Notating Gamakas: Innovations, Advancements, and Adaptations

Deepashree S M [1] & Dr. Hamsini Nagendra [2]
[1] Research Scholar & [2] Prof. of Music,
Department of Performing Arts, Bangalore University.

5

Introduction

Indian music is rāga-based music, *gamakas* being their backbone. The *gamakas* breathe life into the *svaras* and, in turn, the *rāgas*. It could be seen that the rāgas under the same meḷa and/or with similar phrasings sound entirely different, thanks to the inherent *gamakas*. They can give a *svarasthāna* a completely new identity. Being such an important entity of Indian music, they are not clearly understood.

Traditionally, the aural mode of instruction was given importance in imparting musical education. Be it the Guru or the *vāggēyakāra* himself, never believed in written representation of music. Over the years, an urge arose to document music to preserve the right source for posterity, which paved the way for adopting different music notating systems. Though the solfa (*sargam*) notation is traced back to the 7th CenturyA.D, in the rock inscriptions of Kudumiyāmalai[1], music notation in India is believed to be heavily influenced by the Western and European systems. Few manuscripts(inevitably corrupt) of the pre-Mughal period have been found to have similarities with the *sargam* notation that is being used today[2].

Having said the importance of *gamakas* and the need for notations in Indian music, there needs to be a well-equipped notation system that can communicate the gamakas without any ambiguity and help properly reproduce the same. The name that comes up at this juncture is SubbarāmaDīkṣitar, who is the trailblazer in notating *gamakas*, which became a significant milestone in the history of Karnāṭak music. He not only symbolised the pañcadaśa*gamakas* mentioned in the treatise SaṅgītaRatnākara of Śārṅgadēva, but also gave the descriptive notations, i.e., the detailed notations with *gamaka* signs, to the compositions of MuttusvāmiDīkṣitar and his lineage, in his voluminous treatise SaṅgītaSampradāyaPradarśini (SSP)[3]. Later in the line comes Vidya Shankar[4], who, on the basis of SSP gave the detailed *gamaka*-notations for the compositions of ŚyāmaŚāstri. Over the years, the notation system went through various experiments in order to make it more user-friendly. In the process, it did get a digital touch as well.

This paper deals with the various *gamaka* notation systems of Karnāṭak music, relevant innovations, and adaptations, right from SaṅgītaSampradāyaPradarśinito date. It dwells on both historical and scientific methodologies. It also touches upon the impacts it created on Indian music and the challenges & shortcomings in adapting them.

Different *gamaka*-notation systems: An analysis

Musical notation is a system used to represent the otherwise aurally perceived music (played/ sung) through the use of written, synthesised or otherwise-produced symbols. Notations could be classified into 2 types based on the complexity involved in the representation- the *prescriptive notation* and the *descriptive notation*. The prescriptive notation is a simple system with the solfa syllables equipped with the octave and time measure representations in the first row and the corresponding lyrics (sāhitya) in the second row, set to a particular *tāla*. This system of representation does use a few of the *gamaka* indications. On the other hand, the descriptive notation is a full-fledged representation that is performance-ready and hence uses all possible *gamaka* symbols. In today's practical usage, an intermediate of the above two systems is being made use of.

In practical music, *gamakas* exist as a part of the phrase belonging to a certain rāga and not in isolation. Hence, to interpret a *sargam* notation (or *sariga ma* notation), the knowledge of the rāgas or the

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[1] Bhandarkar P R(1913-14) , Kudimiyamalai Inscription on music, Epigraphiaa Indica(XII:28), p 226

[2] Widdess, D. R. (1979). The Kudumiyamalai inscription: a source of early Indian music in notation. Musica Asiatica, p 122.

[3] DikshitarSubbarama, Sangita Sampradaya Pradarshini(Eng Web version), Jan 2008

[4] Shankar Vidya (1979), Shyama Sastry's Compositions, Vol I-III, Pub., Author, Madras

rāga-lakṣaṇas in specific, is mandatory, without which the notation remains uninterpretable. For a musician who is well versed in the lakṣya andlakṣaṇa aspects of music, interpreting the notation, be it prescriptive or descriptive, is not a tough job.

