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TRADITION MEETS INNOVATION – AI'S IMPACT ON INDIAN CLASSICAL DANCES

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ABSTRACT

Artificial intelligence is making waves in the field of Indian classical dance, merging technology with tradition to innovate and expand this ancient art form. Traditionally, these art forms rooted deep into the cultural heritage and always pass down through rigorous training, but with time Indian art forms are experiencing a transformation as AI becomes an integral part of choreography, teaching and performance. Through various AI driven applications, the art form is reaching broader audiences and fostering interest among younger generations and global reviews. AI powered platforms can now provide virtual training sessions enabling students from all over the world to learn from renowned teachers. These platforms use AI to give real-time feedback on students, postures and movements which is valuable for those students who may not get a chance to have a direct contact with the teachers. AI generated applications also help a person to practise and understand tala, laya and layakaries. There exist many applications that provide a musician, a base tempo or rhythm to hold the tala in place and helps in composing difficult bandishes. In recording also, it simplifies mixing and mastering enabling dancers and musicians to produce clear professional recordings for online platforms. As a result, artists can reach a wider audience and promote their work on digital stages, empowering them to innovate while protecting the essence of their art.
Keywords: Indian classical dance, music, artificial intelligence, choreographies, tala and laya

Introduction

Indian classical dance is a wide term that encompasses a variety of highly stylised traditional dance forms originated in India. Rooted in ancient texts, particularly the Natyashastra (a classical Sanskrit treaty on the performing arts), these dances are rich in Indian mythology, spirituality and aesthetic sense. These dances are featured by their strict attachment to classical music, complicated footwork, precise hand gestures and expressive facial expressions. Each dance form follows a structured system of gestures, expressions, rhythm and storytelling often taking episodes from Hindu epics like Ramayana and Mahabharat, and also from the folklore and themes of devotion and nature. There are primarily eight classical dances of India recognised by the Sangeet Natak Academy, which is India's national Academy for dance, music and drama. The dance forms are: Kathak (north India), Bharatanatyam (Tamil Nadu), Kathakali (Kerala), Kuchipudi (Andhra Pradesh), Manipuri (Manipur), Odissi (Odissa), Sattriya (Assam), Mohiniattam (Kerala). Each style has its own unique music, makeup costumes, mudras, abhinaya. Indian classical dance combines nritta (pure technical dance), Nritya (expressive dance) and Natya (drama) to create overwhelming performances that makes a deep connection with audience, emotionally spirituality and aesthetically.

Artificial Intelligence

Artificial intelligence is the way for computers to act like humans by learning from data stored in it. "AI is a branch of computer science concerned with the study and creation of computer systems that exhibit some form of intelligence: systems that learn new concepts and tasks, systems that can reason and draw useful conclusions about the world around us, systems that can understand a natural language or perceive and comprehend a visual scene and systems that perform other types of feats that require human types of intelligence. "Instead of following instructions step by step for every task, AI systems can easily analyse information and recognise patterns, make decisions and even improve over time. It's like teaching a computer to solve problems and think on its own with some boundaries like searching objects in photos, understanding speech or giving recommendations and advices. It is a branch of computer science that is focused on creating systems that can perform tasks which requires human intelligence. There are different types of artificial intelligence: 1.) Narrow Artificial Intelligence (Weak AI) 2.) General Artificial Intelligence (Strong AI) 3.) Super intelligent Intelligence

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AI is also increasingly making its way into fields like Indian classical dance and music, where it can offer innovative tools for artists, learners or spectators. The relation of AI with Indian classical dance is dynamic and evolving that combines tradition with cutting-edge technology.

