Analysis of an Indian Classical Music Composition

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Abstract: This research aims to enable analysis of Indian classical music compositions by studying different elements of a composition of vocal music using a statistical method. Indian classical music is an art which is passed on to the next generation through an oral tradition and is mastered by practicing it orally and by listening to it. Writing music has been very minimal in Indian classical music tradition and is essential mainly for the reference purpose. Traditionally, analysis of an Indian classical composition too is done by listening to a composition and by studying its notation. Only medium paced compositions are analyzed in this research.

The new method that I have suggested in this research can be used to check whether the results of analyzing a composition traditionally can match the results of analyzing a composition by using the statistical method. This research is a novel way of analyzing a few elements of a composition visually using its graphical representation. Using this method, an individual who understands mathematics and statistics but has a limited understanding of music can attempt to analyze certain elements of a composition. The prominent elements that are analyzed are: Mukhada- beginning of a composition, Sam swara- the swara on which the first beat of a taal is kept, Sthayi and Antara- the two parts of a composition, Taal-a cycle of beats, Laya- distance between two beats of a taal, Raagaroop- a melodic framework for improvisation in Indian classical music and Sahitya- Text of a composition.

I have analyzed three elements out of seven using the standard deviation, mean and the graphical representation. The elements are Mukhada, Sthayi-Antara and the Laya. The rest of the elements are analyzed by listening to the composition and by studying its notation.

Keywords: composition, indianclassicalmusic, elements, vocalmusic.

1. WHAT IS A COMPOSITION

A composition plays an important role in Indian classical music. It is a crafted structure according to the rules and framework of a raga. It gives a solid foundation for exploring and improvising the raga. A raga has countless possibilities for improvising. A composition is a part of a raga which provides a certain path and direction for improvisation.

2. PURPOSE OF ANALYSING A COMPOSITION

In order to explore infinite possibilities within a raga, more than one composition is required. Each composition has a different path and direction of improvisation. Multiple compositions are composed by composers. Some compositions sung by vocalists have lasted for centuries, remained favorite compositions of audience and have gained immense popularity. Hence, to understand a composition in depth, its analysis is important.

3. METHODOLOGY OF ANALYSIS

In order to analyze a composition, important elements like Mukhada-beginning of a composition, Sam swara- the swara on which the first beat of a taal is kept, Sthayi-Antara- the two parts of a composition, Taal- a cycle of beats, Laya- distance between two beats of a taal, Raagaroop- a melodic framework for improvisation in Indian classical music and Sahitya- text of a composition, need to be studied.

Analyzing a composition using the above parameters by the listening method needs many years of music practice and study. This study focuses on analyzing a medium paced composition visually using statistics and simple concepts like Mean and Standard deviation. My attempt is to see whether both the results match.

These seven factors are useful for studying and analyzing a composition. Out of the above factors Mukhada, Sthayi-Antara and Laya are analyzed additionally by a novel method using statistics and graphs.

The notations of the compositions are coded with numbers and then are represented graphically. Values of Mean and standard deviation are sought using Microsoft excel and the notations of compositions and mukhada and sthayi-antara are analyzed.

The value of Mean of mukhada is calculated to know which swara has been repeated for maximum number of times in Mukhada. Standard deviation gives details about the spread of Mukhada from the mean value and thus determines its region of swaras. It also determines the uppermost swara point and lowermost swara point in the mukhada. This is important in determining the importance of a particular swara in the mukhada and to find out whether it is in concurrence with the grammar of that raga. Similarly, such derivations are important to analyze Sthayi- Antara too.

Two compositions in raga Bageshree are analyzed using Mean, Standard deviation and are presented graphically.

4. ELEMENTS OF A COMPOSITION

1) Mukhada- Mukhada is the opening of a composition that ends in a Sam i.e. the first matra(beat) of the taal (cycle of beats). It is that part of the composition which is sung repeatedly along with improvisation in each rhythm cycle. It is designed to be the most attractive section of the composition. Compositions typically have mukhadas starting from any matra of a taal.

Mukhadas are aarohapradhan (ascending), avrohapradhan (descending) or a mix of both. Earlier, compositions with aarohapradhan mukhadas were performed with preference. It made them easily audible to the audience as there were no microphones. Aarohapradhan mukhadas are attractive and catchy as they end on a higher note in a saptak. Aarohapradhan mukhadas display the melody of raga instantly.

