Measuring the Human Nasal Dominance in the Context of Svara Yoga: A Low-Cost Tool Based on Nasal Airflow Detection

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Abstract: Human nasal dominance, characterized by variations in airflow or pressure between the nostrils due to transient obstructions caused by erectile tissue, has significant implications for wellbeing, as it is related to neurological and physiological aspects [1]. In Svara Yoga, which is one of the authentic and ancient traditions of Yoga, the concept of human nasal dominance holds great importance, the alternating airflow or pressure variations between the nostrils correspond to the activation of specific energy channels or "Nāḍīs" in the subtle body [2]. The transient obstructions caused by erectile tissue in the nostrils are linked to the flow of Prāṇa (life force energy) and can be influenced through specific techniques in Svara Yoga and Haṭha Yoga [3]. Accurate detection of nasal airflow and dominance is essential for understanding Svara Yoga, the dynamics of the Nasal cycle, and potential diagnostic applications. This research article introduces a novel and cost-effective tool for measuring and characterizing nasal dominance through airflow.

Keywords: Nasal Dominance, Airflow Detection, Nasal Cycle, Svara Yoga, Chandra Svara, Surya Svara

1 Introduction

1.1 Svara Yoga:

Svara Yoga is one of the most ancient and traditional forms of Yoga [4]. Svara Yoga deals with the distribution of Prāṇa (vital force) in different parts of the body through subtle pranic channels termed Nāḍīs [5]. The major teachings of Svara Yoga have been given in the classical text Śiva Svarodaya in the Sanskrit language, as a dialogue between Bhagwan Śiva and Devi Parvati [6]. Svara is described as the sound of breathing as Hamso which is divided into the sound of the inhalation as Ham and the sound of the exhalation as So [7][8]. Svara Yoga can be defined as the Yoga of Breath or the Science of Breath [9]. The understanding of Svar Yoga allows practitioners to harness the breath as a means to achieve physical, mental, and spiritual well-being [10]. The flow of Prāṇa, the subtle vital force, is present in the subtle channels known as Nāḍī which are 72,000 in number originating from the center of the Nāḍīs known as Kanda that is situated in the Sūkṣhma Sharīra somewhere around the navel of a person [11]. The movement of the Prāṇa in most of these 72,000 Nāḍīs is very subtle and hard to detect [12].

The Nāḍīs situated in the Sūkṣhma Sharīra around the nostrils is known as Idā Nāḍī and Pingala Nāḍī. Ida Nāḍī is related to the left nostril and the sound created by the left nostril is named Chandra Svara [13]. Pingala Nāḍī is related to the right nostril and the sound created by the left nostril is named Surya Svara [14]. The frequencies of the sounds of these nostrils vary over time representing the rise and fall of the Chandra and Surya Svara [15]. The Ida Nāḍī, and its Svara that is Chandra Svara is situated in the left nostril having a cooling and calming effect on the body and mind. Pingala Nāḍī, or the right nostril, is associated with the sun and is believed to be energizing and heating [15][17]. The balance and dominance of these two nasal passages play a crucial role in determining an individual's mental and physical state [17]. According to Svara Yoga, when one of the nostrils is dominant over the specific kind of effects are manifested. than the other, it indicates the dominance of either the cooling or heating energy in the body. This is the phenomenon evident as Svara alteration in Svara Yoga known as Svara Uday [18]. In the Western world, Keyser is said to be the first formal observer of this phenomenon who also termed it nasal cycle in 1895 [19].

The advancements in medical technology have allowed us to develop different modalities of investigations of the nasal cycle. Some of them are rhinomanometry, Peak Nasal Inspiratory Flow (PNIF) nasal endoscopy. But accurate detection of nasal dominance is still an unaddressed problem. There is a need for a low cost device that detects nasal dominance accurately.

1.2 Nasal Dominance Measurement:

Nasal dominance is the phenomenon where one nostril is more dominant in airflow and pressure than the other at any given time. This dominance changes over time from one nostril to another. Studies suggest switching these Nasal Dominance approximately phase length ranging from 30 min to 6h [20]. In right nasal dominance, the right nostril is more open, the airflow is smooth and free, and the left nostril tends to be relatively constricted, and vice versa. This rhythmic alteration of nasal dominance is termed the nasal cycle [21]. In the same manner, Surya Svara is the condition when the right nostril is more open, the airflow is smooth and free, the left nostril tends to be relatively constricted and Chandra Svara is the condition when the left nostril is more open, the airflow is smooth and free, the right nostril tends to be relatively constricted. When the flow of the air in both nostrils is equal it is called Sushumna Svara [22].