Sections that follow give an overview of some of the Karnāṭak music notation systems.

➢ **Notation system inSaṅgītaSampradāyaPradarśini (SSP) ofSubbarāmaDīkṣitar**

This great work indeed played a significant role in developing the *gamaka* notations while keeping the tradition intact. The symbols featured in SSP seem to have greatly influenced by the Staff notations. Following is the list of symbols from the treatise[5]:

A. *Gamaka*Symbols:

Symbol	Name
∿∿	kampita
∴	sphurita
∵	pratyāghāta
w	nokku
∧	ravai
✓	khaṇḍiṁpu
⌒	vaḷi
/	ētRa jāru
\	iRakka jāru
×	odukkal
Y	orikai

B. **Symbols**   **for**   *Sthāyīsvaras*

anumandra	|s r̤ g̤ m̤ p̤ d̤ n̤|
mandra	|s̤ r̤ g̤ m̤ p̤ d̤ n̤|
madhyama	|s r g m p d n|
tāra	|ṡ ṙ ġ ṁ ṗ ḋ ṅ|
atitāra	|s̈ r̈ g̈ m̈ p̈ d̈ n̈|

C. **Details**   **of**   *śuddha-vikṛtasvaras*

♭ — This symbol is used for *śuddha ṛṣabha, sādhāraṇa gāndhāra, śuddha dhaivata* and *kaiṣikī niṣāda*.

♭♭ — This symbol is used for *śuddha gāndhāra* and *śuddha niṣāda*.

♮ — This symbol is used for *pañcaśruti ṛṣabha, antara gāndhāra, śuddha madhyama, pañcaśruti dhaivata,* and *kākalī niṣādam*.

— This symbol is used for *ṣaṭṣruti ṛṣhabha, varāḷī madhyama,* and *ṣaṭṣruti dhaivata*.

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[5]DikshitarSubbarama, Sangita Sampradaya Pradarshini(Eng Web version), Jan 2008, Vol 1, pp xii-xiv

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES   21
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National Conference   Special Issue : Volume-2 issue-4

D. Symbols for time measure(Kālapramāṇa)

s	=	1 akṣarakāla
S	=	2 akṣarakāla
S ⌣ s	=	3 akṣarakāla
S ⌣ S	=	4 akṣarakāla
S ⌣ S ⌣ s	=	5 akṣarakāla
S ⌣ S ⌣ S	=	6 akṣarakāla
S ⌣ S ⌣ S ⌣ s	=	7 akṣarakāla
S ⌣ S ⌣ S ⌣ S	=	8 akṣarakāla

Also, if a dot is placed next to the *svara-akṣara*, its *kālapramāṇa* increases by half a measure; i.e

$$s = 1; \ s \cdot = 1\tfrac{1}{2}; \ s \cdots = 1\tfrac{3}{4}; \ S = 2; \ S \cdot = 2; \ S \cdots = 3\tfrac{1}{2} \ aksara \ k\bar{a}las.$$

Similarly,

s	=	one *akṣara kāla*
s̱	=	1/2 *akṣara kāla*
s̳	=	1/4 *akṣara kāla*
s̲̳	=	1/8 *akṣara kāla*
s̲̳̱	=	1/16 *akṣara kāla*

☞	—	special notes with reference to the the (current) discussion;
‖	—	end of a *tāla āvarta*;
		—	end of each component (*avayava*) contained in a particular *tāla cycle*;
℅	—	indicates the *pallavi eḍuppu* of *kīrtana*s and other musical forms;
⋮	—	indicates places where the *pallavi*, *anupallavi* have to be repeated;
⌢ ⋮	—	is employed in some places;[†]
⊙	—	indicated the places where the rendition of *gīta, tāna, prabandha, kīrtana,* etc., have to be concluded;
ₛS	—	indicated the occurrence of the *svara* which indicates a stressed enunciation;
♩	—	this symbol is used to indicate the *eḍuppu* after one *akṣara*;
♪	—	this symbol indicated the *eḍuppu* after half *akṣara*.

