Perspectives for the Development of Music Computer Technologies and Streaming Services: Artificial Intelligence and Generative Music

Irina B. Gorbunova, Irina O. Tovpich, and Olga L. Yasinskaya

Abstract— The use of artificial intelligence (AI) in musical composition is not just a technological achievement, but a symptom of a profound transformation of ideas about creativity, authorship and the value of an artistic act. Generative music created using algorithms calls into question many familiar categories: Who is the composer? What is the status of the algorithm? Does the generated music have emotional or cultural authenticity? These questions are no longer rhetorical — they are becoming the subject of scientific, legal and philosophical research.

The prospects for the development of generative music also raise concerns within the professional community. Music producers, composers, and sound designers face the risk of "automating creativity," in which technology can not only help, but also displace people from a number of creative professions. Those areas where music performs a utilitarian function are particularly vulnerable: background tracks for videos, games, podcasts, and advertisements. Algorithms are already capable of generating such content faster, cheaper, and without restrictions under copyright agreements. This threatens the economic sustainability of many industry representatives. On the other hand, generative music has the potential to redefine the role of man in creativity. This article is devoted to the discussion of these issues.

Keywords— Artificial intelligence (AI), generative music, music computer technologies (MCTs), musical composition.

I. INTRODUCTION

The higher the level of "musicality" of artificial intelligence (AI), the more acute the question becomes: where does human creativity end and machine operation begin? The classical idea of the composer as the bearer of the author's idea comes into conflict with reality, in which music becomes the result of statistical processing of millions of sounds [1-4]. The problem is compounded by the fact that most of the training samples for generative models consist of copyrighted works. This causes

Manuscript received Aug. 10, 2025.

Irina B. Gorbunova is with the Reseach and Methods Laboratory *Music Computer Technologies* at the Herzen State Pedagogical University of Russia, St. Petersburg

Irina O. Tovpich is with the school No. 8 *Music* with profound study of musical series at the Frunze district of St. Petersburg; and Research and Methods Laboratory *Music Computer Technologie*s at the Herzen State Pedagogical University of Russia, St. Petersburg

Olga L. Yasinskaya is with the Research and Methods Laboratory *Music Computer Technologie*s at the Herzen State Pedagogical University of Russia, St. Petersburg, Russia

legal conflicts: can algorithms trained on other people's music be considered producers of original content? The question arises: in this case, who should own the result — the AI developer, the user who initiated the generation, or the copyright holders of the source data? The prospects for the development of generative music also raise concerns within the professional community [5-9]. Music producers, composers, and sound designers face the risk of "automating creativity," in which technology can not only help, but also displace people from a number of creative professions. Those areas where music performs a utilitarian function are particularly vulnerable: background tracks for videos, games, podcasts, and advertisements. Algorithms are already capable of generating such content faster, cheaper, and without restrictions under copyright agreements. This threatens the economic sustainability of many industry representatives. On the other hand, generative music has the potential to redefine the role of man in creativity. Instead of perceiving AI as a competitor, it can be viewed as a partner that expands the capabilities of the composer

In such an interaction, a person defines goals, emotions, ideas, and an algorithm suggests sound solutions, builds harmonic hypotheses, and experiments with form. This creates a new model of co-authorship, where creativity becomes a process of dialogue between human and machine intelligences.

In this regard, an extremely interesting experience of the famous Russian composer Vladimir G. Pesnja, honored art worker of the Russian Federation (2009), member of the Union of composers of Russia, Professor of the Russian Academy of music Gnesin (2019). Until recently, his music was known primarily to music connoisseurs as music for theater, traditional orchestras – symphonic and Russian folk instruments, as well as chamber instrumental, choral and vocal works. (The original works of V.G. Peshnyak, written by him before the AI period, can be found at the link — https://classic-online.ru/ru/composer/Peshnyak/22132; information about the composer — https://ru.wikipedia.org/wiki / Peshnyak,Vladimir Grigorievich.)

But time is taking its toll, and last summer a completely new direction appeared in the master's art laboratory, caused by his interest in the phenomenon of digital neural networks, which is now penetrating the field of contemporary art.