1.3 Objectives

This research aims to investigate and measure the concept of human nasal dominance in the context of Svara Yoga.

- Developing a low-cost tool for nasal airflow detection and its dominance
- Assessing nasal dominance patterns among participants

2 Significance of Nasal Dominance in Svara Yoga

The ancient practices of Svara Yoga, also known as the science of breath, are based on the ideas of conventional Indian yogic philosophy. It highlights the importance of breathing as a fundamental mechanism that unites the body, mind, and consciousness [23]. The breathing pattern through the nostrils is very important for health and spiritual growth as per the tradition of Svara Yoga. The fundamental concept in Svara Yoga is the idea of "Nasal Dominance"[22][3]. It is believed that the breath flow in each nostril is associated with specific energetic pathways or Nāḍīs, namely, the Idā Nāḍī (connected to the left nostril) and the Pingala Nāḍī (connected to the right nostril). The central channel, called the Sushumna Nāḍī, is associated with balanced breath flow through both nostrils and is considered to be the pathway to spiritual awakening.

The significance of nasal dominance in Svara Yoga can be understood from several perspectives: Svara Yoga as defined to be the study of breathing has different dimensions as Nasal dominance, the direction of the flow of nasal air, the form of the nasal vapor condensation, the volume of the air.

2.1 Mind-body Harmony: In Svara Yoga, it is believed that the left nostril (Idā Nāḍī) is connected to the mental faculties and is associated with qualities like calmness, receptivity, and relaxation. The right nostril (Pingala Nāḍī), on the other hand, is linked to the physical Faculties and is associated with qualities like alertness, activity, and dynamism. The balance between these faculties is essential for overall well-being and maintaining harmony in the body and mind [23].

2.2 Psychological Effect: It is said that breathing through the left nostril has a calming and cooling effect on the mind, fostering emotional equilibrium and a sense of serenity. The study suggested that after left nostril yoga breathing spatial memory scores increased [24]. As opposed to this, right nostril breathing is thought to stimulate the mind and improve alertness and memory. A study shows right nostril breathing facilitates the better performance of inherent digit backward and digit forward span memory [25]. Svara Yoga practitioners can effectively change their mental and emotional states by comprehending and utilizing nasal dominance.

2.3 Health and Healing: According to ancient yogic writings, nasal dominance imbalance has been connected to several health problems. In contrast, excessive dominance of the left nostril (Idā) is linked to lethargy and sadness, while excessive dominance of the right nostril (Pingala) is linked to disorders like stress, anxiety, and hypertension. Individuals may be able to treat these health issues and advance general wellness by using specialized breathing techniques to balance nasal dominance [26]. Left nostril breathing has been related to anxiety-reducing effects of the left nostril [24].

2.4 Improved Spiritual Practice and Meditation: In the context of meditation, balanced nasal dominance is said to be quite beneficial. The Sushumna Nāḍī is thought to activate when the breath is evenly distributed across both nostrils, enabling the practitioner to enter higher realms of consciousness and spiritual experiences. Forced Alternate Nostril Breathing that is applied to activate Sushumna Nāḍī can balance the functional activity of the right and the left hemisphere [27].

2.5 Coping Stress and Anxiety: Knowing one's nasal dominance allows one to adjust their yoga and meditation routines. For instance, practices that encourage balance of nasal dominance may be useful to help a person feel calm and relaxed if they are under a lot of stress. Anxiolytic effects are shown by the practice of Alternate nostril breathing in acute stressful situations [28].

3 Literature Review: Tools to Detect Nasal Dominance

There exist various methods for the detection of nasal dominance. The literature presents a range of instrumental methods to detect nasal dominance. Methods like acoustic rhinometry and Peak nasal inspiratory flow provide insights regarding the nasal airflow while acoustic rhinomanometry assesses nasal resistance. The Odiosoft Rhino converts nasal airflow-induced sound frequency into cross-sectional area measurements.

Table 1. Available devices for the detection of nasal dominance

S.N.	NAME	MEASUREMENT	KEY POINT	SPECIFICATION
1.	Peak nasal inspiratory flow (PNIF) [29]	Maximal liters per minute of forced nasal airflow	If there are airway obstructions PNIF can be affected	It may not capture normal breathing airflow and relies on correct instruction and patient cooperation.
2.	Acoustic rhinometry (AR) [30]	Cross-sectional area (CSA) at different distances from the nostril, helping assess nasal passages and volumes	Rhino graph based on sound wave distortions, with high accuracy in the first 5-6 cm from the nostril	Useful for patients with obstructions like nasal polyposis or septal deviation
3.	Rhinomanometry (RM) [31]	Simultaneously assessing transnasal pressure and airflow	Tachometer and a pressure transducer	Nasal function, including resistance and work of breathing
4.	Odiosoft Rhino (OR) [32]	Converts nasal airflow-induced sound frequency into cross-sectional area measurements.	Microphone and a nasal probe placed 1 cm from the nostril	Stronger correlation with patient symptom scores compared to AR

Despite the given methods such as as Peak Nasal Inspiratory Flow (PNIF), Acoustic Rhinometry (AR), Rhinomanometry (RM), and Odiosoft Rhino (OR), there remains a great need for the development of a low-cost device to detect nasal dominance. Controlled environments, trained personnel, patient cooperation, specialized equipment are required for the existing methods to function. They are also costly and less accessible.