E. Other symbols

Following is a notation clip from the SSP[6], of the *KamalāmbaNavāvaraṇa*kṛti in the rāga*Tōḍi*, which is a *Sarva-svaragamakavarikaraktirāga*:

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[6]DikshitarSubbarama, Sangita Sampradaya Pradarshini (Eng Web version), Jan 2008, Vol 1, p 62

Inferences drawn:

The role of musical notation is to preserve the music of a particular time period for posterity. The *gamaka* symbols help in representing the ideas of the *Vāggēyakāra*as is. Also, a notation should serve the purpose of an aid to the performer. The notation system of SSP is historical yetscientific in nature and serves the first two purposes but doesn't seem to serve the third fully,for the notation needsa lot of expertise to interpret, and for a novice or a medium-level musician, it may not seem very friendlyin terms of readability as well as the interpretation.

➢ **Notation system in the book *Shyama Sastry's Compositionsby*Vidya Shankar**

In the book, '*Shyama Sastry's Compositions*', Vidya Shankar has notated all available compositions of Sri ŚyāmaŚāstri with the appropriate*gamaka* symbols. Her system of *gamaka* representation is based on that of SSP, with slight differences in symbolisation as well as interpretation. The *Kampitagamaka*hereis represented and demonstrated in three different varieties based on the type of oscillations, unlike SSP, wherein only one representation is seen.The *gamakassphurita* and *Prathyāghāta*are represented by a '*triangle'* and an '*inverted triangle*' respectively, citing the clashes that might occur when the above-said*gamakas*are used along with the higher octave notes. Similarly, the lines indicating the higher speeds are used below the *svara-line*, unlike in SSP, where they are represented above the *svara* lines, to avoid overlapping of *gamaka* symbols.

Inferences drawn:

This system of notating (though based on SSP), tries to overcome some of the issues related to readability. But as the author herself mentions[7], 'howsoever scientifically the *gamakas* are explained, unless proper training and practice is given, an understanding on *gamakas* will elude grasp.'

➢ *Gamaka*Box by Ramesh Vinayakam:

'*Gamaka* Box' is a very innovative musical notating system designed by Sri. Ramesh Vinayakam. This system of portraying the *gamakas* is applied on top of the existing notational practices without interrupting the understanding of a prescriptive notation. In the procedure, it uses new symbols along with some of the traditional ones.

The features of *Gamaka* Box can be listed as follows:

• It is a 3-lined box representation placed on top of a *svara*, wherein the middle line denotes the base *svara* that is being pronounced; the line above denotes the next *svara* in the rāga, and the line below, the lower *svara*. In the case of *varjya-sampūrṇa*rāgas, it would be taken as *sampūrṇa* with the involved *svaras* indicated.

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[7]Shankar Vidya (1979), Shyama Sastry's Compositions, Vol I ,p 8, Pub., Author, Madras

- Graph-like symbols are used to indicate the oscillations of the notes. If a note/ *svara*oscillates beyond the *svaras* above or below it, it could be represented in the space outside the box or by adding extra lines to it.
- As *gamakas* differ with time / *kāla-pramāṇa*, the system has features representing the same. Here the time ticked by a *svara* is divided into four nearly equal sub-times, and a *gamaka* curve (smooth or sometimes sharp) is used to denote the time spent on each of the components of *gamaka* applied.
- The space between the lines is meant to be a musical space representing the other *svaras* or *anusvaras* featuring in the applied *gamaka*.
- A '<' symbol represents the stress points in the *gamaka,* and a '**.**' is the intended rest in the elongation.

