

# Carnatic Ragas as Music Information Retrieval Entities

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## ABSTRACT

Carnatic music is the 'art' music of the four southern States of India (Andhra Pradesh, Karnataka, Kerala and Tamilnadu). One difference between Carnatic music and the better-known Hindusthani music of North India is its embeddedness in a religious-philosophical context. This context crucially determines the objects of knowledge organization and the indigenous theory of musical affect. The author presents the view that a digital library of Carnatic music should contain the objects of knowledge organization and their interrelationships as conceived by indigenous practitioners and audiences, rather than by Western specialists or North Indian practitioners. The author demonstrates how three features of Carnatic music (*viz.* aural transmission, improvisation and cultural context) have particular implications for the development of a digital library. Aural transmission results in musical documents being less important sources of information than recordings. Improvisation results in a highly transformational and often ambiguous relationship between (intra)musical signifiers and signified, causing problems of classification and machine recognition. The cultural context favours the prioritisation of emotional affect over introductory ease of listening and even technical recording quality in the selection of the recordings to be included in a digital library of Carnatic music.

## 1. CARNATIC MUSIC

Carnatic music is the 'art' music of the four southern States of India (Andhra Pradesh, Karnataka, Kerala and Tamilnadu). Traditionally this music was performed by members of the Brahmin and Barber castes, in Hindu temples and the courts of Hindu rulers. Its exponents (called *vidwans*: literally 'people with knowledge') regard it as the indigenous Indian music tradition which, during the period of the Muslim invasions of the sub-continent, became merged with 'Persian' music (their term) in the courts of Muslim rulers to become 'Hindusthani' music (their term for North Indian art music, with which Western audiences are much more familiar).

In the 20<sup>th</sup> Century, Carnatic music did not adapt as well as the more secularised Hindusthani music to concert and recording contexts. Carnatic music theory is based upon the religious-philosophical tenets of the Brahmin caste in southern India. These derive from Vedanta Hinduism and Samkhya physics and define the three *marga* ('paths towards self-development') of *bhakti* (devotion towards the Supreme God), *jnana* (meditational pursuit of the experiential Unity that is 'beyond the dualities of thought') and *laya* (physical yogas based upon homologies between the

human body and the cosmos, which posit *nada* (vibration) as the origin of matter and consciousness). The practice of Carnatic music is itself conceived as a *marga*, called *sangita* ('music') *marga*.

In Carnatic music terminology, *laya* literally means 'rhythm'. However, *vidwans* and audiences articulate homologies between Carnatic music and Samkhya physics, upon which the *laya marga* is based. Most evidently, the sound of *nada* is said to be 'like the buzzing of a bee'. This is directly related to the timbre of the *tambura*, which sounds the drone-tonic throughout the performance, and the *vina* (lute). The seven notes of the musical scale are related to the seven *chakras* of the body/cosmos. Ascent and descent of *nada* between the *chakras* is related to musical ascent and descent.

Carnatic *vidwans* conceptualise musical affect in terms of *bhava* ('emotional' affect) and *ganam* ('intellectual' affect). *Bhava* is conceived as being achieved through words (*sahitya*) and *raga*. *Ganam* is conceived as being achieved through improvisation (*manudharma*: literally 'duty of the mind'): the listener's experiences of climax and resolution are conceived as being achieved through the performer's extemporisation of patterns of musical repetition and variation.

*Bhava* is classified in terms of seven *rasas* (literally, 'tastes'). Most (and all the 'serious') Carnatic *ragas* express *bhakti-karuna* (literally 'devotion-pathos') *rasa*, which is described as the devotee's expression of love for the Supreme God and the misery (*duhkha*) endured in His absence, having the intention of persuading Him to appear before the devotee and thereby grant *mukti* (the guarantee of release from the cycle of rebirths). The expression *sukha-duhkha* ('sweet misery') is also used to describe this *rasa*. Vocalists employ what, in Western or Hindusthani terms, would be described as elements of speech intonation, for example the 'sob' to express sorrow. Instrumentalists intentionally imitate these. Such intonational features are an aspect of *raga*.

Carnatic performance items, which may last from 5 minutes to one hour, are 'in' a single *raga*. They typically start with *alapana* (improvisation within the *raga*), followed by a *kriti* (composition: literally 'work'). *Kritis* are also 'in' a single *raga*. Thousands of Carnatic *ragas* exist. Within one of 72 scale types (*melakartas*), a *raga* is distinguished from all other *ragas* by the sequence of *swaras* (notes) specified in ascent from tonic to supertonic (*arohana*: ascent pattern) combined with the sequence of *swaras* specified in descent from supertonic to tonic (*avarohana*: descent pattern). The ascent and descent patterns can be scalar or *vakra* (i.e. containing subsidiary ascents and descents).

In addition to an ascent-descent pattern, a *raga* is conceived as having a set of (approximately 20 to 30) *sanchara prayogas* ('characteristic melodic phrases'). These *prayogas* are conceived as deriving from the set of *kritis* in the *raga*. Many *sanchara prayogas* adhere to the ascent-descent pattern of the *raga* but are distinguished by *gamaka* (glissando and microtonal ornamentation

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of some notes). Other *sanchara prayogas* depart from the ascent-descent pattern of the *raga* by omitting a note in ascent but including it in descent (called *langhana swara*) or by omitting tonic, supertonic or perfect fifth in both directions (called *varjya swara*). Very few of the possible note combinations thus generated are *sanchara prayogas* of a *raga*.