A cost-effective device that functions on the principle of air flow detection would make the assessment process easy and feasible to be widely applied into both clinical and non-clinical settings. Moreover, such a low cost device could assist individuals to regularly monitor their nasal dominance at home at their comfort. It promotes early detection and longitudinal profiling of the nasal dominance and nasal cycle that may be utilized for their personalized interventions. This can reduce the burden on the system of traditional healthcare.

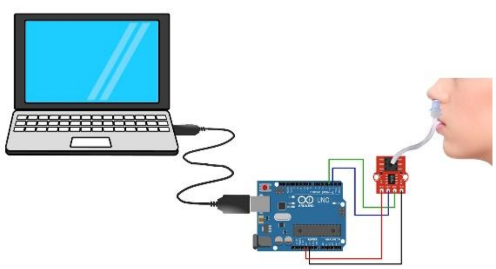
4 Methodology:

4.1 Research Design: To assess nasal dominance, a low-cost tool based on nasal airflow detection was developed and tested. This tool measures the airflow through each nostril to determine the dominance pattern of the participants. The development of the nasal airflow detection tool was inspired by previous studies on similar devices for measuring nasal airflow [1]. Participants were recruited from IIT Mandi through convenience sampling. Inclusion criteria required participants to be healthy adult practitioners aged between 18 to 30 years, and free from any respiratory or nasal abnormalities that could affect nasal airflow. Before their inclusion in the study written informed consent was obtained from all participants.

The study protocol involved two main components:
(1) Experiment 1: Nasal airflow measurement of one nostril by closing the other and vice versa for 10 seconds for each nostril (this serves as an ideal case, where the flow from one of the nostrils is assumed to be zero)
(2) Experiment 2: Nasal airflow measurement of both nostrils simultaneously for 10 seconds. (This serves as a practical case, which immediately follows Experiment 1 (which assumes that the dominance is not changing in such a short time), where the flow from both nostrils is normal, and the device outputs about the dominance can be validated against that in Experiment 1)

Participants sat comfortably in a chair and breathed naturally through their nostrils while the device recorded the airflow patterns. Respiration Laterality Index (LI) was calculated as a measure of the ratio of flow between the nostrils using the method adopted by Kahana-Zweig, Roni, et al [1]. Respiration Laterality Index (LI) can be calculated as (Right Nostril Pressure -Left Nostril Pressure)/ (Right Nostril Pressure + Left Nostril Pressure) for every certain period.

4.2 Nasal Airflow Detection Tool Development



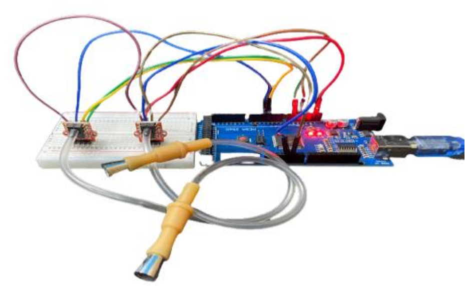


Fig: Schematic representation of the proof of concept. **Fig: Image depicting the developed proof of concept.**

4.2.1 Sensor Selection: HX710B pressure sensor, a high precision that is widely used in various applications for measuring pressure with stability and accuracy was selected. This sensor stability piezoresistive sensing element converts pressure variations into electrical signals. This becomes a good choice for both differential pressure and absolute measurements. This sensor is compact, with low power consumption making it ideal for applications in our proof of concept.

4.2.2 Signal Processing: The HX710B pressure sensor, is a highly accurate integrated circuit-based device utilizing a resistive bridge configuration. It was interfaced with an Arduino board for precise data acquisition. To facilitate non-intrusive measurements of nasal airflow, a hollow conical piece was employed to securely house the sensor during experimentation. The conical piece was comfortably kept in the front of the nostril with close contact to ensure minimal discomfort for the participants.