General References of the work

Artificial intelligence has been a transformative field evolving from early theoretical work to modern applications across various domains. Basic research in AI begins with 'Alan Turing's *Exploration of machine intelligence'* in 1950s. John McCartney introduced the term in 1956 and often referred to as the 'father of AI'. Most of the work on AI has been originally reported in journal articles, which later on appeared in special collections published as books. '*Computers and Thought'* by Feigenbaum and Feldman in 1963 is a very well-known collection. Modern AI research addresses challenges like scalability and ethical considerations. General references for AI include books like *'Artificial Intelligence: A modern approach'* by Stuart Russel and Peter Norvig and journals such as AI magazine and 'Journal of Artificial Intelligence Research' (JAIR). Some of the key references for Indian classical dance include '*Indian classical dance: tradition in transition'* by Kapila Vatsyayan, which explores the historical and cultural aspects of classical dance. Many articles in Sangeet Natak journal published by the Sangeet Natak Akademi, focusing on every aspect of performing arts and its relation with other multidisciplinary fields. Many research papers can be found in 'International Journal of Indian culture and business management' (IJICBM). References for the interdisciplinary work include papers in journals like Digital humanities quarterly and conference proceedings in AI and arts, emphasising the preservation and innovation of traditional dance through AI Integration.

AI's impact on Indian Classical Dance

Artificial intelligence can help analyse and preserve Indian classical dance and music by digitally documenting techniques, styles and compositions. AI models can analyse old recordings to understand rhythmic patterns in Kathak footwork or the structure of raga compositions. By Archiving performances, AI helps in preserving traditional art forms and makes them accessible to future generation. It can also analyse rhythm patterns and movements specific to Indian classical music and dance. For example, AI can recognise the mudras, bhava and other facial gestures when shown a picture of any classical dancer. Even by analysing the costume of the dancer in the picture, it can tell about the dance form of the dancer. In the same manner, AI can recognise and classify ragas and talas used in the composition. AI also helps in creating interactive learning platforms for students of classical dance and music. For example, AI powered virtual teachers can give real-time feedback on the pitch, rhythm and technique in vocal or instrumental music, helping students learn effectively. It helps dancers refine their posture, expressions and timing. It makes classical art forms more accessible to people who may not have easy access to expert teachers.

Generative AI models can experiment with creating new compositions or choreographies by blending elements from various classical dance styles. This may include composing compositions inspired by previous traditional ragas or choreographing sequences in Kathak or any other dance form. AI can enable immersive experience for audiences. Using technologies like virtual reality (VR) audiences can experience live performances aura by sitting in their room. VR could place viewers in settings inspired by classical eras, allowing them to watch a dance as if they were attending a historical court performance or an ancient ritual enriching their understanding of the dance's cultural and historical context. AI is useful for researchers studying the evolution of Indian classical music and dance. Many classical dance records are stored in scripts like Sanskrit or regional languages. Optical character recognition software powered by AI can help convert these texts into searchable forms; Indian classical dance often involves storytelling through lyrics in Sanskrit, Tamil or other regional languages. AI translation tools can also assist in translating these texts, helping researchers understand the cultural text. NLP (natural language processing) models can help analyse the themes in lyrics and dance performances providing insights into emotional tones and cultural significance.

AI powered tools like 'iZotope Neutron' can analyse individual tracks and suggest the adjustments based on the genre of the track. This saves time and can provide a strong starting point for audio engineers. Platforms like

'LANDR' and 'eMastered' use AI algorithms to automatically master tracks, balancing elements like loudness and frequency spectrum, making high-quality mastering more accessible to independent artists. Tools like AIVA (Artificial intelligence virtual artist) can create new melodies, harmonies or even entire compositions and giving magicians' fresh creative material to work with. Neural network based plug-ins can add realistic, instrumental sounds or adjust effects like reverb, pitch and modulation, allowing musicians to stimulate complex sounds in digital formats. Slogans like 'XO' by 'XLN audio' and 'Atlas' analyse existing rhythms to suggest new beats or fill in drum beats that fit the genre and feel of a track. "Musical Instrument Digital Interface (MIDI) is a communication standard developed in early 1980s for electronic musical instruments and computers. A MIDI file consists of a list of commands that represent the recordings of a musical action. When these commands are sent to MIDI playback device, a sound is produced. "Artificial intelligence can also create visually stunning invitation cards for Indian classical dance events. It can provide creative themes, customised templates, can suggest scripts, and provide cultural symbols. AI tools such as DALL.E can generate artistically attractive backgrounds and motifs. Inspired by Indian classical dances like Kathak, Kathakali, Odissi etc. Platforms like Canva combined with AI can provide templates of classical themes. AI also recommends traditional forms of scripts such as Sanskrit inspired calligraphy to match the cultural aesthetics. AI can also provide images or silhouettes of classical dance mudras or hand gestures and posters. It can also generate elements like temple pictures, musical instruments, animated dancer figures, lotus patrons and many more. It also helps in embedding the hosts' name, event details and photos seamlessly while suggesting different layouts that align with the respective theme. We can also use AI for multilingual translation in languages such as Hindi, Tamil, Telugu, Sanskrit etc. to make the invitation accessible to a diverse audience.

