

AI shows Indian music is both an Art and a Science

Aparna Sridhar December 9, 2019

Does it matter who has created a piece of artistic work, especially a piece of music. Why is it that something that is created by humans is valued more than say the music of birds or machines? Some Artificial Intelligence music naysayers predict that the consumption of AI music will mostly be by those who do not know the source of the music, not realising that in itself is telling.

Professor Dr Vinod Vidwans of Pune-based FLAME University has developed software that generates computational Indian music using AI. His research has led to the generation of a 'Bandish' on its own without any human assistance. The system is tested with a number of Ragas such as Hamsadhwani, Dhanashri, Malkaunsa, Maru Bihag, Kalavati, Desha, Bilaskhani Todi, Bhairavi and so on.



Prof. Dr Vinod Vidwans

"This expert system possesses the knowledge of an expert in the domain of Indian classical music. The principles, concepts and conventional knowledge-base of Indian music have been encoded in this system in the form of generic rules to generate music. It is a rule-based system and does not have any database of Ragas and generates the required musical data following the rules."

This is the 'generative' strength of Artificial Intelligence. The system is capable of generating appropriate aalaaps, taans and swara-vistara following the rules. "My expert system is AI enabled and it generates music by itself without my intervention. I do not use machines or any editing and music composing tools for generating music."

For him the existing notions of creativity are inadequate to evaluate non-human music.

“Currently the concepts of originality and creativity are understood from a subjective perspective. AI enabled computational output cannot be explained with the current paradigm. We need to look at these concepts from an objective point of view. Creations in nature are independent of human existence and therefore not subjective. Creativity is not limited to human activity.”

AI generated music

Raga-Maru-Bihag-on-String-Instrument

A product of Mumbai's Industrial Design Centre at the Indian Institute of Technology Creation, Dr Vidwans sees creativity as an objective phenomenon, which can be envisaged at three levels - Natural (Cosmic), Human and Artificial. If the music of the spheres or cosmos as articulated by Pythagoras and Kepler can be beautiful, so can the music generated by computers, he says.

AI music while not originating exclusively from the human mind will continue to be curated by humans with a highly developed musical sense, working not just with chords and strings, but also with algorithms. The musical experience is never constant anyway.

“Feelings are subjective. Even the same Raga rendered by two human performers may not evoke the same feelings in a particular individual. Every individual has their own preferences of musicians, performers, Ragas, and genre. Music created by AI can be considered as an additional genre. AI can generate music which is not distinguishable from the music created by humans. In such instances the listeners will have emotions similar to those evoked by human performers,” says Dr Vidwans.

This leads us to another possibility, which is utterly fascinating, more than the sound of the music itself. Dr Vidwans' research into ancient Indian music treatises suggests our early musicologists showed high scientific acumen in the way they approached their art. While he was working on a project of the graphical representation of Indian music, he found that Bharata's Natyashastra and the Sangita Ratnakara of Sharanga Deva carry valuable theoretical knowledge of Indian music which could be validated, apart from the performance aspects of the art.

While contemporary musicians have very high regard for these treatises, musicologists have told Dr Vidwans, the concepts from these treatises are not followed by musicians consciously or consistently. A point made frequently every Chennai season, about the

difference about what is discussed at the Music Academy's morning conferences by musicologists and what is actually sung in the evening concerts by musicians.

"I could see that these concepts of Vadi, Samvadi, Graha, Nyasa etc. are logically consistent and are still valid though musicians may not acknowledge it. So I decided that if by using these concepts one can generate music on computers then it can be proved that these concepts are valid and worthy of further research. I started working on it by using AI theoretical paradigms and now this effort has started producing results. This suggests that these treatises carry scientific (Shastriya) knowledge and there exists a science (Shastra) of music."

To test the concept of 22 shrutis or microtones, Bharata's Natyashastra provides an experiment called 'Shruti Nidarshanam' or 'Sarana Prayoga' which demonstrates the existence of these microtones. When Dr Vidwans examined this closely, he realised that this could be tested on the Veena. "I designed and developed a special Veena – which I called Bharat Veena – and successfully tested the theory. Again this shows that many of the concepts from Bharata's Natyashastra can be proved empirically and scientifically."

For those who believe that classical music is static and under threat of being outpaced by all kinds and modes of entertainment, AI music offers solutions to make the offerings more personalised and exciting. "AI is a very powerful tool of analysis as well as decision making. It can help analyse and make predications in terms of audience preferences, trends, deep learning, categorization and classification of popular music. AI has very robust generative ability which needs to be explored that may set new trends in musical creativity," says Dr Vidwans.

The old models of transmission of knowledge are also changing and with "constraints of space, time and availability of Gurus, the tradition has been gravely impacted. The psyche of Gurus as well as that of the students is now changing. They have started using web-based platforms for teaching and learning music. AI enabled technology can be used as an additional tool as it is flexible and economical."

The next logical step would be AI augmented teaching, learning, preservation, and documentation of musical and other oral traditions, says Dr Vidwans. "The preservation of the Vedas was a major tradition throughout the medieval ages. There were over a thousand branches of the Samaveda, today only four survive. This represents an inevitable loss of information due to various socio political factors and human limitations. Artificial Intelligence will help vindicate and preserve this information as it is independent of these external developments. It will greatly contribute in preserving the oral tradition in a most authentic way."

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