4.2.3 Data Acquisition: Arduino sketch was used for data acquisition and processing leveraging the HX711 library to interface with the HX710B sensor. For a duration of 10 seconds, the Arduino sketch was programmed to conduct pressure readings at a specific interval of 10 milliseconds. Capturing the data with this high frequency the system could precisely capture subtle changes in nasal airflow. Arduino in conjunction with the HX710B pressure sensor facilitates real-time data acquisition and allows for straightforward data processing making it a reliable and efficient system for studying nasal airflow dynamics and related parameters.

4.2.4 Data Collection: Participant comfort and relaxation are crucial for accurate study results. To fulfill this sensors are connected to cannulas that are kept outside of the nostrils in proximity so that they can detect the inhaled and exhaled airflow properly. If the sensors are placed inside the nasal cavity it may interfere with different variables like moisture and heat, affecting pressure readings.

To collect sufficient data the participants were instructed to breathe naturally through the cannula for a few seconds. The collected data is then presented in a graph format that presents pressure changes over time. The nostril exhibiting higher pressure is easily identified as the dominant nostril. The sensors are positioned around 15-18 cm from the nostrils and connected to the cannula which is made of soft plastic or silicone for comfortable application.

Various advantages are applying this method of data collection as it is simple and non-invasive. The connection of the sensor with the cannula removes the need for nasal insertion of the sensors, making the method feasible and requiring less patient cooperation. As the sensors are low-cost and highly sensitive that can detect subtle pressure changes, this method becomes reliable and cost-effective. The clarity is further enhanced by its graphical representation of the collected data helping in the easy identification of the dominant nostril.

4.2.5 Data Analysis:

Respiration Laterality Index (LI): It is a measure of the ratio of flow between the nostrils. Respiration Laterality Index can be calculated as:

Respiration Laterality Index LI =

(Right Nostril Sensor Value - Left Nostril Sensor Value) / (Right Nostril Sensor Value + Left Nostril Sensor Value)

for every 10 second

The result of this calculation is a 10-second resolution time series of the lateralization extent,

- If LI= 1, Only Right Nostril is Dominant, Flow of Left Nostril is Zero
- If 0 < LI < 1, Right Nostril is More Dominant over Left Nostril
- If LI= -1, Only Left Nostril is Dominant, Flow of Right Nostril is Zero
- If 0 > LI > -1, Left Nostril is More Dominant over Right Nostril
- If LI= 0, Both Nostrils are Dominant with Equal Flow

Mean LI: It is an average of the LI over some time. It can potentially represent the tendency of any subject to be in any particular nasal dominance over some time.

Data received by the uncalibrated sensors were divided by 1000000 and it was rounded off to two digits after decimal.

5. Results/Findings:

The study collected two types of data related to nasal dominance from a sample of 7 participants. In one type of experiment, readings (Experiment 1) were collected after closing one nostril with the other nostril that was open. In the second experiment (Experiment 2) readings were taken simultaneously from both nostrils to observe natural airflow patterns. This process was repeated for the other nostril also.

As indicated earlier, the results from the practical situation of Experiment 2, can be validated against the idealistic case of Experiment 1, to ascertain that each sensor is yielding similar values to that in Experiment 1, and the left and right sensors are not interfering with each other, in a normal breathing setting.

The analysis of the collected data is given in the form of graphs that depicts the pressure changes in the nostrils over a period of 10 seconds. The sensor output values given in the Table below, are averaged over this interval. In the results below, there are two graphs for each sample showing the left and right nostrils of both experiments.

It is observed in the Table below, that columns 3 and 4, which are taken when both the nostrils are open, closely match the idealistic case depicted in the first two columns. The dominant nostril not only is identified correctly and consistently, but the sensor output values are also of the same order in both Exp 1 and Exp 2. The Nasal Dominance can also be identified with the score of LI, which, in these cases, essentially depicts that in realistic cases, one may not achieve a value very close to 1 or -1 (which is quite natural), and hence the order of L1 values used to associate dominance (for average humans), should be considered in ranges as achieved here.

Table 2. The 24-bit integer values received by the HX710B pressure sensor.