Back in the 90s, Vladimir Grigorievich mastered the most

diverse possibilities of music computer programs (including sequencers, music editors, arrangers). Later, he taught a course *Computer Music and Arrangement* at the Gnessin Academy. Recently, he has been seriously exploring ways to use AI resources, considering it a new revolutionary level of music composition technology development. Vladimir Peshnyak formalized his experiments in this direction in September 2024 by creating the channel *Music and Artificial Intelligence* in the Telegram messenger – web.telegram.org/k/#@Peshnyak (at the moment, the channel has more than a hundred subscribers who support the experimental efforts of its founder, commenting on his achievements and discoveries that appear periodically; the creator of the channel has uploaded more than 300 of his audio and media files).

It is also important to consider the cultural perspective. Generative music is not only the result of a code, but also part of a broader cultural transformation in which the boundaries between natural and artificial, original and copy, author and instrument are becoming increasingly blurred.

AI in generative music is at the intersection of innovation and cultural challenge. This technology can not only optimize musical production, but also transform the very nature of the musical act. The prospect is not to oust the composer, but to reformat him — from the sole author to the curator, the conductor of algorithmic processes. But this requires not only the development of tools, but also the formation of new norms — ethical, legal and cultural — that will allow AI not to replace, but to complement human creativity.

II. DEVELOPMENT OF VR/AR FORMATS FOR MUSIC EXPERIENCE

One of the most ambitious directions in the field of MCT was the introduction of virtual (VR) and augmented (AR) reality into the musical experience. These technologies open up new possibilities for both artists and audiences — going beyond the linear perception of sound and creating spatial, immersive forms of musical interaction. At the beginning of its development, VR/AR was used as a kind of visual layer on top of existing content — 3D visualization of a concert, a panoramic video sequence, or a simulation of presence at a performance. However, with the development of interfaces, spatial audio technologies (binaural) and cloud engines (Unity, Unreal Engine), VR has become an independent form of musical space in which learners (and listeners!) it not only consumes, but also participates in the sound. Examples of successful projects show how far this area has progressed. Platforms such as WaveXR, The WaveVR, Sensorium Galaxy create virtual scenes where artists act as avatars, and viewers can move around a location, react to music, and interact with objects. Travis Scott's concerts in Fortnite, Jean-Michel Jarre in VRChat, Ariana Grande in Roblox demonstrated not only the technical implementation of the format, but also its potential mass appeal: millions of users participate in such events simultaneously. However, such projects raise the question: where does the concert end and the game begin? This is not only an aesthetic challenge, but also an economic one. Virtual concerts require new monetization models — sales of skins, NFTs, digital tickets, and subscriptions to exclusive locations. This leads to the emergence of a hybrid economy in which the musical experience is transformed into a multi-sensory, interactive and partially gamified product. The difficulty lies in the fact that technology is developing faster than infrastructure: a full-fledged VR experience requires powerful hardware, high network bandwidth, and specific user skills. This limits the availability of immersive formats and exacerbates digital inequality. Educational, therapeutic, and experimental VR/AR applications play an essential role [10-11]. There are projects in which music is used as a means of neurorehabilitation, emotional regulation, or inclusive music education. In such scenarios, the audiovisual content adapts to the user's reactions, allowing you to create an individualized musical route in real time. This raises a fundamental question: how does the very concept of a piece of music change when it ceases to be a linear composition, but turns into an interactive environment that reacts to the behavior of the learner or listener? What does it mean to be a composer in an environment where a user can modify music by moving their head or interacting with objects? VR/AR formats represent not just a technological expansion of the musical experience, but a reinterpretation of the very nature of listening and participating in music. They combine performance, interactive, game mechanics and emotional empathy, forming a new generation of music content. Despite the current limitations of infrastructure and accessibility, it is here that the foundations of a future are being laid, in which music ceases to be flat and becomes spatial, personal and deeply involving.

III. NEW FORMATS OF INTERACTION, MUSICIANS, TEACHERS, PERFORMER, ACTORS AND THE AUDIENCE

With the development of the MCT and especially the platform economy, the interaction between the teacher-musician and the student, the artist and the listener ceases to be one-sided. Previously, music relations were based on the "creator—consumer" model, but today this model is increasingly being replaced by a "partner" model: the user is involved in the processes of distributing, interpreting, and even co-authoring music content. This is not just a new communication channel, it is a shift in the very cultural logic of music production. Social and creative platforms, from SoundCloud and TikTok to BandLab and Endlesss, play a key role in this transformation. They provide an opportunity not only to download and listen to tracks, but also to remix, comment, participate in challenges, and create collaborations. The student and the listener become active participants in the musical and creative process. Such services blur the line between a professional artist and an amateur, allowing any student to turn into a creator with minimal technical costs. This decentralization leads to new formats of representation: for example, decentralized platforms appear in the Web3 environment, where trainees can vote for the promotion of tracks or receive tokens for participating in the promotion of an artist. This approach not only expands the audience's control