Mukhadas are of various lengths. Mukhadas begin from sam or from any other matra in a taal. The length of a mukhada is determined by the starting point of the mukhada and the number of matras in the taal. For example, a mukhada beginning from seventh matra in taal teentaal is eleven matras long.

Structure of a mukhada varies depending on whether a raga is poorvaangapradhan or uttarangapradhan. In a poorvangapradhan raga, the elaboration of a raga is in the lower section of the saptak(Mandra and Madhya saptak) and in a uttarangapradhan raga, the elaboration of a raga is in the upper section of the saptak. A saptak comprises of seven swaras or seven notes of classical music. A purist composes a composition and keeps it aligned with the raga grammar to achieve the required impact on the audience.

2) Sam swara- Sam is the first matra of any taal. It is an important element of a composition as it determines the path and direction for improvising a raga. Therefore, composers choose to compose many compositions in one raga with sam on different swaras so that different paths to a raga can be explored. A scale of raga has two parts, poorvaanga (lower section of the saptak) and uttaranga (upper section of the saptak) . Each raga has a dominant region of swaras for improvisation, poorvaanga or uttaranga. The sam of a composition is usually kept on the Vaadi (the most important note in a raga) swara or it is kept in sync with the poorvaanga or uttaranga of the raga. For novelty purposes, composers experiment and keep the Sam in opposite ang (section of the saptak) too. The compositions sung by capable performers through regular performances become and stay popular. A composition with a sam in opposite ang, if sung by an able performer can change the grammar of a raga. E.g., Ustad Amir Khan's (founder of Indore gharana) composition in raga Marwa (an Indian classical raga sung in the evening) had the unusual sam on the note of lower saptak Dha. His performance of Marwa became popular and the composition was well accepted by the audience. This changed the aesthetics and grammar of raga Marwa. Earlier it was known to be an Uttarangapradhan raga. After Amir Khan's rendition of raga Marwa, the grammar of the raga changed and it was accepted as a Poorvangapradhan raga.

3) Sthayi and Antara- Sthayi, the first half and Antara, the second half are the two important parts of a composition in which middle saptak and upper saptak notes are used respectively. Traditionally, the practice has been to sing both the sthayi and the antara. But in the recent past I saw that some composers and singers give preference to singing only the sthayi and leave the antara unsung. It is true that most of the improvisation of a raga can be done alone with the reference of sthayi, but it cannot be denied that the antara is at least a little different from the sthayi which is why it is important to not leave it unsung.

The length of the sthayi and antara differs according to the gharana or style of singing.

4) Taal- Taal is a cycle of beats. Beats are known as matras in Indian classical music. They are represented by syllables which are equidistant from each other. A composer has the freedom to choose any taal for composing a composition. Taals like teentaal, ektaal, jhaptaal, rupak, tilwada, jhoomra, ada chautaal, dadra, keherva are used widely for compositions. While there are many taals a composer experiments with, a popular preference is towards taal teentaal. Teentaal is a taal with sixteen matras equally divided into groups of four. Each matra carries one single syllable which makes it useful for improvising and exploring a raga through the composition set in taal teentaal, giving a wide range of possibilities. Therefore, it is seen that composers have a preference of choosing taal teentaal for composing.

5) Laya- Laya is the distance between two matras. Lesser the distance between the matras, the faster is the tempo of the composition and vice versa. Different laya or tempo are chosen by composers for compositions. There are three types of laya- Vilambit (slow), Madhya (medium paced) and Drut(fast). The compositions in slow pace are useful for improvising through alaaps (slow movement of notes), the medium paced compositions for alaaps and layakari (improvisation with the help of taal and laya) and fast paced compositions are useful for layakari and taans (fast movement of notes). Slow paced, medium paced and fast compositions when presented graphically give different results. The number of peaks (see fig. 1 to 4) in the graphs go on increasing from slow paced, medium paced to faster compositions. The graphical representations (see fig. 1 to 4) of compositions and the number of peaks in it determine the laya of the composition.

6) Raagaroop- Raagaroop is a melodic framework for improvisation in Indian Classical music. It refers to the grammar of a raga. It conveys the flow of notes and the rules within a raga. Indian classical music was passed on as an oral tradition from older generation to the newer generation. The Raagaroop is passed on orally. In this process of passing on, a few raagaroops are lost and a few change bit by bit. The change happens because of the difference in singing and intellectual capabilities of singers and the difference in thought processes. As a result, some ragas have more than one raagaroops. The gharana to which a singer belongs to is a critical factor that determines the ragaroop of a raga.

