INTEGRATING ARTIFICIAL INTELLIGENCE-BASED SPEECH RECOGNITION SYSTEMS INTO ENGLISH PRONUNCIATION TEACHING: IMPLICATIONS FOR UZBEK EFL CONTEX

Xaydarova Maftuna Narzilla qizi
Teacher, Samarkand State University.
E-mail: maftunakhaydarova1403@gmail.com

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Annotation. This study explores the integration of artificial intelligence (AI)-based speech recognition systems into English pronunciation teaching and examines their implications for Uzbek EFL learners. AI-driven tools offer real-time feedback on pronunciation, stress, intonation, and rhythm, providing learners with individualized guidance and opportunities for self-correction. The study investigates how these technologies can enhance learners' pronunciation accuracy, oral fluency, and overall communicative competence. Classroom implementation strategies, learner engagement, and pedagogical considerations are discussed to provide practical insights for EFL instructors. Findings suggest that AI-based speech recognition can effectively supplement traditional pronunciation instruction, promote autonomous learning, and address common pronunciation challenges faced by Uzbek learners.

Introduction. The integration of artificial intelligence (AI) into language education has brought significant innovations in the way English is taught and learned, particularly in the area of pronunciation. For Uzbek EFL learners, mastering English pronunciation presents ongoing challenges due to differences between the phonological systems of Uzbek and English, including issues with word stress, intonation, rhythm, and individual sounds. Traditional classroom approaches to pronunciation instruction often rely on teacher modeling, repetition, and corrective feedback, which, while effective to some extent, may not provide sufficient individualized support or immediate, consistent feedback. AI-based speech recognition systems have emerged as promising tools that can

address these limitations by offering real-time assessment and feedback on learners' pronunciation, highlighting errors in stress, intonation, and segmental features, and allowing learners to practice independently in a controlled, interactive environment. These technologies can track learners' progress over time, adapt to their individual needs, and provide objective, consistent evaluation, thereby enhancing both accuracy and confidence in spoken English. The application of AI in pronunciation teaching is particularly relevant for the Uzbek EFL context, where large class sizes and limited exposure to native English speech can hinder the development of suprasegmental competence. By integrating AI-driven speech recognition into classroom practice, instructors can supplement traditional teaching methods with interactive, learner-centered activities that promote autonomous learning and continuous improvement. This study examines the potential of AI-based pronunciation tools to enhance Uzbek learners' oral proficiency, focusing on the practical strategies for implementation, pedagogical benefits, and challenges associated with their use in EFL instruction.

Literature rewiev. The use of artificial intelligence (AI) in language learning has gained significant attention in recent years, particularly in the field of pronunciation teaching [1]. Speech recognition technology, powered by AI, offers the ability to provide learners with immediate, objective feedback on their pronunciation, including segmental features such as individual vowels and consonants as well as suprasegmental features like word stress, sentence stress, rhythm, and intonation [2]. Research indicates that timely and specific feedback is critical for improving pronunciation accuracy and intelligibility, and AI-based systems can deliver this feedback consistently and on a scale that is often difficult for human instructors to achieve [3]. Studies have shown that learners who use speech recognition tools demonstrate greater awareness of their pronunciation errors, improved self-monitoring skills, and increased motivation to practice outside the classroom [4]. Moreover, AI-based systems can adapt to individual learners' proficiency levels, providing personalized exercises and tracking progress over time, which facilitates autonomous learning and sustained improvement, and in the context of EFL teaching, these tools address limitations such as large class sizes, limited teacher attention, and insufficient exposure to native English speech, making them particularly effective for learners who struggle with suprasegmental features [5].

Research methodology. For this study was designed to examine the effectiveness of AI-based speech recognition systems in enhancing English pronunciation, focusing specifically on word stress, sentence stress, intonation,

and overall oral fluency among Uzbek EFL learners. A mixed-methods approach was employed to capture both quantitative improvements in learners' pronunciation and qualitative insights into their experiences and perceptions of using AI-driven tools. The participants consisted of forty intermediate-level Uzbek EFL learners aged between sixteen and twenty-two, drawn from secondary schools and university language programs. Purposive sampling was applied to ensure that participants had similar English proficiency levels and prior exposure to the language. Pre-tests were administered to assess learners' baseline competence in pronunciation, including both segmental and suprasegmental features. The instructional intervention lasted six weeks, with two 60-minute sessions per week. During the intervention, learners engaged in a combination of explicit pronunciation instruction and AI-supported practice. Classroom activities included teacher modeling of correct stress and intonation patterns, repetition and drilling exercises, perception-based listening tasks, audiovisual demonstrations of natural speech, and communicative speaking activities that required learners to apply stress and intonation in meaningful contexts. The AI-based speech recognition system provided immediate, individualized feedback, highlighting errors in segmental and suprasegmental features and allowing learners to practice autonomously and self-correct. Peer-assessment and self-monitoring were also incorporated to enhance learner awareness and foster active engagement. Data collection involved multiple instruments to ensure comprehensive analysis. Quantitative data were gathered from pre- and post-tests, which included recorded reading passages, sentence-level exercises, and spontaneous speech tasks designed to assess word stress, intonation, and rhythm. Qualitative data were collected through learner questionnaires, semi-structured interviews, and classroom observations to explore learners' attitudes, experiences, and perceptions regarding the use of AI-based tools. Audio recordings of learners' spoken output were analyzed to measure improvements in accuracy, consistency, and naturalness of pronunciation. For data analysis, quantitative results from pre- and post-tests were statistically examined using paired-sample t-tests to determine the significance of observed improvements in pronunciation performance.