over the cultural product, but also calls into question the traditional verticals of music production — from labels to streaming platforms. At the same time, a trend of personalized artistic experience is emerging. Some musicians use data on fan activity (for example, through Spotify for Artists or Apple Music Analytics) to adapt their communication in real time, select cities for tours, share behind-the-scenes content, or even include listeners in the album creation process. This leads to the effect of a "musical microcommunity" in which the artist and the audience become interdependent subjects. However, such transparency and engagement have a downside. Musicians have to constantly keep in touch with the audience, demonstrate "authenticity" and be available on social media. They are expected not only to create music, but also to participate in an endless media stream: lives, blogs, stories, memes. This leads to new forms of burnout and changes the very idea of musical creative work as an emotional and public work. In addition, modern formats of musician-audience interaction reflect the transition from a hierarchical model of musical creativity to a networked, hybrid and interactive system where each participant can simultaneously be both a listener and a creator [12-14]. This opens up new horizons for cultural democracy, but it also requires a new ethic: respect for the artist's work, a balance between attention and intrusion, between accessibility and autonomy.

IV. THE FUTURE OF STREAMING: DEVELOPMENT SCENARIOS

The growing influence of local platforms Although global streaming giants — Spotify, Apple Music, YouTube Music — continue to dominate most music markets, more and more signs point to the growing influence of local and regional platforms. These services, focused on the cultural, linguistic and technological specifics of their countries, are becoming increasingly important elements in the global music ecosystem. In a number of regions, especially in Asia, Africa, and Latin America, local platforms not only compete, but often outperform international competitors in terms of audience reach and user engagement (Tencent Music and NetEase Cloud Music in China, Anghami in the Middle East, Boomplay in Nigeria, JioSaavn in India, and Yandex Music in Russia). These services adapt to the specifics of the local audience: interface language, preferred genres, habits, subscription models, and even the political context. The reasons for this success lie not only in localization, but also in institutional and technological autonomy. In conditions where Western platforms often face restrictions (for example, censorship, blocking, legal conflicts), local services can operate more freely and offer flexible cooperation schemes with local artists and copyright holders. This, in turn, stimulates the development of local music production. Musicians who were previously focused on the global mainstream are increasingly returning to their native languages, genres and forms, as this is the path to success within regional ecosystems. In this way, local platforms become not only economic agents, but also cultural institutions that support the diversity and sustainability

of the music scene. However, the opposite trend is also emerging: the fragmentation of the global musical space. If digital music seemed to be the driving force behind globalization in the early 2010s, today we are seeing the opposite - separation by platforms, languages, algorithms, and recommendations, which can make it difficult for music to circulate between regions and reduce cultural understanding. The growing influence of local streaming platforms suggests that the future of music streaming will not be unified and centralized. It will be polycentric, culturally diverse, and technologically adaptive. This trend requires global players to be able to deeply localize, and the music community to be open to a new understanding of the global: not as standardization, but as the coexistence of different musical worlds on the digital world map. The concept of metaverses and streaming in immersive spaces The idea of the metaverse — a digital, constantly functioning space in which users interact through avatars in real time — is increasingly penetrating the field of music consumption. In this context, music becomes not so much a separate product as a function of the environment: you can not just listen to it, but live, explore, and adapt it to yourself. Streaming in the metaverse is not about "playing a track", but about participating in an audiovisual ecosystem where the boundaries between listener, participant, and artist are gradually blurring. The key milestones of this process were the virtual performances of artists on platforms like Fortnite (Travis Scott, Ariana Grande), Roblox (Lil Nas X), Decentraland, WaveXR, as well as DJ sets in VRChat and Horizon Worlds. These events gather millions of users, turning into global cultural events of a new format. They show that music is becoming part of social navigation, symbolic identity, and virtual interaction in digital worlds. Music streams in the metaverse are often accompanied by additional levels of engagement: interaction with the surrounding space, customization of avatars, purchase of virtual goods, creation of shared content. This is changing the nature of music distribution: sound becomes associated with movement, graphics, choice, and gamification. The user — and the learner — can "live" in his virtual musician environment. However, the massive integration of streaming services into metaverses is still facing a number of barriers. Among them are technical limitations (bandwidth, graphics, lack of a single standard), insufficient digital literacy of the audience, as well as the uncertain legal status of music and content hosted in virtual spaces. Copyright issues are becoming particularly acute: who owns the track if it was generated by AI inside the metaverse? What licenses are needed if music is played simultaneously in dozens of countries with different legal systems? And how can music content be monetized if the user perceives it as part of the overall "experience" rather than as an independent work? The prospects of streaming services in the metaverse are perceived by the music industry [15-18]. For example, Spotify has already launched its Roblox metaverse, Spotify Island, where users can interact with the brand, listen to music, collect virtual items, and participate in events. Apple Music and Amazon Music are taking similar steps by integrating into augmented

