

## ECG Electrode for Nadi Pariksha

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### ABSTRACT

Vein pulse observation is the main process to make diagnosis in the Ayurveda. The process called as “NADI PARIKSHA”. Vata, Kafa and Pitta and their combinations are the main dosha (Decease) in the human body. The decision making for Vaidya (Ayurveda Doctor) gets simple using NADI PARIKSHAN and accordingly the treatment given to patient. Here to sense the pulses from the NADI we have develop the prototype circuitry. It uses ECG machine electrode sensors to detect the vibrations in the vein (NADI) just below the thumb. The results are shown at the end of this literature.

### KEYWORDS

Nadi Pariksha, ECG, Pulse

### 1. Introduction

Health monitoring has become increasingly important due to the rise in cardiovascular diseases and lifestyle-related health issues. Many people overlook regular check-ups, creating a need for simple, low-cost, and continuous monitoring solutions [1-3]. The 3-Tier Pulse monitoring System is designed to provide a portable and affordable method for real-time pulse measurement. Pulse rate is a key indicator of cardiac health, and abnormalities can signal conditions such as arrhythmia, tachycardia, or bradycardia. Continuous monitoring enables early detection and timely medical intervention. This project uses an Arduino Nano and an ECG sensor, where three electrodes are placed on the hand to capture the heart's electrical signals. The Analog signals are processed and displayed in real time on the Arduino IDE Serial Monitor [4-8].

### 2. The system operates through three tiers:

**Data Acquisition** – ECG sensor collects heart signals through three hand electrodes.

**Signal Processing** – Arduino filters employed to extracts accurate pulse data.

**Data Visualization** – Real-time pulse rate and waveform are displayed.

The pages demonstrates how biomedical sensors and Arduino can be combined to create compact, efficient, and low-cost monitoring devices suitable for personal and remote healthcare. It also provides educational insight into biomedical instrumentation and embedded systems. The 3-Tier Pulse Monitoring System offers a practical and innovative approach to real-time pulse monitoring, contributing to the development of accessible and modern healthcare solutions [9-13].

### 3. System – The monitoring system for Nadi parikshan is developed with the following components.

Component	Specification	Purpose
Arduino Nano	ATmega328P microcontroller, 16 MHz clock speed, 5V operating voltage	To process signals from the ECG sensor and display pulse rate.

ECG Sensor Module	Analog ECG sensor with 3-lead input	To detect heart signals and convert them into electrical signals.
ECG Electrodes	Ag/AgCl reusable electrodes	To collect heart signals from the human body.
Arduino IDE Software	Open-source programming environment	To write, compile, and upload code, and view live sensor readings.

#### 4. Outcome:

After assembling and programming the 3-Tier Pulse Monitoring System, the prototype was tested to evaluate its performance and accuracy. The ECG sensor was connected to a person, and the Arduino Nano was used to process and display the pulse rate on the Arduino IDE Serial Monitor. The Fig. 1 shows the complete assembly of the circuit.