1-table. Integrating artificial intelligence-based speech recognition systems into english pronunciation teaching: implications for uzbek efl context

Strategy	Description	Benefits
Real-time Feedback	AI system provides immediate correction on stress, intonation, and pronunciation	Helps learners self-correct errors and improve accuracy
Personalized Exercises	AI adapts practice tasks based on individual learner proficiency	Supports autonomous learning and targets specific weaknesses
Audiovisual Demonstrations	Audio and visual models of native speech	Enhances perception of natural stress and intonation patterns
Repetition and Drilling	Learners repeat words and sentences with AI guidance	Reinforces memory and muscle control for correct pronunciation
Progress Tracking	AI tracks performance over time	Motivates learners and provides measurable improvement

The findings of this study indicate that integrating AI-based speech recognition systems into English pronunciation teaching has a significant positive impact on the development of Uzbek EFL learners' oral proficiency. Analysis of pre- and post-test recordings revealed measurable improvements in word stress, sentence stress, intonation, and overall rhythm, suggesting that AI-supported practice effectively enhances learners' suprasegmental competence. Learners who received immediate, individualized feedback through the AI system demonstrated faster correction of pronunciation errors and greater consistency in producing accurate stress and intonation patterns compared to traditional classroom instruction alone. This supports previous research highlighting the importance of timely, specific feedback in pronunciation development, and demonstrates the advantages of AI technology in providing scalable, continuous, and precise guidance.

Research discussion. The findings of this study indicate that integrating AI-based speech recognition systems into English pronunciation teaching has a significant positive impact on the development of Uzbek EFL learners' oral proficiency. Analysis of pre- and post-test recordings revealed measurable improvements in word stress, sentence stress, intonation, and overall rhythm, suggesting that AI-supported practice effectively enhances learners' suprasegmental competence. Learners who received immediate, individualized feedback through the AI system demonstrated faster correction of pronunciation

errors and greater consistency in producing accurate stress and intonation patterns compared to traditional classroom instruction alone. This supports previous research highlighting the importance of timely, specific feedback in pronunciation development, and demonstrates the advantages of AI technology in providing scalable, continuous, and precise guidance.Qualitative data collected from questionnaires, interviews, and classroom observations further underscored the effectiveness of AI-based tools. Learners reported that the real-time feedback helped them recognize subtle pronunciation errors that were previously unnoticed and increased their confidence in speaking. Audiovisual features of the system, including visual waveforms and pronunciation scores, enabled learners to monitor their progress and self-correct more efficiently. Furthermore, the interactive nature of the AI system fostered higher engagement and motivation, encouraging learners to practice outside the classroom and take ownership of their learning. Peer-assessment and self-monitoring exercises incorporated alongside AI support reinforced awareness of suprasegmental features and facilitated collaborative learning. The study also highlighted challenges faced by learners, particularly in mastering English suprasegmental patterns that differ from their native Uzbek language, which is syllable-timed and has predictable stress patterns. Initial difficulties with variable stress placement, intonation contours, and connected speech were observed, indicating the need for sustained exposure and repeated practice. However, consistent AI-supported exercises, coupled with teacher guidance, gradually mitigated these difficulties, resulting in improved intelligibility, naturalness, and fluency. The study suggests that the combination of AI-based feedback and traditional instructional methods, including modeling, repetition, and communicative activities, creates a comprehensive approach that addresses both segmental and suprasegmental challenges effectively.

Conclusion. The study concludes that integrating AI-ba Qualitative data collected from questionnaires, interviews, and classroom observations further underscored the effectiveness of AI-based tools. Learners reported that the real-time feedback helped them recognize subtle pronunciation errors that were previously unnoticed and increased their confidence in speaking. Audiovisual features of the system, including visual waveforms and pronunciation scores, enabled learners to monitor their progress and self-correct more efficiently. Furthermore, the interactive nature of the AI system fostered higher engagement and motivation, encouraging learners to practice outside the classroom and take ownership of their learning. eer-assessment and self-monitoring exercises incorporated alongside AI support reinforced awareness of suprasegmental

features and facilitated collaborative learning. sed speech recognition systems into English pronunciation teaching significantly enhances Uzbek EFL learners' oral proficiency, particularly in the areas of word stress, sentence stress, intonation, and overall rhythm. The findings indicate that AI-driven feedback allows learners to identify and correct pronunciation errors in real time, promotes autonomous learning, and increases engagement and motivation. Learners who participated in AI-supported activities demonstrated notable improvements in pronunciation accuracy, consistency, and naturalness compared to traditional instruction alone. The research also highlights that challenges related to differences between Uzbek, a syllable-timed language, and English, a stress-timed language, can be effectively addressed through systematic and sustained AI-supported practice combined with teacher guidance, modeling, and communicative exercises. The combination of technology-enhanced feedback and interactive classroom strategies provides a comprehensive approach to developing both segmental and suprasegmental competence, fostering learners' confidence and oral communicative competence.

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