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Updated SRP Proposal

Manivannan M <mani@iitm.ac.in> Mon, May 2, 2022 at 8:53 AM
To: Debadutta Subudhi <dev.subudhi49@gmail.com>
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Dear All,

Forwarding the proposal to our Scholar Subudhi who will spearhead the efforts from our side.

Lets not wait for the project funding. Lets start the work asap.

Best Regards

-M Manivannan

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http://touchlab.iitm.ac.in
https://scholar.google.co.in/citations?user=-a9uJFYAAAAJ&hl=en

Associate Editor: Springer Nature Journal of Medicine, Biological Engineering, Computers (MBEC)
https://www.springer.com/journal/11517

Associate Editor: Frontiers in Virtual Reality
https://www.frontiersin.org/journals/virtual-reality#editorial-board

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From: Srinivasa Chakravarthy V
Sent: Monday, May 2, 2022 8:47 AM
To: Manivannan M; Chief Manager Technical
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SRP Proposal_AI_ML use in Siddhaa System of Healing_29Apr2022.docx
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fwd to Secretary
SSG

AI/ML SYSTEMS FOR DERIVING PRAKRITHI PARAMETERS FROM PHOTOPLETHYSMOGRAPHY

– EXTENDING TRADITIONAL SIDDHAA MEDICAL PRACTICES TO RURAL COMMUNITIES

A PROJECT PROPOSAL

Submitted by

Dr. M. Manivannan
Professor,
Department of Applied Mechanics,
INDIAN INSTITUTE OF TECHNOLOGY MADRAS

in partnership with

Thiruthangal Nadar College, Selavayal, Chennai 600 051
(a College of general higher education serving the cause of the poor and first-generation learners in and around Chennai)

for support

via

The Socially Relevant Projects Initiative of I I T Madras

funded by

The I I T MADRAS ALUMNI ASSOCIATION

SOCIALLY RELEVANT PROJECTS (SRP) INITIATIVE OF I.I.T MADRAS

1. BROAD AREA IN WHICH THE PROJECT IS TO BE UNDERTAKEN

Simple Sensor System to Support and Extend Traditional Siddhaa Health Practices in Rural Areas using AI/ML

2. TITLE OF THE PROJECT

AI/ML Techniques for Deriving Prakriti Parameters from PPG.

3. TOTAL BUDGET

INR 3,00,000 (INR Three Lakhs only)

4. DURATION OF THE PROJECT

12 months

5. NAMES(S) OF THE INVESTIGATORS

Principal Investigator: **Dr. M. Manivannan,**
Professor, Touch Lab,
Department of Applied Mechanics,
IIT Madras, Chennai 600036.

Co-Investigators:
1. **Dr.A.Ambeth Raja**
Head and Associate Professor
PG & Research Department of Computer Science.

2. **Dr.S.Lavanya**
Head and Associate Professor
Department of Software Application
Thiruthangal Nadar College,
Selavayal, Chennai51.

6. INTRODUCTION

Naadi or pulse pattern reading is a core and compulsory practice in the Siddhaa system of holistic traditional healing and wellness support. According to this traditional Siddhaa system, 96 basic, reference naadi or pulse pattern types form the basis for the practitioner to observe, understand and diagnose the state of balance or imbalance of physiological functions of the service-receiver. By observing the naadi or pulse patterns, which are known to be controlled by three basic humors (vaadham or gas-related, piththam or heat-related, and kapham or fluid-related) Siddhaa practitioners can determine any abnormalities in the service-receiver.

Although the Siddhaa system of medicine has been practiced for over a few thousand years, there is a lack of quantitative measures of "Prakriti" or body constitution and many related parameters. The diagnostic classification of body constitution is useful for the Siddhaa system based on the principles of individual-centric, holistic treatments and lifestyle

recommendations. "Prakriti" determines the effectiveness of a particular treatment involving herbal/compound formulations. This approach enhances the therapeutic effect and reduces the unwanted effects of the treatment. Body constitution is a very important criterion in clinical research for uniform outcomes. Reliability is a prerequisite of this diagnostic method if it is to be incorporated into clinical studies (1). Also, there are several interesting studies indicating either a genetic or a biochemical basis for different constitutional types (2–4). Despite this, quantitative measurements of the reliability of this method are unknown.

