

PRONUNCIATION TRAINING USING AI VOICE TECHNOLOGY

Tashkent International University of Chemical Technology,

Namangan Branch

Nabijonova Sugdiyona Rustamjon kizi

Annotation. The advancement of artificial intelligence (AI) has significantly transformed language learning methodologies, particularly in the domain of pronunciation training. Traditional approaches often rely on instructor feedback, which may be limited by time, subjectivity, and accessibility. AI voice technology offers a scalable, consistent, and data-driven alternative that enhances learners' phonetic accuracy and communicative competence. This thesis examines the role of AI-powered speech recognition, synthesis, and feedback systems in improving pronunciation skills among second language learners. Drawing on recent empirical studies, the research highlights the effectiveness of AI tools in providing real-time corrective feedback, personalized learning pathways, and increased learner autonomy. The findings suggest that AI voice technology not only supplements traditional instruction but also redefines pronunciation pedagogy in contemporary language education.

Keywords: artificial intelligence, pronunciation training, speech recognition, language learning, phonetics.

SUN'IY INTELLEKT ASOSIDAGI OVOZ TEXNOLOGIYALARI YORDAMIDA
TALAFFUzni O'RGATISH

Annotatsiya. Sun'iy intellekt (AI) texnologiyalarining rivojlanishi til o'rganish metodologiyalarini sezilarli darajada o'zgartirdi, ayniqsa talaffuzni o'rgatish sohasida. An'anaviy yondashuvlar ko'pincha o'qituvchi fikr-mulohazalariga tayanadi, biroq ular vaqt, subyektivlik va mavjudlik jihatlaridan cheklangan bo'lishi mumkin. AI asosidagi ovoz texnologiyalari talaffuz aniqligi va kommunikativ kompetensiyani oshirishga xizmat qiluvchi kengaytiriladigan, izchil va ma'lumotlarga asoslangan muqobil yechimni taklif etadi. Mazkur tadqiqot sun'iy intellektga asoslangan nutqni aniqlash, sintez qilish va fikr-mulohaza berish tizimlarining ikkinchi til o'rganuvchilarning talaffuz ko'nikmalarini rivojlantirishdagi rolini tahlil qiladi. So'nggi empirik tadqiqotlarga tayangan holda, ish AI vositalarining real vaqt rejimida tuzatuvchi fikr-mulohaza berish, shaxsiylashtirilgan o'quv yo'llarini yaratish va o'quvchilarning mustaqilligini oshirishdagi samaradorligini yoritadi. Natijalar shuni ko'rsatadiki, AI ovoz texnologiyalari nafaqat an'anaviy o'qitishni to'ldiradi, balki zamonaviy til ta'limida talaffuz pedagogikasini qayta shakllantiradi.

Kalit so'zlar: sun'iy intellekt, talaffuzni o'rgatish, nutqni aniqlash, til o'rganish, fonetika.

ОБУЧЕНИЕ ПРОИЗНОШЕНИЮ С ИСПОЛЬЗОВАНИЕМ ТЕХНОЛОГИЙ
ГОЛОСОВОГО ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

Аннотация. Развитие технологий искусственного интеллекта (AI) существенно трансформировало методики обучения языкам, особенно в области формирования произносительных навыков. Традиционные подходы в основном опираются на обратную связь

преподавателя, которая может быть ограничена во времени, субъективна и не всегда доступна. Голосовые технологии на основе AI предлагают масштабируемую, стабильную и основанную на данных альтернативу, способствующую повышению фонетической точности и коммуникативной компетенции обучающихся. В данной работе рассматривается роль систем распознавания речи, синтеза и обратной связи на основе искусственного интеллекта в совершенствовании произносительных навыков изучающих иностранный язык. На основе современных эмпирических исследований показана эффективность AI-инструментов в обеспечении обратной связи в реальном времени, формировании персонализированных траекторий обучения и развитии автономности обучающихся. Полученные результаты свидетельствуют о том, что голосовые технологии AI не только дополняют традиционное обучение, но и переосмысливают методику преподавания произношения в современной языковой педагогике.

Ключевые слова: искусственный интеллект, обучение произношению, распознавание речи, изучение языка, фонетика.

Pronunciation is a fundamental component of communicative competence in second language acquisition. Despite its importance, it has historically received limited instructional focus due to methodological challenges and resource constraints (Derwing & Munro, 2015). Conventional pronunciation teaching often depends on teacher-led modeling and corrective feedback, which may not sufficiently address individual learner needs.