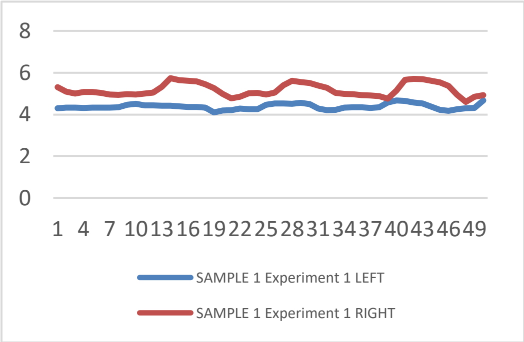
S.N.	Experiment 1 Mean of Right Nostril (When Left was closed)	Experiment 1 Mean of Left Nostril (When Right was closed)	Experiment 2 Mean of Right Nostril	Experiment 2 Mean of Left Nostril	Experiment 2 Mean LI
SAMPLE 1	5.18	4.38	5.20	4.37	0.09
SAMPLE 2	5.17	4.37	5.15	4.36	0.08
SAMPLE 3	4.44	5.44	4.55	5.27	-0.07
SAMPLE 4	5.17	4.37	5.17	4.36	0.08
SAMPLE 5	4.40	5.52	4.39	5.70	-0.13
SAMPLE 6	5.22	4.39	5.17	4.38	0.08
SAMPLE 7	5.17	4.50	5.36	4.43	0.09

In addition to the Table, which gives the average values, the graph below also depicts the actual sensor outputs. At the outset, we find that the variations in the signals are also very smooth, show consistent patterns of relative amplitude and frequencies, and do not show noisy variations. This is indeed a desirable quality for a sensor. More insights about the characteristics and patterns of the signals are given below for each of the samples individually.

5.1 Visual analysis of the signal outputs:

The experiment measures the Respiration Laterality Index (LI) of the airflow of the right and left nostrils during respiration. The LI quantifies the airflow distribution, ranging from -1 (left nostril dominance) to 1 (right nostril dominance), with 0 representing balanced airflow.

A. Sample 1: Experiment 1 LI is approximately 0.083, suggesting a slight tendency for right nostril dominance. Experiment 2 LI is similar, indicating a similar level of lateralization during simultaneous airflow measurements.



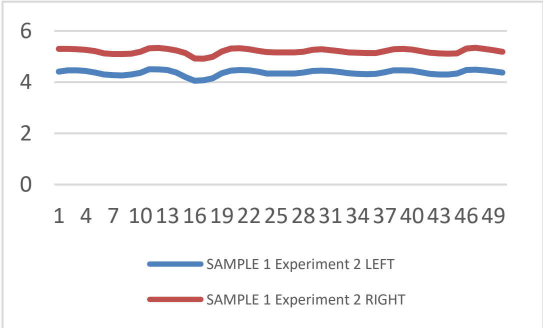
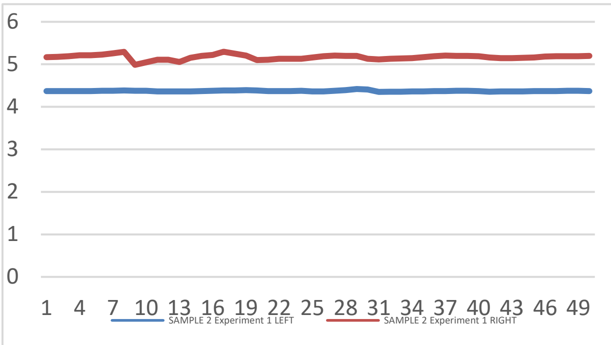


Fig. 1. Right Nostril Sensor having higher frequencies

Fig. 2. Right Nostril Sensor having higher frequencies

B. Sample 2: Experiment 1 LI is approximately 0.084, indicating a slight tendency for right nostril dominance. Experiment 2 LI is slightly higher, suggesting a slightly increased right nostril dominance during simultaneous measurements.



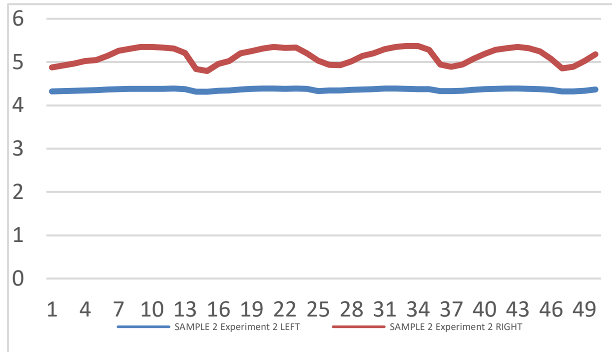
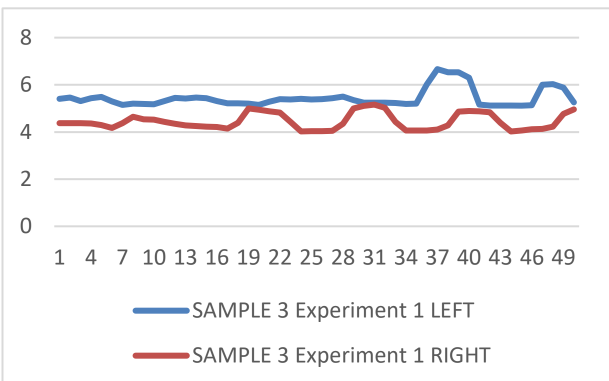


Fig. 3. Right Nostril Sensor having higher frequencies

Fig. 4. Right Nostril Sensor having higher frequencies

C. Sample 3: Experiment 1 LI is approximately -0.110, indicating a tendency for left nostril dominance. Experiment 2 LI is even lower, suggesting a more pronounced left nostril dominance during simultaneous measurements.