AI can also change or enhance the backgrounds of artist's pictures to create a stunning and appropriate content for Indian classical dancers. "Photoshop ships with more than 95 filters as standard. Filters add enormous creative flexibility and potential to image manipulation, and they are well worth experimenting with." AI tools like remove.BG, Luminar AI or Photoshop AI can replace distorted backgrounds which seem inappropriate with aesthetically appealing backgrounds such as Temple courtyard, ornate stage setups, nature inspired backgrounds and mythological scenes. AI can also enhance the already existing background by including cultural motifs like rangoli patterns, temple bells or mandala art. "Pictures/graphics enhance the overall look of a multimedia package. Pictures express more than normal text and are generally considered the most important element of a multimedia application." It can also add soft lighting effects like stage spotlights. It blurs the background to keep the focus on dancer while keeping the ambience of the picture intact. It can also recreate backgrounds in the traditional art form styles such as Madhubani paintings, kalamkari patterns, Tanjore art inspired gold embellishments. AI can also add dynamic effects like flowing dupattas or saris in the wind, flower petals, scattering and subtle smoke or stage mist effect etc. AI tools can also enhance the lighting, contrast and overall quality of dull or poorly lit pictures of dancers, especially classical dancers. AI photo editors automatically scan and analyse pictures and adjust brightness, contrast, shadows and highlights to bring out the details. AI ensures proper lighting without overexposure enhancing the focus on facial expressions and costumes. It can also remove graininess from low light pictures making the image of appear clearer. Editors like 'Portrait Pro AI' and 'Luminar Leo' can stimulate stage light effects, spotlight focus on the artist and warm ambient light for a classical aesthetic aura. Many tools can also enhance details like facial expressions, mudras and costume embroidery by sharpening the blurry images. Here are some AI generated apps- 'Snapseed by Google', 'Remini', 'Fotor AI', 'Canva Pro AI' etc.

AI can also assist Indian classical dancers in different ways during stage performances, enhancing the overall experience of both audiences and artists on the stage. "The brightness/ contrast command provides the least complicated controls for changing overall brightness/ contrast levels in an image. It does not change individual colour channels; it makes the same adjustment to all pixels across the full tonal range of the image." AI powered lighting systems, can adjust stage lighting in real time based on the dancer's movements, creating dramatic effects. Spotlights following the dancer during key movements or changing hues to match the mood of tala or raga. AI can project mythological scenes, temple backgrounds on natural landscape on stage that interact with the dancer's performance. Tools like AIVA can adapt live music to a dancer's tempo, ensuring synchronisation between

movements and rhythms. AI can also optimise the acoustics of live instruments like tabla, mridangam, veena, flute harmonium etc., ensuring clarity for audiences in large venues. AI tools can analyse the dancers pose (mudras and adavus) during rehearsals or live performances, providing feedback or syncing visual effects with specific movements. AI can superimpose cultural or mythological visuals onto the stage, enhancing the storytelling of dance dramas. A live classical performance depicting the Dasavatar of Vishnu ji could be enhanced by AI generating avatars of Vishnu's incarnations appearing on stage. AI language tools can translate or narrate the Abhinaya Paksha (dance's story) into multiple languages, displayed on screens for non-native audiences. AI ensures high-quality, live streaming on social media with automatic camera focus and angle adjustments to capture the most dramatic moments of the dancer's performance. "The massive increase in the availability of inexpensive, high-speed personal computers has led to the development of large scale computing networks, capable of serving thousands of users spread out across the globe. Such systems permit the users to share software and databases to accomplish tasks that were once the sole province of mainframe time share computers." Another benefit is AI-aided costume illumination. LED embedded costumes controlled by AI can light up or change patterns in sync with the dancer's movements. AI filters during live streaming can also enhance facial expressions, ensuring the dancers abhinay reaches distant viewers. AI powered robotic props or screens can move or adapt in sync with the dancer's performance, creating a dynamic and interactive stage presence.