With the emergence of AI voice technology, new opportunities have arisen to enhance pronunciation training. AI-driven systems, including automatic speech recognition (ASR) and text-to-speech (TTS), enable learners to receive immediate, objective, and individualized feedback (Liakin et al., 2017). This study explores how AI voice technology contributes to effective pronunciation training and evaluates its pedagogical implications.

Recent research demonstrates that AI-based tools significantly improve learners' pronunciation accuracy and fluency. According to Liakin et al. (2017), AI applications provide consistent feedback that reduces learner anxiety and increases practice frequency. Similarly, McCrocklin (2016) found that ASR technology enhances learners' awareness of phonological errors through repeated exposure and self-monitoring.

Moreover, AI voice systems employ deep learning algorithms to analyse speech patterns, enabling precise identification of segmental and supra-segmental features (Leong & Mak, 2014). This level of analysis is difficult to achieve in traditional classroom settings. Studies also indicate that learners using AI-assisted pronunciation tools demonstrate higher motivation and engagement compared to those using conventional methods (Fouz-González, 2020).

This research adopts a qualitative and analytical approach, synthesizing findings from peer-reviewed studies on AI-based pronunciation training. The study focuses on three core components:

1. **Speech recognition accuracy** – evaluating how effectively AI systems detect pronunciation errors.
2. **Feedback mechanisms** – analysing the types of corrective feedback provided.

3. Learner outcomes – assessing improvements in pronunciation and learner autonomy.

Data were collected from recent academic publications and systematically analysed to identify patterns and trends in AI-assisted pronunciation learning.

The analysis reveals that AI voice technology significantly enhances pronunciation training in several ways:

1. Real-time feedback - AI systems provide immediate corrective feedback, allowing learners to identify and correct errors instantly. This continuous feedback loop accelerates the learning process (McCrocklin, 2016).

2. Personalization - AI-driven platforms adapt to individual learner needs by analysing performance data and tailoring exercises accordingly. This personalized approach improves learning efficiency and outcomes.

3. Increased practice opportunities - Unlike traditional classrooms, AI tools enable unlimited practice without instructor intervention, promoting learner autonomy and confidence.

4. Objective assessment - AI eliminates subjective bias in pronunciation evaluation by using standardized algorithms, ensuring consistent and reliable feedback.

However, certain limitations remain. AI systems may struggle with diverse accents and contextual nuances, which can affect feedback accuracy. Additionally, overreliance on technology may reduce human interaction, an essential aspect of language learning.

AI voice technology represents a transformative development in pronunciation training. By offering real-time feedback, personalized learning experiences, and objective assessment, it addresses many limitations of traditional teaching methods. While it cannot entirely replace human instruction, it serves as a powerful complementary tool that enhances both teaching and learning processes.

Future research should focus on improving AI accuracy across diverse linguistic backgrounds and integrating AI tools into blended learning environments. The continued evolution of AI technology is expected to further refine pronunciation pedagogy and contribute to more effective language education.

References

Derwing, T. M., & Munro, M. J. (2015). Pronunciation fundamentals: Evidence-based perspectives for L2 teaching and research. John Benjamins.

Fouz-González, J. (2020). Using apps for pronunciation training: An empirical study. *Computer Assisted Language Learning*, 33(7), 1–24. <https://doi.org/10.1080/09588221.2019.1595661>

Leong, C. W., & Mak, B. (2014). Automatic pronunciation assessment: Recent trends and future directions. *Speech Communication*, 63–64, 1–18. <https://doi.org/10.1016/j.specom.2014.05.001>

Liakin, D., Cardoso, W., & Liakina, N. (2017). Learning L2 pronunciation with a mobile speech recognition app. *CALICO Journal*, 34(1), 1–25. <https://doi.org/10.1558/cj.26744>

McCrocklin, S. M. (2016). Pronunciation learner autonomy: The potential of automatic speech recognition. *System*, 57, 25–42. <https://doi.org/10.1016/j.system.2015.12.013>

Lutsenko, E. V. (n.d.). Intelligent scalable open interactive online environment for teaching and researching. Kuban State Agricultural University.

Caballé, S., Demetriadis, S., Gómez-Sánchez, E., Papadopoulos, P., & Weinberger, A. (Eds.). (2016). *Intelligent systems and learning data analytics in online education*. Academic Press.

