WEB OF SYNERGY :

International Interdisciplinary Research Journal

Volume 5, Issue 2, Year 2026 ISSN: 2835-3013

https://univerpubl.com/index.php/synergy

Article

Preserving Field Performance in the Context of Digital Technologies: Audiovisual Archiving, Digital Documentation, and Methodological Analysis Based on Artificial Intelligence

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Citation: Sunatullayevich S. R. Preserving Field Performance in the Context of Digital Technologies: Audiovisual Archiving, Digital Documentation, and Methodological Analysis Based on Artificial Intelligence. Web of Synergy : International Interdisciplinary Research Journal 2026, 5(2), 33-36.

Received: 10th Dec 2024

Revised: 11th Jan 2026

Accepted: 19th Feb 2026

Published: 31th Mar 2026

Abstarct: The article analyzes modern possibilities for preserving and studying Uzbek doira performance in the context of digital technologies. The prospects for audiovisual archiving, digital documentation of master performances, as well as the automatic analysis of doira methods using computational ethnomusicology and artificial intelligence tools are considered. Based on the limitations of the traditional oral transmission system and the complementary role of digital tools, the need to combine traditional and digital approaches in the preservation of intangible cultural heritage is put forward.

Keywords: Doira, method, digital archiving, intangible cultural heritage, computational ethnomusicology, artificial intelligence, music information retrieval (MIR), digitization, traditional performance.

Introduction

The performance of the circle is a unique heritage that forms the metro-rhythmic basis of Uzbek traditional music, which has been transmitted orally for centuries through the teacher-student system [1]. The method (rhythmic formula) relies on the memory of live performance and preserves subtle performance features that are difficult to fully transfer to a written text. It is for this reason that the interruption of the traditional transmission system - the decline of the master generation or changes in performance practice - poses a risk of loss of the heritage [2]. The international legal framework for the preservation of the intangible cultural heritage (ICH) is established in the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage, adopted in 2003 and entered into force in 2006 [3]. Shashmaqom is included in the Representative List of the Intangible Cultural Heritage of Humanity within the framework of this convention [4]. These documents do not only "museumize" the heritage, but also transmit it to future generations as a living practice.

The rapid development of digital technologies in recent decades has opened up new opportunities for the preservation and study of traditional music. The purpose of this article is to scientifically review the main areas of preservation and study of circle performance in the context of digital technologies, namely audiovisual archiving, digital documentation, and artificial intelligence-based method analysis, and assess their prospects [5].

Method

Traditional preservation methods and their limitations. In traditional musicology, there were two main ways to preserve circle performance: live oral transmission and written notation [6]. Oral transmission is based on the teacher-student system, conveying all the subtleties of the performance through direct demonstration, but it is unstable due to the lack of documentation and the direct participation of the teacher [7].

Although written notation has been widely used since the beginning of the 20th century (since V. Uspensky's Shashmaqom notation in 1923), it cannot fully reflect the timbre richness, agogics, and free expressive nuances of the method [8]. Thus, both traditional methods have certain limitations in fully covering the performance of the circle, and new tools are needed to supplement them [9].

Results and Discussion

Audiovisual archiving and digital documentation. The first and most important stage of digital preservation is the audiovisual recording of the performance and its digital archiving [10]. High-quality audio and video recordings, unlike written notation, directly preserve the realistic sound of the performance, the performer's hand movements and body plasticity, as well as timbre and dynamic nuances. This is especially important for an instrument such as the circle, where the performance technique is important [11].

The effectiveness of digital documentation is based on several principles. The main ones are listed below:

High quality and standardization. Recordings should be made in accordance with archival standards, at high sample rates and resolutions [12].

Metadata. Each recording is accompanied by complete information about the performer, teacher, maqam/musul name, date, place and context of performance - this is necessary for further search and analysis.

Long-term storage. Data should be stored in systems that are protected from format obsolescence, backed up and migrated.

Open access. It is desirable that archives be open to researchers and students, delivered via digital platforms [13].

Systematic digital documentation of the performance of teachers is one of the most reliable ways to preserve the skills of the owners of “living treasures” (Human Treasures). Such archives serve not only as a storage, but also as an invaluable resource for teaching and scientific research.

Computational ethnomusicology and method analysis based on artificial intelligence. The most modern and promising direction of digital preservation is not limited to the mere storage of audio recordings, but to their analysis using computational methods. This direction is developing within the framework of the fields of computational ethnomusicology and music information retrieval (MIR) [14].

An important feature of this area is the development of models adapted to non-Western musical traditions. For example, the international project “CompMusic” under the leadership of H. Serra aims to study the classical musical traditions of India, Turkey (Ottoman status), the Maghreb and China using computational methods precisely on the basis of their specific cultural context [23, 1-b]. Such an approach can also serve as a methodological model for analyzing Uzbek circle methods.

Artificial intelligence and signal processing tools help solve the following tasks in the study of circle performance:

Onset detection. Automatic detection of the timing of “boom” and “bak” beats from an audio signal and extraction of the rhythmic structure of the method.

Automatic method classification. Recognition and classification of various methods (Sarakhbor, Talqin, Ufar, etc.) using machine learning algorithms.

Audio and note synchronization. Time-alignment of a live performance recording with a note or schematic text, facilitating teaching and analysis.

Comparative analysis. Quantitative measurement and comparison of rhythmic differences in the performance of different teachers or regional schools.

Such analysis complements traditional aural perception and description with new, objective and repeatable quantitative data. At the same time, artificial intelligence tools should not replace traditional expert knowledge, but rather be seen as an assistant that enhances it [15].

The use of digital technologies also raises a number of methodological and ethical issues. First, analysis models developed for Western music cannot always accurately reflect the micro-rhythmic and agogic features of Uzbek methods; therefore, it is necessary to develop models adapted to the cultural context. Second, when using digital archives, copyright, teacher and community consent, and cultural property issues must be taken into account.

The following can be identified as promising areas: creating an open digital corpus (database) of circle methods; establishing programs for consistent archiving of teacher performances; developing analysis algorithms adapted to Uzbek methods; and harmoniously integrating digital tools into the traditional educational process. All of this should be based on international experience and the principles of protecting NMM.

Conclusion

The analysis shows that digital technologies do not replace traditional methods of preserving and studying circle performance, but rather complement them in important ways. Audiovisual archiving preserves the live sound and technique of the performance, digital documentation carries the mastery of the masters into the future, and artificial intelligence and computational methods allow for objective, quantitative analysis of the methods.

The most effective way is a comprehensive approach that combines the traditional teacher-student system and digital tools. In this case, the living tradition remains the main one, and digital technologies serve as a means of strengthening and complementing it. The implementation of modern technologies in the preservation of intangible cultural heritage such as circle performance in a culturally context-appropriate, ethical and scientifically based manner is an important task of the present era. It is advisable that future research be focused on developing and testing in practice digital analysis models adapted to Uzbek methods.

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