reality platforms. The comparative historical approach allows us to identify ways to expand the traditional forms of creation and processing of musical material. An analysis of the capabilities of the MCT software and hardware shows the possibilities of transforming musical and creative activity, creating the basis for the accessibility of the music composition and production process even outside of a professional studio. This circumstance became the basis for the formation of a new type of musical figure — a universal, hybrid professional combining the functions of a composer, arranger, sound engineer and performer [19-24]. (*Let us recall that, just as now, a few centuries ago — 350-400 years earlier — the composer was both a performer, an interpreter, a producer, and a teacher. The greatest masters of all time, such as N. Paganini and W. A. Mozart, sometimes performed as street musicians, and the stage for them was a city square, and the listeners were random street passers-by. The situation is remarkably similar to the online technological creative and educational space that exists today, but the instrument for a musician - composer and performer at the same time - is his small home studio, and the stage is the whole world. And if earlier for most musicians the instrument was an acoustic violin or a small ensemble consisting of musical instruments that could be moved using vehicles appropriate to that time, now for a performer on the stage of any concert hall it can be a single digital musical instrument (electronic musical synthesizer) containing the possibilities of sounding huge orchestras of any kind. instrumental composition. It is worth adding that there are no problems related to the sound of such an instrument caused by the architectural features of concert halls or their acoustic disadvantages (for example, the presence of "dead zones", etc.*).

A meaningful analysis revealed that the MCT and streaming environment generates not only new channels of interaction between the musician and the audience, the teacher and the student, but also new challenges — from musical preferences to manipulation and artificial activity [25-26].

V. Conclusion

Generalization and systematization of the data obtained allowed us to formulate the following conclusions:

- MCT has transformed professional and amateur musical creativity practices, opening up wide opportunities for individual and collective creative expression.

- Streaming platforms act not only as a technical intermediary, but also as an active actor in the musical space, shaping the conditions of perception, the economy of attention and cultural trends.

- The digital music environment requires new approaches to copyright, the ethics of digital music creation, and a critical understanding of algorithmic models and recommendations.

- The future of the music industry lies in hybrid formats where artistic intent, technological environment, and social interaction combine into a single, interactive ecosystem.

Thus, it can be concluded that MCT and streaming services

are not just a backdrop for musical creativity, but form a new cultural infrastructure in which everything is changing.: from the role of musicians (composers, music teachers of various specialties working in a wide variety of educational institutions - music and general education schools, colleges, universities, in the system of inclusive musical education), artists working in various genres involving music, to the nature of the musical work itself. Understanding these processes is necessary for both the professional community of musicians and teachers who form musical culture and instill the values, norms, knowledge and traditions characteristic of musical art to people all over the world. In this regard, the possibilities of the contemporary musical, creative and musical educational space are almost limitless, since music as a sounding phenomenon, as one of the most vivid art forms that allow people to understand and experience emotions, is an important part of world culture, reflecting events and worldviews of different nations, attracts the attention of a huge number of listeners and creators of music content.

Summing up the analysis, we can say that information technologies in music today are an integral part of the musical creative and pedagogical process, enriching it with a whole range of new possibilities, which is fully embodied in the MCT.