When improvising within a *raga*, Carnatic *vidwans* distinguish between three types of *prayoga* (melodic phrase): either they

1. adhere to the ascent-descent pattern of the *raga* (referred to by *vidwans* as ‘playing in scales’);
2. are *sanchara prayogas* of the *raga*; (*Vidwans* say that this achieves the strongest expression of *raga bhava*.) or
3. are *prayogas* which may conform with *langhana* or *varjya swara* but which are not *sanchara prayogas* of the *raga*. *Vidwans* say that such *prayogas* must be used only with extreme care, otherwise *raga bhava* is destroyed. They also define their objective in *raga* improvisation as seeking to play all possible combinations of notes, thereby risking destroying *raga bhava*.

Carnatic music is aurally transmitted. *Kritis* are attributed to individual composers but are not ‘published’ at their time of composition. They are aurally transmitted in *vidwan*-disciple ‘lineages’. The *vidwan* dictates a simplified, ‘student’ version of the *kriti*. Once learned, this is significantly elaborated by purely aural transmission. The compositions which are published in South India, usually in commemorative compilations made after the *vidwan*’s death, comprise these ‘student’ versions. In performance, variations are extemporised (an aspect of *ganam*). Significant variations between versions of the same *kriti* recorded by performers from different regions and *vidwan*-disciple ‘lineages’ are evident: for example, from listening to All-India Radio.

## 2. IMPLICATIONS FOR MIR

The “objects of knowledge organization” [Smiraglia 2001., P. 88] and their interrelationships which are represented within a digital library of Carnatic music should ideally be those employed by its practitioners (and audiences). The academic study of Carnatic *ragas* has been claimed by Indic Musicology, which regards them as transformations from Hindusthani equivalents and insists upon the employment of North Indian objects of knowledge organization in their analysis [e.g. Powers, 1971] which have little relation to the Carnatic conception detailed in Section 1. It is therefore necessary to look outside area studies for academic debate on the development of a digital library of Carnatic music.

In MIR, whilst Smiraglia’s [*ibid.*] conception of the musical ‘work’ and its ‘instantiations’ is adequate for the representation of *kriti*, *raga* constitutes a separate object of knowledge organization having a specific relationship to *kriti*. This relationship ideally needs represented in order to expose to the library user important (intra)musical meanings.

Three features of Carnatic music pose particular problems for the development of a digital library: *viz.* aural transmission, improvisation and cultural context. An important consequence of aural transmission is the unreliability of documents. Many published versions of *kritis* and the *sanchara prayogas* of *ragas* are available (and in English) but *vidwans* warn students against their use because they are out of date (by more than 100 years) and incomplete. The music notation used requires detailed

knowledge of the *raga* in order to replicate a notated *kriti* in sound or to utilise it as an input for meaningful musical analysis. In consequence, the most valuable entities in a digital library of Carnatic music are recordings.

Improvisation in Carnatic music essentially results from a set of interactions: between musicians and between musicians and audience. The goal of these interactions is to achieve experiential outcomes in the listener. The communication medium for the interactions consists in sets of expectations in the listener concerning what will be played next. These expectations are generated from past experience as well as experience of the current performance (on many levels of time-frame). In such an improvisational tradition, the role of compositions is that of a ‘package of expectations’ to be worked with in performance: they supply pre-existing vehicles for communication between performer and listener. In the traditional performance context, the performer interacts with accompanists and the *vidwan* listeners located in front of him whilst the rest of the audience observe these interactions. This set of interactions is difficult to achieve in the Westernised concert or recording studio context.

Recent work on the development of a digital library of Carnatic music reveals a highly transformational relationship between *sanchara prayogas* of *ragas* as performed in their ‘original’ *kritis* and as performed in *alapana*. In *alapana*, the performer changes the timing, repeats parts, transfers between *sanchara prayogas* in mid-phrase and runs them into each other. The manipulation of the listener’s expectations in *alapana* evidently results in subtle and often indeterminate (intra)musical references which are problematic both to classify and to automate the identification of.

Carnatic music is deeply embedded in a particular (religious-philosophical) cultural context. Explanation of this context for users of a digital library of Carnatic music is necessary but, more fundamentally, the recordings themselves must reinforce this context. For example, I am currently mastering a series of recordings of the Mysore *vina* made in 1974 - 6. These were recorded mainly in a traditional music school by a single performer (i.e. with no *tambura* or percussion accompaniment). Room echo and the periodic ringing of bells convey the social context of a Hindu temple and the solo performance conveys the cultural context of the individual devotee in the act of *bhakti*. In my editing, I have emphasised rather than sought to minimise these features because the previously available set of (studio) recordings of the Mysore *vina* [EMI, 1971], whilst suffering none of these technical deficiencies, nonetheless, in seeking popular appeal through short *alapana* and a high proportion of dance compositions, arguably fails adequately to convey the cultural context of *bhakti*.

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