Following clips represent some of the *gamaka* symbols (Fig 1) and their representations in some rāgas (Fig 2)[8]
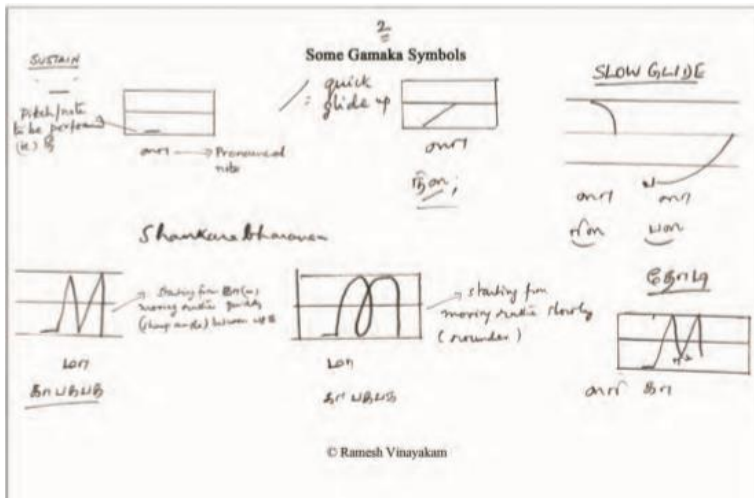
(Fig 1)

[8]PC: Vinayakam Ramesh, principles of Gamaka Box, *Sruti* magazine, May 2011, pp 37-38

(Fig 2)

Inferences drawn:

This system of notation seems less tangled and comparatively easy to follow than the older ones discussed. But for a person not well versed with the gamakas, it might seem alien without an audio reference. Also, understanding *gamakas* is not possible overnight. Students need to be made well aware of the notation symbols for them to adapt to this system. Otherwise,notating the compositions is surely going to be an uphill task. But that apart,itshighly systematic and scientific approach tries to depict the *gamakas* in a much unambiguous way.

➢ **Rasika-Gaayaka software by M Subramanian**

The Rasika and Gaayakasoftwares bySri. M. Subramanian provide the audio-visual representation of *gamakas*on a digital platform and facilitate the user in notating the compositions, which generate simulated synthetic music when played.

Features of the aforesaid softwares are listed below:

Gaayaka:

- In the gaayaka program, it is possible to type the traditional '*sariga ma*' notation and play it in the tones of Vina or Flute at the required pitch (*ādhāraśruti*) and tempo.
- Up to three-octave representations are possible using letter capitalisations; i.e., for example, the
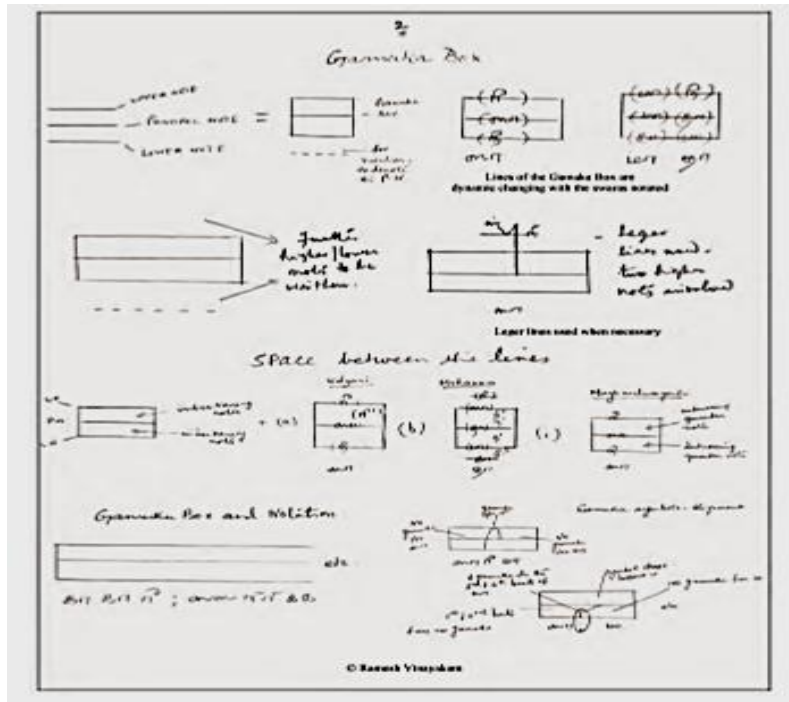
lower and higher octave pitches for the *svara* '*ga*' are denoted as '*Ga*'and '*gA*', respectively. Also,it gives the flexibility of changing the octaves for select phrases in the midst of playing.

