Executive Profile

Dr. Vinod Vidwans

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Pioneer in Computational Indian Music, Artificial Intelligence, and Indian Knowledge Systems

Dr. Vinod Vidwans is one of India's pioneering researchers working at the intersection of **Indian Knowledge Systems (IKS), Artificial Intelligence, computational musicology, design, and cognitive philosophy**. For more than three decades, he has pursued a unique research mission: to demonstrate that the foundational principles of India's classical knowledge traditions can be interpreted scientifically and translated into intelligent computational systems.

His work represents an important convergence of ancient Indian wisdom and contemporary technology. Drawing upon foundational treatises such as *Naradiya Shiksha*, *Natyashastra* of Bharata, *Brihaddeshi* of Matanga, and *Sangita Ratnakara* of Sharangadeva, Dr. Vidwans has developed computational frameworks that transform traditional musicological knowledge into intelligent systems capable of generating, analysing, and preserving Indian classical music.

Unlike conventional Artificial Intelligence approaches that depend primarily on large datasets, his research demonstrates that knowledge encoded in classical Indian treatises can itself serve as the foundation for intelligent generative systems. This work provides an important example of how Indian Knowledge Systems (IKS) can contribute to contemporary Artificial Intelligence research while preserving the integrity of India's living cultural traditions.

Artificial Intelligence Systems for Indian Classical Music

Among Dr. Vidwans' most significant contributions is the design and development of a family of Artificial Intelligence systems for Indian classical music, including **AI-*Raga***, **AI-*Tala***, and the ***Bharati* System**. These systems represent one of the earliest sustained efforts to integrate traditional Indian musicology with modern Artificial Intelligence.

AI-*Raga*

AI-*Raga* is an intelligent generative system capable of creating original ***Bandish*** (classical compositions) in a specified *Raga* without relying on a pre-existing database of compositions. Instead, the system generates music by applying the structural principles

that define the *Raga*, including its melodic architecture and governing musical relationships.

This research demonstrates that Indian classical music possesses a rigorous underlying grammar that can be computationally modelled and used for creative generation. The work has significant implications for music education, preservation of cultural heritage, computational creativity, and next-generation AI systems inspired by Indian Knowledge Systems.

AI-*Tala*

Complementing AI-*Raga* is the AI-*Tala* system, which generates authentic tabla accompaniment for a specified tala using computational representations of rhythmic knowledge rather than a pre-loaded database of rhythmic patterns.

Together, AI-*Raga* and AI-*Tala* demonstrate that both melody and rhythm in Indian classical music can be represented through formal computational models derived from traditional Indian musicology. These systems establish a new framework for intelligent music generation based on knowledge rather than imitation.

Bharati System

The *Bharati* System extends this work by creating intelligent digital knowledge repositories based on Bharata's *Natyashastra*, particularly the twenty-eighth chapter (*Sangeetadhyaya*). The system enables traditional musical knowledge to be documented, organized, analyzed, and computationally explored through intelligent digital platforms.

Beyond preservation, the *Bharati* System provides a framework for empirical validation of concepts described in classical Indian texts, thereby creating a bridge between traditional scholarship and contemporary computational research.

Its broader significance lies in demonstrating that Indian Knowledge Systems (IKS) can become active computational frameworks rather than remaining static historical documents.

Generative Theory of Indian Music

The theoretical foundation underlying these AI systems is Dr. Vidwans' **Generative Theory of Indian Music (GTIM)**, developed through more than thirty years of interdisciplinary research.

GTIM presents a unified scientific framework for understanding Indian classical music by formally describing the principles governing raga, tala, composition, improvisation, and musical structure. The theory addresses several long-standing conceptual questions

within Indian musicology while establishing a computational foundation for intelligent music generation.

Major contributions of the theory include:

- A formal scientific definition of the concept of ***Raga***.
- Development of the ***Nava Gana Ragas*** classification framework capable of accommodating existing as well as theoretically possible ragas.
- A comprehensive theoretical framework for understanding ***Tala***.
- Development of the ***Nava Gana Talas*** classification system.
- Formalization of the concepts of ***Bandish*** and ***Raga Vistara***.
- Establishment of computational principles enabling generative Artificial Intelligence for Indian classical music.
- Demonstration of the continuing relevance of Bharata's *Natyashastra* and other foundational Indian treatises within modern AI research.