References

[1] Zadeh L.A. Outline of a new approach to the analysis of complex systems and decision processes. IEEE Transactions on systems, man and cybernetics SMC-3. IEEE, 1973, iss. 1, pp. 28–44. https://doi.org/10.1109/TSMC.1973.5408575

[2] Chibirev S., Gorbunova I. Computer modeling in musical creative work: an interdisciplinary research example. Technology, Innovation and Creativity in Digital Society. PCSF 2021. St. Petersburg, October 26–27, 2021. Cham, Switzerland: Springer, 2022, vol. 345, pp. 474–483. https://doi.org/10.1007/978-3-030-89708-6_40

[3] Gorbunova I.B. Information technologies in music and integrative model of its semantic space. St. Petersburg State Polytechnical University Journal. Humanities and Social Sciences. 2014, no. 4(208), pp. 152-161.

[4] Gorbunova I.B., Alieva I.G. Concerning the project of intelligent system of cataloguing and analyzing of the world's peoples music. Society: Philosophy, History, Culture. 2016, no. 9, pp. 105-108.

[5] Gorbunova I.B., Petrova N.N. Music computer technologies, supply chain strategy and transformation processes in socio-cultural paradigm of performing art: using digital button accordion. International Journal of Supply Chain Management. 2019, vol. 8, no. 6, pp. 436-445. https://ojs.excelingtech.co.uk/index.php/IJSCM/article/view/4017.

[6] Gorbunova I.B., Kameris A. Music computer technologies in training a modern teaching musician. Journal of Advanced Research in Dynamical and Control Systems. 2020, vol. 12, no. S6, pp. 518-531. DOI: 10.5373/JARDCS/V12SP6/SP20201060

[7] Gorbunova I.B. The concept of music computer pedagogical education in Russia. International Journal of Advanced Science and Technology. 2020, vol. 29, S6, pp. 600-615. http://sersc.org/journals/index.php/IJAST/article/view/8881

[8] Gorbunova I.B., Kameris A. Music computer education concept for teachers: raising the problem. International Journal of Recent Technology and Engineering. 2019, vol. 8, no. 2 S4, pp. 913-918. DOI: 10.35940/ijrte.B1181.0782S419

[9] Gorbunova I. The integrative model for the semantic space of music and a contemporary musical educational process: the scientific and creative heritage of Mikhail Borisovich Ignatyev. Educação. 2021. DOI: 10.5902/1984644453329

[10] Gorbunova I.B., Zakharov V.V., Yasinskaya O.L. Development of applied software for teaching music to people with deep visual impairments based on music computer technologies. Universidad y

Sociedad. 2020, vol. 12, no. 3, pp. 77-82. https://rus.ucf.edu.cu/index.php/rus/article/view/1559

[11] Gorbunova I., Govorova A. Music computer technologies in informatics and music studies at schools for children with deep visual impairments: From the experience. Lecture Notes in Computer Science. Proceedings. 2018. C. 381-389. DOI: 10.1007/978-3-030-02750-6_29

[12] Gorbunova I.B., Zalivadny M.S. Leonhard Euler's theory of music: its present-day significance and influence on certain fields of musical thought. Music Scholarship. 2019, no. 3 (36), pp. 104-111. DOI: 10.17674/1997-0854.2019.3.104-111

[13] Gorbunova I.B., Chibirev S.V. Modeling the process of musical creativity in musical instrument digital interface format. Opcion. 2019, vol. 35, no. Special Issue 22, pp. 392-409. https://produccioncientificaluz.org/index.php/opcion/article/view/29453

[14] Vijayalakshmi P.R., Divya Bharathi P., Jeyakarthika C.S., Haripriya K. 2024. URL:https://www.theijire.com/archiver/archives/music_recommendation_system_using_k_nearest_neighbor_algorithm.pdf

[15] Koren Y., Bell R., Volinsky C. Matrix factorization techniques for recommender systems. IEEE Computer. 2009. Vol. 42, № 8. P. 30–37.

[16] McDonald G. You Have Not Yet Heard Your Favourite Song: How Streaming Changes Music. Nine Eight Books, 2024. 352 p.

[17] Meier L.M. Popular Music as Promotion: Music and Branding in the Digital Age. Polity Press, 2017. 210 p.

[18] Morris J.W. Selling digital music, formatting culture. University of California Press, 2015. 232 p.

[19] Music recommendation system using k nearest neighbor algorithm. URL https://www.example.com/music_recommendation_system_using_k_nearest_neighbor_algorithm.pdf.