7) Sahitya or text- The Sahitya or text are the lyrics of the composition. The topics or subjects of compositions that are chosen by the composers are often results of their personal inspirations and observations. Guru-shishya relationship or teacher-student relationship, love and devotion towards guru, human relationships, nature and God are some of the popular topics chosen for writing the text of compositions. Many composers choose to include their pen name in the last line of the compositions. e.g., Jagannath Bua Purohit, a noted composer, and singer of Agra gharana composed compositions using the pen name ‘Gunidas’.

The text used in Indian classical vocal compositions is usually in Braj language, a dialect of Hindi. The words used for compositions are often made from soft consonants which are easy to pronounce and are pleasing to the ears. e.g., tana, dhana, darsana, dukh, jaane, jay, piyarava etc.

Table I - Swara Coding

Swara	**Numerical Code**		**Swara**	**Numerical Code**
Pa	-5		Dha	8
Dha	-4		Dha	9
Dha	-3		Ni	10
Ni	-2		Ni	11
Ni	-1		SA	12
Sa	0		RE	13
Re	1		RE	14
Re	2		GA	15

Swara	Numerical Code
Ga	3
Ga	4
Ma	5
Ma	6
Pa	7

Swara	Numerical Code
GA	16
MA	17
MA	18
PA	19

5. CODING OF SWARAS

The swaras in the notations are coded numerically (See Table I).

The swaras written in bold e.g., **'Pa '**are from the mandra saptak, the swaras written with one capital letter and one small letter are madhya saptak swaras e.g., **'**Pa **'**and the swaras written with both the capital letters are taar saptak swaras e.g **'**PA**'**. The komal swaras have a horizontal line below the swara and the teevra swara has a vertical line on the top of the swar.

I have used the widely available Microsoft excel program for representing the compositions in the graphical format. Since the Microsoft excel program is designed to showcase only the mathematical values, the swaras are coded mathematically. The coded values are not the exact frequencies of the notes but are mathematical abstractions. Two saptaks, pancham from mandra saptak to pancham of madhya saptak to pancham of taar saptak are coded. The shadja of madhya saptak is coded as numerical 0 and the mandra saptak is coded as -1,-2,-3,-4 and so on for shuddha nishad in mandra saptak (lower octave), komal nishad in mandra saptak, shuddha dhaivat in mandra saptak, komal dhaivat in mandra saptak respectively. Similarly, madhya saptak (medium octave) begins from shadja in madhya saptak coded as numerical zero and proceeds with 1,2,3,4,5 coded for komal rishabh in madhya saptak, shuddha rishabh in madhya saptak, komal gandhar in madhya saptak, shuddha gandhar in madhya saptak and shuddha madhyam in madhya saptak respectively and so on. The taar shadja is coded as 12 and komal rishabh in taar saptak (higher octave), shuddha rishabh in taar saptak, komal gandhar in taar saptak are coded as 13, 14, 15 respectively.

The notations of the compositions are coded numerically and a graphical representation is sought. Mean and Standard deviation of mukhada, sthayi and antara are calculated separately.

Using these values, the upper and the lower limit of swaras in the mukhda, sthayis and the antaras and prominent range of swaras in mukhadas, sthayis and antaras is obtained. The graph of a mukhada can depict number of ascents vs number of descents present. After counting its ascents and descents, its ratio can give a clear indication of whether the mukhda is aarohapradhaan, avrohapradhaan or a mix of both.

Coding of mukhada, sthayi and antara of Composition-01 are shown in table II, table III and table IV respectively. The values of mean and standard deviation of Composition-01 are given in Table VI. Similarly, values of Composition 02 are obtained (See Table VII). The methodology of obtaining values and graphs of Composition-01 is given in detail with coding. The values of Composition-02 are obtained using the same methodology. The values of Composition-02 are given directly to avoid repetition. The graphs of both the compositions are given.