Rather than treating Indian music solely as a performing art, GTIM establishes it as a coherent knowledge system whose principles can be represented mathematically and computationally while remaining faithful to its traditional foundations.

This work contributes not only to Indian musicology but also to the broader fields of Artificial Intelligence, computational creativity, digital humanities, and the scientific study of traditional knowledge systems.

Research Publications and Scholarly Contributions

Dr. Vinod Vidwans has made significant scholarly contributions to the emerging discipline of computational Indian musicology through books, monographs, book chapters, invited lectures, and interdisciplinary research spanning Indian Knowledge Systems, Artificial Intelligence, musicology, design, and cognitive philosophy. His publications seek to reinterpret classical Indian musical knowledge using rigorous scientific and computational methodologies while remaining firmly rooted in the traditional knowledge framework.

His major publications include:

- **The Doctrine of *Ragas* in Indian Music: With *Nava Gana Ragas* System**, presenting a systematic scientific framework for understanding and classifying *Ragas*.

- **The Music of Minds and Machines: A Deep Dive into the Generative Theory of Indian Music**, which introduces the conceptual foundations of the Generative Theory of Indian Music and explores its implications for Artificial Intelligence, computational creativity, and the future of Indian classical music.

- **The Doctrine of *Shrutis* in Indian Music**, a monograph examining the theoretical and practical significance of microtonal intervals (*shrutis*) in Indian music.
- **Computational Indian Musicology: Challenges and New Horizons**, a scholarly book chapter that outlines future directions for research at the intersection of Indian musicology, computer science, and Artificial Intelligence.

Collectively, these publications contribute toward establishing computational Indian musicology as an interdisciplinary academic field and provide a scientific framework for future research on Indian Knowledge Systems (IKS).

Innovation in Musical Instrument Design

Complementing his theoretical and computational research, Dr. Vidwans has made pioneering contributions to the design and development of innovative musical instruments inspired by classical Indian musicological principles.

His research extends beyond digital technologies into the physical realization of ancient theoretical concepts, demonstrating that the foundational ideas described in classical Sanskrit treatises can be translated into contemporary musical instruments for education, experimentation, and performance.

Bharat Veena

Among his most notable innovations is the ***Bharat Veena***, developed during 2017–18. Inspired by Bharata's *Natyashastra* and the classical theory of ***Shrutis*** (microtonal intervals), the instrument enables practical demonstration of concepts that have traditionally remained confined to theoretical texts.

The Bharat Veena makes it possible to experimentally investigate important concepts described in the *Natyashastra*, including:

- *Shruti-Nidarshanam*
- *Gramantara*
- Classical microtonal relationships
- *Swara-Sthapana*

By transforming textual knowledge into musical instrument, Dr. Vidwans has created an important bridge between traditional scholarship, pedagogy, scientific experimentation, and musical practice.

Its educational significance lies in enabling students, researchers, performers, and musicologists to directly experience theoretical concepts that were previously difficult to visualize or demonstrate.

Other Instrument Innovations

Over the past decade, Dr. Vidwans has designed a number of additional instruments and experimental systems based on Indian musicological principles, including:

- *Shruti Mandalam*
- *Brihad Shruti Mandalam*
- *Shruti* Guitar
- Flexi-Flute *Algoza*
- Flexi-Flute Scale Shift
- Flexi-Flute Pitch Variations

These innovations collectively represent a sustained program of research into the relationship between musical theory, acoustics, ergonomics, instrument design, and computational thinking. All the above musical instruments designed by Dr. Vinod Vidwans have been granted patents by appropriate authorities.

The work illustrates how ancient Indian Knowledge Systems can inspire modern design innovation while preserving their theoretical foundations.

National and International Recognition

Dr. Vidwans' pioneering work has attracted recognition across academia, government, research organizations, and cultural institutions in India and abroad.

His research has been presented at international conferences on speech, music, Artificial Intelligence, digital humanities, and Indian Knowledge Systems, where he has consistently demonstrated the relevance of classical Indian knowledge to emerging technological paradigms.

His work has also received extensive media attention because of its unique integration of Artificial Intelligence with Indian classical music. Coverage has appeared in leading newspapers, magazines, and digital media, helping introduce computational Indian musicology to a wider audience.

His research has been featured in:

- Hindustan Times
- Sakal
- Lokmat
- Economic Times
- Business Standard

- The Week
- SoftPower Magazine
- Devdiscourse
- News Track (Hindi)

Through public lectures, demonstrations, interviews, workshops, and digital platforms, Dr. Vidwans has actively communicated the importance of Indian Knowledge Systems to scholars, students, policymakers, artists, and the general public.