- The symbols '>'and '<'are used in representing the decrease and increase in pitch, respectively, for the pitch inflections smaller than that of a semitone.
- A ',' indicates the note continuation, and ';' a pause.
- Parentheses are used in grouping of expressions that need to be performed at speed factors that are powers of two, with the nesting proportional to the speed.
- It facilitates the selection of desired *Meḷa* or individual notes to define a rāga scale.
- Sample notations and frequently used *gamaka* phrasesof the rāgasare available to assist the user, which means a well-built database of rāgas is available.

Following is a screenshot of a gaayaka program[9] showing the syntax of a notation:

[9]http://carnatic2000.tripod.com/gaayaka6.htm
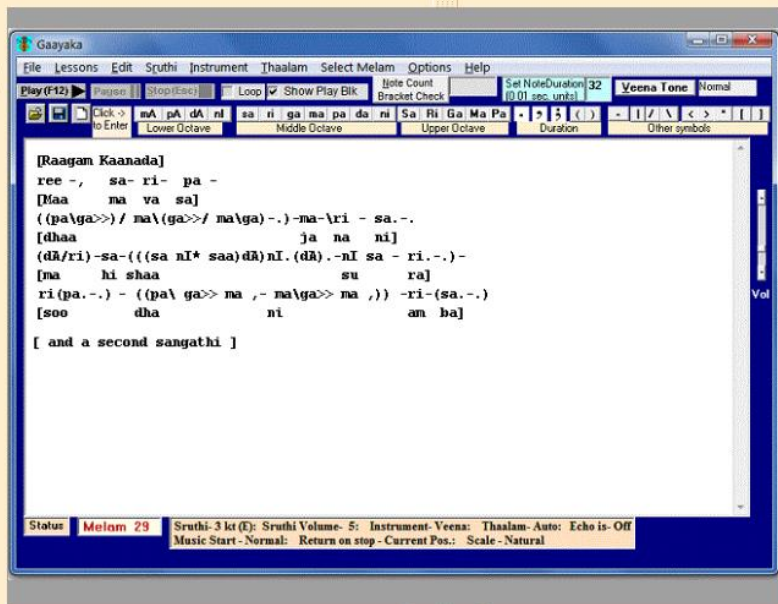
(Fig 3)

Rasika:

- Rasika is software that produces synthetic music in the tones of Vina and Flute, with all the required *gamakas*.
- It is an informative program with modules: *Introductory, Meḷam, Raagam,Thaalam, Physics and Music, Glossary, and Index,*giving all the required inputs.

  Following are the clips explaining some of the above features,[10] like meḷam module (Fig 4) and the rāgam module (Fig 5):

(Fig 4)

