

## ABSTRACT

The size of the explanatory note is 145 sheets, contains 8 illustrations, 30 tables, 2 appendices, 20 references to sources.

**The relevance of the topic** is manifested in the growing need to optimize drive-thru services, simplify order processing processes and eliminate the lack of available multilingual solutions. Language barriers often lead to inefficiency and customer dissatisfaction in fast food establishments, especially in diverse language environments. The development of an adaptive system can improve communication, optimize work and fill a critical gap in the industry, providing an innovative, inclusive and scalable solution adapted to modern customer requirements.

**Research objective.** The aim of the work is to improve the automatic order taking system by automatically adapting to the user language and increasing its accessibility.

**Research object:** automation of work with users using large language models and speech recognition models.

**Subject of research:** conceptualization, development and implementation of an adaptive system for multilingual order taking in fast food restaurants.

To achieve the goal, the following tasks have been formulated:

- To analyze existing solutions and find the optimal
- To develop a software architecture
- To develop a prototype
- To conduct a comparative analysis of models to find the best solution

**Scientific novelty.** This project presents an innovative order taking system that dynamically integrates adaptive multilingual speech recognition, enabling real-time processing of various languages and reducing communication barriers. The key achievement is the tuning of speech recognition models for the Ukrainian language, eliminating its underrepresentation in commercial systems by refining phonetic and grammatical nuances for greater accuracy. In addition, the system uses an architecture based on query development, optimizing real-time interaction between

voice inputs and server processing to ensure scalability and efficiency. Together, these innovations enhance inclusivity and functionality in fast food environments.

**The practical significance** of this project lies in its potential to improve operational efficiency and customer satisfaction in fast food restaurants. By integrating adaptive systems capable of handling multilingual order taking, the solution eliminates language barriers, reduces order inaccuracies, and simplifies communication between customers and staff. This innovation can increase service speed, serve diverse customer bases, and create a more inclusive dining experience, ultimately increasing customer loyalty and revenue.

**Connection with scientific programs, plans, topics.** The work was carried out within the framework of the research project “Theoretical and practical aspects of Internet of Everything technology” State registration number: 0123U104930.

**Approbation.** The scientific provisions of the dissertation were approved at

- VII International Scientific and Practical Conference of Young Scientists and Students "Software Engineering and Advanced Information Technologies (SoftTech-2024)" dedicated to the 126th anniversary of Igor Sikorsky Kyiv Polytechnic Institute.
- II International Scientific and Practical Conference of Young Scientists and Students, December 19 - 21, 2024, Kyiv, State University of Information and Communication Technologies

**Publications.** The scientific provisions of the dissertation are published in:

- 1) Synkovsky I.V. Popereshnyak S.V. Adaptive system for multilingual order taking in fast food restaurants // Software engineering and advanced information technologies (Soft Tech-2024): materials of the VII International scientific and practical conference of young scientists and students, November 20-22, 2024, Kyiv, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", FIOT. pp. 92-96
- 2) Synkovsky I.V. Popereshnyak S.V. Adaptive system for multilingual order taking in fast food restaurants // Modern aspects of digitalization and

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**Keywords:** Big Language Model, AI, Speech Recognition Model