Referring to the tables I and II, mukhada of the composition 1, 'Ranga rangeele' is spread from -2 to 3 which means it is spread between **Ni** and Ga. The mukhada is avarohapradhan which is seen in the graph of composition 1, figure 1. The sthayi is spread from 0 to 7 which means it is spread between Sa and Pa. The antara is spread from 6 to 13 which means it is spread between Ma and RE. The graph shows that there are three peaks each in the sthayi and antara. Similarly, in the composition 2,'Derna Derna', mukhada is spread from -1 to 8 which means it is spread between **Ni** and Dha. The sthayi is spread from 0 to 9 which means it is spread between Sa and Dha. The antara is spread from 5 to 13 which means it is spread between Ma and RE. The graph shows that there are nine peaks in the sthayi according to figure number 3 of composition 2 and there are eight peaks in the antara according to figure number 4 of composition 2. Composition 2 has more melodic variations, is longer is length than composition 1 which

can be seen clearly from the number of peaks each composition has. Higher the number of peaks, more the number of melodic variations and length of a composition.

This method of analysis can be used for analyzing any medium paced Indian classical musical composition.

Composition 01: Rang Rangeele

Raag: Bageshree

Taal: Teentaal

Table II – Coding of Mukhada

Matra	Taal	Swara	Lyrics
	7	5	Ran
	7	5	S
	8	3	Ga
	8	3	S
O	9	2	Ran
	9	2	S
	10	2	Gee
	10	2	S
	11	0	Le
	11	0	S
	12	0	Pre
	12	0	S
3	13	0	S
	13	2	S
	14	-3	Ma
	14	-3	S
	15	-3	S
	15	-3	S
	16	-2	Pi
	16	-2	S
X	17	0	Ya
	17	0	S

Table III - Coding of Sthayi

Matra	Taal	Swara	Lyrics
	7	5	Ran
	7	5	S
	8	3	Ga
	8	3	S
O	9	2	Ran
	9	2	S

Matra	Taal	Swara	Lyrics
	10	2	Gee
	10	2	S
	11	0	Le
	11	0	S
	12	0	Pre
	12	0	S
3	13	0	S
	13	2	S
	14	-3	Ma
	14	-3	S
	15	-3	S
	15	-3	S
	16	-2	Pi
	16	-2	S
X	17	0	Ya
	17	0	S
	18	0	S
	18	0	S
	19	5	San
	19	5	S
	20	5	Ga
	20	5	S
2	21	3	Khe
	21	3	S
	22	2	Le
	22	2	S
	23	2	S
	23	2	S
	24	5	Aa
	24	5	S
O	25	5	S
	25	5	S
	26	3	J
	26	3	S
	27	3	S
	27	3	S
	28	5	Su

Matra	Taal	Swara	Lyrics
	28	5	S
3	29	9	R
	29	9	S
	30	10	Na
	30	9	S
	31	12	Ki
	31	12	S
	32	12	S
	32	12	S
X	33	10	Ho
	33	10	S
	34	10	S
	34	10	S
	35	9	S
	35	9	S
	36	5	S
	36	5	S
2	37	3	Ri
	37	3	S
	38	2	S
	38	2	S

Table IV – Coding of Antara

Matra	Taal	Swara	Lyrics
O	9	3	Di
	9	3	S
	10	5	Na
	10	5	S
	11	9	Ran
	11	9	S
	12	10	Ga
	12	9	S
3	13	12	Bhi
	13	12	S
	14	12	S
	14	12	S
	15	12	Je
	15	12	S

Matra	Taal	Swara	Lyrics
	16	12	S
	16	12	S
X	17	10	U
	17	10	S
	18	12	Sa
	18	12	S
	19	14	Ran
	19	14	S
	20	12	S
	20	12	S
2	21	10	Ga
	21	10	S
	22	12	Na
	22	12	S
	23	10	Me
	23	9	S
	24	9	Khe
	24	9	S
O	25	10	S
	25	10	S
	26	12	Le
	26	12	S
	27	12	S
	27	12	S
	28	17	Gya
	28	17	S
3	29	15	S
	29	15	S
	30	14	Na
	30	14	S
	31	12	Ki
	31	12	S
	32	12	S
	32	12	S
X	33	10	Ho
	33	10	S
	34	10	S

Matra	Taal	Swara	Lyrics
	34	10	S
	35	9	S
	35	9	S
	36	5	S
	36	5	S
2	37	3	Ri
	37	3	S
	38	2	S
	38	2	S