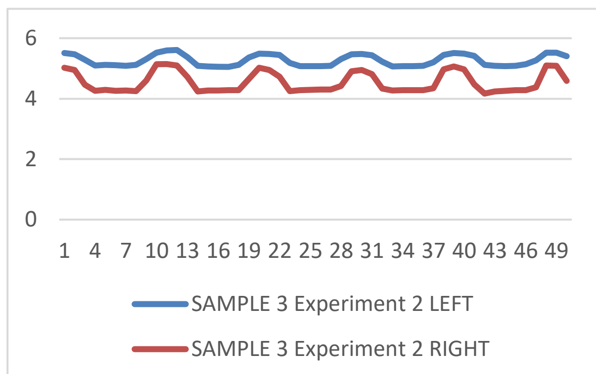
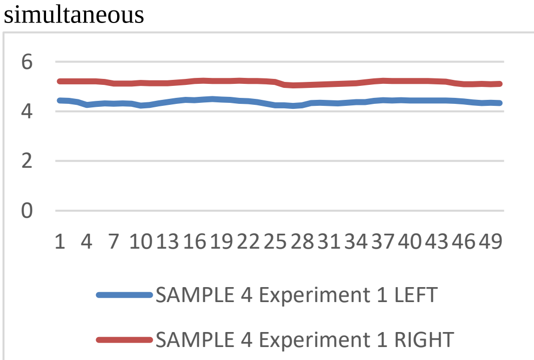


Fig. 11. Left Nostril Sensor having higher frequencies

Fig. 12. Left Nostril Sensor having higher frequencies

D. Sample 4: Experiment 1 LI is approximately 0.083, indicating a slight tendency for right nostril dominance. Experiment 2 LI is slightly higher, suggesting a slightly increased right nostril dominance during simultaneous measurements.



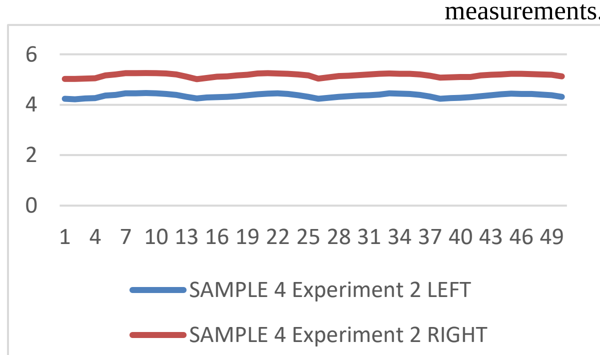
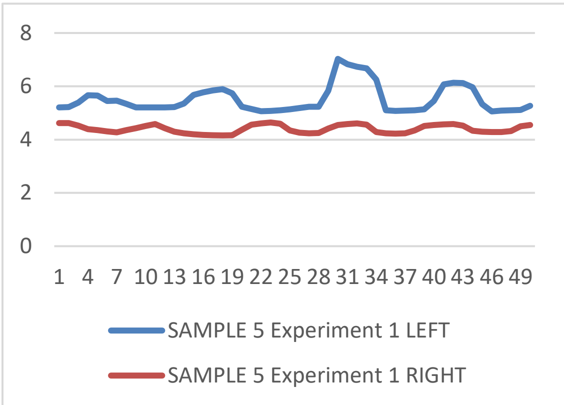


Fig. 5. Right Nostril Sensor having higher frequencies

Fig. 6. Right Nostril Sensor having higher frequencies

E. Sample 5: Experiment 1 LI is approximately -0.101, indicating a tendency for left nostril dominance. Experiment 2 LI is higher but still negative, suggesting left nostril dominance during simultaneous measurements, although less pronounced.