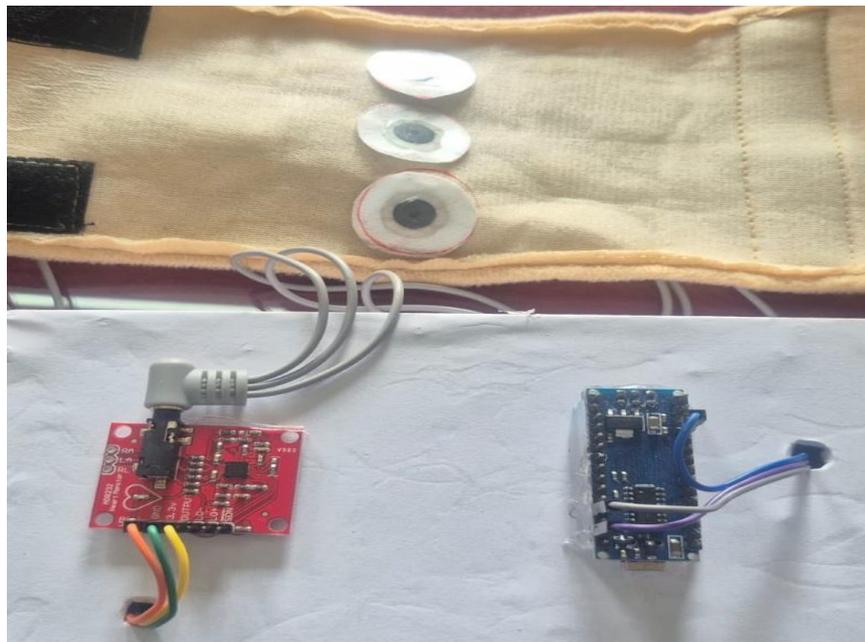


Fig.1 Circuit Assembly

The system successfully detected the electrical activity of the heart and converted it into a readable waveform. The pulse rate was calculated automatically and displayed in beats per minute (BPM). The ECG waveform showed the expected peaks and intervals, confirming the proper functioning of the sensor and the data processing algorithm.

The readings were found to be stable and accurate, with only minor variations when compared to a standard digital pulse oximeter. The average difference was within  $\pm 2-3$  BPM, which is acceptable for a prototype-level biomedical system.



Fig.2 Waveforms received at the output of Arduino (Normal Waveforms)

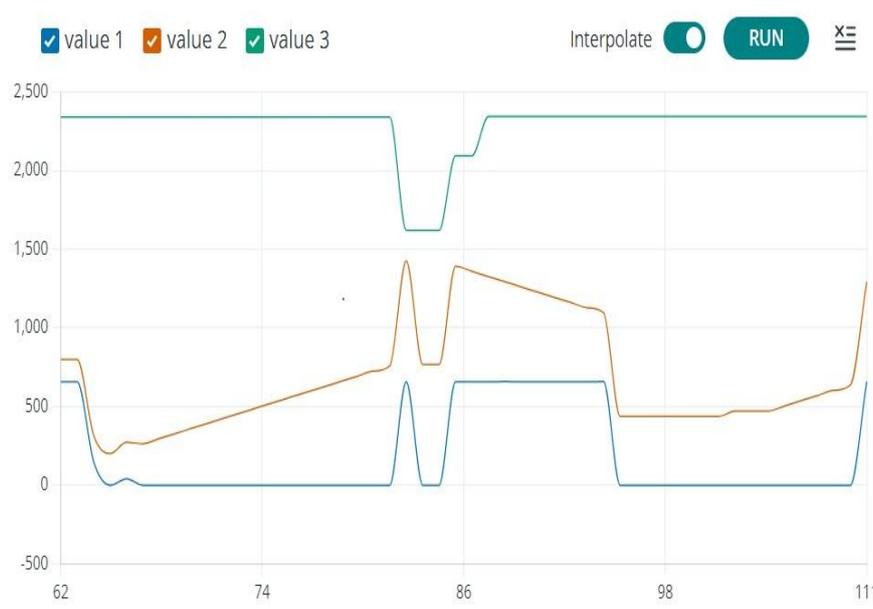


Fig.3 Waveforms received at the output of Arduino (Abnormal Waveforms)

The results also showed that the system responded quickly to changes in heart rate and maintained continuous monitoring without interruption. The three-tier structure ensured smooth signal flow, effective filtering, and real-time display.

Overall, the developed system successfully met its design goals of being accurate, low-cost, portable, and user-friendly, making it suitable for both educational and basic health monitoring applications.

## 5. Conclusion:

The experimental results confirm that the 3-Tier Pulse Monitoring System performs accurately and reliably. Its low cost, portability, and ease of use make it suitable for Nadi-Pariksha for Ayurveda in biomedical engineering.

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