Reliable identification of body constitution is the first step towards the modern practice of a

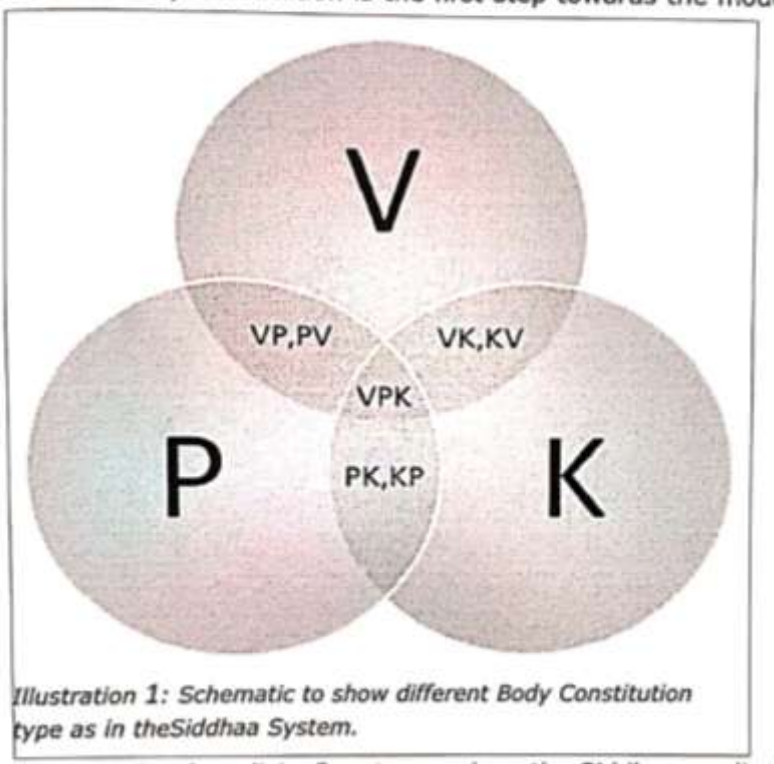

Illustration 1: Schematic to show different Body Constitution type as in theSiddhaa System.

widely practiced "personalized medicine" system such as the Siddhaa medical system.

In this project, we propose to use AI/ML techniques to quantify Prakriti and categorize it using a simple biomedical signal of Photoplethysmography (PPG).

7. OBJECTIVES AND SCOPE OF THE PROJECT

- To identify AI/ML feature vectors and techniques for Prakriti classification of PPG signals.
- To collect finger PPG data of ~2000 subjects along with comparative data from Naadi Experts.
- To train the AI/ML system using the data.
- To check the repeatability of the PPG data for Prakriti.
- To validate the trained AI/ML with new PPG data.

8. SPECIFIC TARGET SEGMENTS THAT WILL BE BENEFITED

- Rural population with limited access to healthcare.
- Urban population that would like "personalized medicine".

9. PROJECT IMPLEMENTATION METHOD

- Protocol for collecting Prakriti data will be developed through discussions with Siddha experts.
- Sample Size will be decided towards the development of Big Data.
- Finger PPG sensor will be used for collecting the PPG signal.
- AI/ML Algorithm will be developed and trained.
- Validation of the algorithm with a new dataset.

10. DELIVERABLES

- AI/ML algorithm that can reliably classify persons with different body constitutions.

11. BUDGET PLAN

Budget Head	Cost	Total in INR	Remarks
Manpower – Siddha Experts	INR 5000 a day for 10 days	50000	
Manpower – Technical Support Staff	INR 2000 a day for 10 days	20000	
Manpower – Project Associate	INT 25000 a month for 4 months	100000	
Consumables	INR 5000 for each Terabyte of External Storage x 6	30000	
Instruments, Sensors	INR 5000 each for 10 systems	50000	
Contingencies	@ 10% of total budget	30000	
Travel		20000	
	TOTAL	3,00,000	

V. Devi
20/10/23
Principal
THIRUTHANGAL NADAR COLLEGE
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