiliar to their native language. Traditional instructional approaches, such as repetition drills, teacher-led correction, and imitation exercises, provide limited opportunities for individualized feedback and may fail to sustain learner motivation.

2. Limitations of Traditional Approaches

Conventional methods in pronunciation training often suffer from delayed feedback, insufficient practice time, and lack of learner autonomy. Many classrooms cannot accommodate personalized correction for each student, leading to slow improvement and decreased engagement. Without immediate corrective feedback, errors can become habitual, making pronunciation improvement more difficult over time. Additionally, learners may feel anxious, nervous or self-conscious, further reducing motivation and willingness to participate actively.

3. Integration of Speech Recognition Technology in Digital Language Learning

Digital learning environments have created opportunities to address the shortcomings of traditional methods. Speech recognition technology enables learners to receive instant feedback on their pronunciation accuracy, identifying errors in segmental sounds, stress patterns, and intonation. Platforms such as ELSA Speak, Duolingo, and Google Pronunciation allow learners to practice independently, track their progress, and adjust their learning strategies based on real-time analysis.

By incorporating automated feedback, speech recognition fosters autonomous learning, empowering students to take control of their practice and monitor improvement over time. This autonomy not only accelerates skill acquisition but also enhances learner motivation, as students can see measurable progress and receive immediate reinforcement for correct pronunciation.

4. Role of Gamification in Enhancing Motivation

Many digital speech recognition platforms integrate gamification features—such as points, badges, leaderboards, and progress tracking—to increase learner engagement. Gamified elements provide extrinsic motivation through rewards and recognition, while also supporting intrinsic motivation by making practice enjoyable and interactive. By combining gamified features with speech recognition feedback, learners are encouraged to engage in sustained, consistent practice, which is important for mastering pronunciation in a foreign language.

5. Benefits for Learner Motivation and Learning Outcomes

The integration of speech recognition technology with gamified features can significantly improve learning outcomes. Immediate, personalized feedback reduces errors more efficiently than traditional methods, while gamified elements increase engagement and adherence to practice routines. Learners gain confidence as they see measurable improvements, which reinforces both motivation and commitment to continued practice. Consequently, pronunciation accuracy improves, and learners develop stronger phonetic awareness and communicative competence.

6. Challenges and Limitations

Despite its advantages, the use of speech recognition technology is not without challenges. Automated systems may misrecognize certain accents or dialects, potentially providing incorrect feedback. Overreliance on technology can reduce opportunities for human interaction, which remains essential for developing communicative competence.

Conclusion

Speech recognition technology offers a powerful tool for improving pronunciation accuracy in foreign language learning. By providing immediate,

personalized feedback, it supports autonomous learning and enables learners to correct errors efficiently. When combined with gamified features such as points, badges, and progress tracking, these systems also enhance motivation and engagement, encouraging sustained practice. However, the effectiveness of speech recognition relies on careful implementation and balanced integration with traditional instruction. Overreliance or poorly designed platforms may limit meaningful learning. Overall, speech recognition technology serves as a complementary approach that strengthens pronunciation training, fosters learner autonomy, and promotes more effective language acquisition.

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