CULTURE SPECIFIC MUSIC INFORMATION PROCESSING: A PERSPECTIVE FROM HINDUSTANI MUSIC

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What is music?

- Music is the sound that we enjoy listening to
- Which of the following can be regarded as music?
  - Sound of the chirping birds, gentle breeze, gushing spring, temple bells
  - Mother’s lullaby, nursery rhyme
  - A great piece of poetry set to melodious tune
  - Collective sound produced by an ensemble of musicians
  - Sound that comes out of the speakers when we play a CD or tune into the radio
What is music?

- The fundamental aesthetic intent sets the art apart
- Music can be considered as an art and/or industry
- Totality of a music tradition comprises of the following ten aspects that are integral to every tradition:
  - compose, perform, receive, perceive, teach, learn, preserve, access, disseminate & share
- These areas are interdependent yet mutually influencing
This presentation

- A perspective of a practitioner and musicologist
- Examine mainly five aspects:
  - listening
  - intonation
  - improvisation
  - instruments
  - notation
- A short discussion of research project AUTRIM (automated transcription system for Indian music), developed in collaboration with Uni of Amsterdam
Man & Music

- Human being is intrinsically musical
- “Music is humanly organised sound & product of behaviour of groups”....... John Blacking
- Many cultures and as many musics
- Creation, performance, significance, and definition of music vary according to culture and social context
Any assessment or study of a music tradition must take into account:
- its tonal and rhythmic structures, grammar and aesthetics and also
- processes and domains that are extramusical such as history, sociology, psychology, philosophy, economics, physics, technology etc. having bearing on the deep structures of music.
Indian music: identity

- The term Indian music implies the music of Indian subcontinent as a whole, including seven nations - India, Pakistan, Bangla Desh, Afghanistan, Tibet, Nepal & Bhutan.

- The classical or art music of India as we know today, traces its origin to Samveda, comprising the lyrical hymns of Rigveda composed between 1500 - 900 BC.

- Unlike the music traditions of ancient Greece, Egypt, Sumeria, Israel and rest of the Middle eastern world; elements of ancient and medieval Indian music are alive in contemporary practice and are documented in the treatises dating back to pre-Christian era.
Indian music: identity

- Contemporary art music is a confluence resulting from cultural exchanges operative over centuries within the cultural zone consisting of Greek, Arabic, Iranian and Indian people.
- Music traditions in these civilizations had or have the following common features to varying proportion: oral tradition, primacy of vocal music and microtonality.
- Music in the Indian subcontinent is a reflection of the diverse elements; racial, linguistic and cultural, which make up the heterogeneous population of the area.
- The extraordinary variety of musical types is probably unparalleled in any other equivalent part of the world. Music has a vital role in the religious, social and artistic lives of the people.
Six categories of music have flourished side by side: primitive, folk, religious, art, popular and confluence.

The Sanskrit word *Sangit*, an exact cognate of the Latin *concentus* - sung together, conveys the core of the ancient Indian conception of music.

The English word ‘music’ fails to capture the exact sense of *Sangit* just like that of Greek *mousike*.

Understanding of religion, philosophy, aesthetics, history and culture is necessary.
Indian music: identity

- The immediate goal is sensory pleasure but its ultimate goal is regarded as the spiritual release.
- Pre-eminently vocal; instrumental music is looked upon as tangential.
- Based on melody and rhythm; harmony and polyphony have no part.
- Modal in character and is often accompanied by a drone, which establishes a fixed frame of reference and precludes key changes.
Art music: characteristics

- Its patently aesthetic intention sets the art music apart from the other categories.
- Governed by two main elements: raga and tala.
- Raga is a tonal matrix & tala is a rhythmic framework, which unlike in many other traditions is cyclic, and not linear in nature.
- Two streams: performing and scholastic. The latter follows the former, leading to codification of pertinent rules, methods and techniques.
Art music: characteristics

- Primarily a tradition of solo performance, affording scope to innovate and interpret.
- Hence methods and techniques are developed to this end. Consequently, this leads to emergence of various musical ideologies and family traditions (*gharana* /*bani*).
- There is an abundance of musical forms with specific structures based on patterning of musical elements (notes, rhythms & tempi).
Art music: characteristics

- Modes of expression are deliberately cultivated and hence necessitate a highly structured teaching-learning process.
- Audiences are supposed to be educated about the art form and are expected to contribute to music making.
- Quality of the audience and their response could bring about qualitative difference.
Listening: pitch identification

- Multi-layered listening required with a complex soundscape comprising voice, tanpura, melody & rhythm accompaniment
- Tanpura: the drone
  - reference for the fundamental pitch
  - 4/6 strings tuned to tonic, fifth below, and an octave below
  - rich envelope of overtones & harmonics
- Other string instruments - difficulty of pitch detection with multiple main strings & sympathetic strings
Tanpura/Tambura & Sitar
Intonation

- The exact pitch of the notes has never been standardized in frequencies or ratios.
- The actual position of the semitones excluding the tonic and the fifth can vary slightly. The flat notes can be lowered by about 20 cents.
- *Shruti* - a concept to describe subtle divisions of an octave
- Problem arising from thinking of melody in terms of fixed positions of intonation. Whereas, experimental studies provide evidence for flexible intonation, ruling out the notion of pitch as fixed points.
Intonation

- Experimental studies provide evidence for flexible intonation, ruling out the notion of pitch as fixed points.
- Modern scholars have observed intonation as a statistical phenomenon in which the note densities occur, not as exact points but rather as limited ranges within a certain tonal region.
- The influence of melodic context on the pitch is also clear from these studies.
Intonation