Disadvantages of Artificial Intelligence on Indian Classical Dance

While AI offers many advantages or benefits for Indian classical dancers, it also brings with it potential disadvantages and challenges, particularly when it comes to preserving the arts cultural authenticity and human essence. Here are some major disadvantages:

- *Loss of cultural originality-* Indian classical dance is deeply rooted in history, mythology, tradition, spirituality. AI tools often fail to capture the subtle details of cultural depths of mudras, body postures, abhinaya and mythical storytelling. By totally depending on AI for choreography, there is a little risk of diluting the originality of these dances of India, sometimes leading to incorrect or distorted interpretation of sacred elements. AI may standardize movements or themes, undermining the uniqueness, diversity, grace and individuality present across different Indian classical dance forms such as Kathak, Bharatanatyam, Odissi, etc.

- *Commodification of the art form-* AI driven visual effects, augmented reality (AR) and dynamic stage setups might shift the audience's focus from dancing skills and emotional storytelling to flashy entertainment oriented spectacles. This could reduce the art form to a mere visual performance, overshadowing its spiritual and narrative depth. The emphasis on AI-enhanced visuals may shift training priorities for artists. Instead of understanding and mastering the subtleties of tala (rhythm), abhinaya (expression), laya (speed), mudra (hand gestures), dancers may feel compelled to align their performances with AI driven elements. Spectators in turn may come to expect only visually extravagant performances, decreasing appreciation for the pure skill and emotional depth of the dancer. Due to this, the essence of Indian classical dance as a form of Sadhana and representation of cultural heritage is being raised at a greater level.

- *Technical limitations-* AI is sometimes unable to fully capture the details of gestures and expressions and may struggle to accurately replicate complex dance movements. It also has a limited understanding of complex dance theory and context and may not fully comprehend the historical, cultural or philosophical context of Indian classical dance. Another drawback is its dependency on data quality and its availability. AI effectiveness relies on access of high-quality data for live streaming of the performance or to record the performance in high definition quality. AI generated tools may malfunction or disrupt live performances

- *Fall of Guru Shishya Parampara-* The traditional guru shishya parampara was based on Gurukul system. This tradition has undergone major changes with the introduction of AI. Earlier the relationship between a guru and shishya was deeply personal, often involving face-to-face interaction, the guru not only imparted knowledge but also guided the disciple's moral and spiritual growth. But now AI has emerged as a form of virtual guru. Many educational apps and personalised learning platforms provide instant access to

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information simulating the role of a teacher. While AI provides answer to every question asked by the student, it lacks emotional, mental and spiritual growth and guidance to the disciple. The personal connection is absent between them. It also often struggles to address the political, moral and philosophical discussions.

- *Fading human creativity and imagination-* "Imagination is the intelligent prediction of future events based on a sensitive understanding and perceptive analysis of the past." "Spontaneity begets spontaneity means one creative act leads to another and a chain reaction - The creative process - is underway." When individuals become over dependable on AI, it reduces the problem-solving capacity of them. They might put less effort in brainstorming on their own. This might lead to a decline in thinking critically or out-of-the-box. Dancers can easily generate choreographies from AI without focusing on improvisation and personal interpretation. AI tools have nowadays become a primary source for learning and it might reduce the importance of self-practice.

Conclusion

Hence, we can say that in the field of Indian classical dance, AI is blending tradition with innovation. By helping choreography through motion analysis, enabling awful performances with AR (augmented reality) and by creating virtual instructors, AI enhances the learning process and presentation of these dance forms. AI enhances the accessibility and preservation of these ancient art forms. It helps in understanding unique style, generating music or visualisation that make the performances impactful. However, the integration of AI raises concerns about the downfall of emotional depth and cultural nuances. While AI can replicate, it cannot replace the human soul and spirituality central to Indian classical dance. At last we can say that AI is a powerful tool that supports and modernise the art form but it can never overshadow the rich, cultural heritage and human connection that defines Indian classical dance.

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