

ABSTRACT

Explanatory note size – 123 pages, contains 16 illustrations, 38 tables, 5 applications, 25 references.

Topicality. Users of digital audio workstations (musicians, audio engineers) often face the problem of generating new ideas when composing music. In addition, without in-depth knowledge of music theory, selecting a suitable chord progression can become a challenge, as this process may take an indefinite amount of time and may not yield the desired result.

The aim of the study. The main target is to improve the efficiency of digital audio workstations by developing and implementing a virtual assistant software tool for the automation of routine operations and support of the creative process.

The object of research: Software of virtual assistant systems for digital audio workstations.

The subject of research: Architectural solutions, methods, models, and tools for developing the software of a virtual assistant system integrated into the digital audio workstation environment.

To achieve this goal, the **following tasks** were formulated:

- 1) to analyze modern methods of chord recognition and chord progression generation, such as machine learning, spectral analysis and time–frequency transformations, and LSTM/Transformer models;
- 2) to design the architecture of an assistant system with the integration of audio analysis and chord generation into the DAW environment;
- 3) to implement the system modules;
- 4) to evaluate the effectiveness of the solution in terms of recognition accuracy, performance, and the quality of the generated recommendations.

The scientific novelty of the results of the master's dissertation lies in the fact that, for the first time, a virtual assistant software system for digital audio workstations has been developed, integrated into their architecture, and focused on supporting the creative process through the generation of chord progression recommendations based on the analysis of the input audio signal. The proposed solution differs from existing systems, including automatic music generation and

audio analysis services, in that it ensures interactive user engagement and is aimed at complementing rather than replacing the musician's creative activity.

The practical value of the obtained results is the development of a software tool that can be used in the creative activities of musicians, arrangers, and sound engineers to accelerate the process of composing music and improve the quality of harmonic decisions. The results may also be used for educational purposes and in further research in the field of music information systems.

Relationship with working with scientific programs, plans, topics. Work was performed at the Department of Informatics and Software Engineering of the National Technical University of Ukraine «Kyiv Polytechnic Institute. Igor Sikorsky».

Approbation. The scientific provisions of the thesis were presented and approved at the IX International Scientific and Practical Conference of Young Scientists and Students “Software Engineering and Advanced Information Technologies” (SoftTech-2025).

Publications. The scientific provisions of the dissertation were published in:

- 1) Khusid M.M. *Method and Software of a Virtual Assistant System for Digital Audio Workstations* // Proceedings of the VIII International Scientific and Practical Conference of Young Scientists and Students “Software Engineering and Advanced Information Technologies” (SoftTech-2025).
- 2) Khusid M.M. *Method and Software of a Virtual Assistant System for Digital Audio Workstations* // Proceedings of the IX International Scientific and Practical Conference of Young Scientists and Students “Software Engineering and Advanced Information Technologies” (SoftTech-2025).

Keywords: virtual assistant, digital audio workstation, machine learning, artificial intelligence, chord progressions, music generation.