

A Digital Encoding and Notation Analysis Framework for Indian Music

Abstract

This paper demonstrates a framework for digital encoding, analysis and presentation of notation from music of Indian subcontinent, focussing on the distinctive nature of Indian melody and its nuances. Based on a prototype music encoding and notation framework, it further demonstrates a new representative model of pattern analysis and evaluation for the same domain of music. It includes theoretical analysis as well as hands-on demonstration of a system developed for the present context.

Conventional notation in its written form is significantly limited to the parent musical culture. Between musical systems around the world (for example Western classical music and the music of Indian subcontinent) they often prove to be inadequate. As an alternative digitally encoded audio-visual notation can prove to be more flexible and accesible across cultural boundaries. One such framework has been designed and demonstrated by the author earlier. Subsequently the same has been developed further with focus on interpretation, representation and analysis of melodic constructs present in the music of Indian subcontinent.

Indian music uses scales that do not always conform to the standard Western twelve-tone system. Even the chromatic and minor scales of Western music that are considered to be close to their Indian counterparts, do not exactly correspond. This is also true for Western musical instruments like piano when used for rendering Indian melody. The scales in Western music are static with mathematically formulated pitch ratio between notes. However, Indian music uses scales that do not have a standardized pitch distribution and even contextual scales where notes in the same scale can differ in pitch depending on context. This calls for a special case of encoding by addition of extra meta data not defined in the basic system. Graces and ornaments used in Indian music do not always have equivalent counterpart in Western music and none of them are represented in the music encoding standards. For a digital system to render music out of notation 'gracefully' there has to be a lot of extra software routines and methodological design.

The nuances of melody interpretation considered, it remains a challenge to construct a structural framework for Indian music addressing and surpassing the limits of conventional notation system. Formal representational techniques are inadequate for describing Indian music satisfactorily. An alternative model was hypothesized using formal semantics supplemented with subjective/notional elements that are heuristic in nature. We propose the term 'aformal' for this model as it is balanced between formally structured and intuitive representations.

To develop this model into a workable and usable structure the following comprehensive experiment was carried out: A sample domain of Indian music including instances from classical, semi classical, folk, urban and popular genres were compiled in both audio and notation form. Patterns in these were identified theoretically as well as experimentally using software and human agents. These patterns were further analyzed perceptually by procedures such as context shift, pitch transposition and syllable replacement. From the results obtained, it was demonstrated that musical phrases and note sequences can bear the same formal structure but create a completely different perceptual effect with a different rendition. We propose the term *musicalleles* (from music and alleles) for such musical phrases that are similar or identical in structure but divergent in rendition and effect.

An interesting corollary of the above has been demonstrated in perception of musical patterns, where musical phrases with dissimilar notation components can produce similar perceptive effect.

This has been used in developing a notation-based similar music search algorithm that can identify approximate matches based on perception rather than physical notation.

With the same domain we also experimented on the role of syllables and vocal tone in perception of sung music. By replacement and transposition it was observed that the choice of syllabic and vocalic elements, even if meaningless or onomatopoeic, affect the perception to a varied extent by enhancing (or at times diminishing) the melodic effects. This can be a significant instrument in a formal music analysis and we propose the term *metasemantics* to categorize it.

Building up on our audio-visual notation framework, this paper presents an ongoing research on how such a framework can be extended to incorporate unique aspects of diverse musical cultures. It demonstrates analytical methods and the importance of constructs like *musicalleles* and *metasemantics* in interpretation and perception of melody. It also proposes an a formal representation methodology that could be further developed into a competent alternative schema for music analysis.

Selected Bibliography

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Requirements for Presentation:

Standard audio-visual equipment for displaying slides and playing music/video from a laptop or computer.