His work has helped stimulate interdisciplinary dialogue between music, Artificial Intelligence, design, philosophy, digital humanities, and education.

Academic Leadership, National Service, and Institutional Contributions

Throughout his distinguished career, Dr. Vinod Vidwans has combined excellence in research with sustained contributions to higher education, academic leadership, curriculum development, and institution building. His work reflects a rare integration of scholarship, design, technology, and Indian Knowledge Systems, influencing students, researchers, policymakers, and academic institutions across India.

Leadership in Higher Education

Dr. Vidwans is Professor of Design, Art, and Performance at **FLAME University, Pune**, where he has **contributed in establishment of the School of Design, Art, and Performance** and continues to advance interdisciplinary research spanning Artificial Intelligence, Indian classical music, computational musicology, design, and cognitive philosophy.

Prior to joining FLAME University, he served as **Senior Designer and Professor at the National Institute of Design (NID), Ahmedabad**, one of India's premier design institutions. During his tenure, he headed the Departments of **New Media Design** and played a seminal role in establishing the departments of **Information and Digital Design (IDD)** and **Software User Interface Design (SUID)**, and contributed to curriculum development and fostering interdisciplinary approaches to design education.

Across more than three decades in academia, he has mentored students, guided research, and promoted the integration of technology, design thinking, and traditional Indian knowledge into higher education.

National Educational Contributions

Beyond his institutional responsibilities, Dr. Vidwans has contributed to several national educational initiatives that have shaped curriculum development and academic policy.

He has served on the **Board of Studies** for the **School of Visual and Performing Arts at Indira Gandhi National Open University (IGNOU), New Delhi**, where he has also advised the University's doctoral program. Through these roles, he has contributed to strengthening higher education in the performing arts and promoting interdisciplinary research.

He was invited by the **National Council of Educational Research and Training (NCERT)** to serve on the curriculum development committee for Graphic Design. In this capacity, he contributed to the preparation of national textbooks for **Classes XI and XII**, helping shape design education for school students across India.

Dr. Vidwans has also served on advisory boards and academic councils of several educational and research institutions, contributing his expertise in design, musicology, Artificial Intelligence, Vedic Studies and Indian Knowledge Systems (IKS) to curriculum development, research planning, and institutional growth.

Invited Keynote Addresses and Distinguished Lectures

Dr. Vidwans is widely recognized as an authority on the intersection of Indian Knowledge Systems (IKS), Artificial Intelligence, computational musicology, and design. His expertise has led to invitations from prestigious universities, research institutions, scientific organizations, and national conferences in India and abroad.

His keynote addresses have explored topics such as:

- Artificial Intelligence and Indian Classical Music
- Computational Music Analysis
- Computational Music and Mathematical Modeling
- Digital Humanities
- Indian Knowledge Systems
- Computational Creativity
- Music, Speech, and Cognition
- Design Thinking and Innovation
- Artificial Intelligence in Education

He has delivered keynote lectures and distinguished addresses at institutions including:

- 'Interspeech' Workshop on Speech, Music and Mind (IIIT Hyderabad)

- PES University, Bengaluru
- IIIT Naya Raipur
- IIT Indore
- Renaissance University
- Sardar Vallabhbhai National Institute of Technology (SVNIT), Surat
- Indian Institute of Advanced Study, Shimla
- University of Hyderabad
- Savitribai Phule Pune University
- Indic Academy
- India Science Festival
- India International Science Festival

These invitations reflect the growing recognition of his pioneering work across diverse academic disciplines, including engineering, musicology, linguistics, Artificial Intelligence, digital humanities, and design.

Contributions to Indian Knowledge Systems

A defining feature of Dr. Vidwans' career has been his commitment to demonstrating the continuing relevance of Indian Knowledge Systems (IKS) in addressing contemporary scientific and technological challenges.

He has actively participated in national initiatives dedicated to the advancement of IKS and was invited as a **Special Invitee to the Indian Knowledge Systems Strategic Conclave**, organized by the **IKS Division, Ministry of Education, Government of India**.

His research consistently illustrates how foundational Indian texts—including the *Natyashastra*, *Naradiya Shiksha*, *Brihaddeshi*, and *Sangita Ratnakara*—can inspire contemporary advances in Artificial Intelligence, computational modelling, musicology, education, and digital knowledge systems.