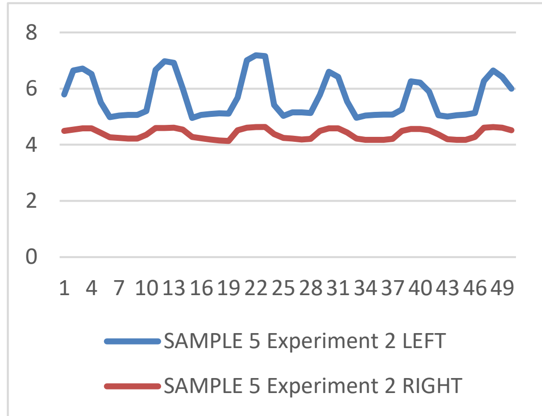
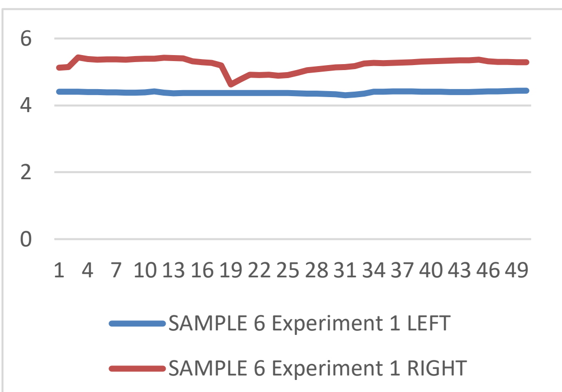


Fig. 13. Left Nostril Sensor having higher frequencies

Fig. 14. Left Nostril Sensor having higher frequencies

F. Sample 6: Experiment 1 LI is approximately 0.087, indicating a slight tendency for right nostril dominance. Experiment 2 LI is slightly lower, suggesting a slightly reduced right nostril dominance during simultaneous measurements.



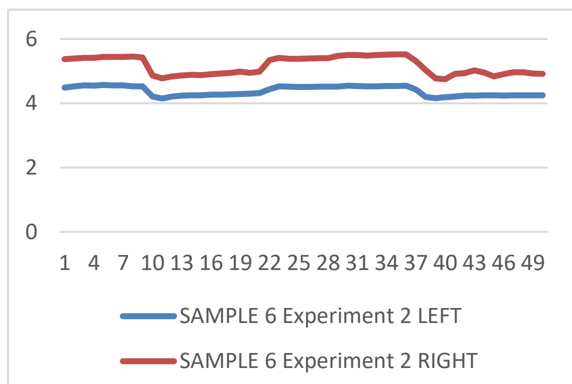


Fig. 7. Right Nostril Sensor having higher frequencies

Fig. 8. Right Nostril Sensor having higher frequencies

G. Sample 7: Experiment 1 LI is approximately 0.061, indicating a slight tendency for right nostril dominance. Experiment 2 LI is higher, suggesting an increased right nostril dominance during simultaneous measurements.

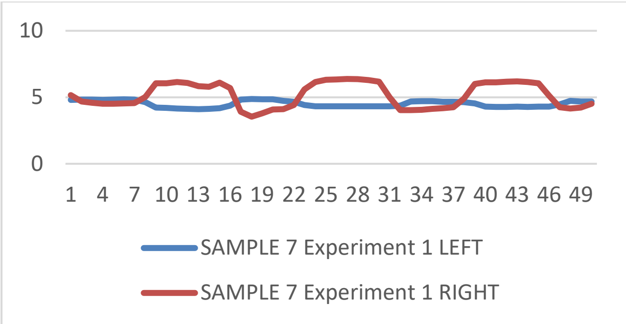


Fig. 9. Right Nostril Sensor having higher frequencies

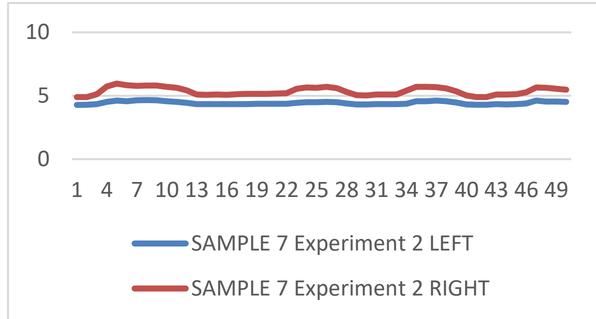


Fig. 10. Right Nostril Sensor having higher frequencies

Overall, the LI values in Experiment 1 and Experiment 2 are relatively consistent for most samples, with slight variations in the extent of nostril dominance.

5.2 Interpretation of Nasal Dominance

Table 3. Classification of the samples based on Nasal Dominance

Samples with Right Nostril Dominance	Samples with Left Nostril Dominance	Samples with Balanced Lateralization
Sample 1: Experiment 1 LI ≈ 0.083, Experiment 2 LI ≈ 0.082 Sample 2: Experiment 1 LI ≈ 0.084, Experiment 2 LI ≈ 0.087 Sample 4: Experiment 1 LI ≈ 0.083, Experiment 2 LI ≈ 0.085 Sample 6: Experiment 1 LI ≈ 0.087, Experiment 2 LI ≈ 0.082 Sample 7: Experiment 1 LI ≈ 0.061, Experiment 2 LI ≈ 0.094	Sample 3: Experiment 1 LI ≈ -0.110, Experiment 2 LI ≈ -0.126 Sample 5: Experiment 1 LI ≈ -0.101, Experiment 2 LI ≈ -0.074	None of the provided samples have LI values very close to 0, suggesting perfect balance.