- Note connections & the “music between the notes” is significant.
- Specific intonations & ornamentations become highly characteristic in some ragas.
- Microtonality in Indian music a reality and not a myth but the formulation needs to be understood more as melodic shape or contour rather than discrete points.
- To describe intonation in the contemporary raga performance, we need a more comprehensive model including acoustic parameters of not only pitch but also volume & timbre in relation to the temporal axis.
Improvisation

• It does not imply an impromptu expression or a random arrangement of notes or melodic phrases.
• The process accepts creativity within the bounds of *raga* grammar and aesthetic norms of the performance practice.
• Based on permutation and combination of notes, varying accent & volume, use of ornaments
• Improvisation w.r.t.matter (what / content) & manner (how /technique)
Improvisation

- Speed /time crucial to the study of melodic shapes
- A specific raga and /a well-structured composition form the basis for improvisation
- Story-telling logic leading to raga-specific atmosphere & aesthetic emotion
Instruments

- Despite primacy of the voice, abundance of instruments
- Present solo, provide drone, or melodic/rhythmic accompaniment
- First ever classification by Bharata (200BC-200AD) on the basis of sound producing agent-string, wind, solid body & membrane
- Forms the basis for modern day classification by Sachs - Hornbostel (1914)
Instruments

- C V Raman in 1920s discovered the unique properties of the Indian string and percussion instruments by the virtue of the peculiar bridge surface and loaded membrane respectively.
- Quality enhanced by special performance techniques
Instruments: characteristics
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Instruments

- Spectral analysis, identification and synthesis of sound of specific instruments.
- Study of the bridge surface, especially for string instruments like tanpura & sitar, with a view to have automated process for its manufacture and maintenance.
- Manufacture of standardized instruments
- Study of the wear & tear behaviour of a string on a given surface so as to identify alternate material for the bridge surface.
- Development of electro-acoustic and electronic instruments
The relationship of notation to performance in the Indian tradition different from that in the West.

Indian musical notations are oral in origin, and mnemonic in function; while the Western staff-notation, is graphic in origin and prescriptive in function.

The system uses mnemonic syllables, which basically means that sounds are given names by which they are referred, essentially to help talk about, think, discuss as well as transmit both melodic and rhythmic music.

Independence from written notation allows, or is a function of, a high degree of variation, embellishment and improvisation practiced in the performance.
Notation - advantage

- For musicians, there is a direct connection between sounds and mnemonics, and hence they resort to *sargam/bol* for musical thinking- teaching and composing.
- The sketchy notations are an aide-memoir especially to keep record of traditional compositions.
- From the late 19th century onwards, compositions were printed & published with notation for the purpose of instruction, dissemination and preservation of traditional repertoire.
Notation-limitations

- Although there is a direct connection between sounds and mnemonics, the ways in which the mnemonics of Indian music can be interpreted are diverse.
- During the process of writing, the ‘extra’ information in terms of various inflections is never written; rendering the system inadequate for visual representation of music.
From notation to transcription

- Notation is prescriptive whereas transcription is descriptive.
- It provides a graphic interpretation of the essential concepts and logical principles of a musical system.
- Manual transcription has a limitation - the coder is a black box, the inscrutable human brain. If we would know the functioning of this black box, we can make the decoder at the other end to work reliably.
Computer-aided transcription

- Coder-decoder system is transparent
- Reliable, objective & consistent
Premise of the project: Sound and sight constitute one of the major synesthetic pairs of senses. Auditory perception combined with a simultaneous image of melodic shapes can be more effective.

It can help to “see” notes as well as their intricate movements. Graphic contours are useful in understanding the “sound” of music, which is otherwise assimilated only by repeated learning and practice.

It reveals what we do not “hear”, what we change in the process of “hearing” or what we take for granted. It can also provide an insight into extremely subtle elements of music that we cannot readily distinguish aurally, but which might nevertheless influence our perception of the music on a subconscious plane.
AUTRIM

- Ongoing project at the National Centre for the Performing Arts, Mumbai and the University of Amsterdam (Prof. Wim van der Meer)

- Evolved a process of developing PRAAT (developed by Boersma and Weenink) into a full-fledged music analysis program for Indian music, and have processed a large volume of music.

- The final output is a video (720 p HD) showing melodic graphs corresponding to a mini raga performance of 10-12 min duration; superimposed on a tonal grid and supplemented with the rhythmic and poetic information, displayed simultaneously with the corresponding audio
A vertical cursor corroborates the visual and audio information.

At present we have a data comprising of 110 compositions in 85 ragas. Out of these, videos corresponding to 25 ragas are already available with the full details of the raga, the composition, the performer and analysis of the performance.

http://autrimncpa.wordpress.com/
Conclusion

Several components of art music are rule based and model based phenomena. Hence, technology could play an important role in understanding, analyzing, documenting and development of these facets.

It is crucial to involve musicians & musicologists to ensure aesthetically meaningful and culturally viable endeavours.

Music an enigma, on one hand, as organized sounds it is an intentional and rule based activity. On the other hand, it is also governed by culture specific philosophical tenets rather than universally standard quantifiable parameters.
Conclusion

- Software to meet the ‘mindware’ of music makers
- “Trying to characterize all the musical cognition in terms of computations alone, is bit like trying to paint all the landscapes without using green.”
  -- John Myhill
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