Rather than treating these classical works solely as objects of historical study, Dr. Vidwans has developed practical computational frameworks that demonstrate their enduring scientific value and contemporary relevance.

Public Engagement and Social Contribution

In addition to his academic and research activities, Dr. Vidwans has remained deeply committed to the dissemination of knowledge beyond the university.

He has delivered numerous public lectures, workshops, lecture-demonstrations, and educational programs introducing audiences to Indian classical music, Indian Knowledge Systems, Artificial Intelligence, and design innovation.

His commitment to preserving and transmitting India's philosophical traditions is further reflected in his extensive teaching on classical Indian texts. He has delivered a series of **26 lectures on Patanjali's Yoga Sutras** and **40 lectures on the Bhagavad Gita** for yoga teachers, practitioners, and members of the public through Yoganjali, Pune.

These initiatives demonstrate his belief that knowledge should not remain confined to academic institutions but should be shared widely for the benefit of society.

Professional Profile

Dr. Vinod Vidwans is an interdisciplinary scholar whose work spans design, Artificial Intelligence, Indian classical music, cognitive philosophy, computational musicology, visual arts, and Indian Knowledge Systems.

He holds a **Doctor of Philosophy in Cognitive Philosophy** and a **Master of Design** from the **Indian Institute of Technology Bombay**. He also earned a postgraduate degree in Fine Arts from **Nagpur University**, where he graduated with distinction.

His unique academic background has enabled him to bridge traditionally separate disciplines, resulting in pioneering contributions that connect the humanities, engineering, design, philosophy, and Artificial Intelligence.

As a researcher, educator, designer, inventor, artist, and institution builder, Dr. Vidwans has consistently demonstrated how India's intellectual heritage can inspire innovative solutions to contemporary scientific and technological challenges.

Enduring Legacy and National Significance

Dr. Vinod Vidwans has devoted more than three decades to advancing a singular vision: demonstrating that the profound intellectual traditions of Indian civilization can serve as the foundation for contemporary scientific discovery, technological innovation, and creative expression. His work has established a unique bridge between Indian Knowledge Systems (IKS) and emerging disciplines such as Artificial Intelligence, computational creativity, digital humanities, cognitive science, and design.

At a time when Artificial Intelligence is increasingly driven by data-intensive approaches, Dr. Vidwans has demonstrated that knowledge-based systems rooted in classical Indian treatises can provide an alternative paradigm for intelligent computation. By translating the principles of *Natyashastra*, *Naradiya Shiksha*, *Brihaddeshi*, and *Sangita Ratnakara* into

computational models, he has shown that India's classical knowledge traditions are not merely objects of historical scholarship but living systems capable of inspiring modern scientific innovation.

His pioneering work has resulted in:

- The formulation of the **Generative Theory of Indian Music**, providing a rigorous scientific and computational framework for Indian classical music.
- The development of intelligent systems such as **AI-*Raga***, **AI-*Tala***, and the ***Bharati* System**, demonstrating how traditional musicological knowledge can power generative Artificial Intelligence.
- The creation of innovative musical instruments that transform ancient theoretical concepts into practical tools for research, education, and performance.
- Significant contributions to higher education, curriculum development, institutional leadership, and interdisciplinary scholarship.
- National and international recognition through keynote addresses, invited lectures, research collaborations, and public engagement.

Collectively, these achievements have contributed to the emergence of **Computational Indian Musicology** as a distinct interdisciplinary field, integrating music, Artificial Intelligence, design, cognitive science, and Indian Knowledge Systems.

Beyond research, Dr. Vidwans has consistently worked to preserve, reinterpret, and disseminate India's intellectual heritage for future generations. His scholarship demonstrates that classical Indian knowledge is not confined to the past but continues to offer meaningful insights into some of the most important scientific and technological questions of the present century.

His career exemplifies the ideals envisioned in India's National Education Policy (NEP) and the national mission to revitalize Indian Knowledge Systems by integrating traditional wisdom with contemporary research and innovation.

As a researcher, educator, inventor, designer, philosopher, artist, and institution builder, Dr. Vidwans has made enduring contributions that extend well beyond disciplinary boundaries. His work represents an important example of how India's cultural and intellectual heritage can inspire globally relevant advances in science, technology, education, and the creative arts.

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