5.3 Interpretation of Svara

Table 4. Classification of the samples based on Svara

Samples with Surya Svara States	Samples with Chandra Svara States	Samples with Potential Transition towards Sushumna Svara
Sample 1: Both Experiment 1 and Experiment 2 indicate a slight tendency for right nostril dominance indicating Surya Svara. Sample 2: Both Experiment 1 and Experiment 2 suggest a slight tendency for right nostril dominance indicating Surya Svara. Sample 4: Both Experiment 1 and Experiment 2 suggest a slight tendency for right nostril dominance indicating Surya Svara. Sample 6: Both Experiment 1 and Experiment 2 suggest a slight tendency for right nostril dominance indicating Surya Svara.	Sample 3: Both Experiment 1 and Experiment 2 indicate a tendency for left nostril dominance indicating Chandra Svara.	Sample 5: Both Experiment 1 and Experiment 2 indicate a tendency for left nostril dominance, although it's less pronounced in Experiment 2. This sample could be in a transition between Chandra Svara and Sushumna Svara.

Sample 7: Both Experiment 1 and Experiment 2 suggest a slight tendency for right nostril dominance indicating Surya Svara.		

Overall, we believe that, although this is an initial PoC, the findings signify the importance of a low-cost tool. The detected nasal dominance offers holistic monitoring of one person's individual Svara and points towards practical order of values and patterns of variances over some time. More studies in the future, considering longer periods, and correlating with other factors, can help the individual to understand their energy flow and overall well-being in the context of practices like Svara Yoga.

6. Discussion:

The research presented in the article shows the importance of nasal dominance and its detection in the context of Svara Yoga. Svara Yoga has been described as an ancient school of yoga that deals with the Svaras which are majorly represented by nasal dominance.

According to Svara Yoga principles nasal dominance correlates with the flow of Prāṇa (life force energy) in different Nāḍīs. When Prāṇa flows in the Idā Nāḍī situated in the left nostril Chandra Svara dominates and as a result left nostril become dominant. In the same manner, when Prāṇa flows in the Pingalā Nāḍī situated in the right nostril Surya Svara dominates and as a result, the right nostril becomes dominant.

The low-cost tool introduced in this article gives valuable insights for the detection and characterization of nasal dominance and corresponding Svara.

The nostril that yields a higher sensor output is identified as the dominant nostril and the corresponding Svara is said to be active which provides the practitioners a deeper understanding of their autonomic activity and Prāṇa distribution enabling overall well-being. Identification of correct Svara is a very tedious task for yoga practitioners and often its measurement is nearly subjective. The tool introduced in this article solves the problem and provides a handy and feasible method.

The non-invasive and simple data collection methodology using the cannula and pressure sensors ensures participant comfort and reliable results. This approach enables practitioners to observe real-time graphical representations of pressure changes in both nostrils. The ability to save and analyze the data over time offers an opportunity for further research on the dynamic nature of nasal dominance in different situations or practices. Future variants of such a tool which more experiments and correlations with other factors can aid yoga practitioners in optimizing their Nāḍīs leading to an enhanced flow of Prāṇa providing well-being and spiritual development.

The tool also has potential diagnostic applications in clinical settings, as it requires less patient cooperation and offers accurate detection of nasal airflow and dominance, providing valuable information for the assessment of an individual's health status. Further exploration of the tool's diagnostic capabilities may open new avenues in complementary medicine and holistic well-being.

7. Limitations:

The study presents a low-cost PoC for measuring nasal dominance through airflow patterns, using an uncalibrated sensor. However, we understand that this was an initial but encouraging effort. The planned improvements in the near future include increasing the sample size, addressing potential bias in participant selection, calibrating the sensor to fine-tune the pressure range, longer durations involving changes in swara, and correlating with other physiological factors to provide more fundamental insights. Additionally, the sensor's long-term stability and applicability to other practices are uncertain.

8. Future Implications and Work:

Calibrating the low-cost tool for precise measurements, refining its accuracy and usability. Exploring diagnostic applications, and investigating the further correlations between nasal dominance and Svara Yoga will deepen our understanding of wellbeing. Longitudinal studies tracking changes in nasal dominance and integrating the tool with digital platforms for personalized feedback will promote overall wellness through effective Svara Yoga interventions.

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