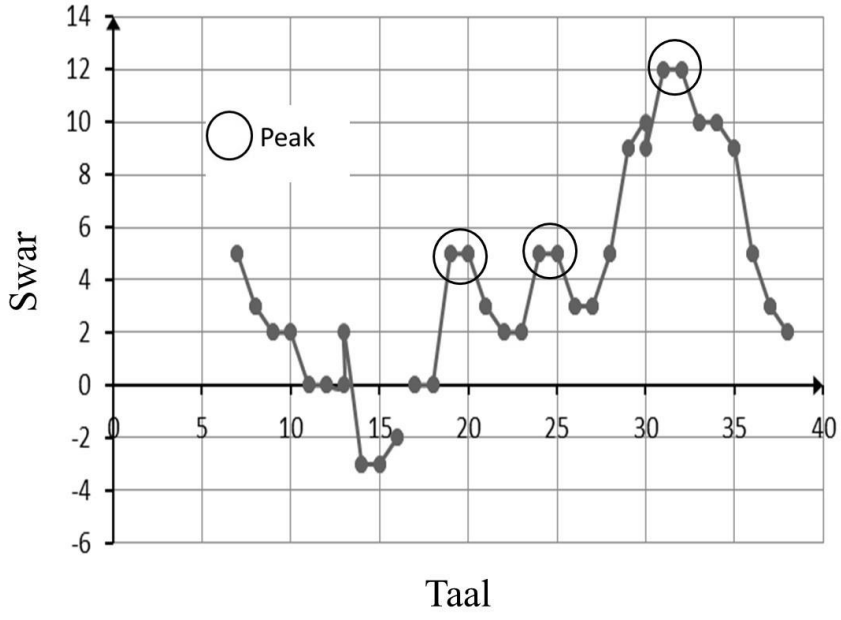

Fig. 1- Plotting of Sthayi (Composition 01)

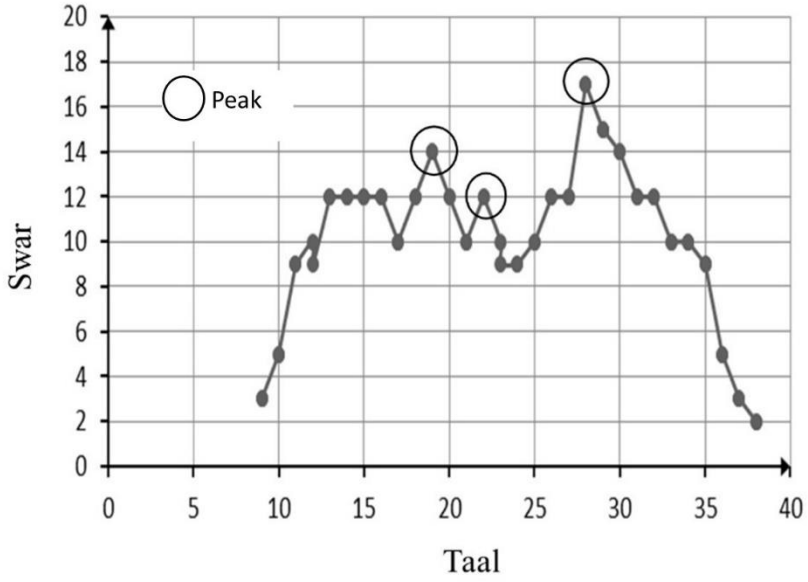

Fig. 2- Plotting of Antara (Composition 01)

Table VI- Mean and standard deviation (Composition 01)

	Mukhada	Sthayi	Antara
Number of values	20.00	64.00	60.00
Mean	0.50	3.89	10.2
Standard deviation	2.59	4.06	3.52
Sum (Mean +stdev)	3.09	7.95	13.72
Difference (Mean - stdev)	-2.09	-0.17	6.68