[20] Nierhaus G. Algorithmic Composition: Paradigms of Automated Music Generation.Springer,2009.URL:https://www.researchgate.net/profile/Paul-Doornbusch/publication/220386641

[21] Rendle S., Freudenthaler C., Gantner Z., Schmidt-Thieme L. BPR: Bayesian Personalized Ranking from Implicit Feedback. Proceedings of the Twenty-Fifth Conference on Uncertainty in Artificial Intelligence (UAI). 2009, pp. 452–461.

[22] Cole S. The impact of technology and social media on the music industry. Econsultancy, 2019. URL: https://econsultancy.com/the-impact-of-technology-and-social-mediaon-the-music-industry.

[23] IFPI Global Music Report 2024. URL: https://www.ifpi.org/what-we-do/global-music-report/

[24] Artificial intelligence (AI) and machine learning (ML): differences, similarities and applications [Electronic resource]. Blog productstar.ru , 2025. URL: https://productstar.ru/blog/iskusstvennyj-intellekt-ai-i-mashinnoe-obuchenie-ml (date of access: 05/06/2025).

[25] Gorbunova I.B. The integrative model for the semantic space of music and a contemporary musical educational process: The scientific and creative heritage of Mikhail Borisovich Ignatyev. Laplage em Revista. 2020. T. 6. № S. C. 2-13. DOI: 10.24115/S2446-622020206Especial940p.2-13

[26] Gorbunova I.B., Zalivadny M.S., Tovpich I.O. On the application of models of the semantic space of music in the integrative analysis of musical works and music education with music computer technologies. Apuntes Universitarios. 2020, vol. 10, 4, pp. 13-23. DOI: 10.17162/au.v10i4.486

Technologies at the Herzen State Pedagogical University of Russia, St. Petersburg; hold the degree of Honorary Worker of Higher Professional Education of the Russian Federation.

2002 – present – Head of the Research and Methods Laboratory *Music Computer Technologies* at the Herzen State Pedagogical University of Russia, St. Petersburg.

She has more than 550 scientific publications, among them are monographs, digital educational resources, and manuals. Her articles have been published in various scientific journals and editions.

Irina O. Tovpich was born in St. Petersburg, Russia. Graduated from the Saint Petersburg State Institute of Cultural and Arts (St. Petersburg, 1986), the Herzen State Pedagogical University of Russia, specialty "Management in Education" (2007); St. Petersburg Law Academy, specialty "Jurisprudence" ((St. Petersburg, 2009); professional retraining courses on the program "Teaching Musical Disciplines Using Music Computer Technologies" at the Herzen State Pedagogical University of Russia (St. Petersburg, 2012), PhD in Pedagogical Sciences.

She was a teacher of music at several regions of the Far East (1986 - 1990); teacher of music at the School № 8 *Musica* with profound studying of musical disciplines for gifted children, St. Petersburg (1991 – 2004). Headmistress of the School *Musica* from 2004 to nowadays.

She is the author of a number of articles published in various scientific journals, as well as the monograph *An Integrative Model for Semantic Spase of Music*, compiled with participation of I.B. Gorbunova and M.S. Zalivadny, St. Petersburg: Publ. House of the Herzen State Pedagogical University of Russia, 2016.

Olga L.Yasinskaya was born in St. Petersburg, Russia. Graduated from the Herzen State Pedagogical University of Russia (St. Petersburg); PhD student of the Herzen State Pedagogical University of Russia under the guidance of Prof. Irina B. Gorbunova.

She is an author of a number of articles published in different research journals.

Since 2014, she has been working as a sound engineer at the Research and Methods Laboratory *Music Computer Technologies* of the Herzen State Pedagogical University of Russia.

Irina B. Gorbunova was born in St. Petersburg (Leningrad), Russia. DipMus, Special Music Higher School of the St. Petersburg State Conservatory named after N.A. Rimsky-Korsakov; BSc in Computer Science: Information Technology, Computer Science and Multimedia, Leningrad State University, Ussurisk State Pedagogical University; MA in Education, the Herzen State Pedagogical University of Russia; PhD in Information Technology and Pedagogical Sciences, the Herzen State Pedagogical University of Russia, St. Petersburg, 1989; Doctor degree: Doctor of Pedagogical Sciences and Information Technology, the Herzen State Pedagogical University of Russia, St. Petersburg, 1999. Dr., Full Professor, Chief Researcher of the Research and Methods Laboratory *Music Computer*