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[10]http://carnatic2000.tripod.com/rasika6.htm
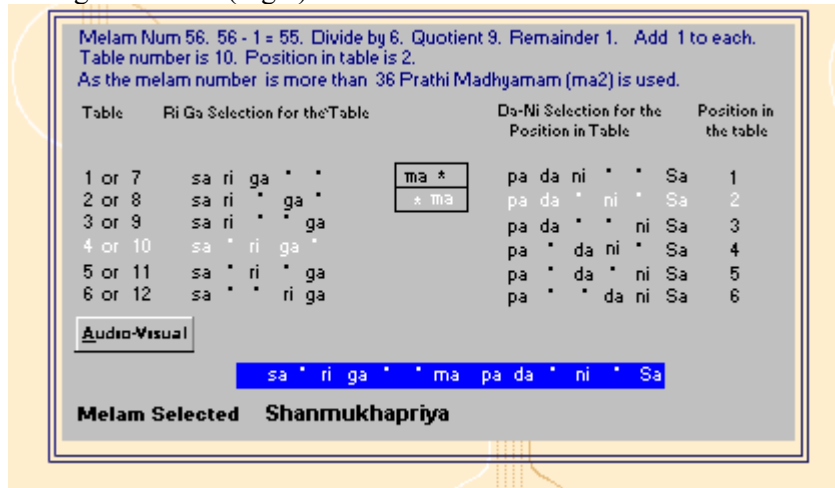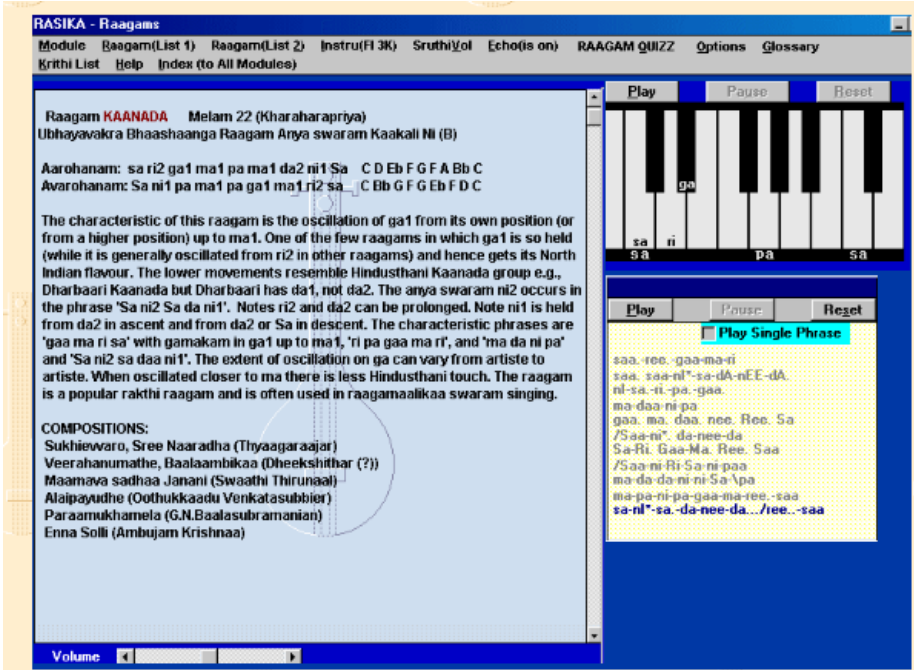
(Fig 5)

Inferences drawn:

Musicians or students, who are very much used to the traditional simple notations, would find difficulty in adapting to this entirely different system. Also, understanding *gamakas* to the core is essential in writing these notations, even though some gamaka phrases are readily available. Sound computer knowledge is also a requirement. But the advantage here is that, unlike the written ones, the user can feel the contour of the *gamakas*played.

➢ **Other Notation Systems**

Apart from the notation systems mentioned in the above sections, there have been a number of innovations thathave contributed considerably. A few have been listed below.

- AMS notation system by Sri. AkellaMallikarjuna Sharma
- Paṭāntara notation system by Sri. Srikumar K S
- RangaRamanujayyangar's notation system

Conclusion

The notating ofcompositions was initially meant for documentation purposes. Students earlier used to learn purely by aural means and hardly did they go for writing. But the picture has been changed today. In this fast-moving world, everyone and everything needs to be instant; so is music learning. Hence the purpose of the notation has also changed. People depend on notations and audio references for learning. Various types of research have been happening of late to assist this purpose. Notation systems are getting more and more advanced and user-friendlywith every passing day.

Gamakas are rhetorical elements in Karnāṭak music. They are broadly defined to be embellishments or grace. It is unlikely that they are hardly associated with the duration of dynamics. As Prof.Sambamoorthy says, at the level of writing, *gamakas* are described as being more than shakes, that they are 'not only shakes.' Be it the manual interpretation or the computer-based interpretation, prescriptive notation has some limitations. To have a *gamaka*-filled recital, a notation that is set accordingly is a must, and bothare mutually dependent.

Although many of the *gamakas* have been effectively represented, quite a good number of them need further research.

Notation design and interpretation need a lot of expertise,butthe irony is that the experts do not really depend on the notations for the interpretation of *gamakas*.This seems to have hit the deadlock.This

requires notational as well as teaching systemsto go hand in hand. At this juncture, a consortium of Karnāṭak musicians and researchersis very much essential to promote this so that the rich treasure of gamakas is preserved and imparted before it loses its originality and charm.

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28

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