Composition 02: Derna Derna

Raag: Bageshree

Taal: Teentaal

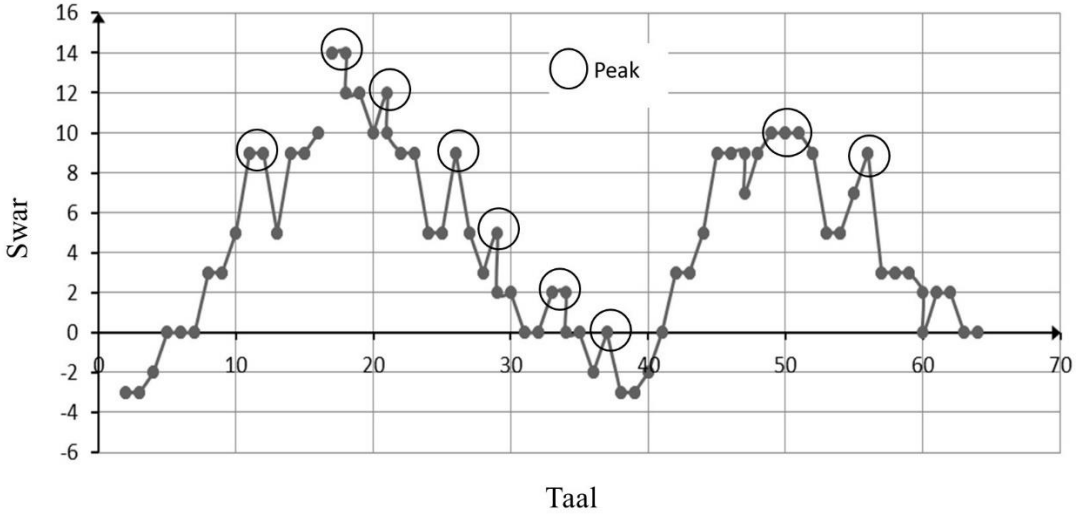

Fig. 3- Plotting of Sthayi (Composition 02)

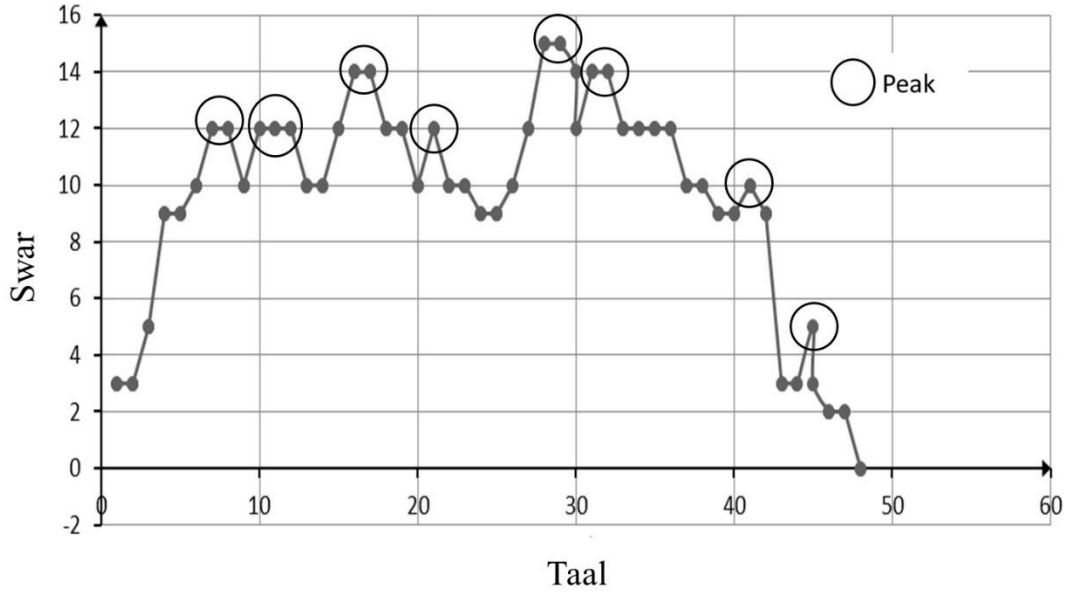

Fig. 4 - Plotting of Antara (Composition 02)

Table VII- Mean and standard deviation

(Composition 02)

	Mukhada	Sthayi	Antara
Number of values	30.00	126.00	96.00
Mean	3.60	4.48	9.69
Standard deviation	4.69	4.57	3.75
Sum (Mean +stdev)	8.29	9.05	13.44
Difference (Mean - stdev)	-1.09	-0.09	5.94

6. CONCLUSION

The results of analysis of a medium paced composition with reference to Mukhada, Sthayi-Antara and Laya using the statistical method matches the results achieved by the listening method.

This method of analysis can be used as a supplementary method to analyze any composition.

7. REFERENCES

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