

## EVOLVING TECHNOLOGIES TO AN INTEGRATED BIOMEDICAL SYSTEM FOR UNCERTAINTIES EVALUATION USING LM49, GSR AND RESPIRATION SENSORS

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### ABSTRACT

A combined approach to body temperature (LM49), respiratory and galvanic skin response (GSR) sensors to create strongest and most accurate body parameter evaluation system through Atmega 328P PU microcontroller. The system is efficient enough to check respiration uncertainties, skin conductance and Body temperature uncertainties. We can use this system in a much efficient way which was not used in combined before. An additional feature of the system is online display of parameters over internet on Laptop, Computers or even Mobile Phones. The main benefit is internet based display worldwide where doctors or patient's family members can see the parameters in real-time. System is really cost efficient and it's a real-time application which can be directly implemented in hospitals. This system is highly reliable with live data transmission and synthesis.

**KEYWORDS:** GSR Sensor, LM49 Temperature Sensor, Respiration Sensor, Atmega 328P PUMicrocontroller.

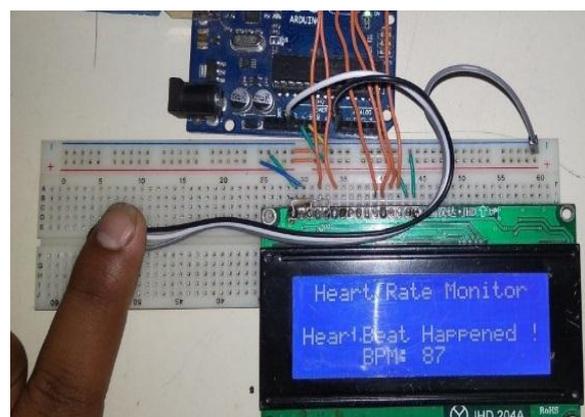
### 1. INTRODUCTION

This system is the combined approach of GSR, heart beat and respiration thus it is used to analyze the body condition of the patient. The body temperature can be measured by the LM49 sensor. The GSR sensor is used to measure the stress level present in the patient then the respiration sensor is used to find the respiration level present in the patient, then the data of the patient send to the cloud data this data can be accessed from the internet through mobile phones, laptop and personal computer using ESP8266 based IoT System. The system is efficient enough to check respiration uncertainties, skin conductance and body temperature and uses the overall integration in much efficient way which is not used before. An additional feature of the system is online display of parameters over internet on any internet enabled devices. The major feature is internet connectivity based information system in which the live data is processed displayed on any remote location with user having authenticated username and password. The sensors measures the condition of the patient and every data collected from the sensors can be send to the Atmega 328 P PUMicrocontroller, then the data can be sent to the IOT module which transmit the information to the cloud, so we can access the information of the patient from any geographical point around the world.

### 2. PREVIOUS WORK

The technology in the field of disease prevention and maintenance of patient health has enabled the evolution

of fields such as monitoring systems. Heart rate plays a major role in health parameter that is directly related to the soundness of the human cardio vascular system. Heart rate is the number of times the heart beats per minute, it's related to different physiological conditions such as biological workload, stress at work and concentration on tasks, drowsiness and the active state of the autonomic nervous system. It can be measured either by the ECG waveform or by sensing the pulse - the rhythmic expansion and contraction of an artery as blood is forced through it by the regular contractions of the heart. In the existing system the heart beat is measured by the pulse rate sensor then the beat rate is transmitted to the Arduino board to view the output in the Arduino.



**Fig. 1-Existing Work.**

It find the fluctuation in the blood flow in the human body thus it is an efficient method but can only be used inside a small area and gets output there itself.

## 2.2 DRAWBACKS

- Pulse Recording is not possible usually.
- Less accurate due to false results.
- Heart Beat changes as per the work, and stress. Single parameter is considered inappropriate.
- Heart beat and ECG depends on body movement patient lying or standing will get different values.

## 3. PROPOSED SYSTEM

### 3.1 Functions of Sensor

One of the most sensitive markers for emotional arousal is galvanic skin response (GSR), also referred to as skin conductance (SC) or electro-dermal activity (EDA). EDA modulates the amount of sweat secretion from sweat glands. The amount of sweat glands varies across the human body, being highest in hand and foot regions (200–600 sweat glands per cm). While sweat secretion plays a major role for thermoregulation and sensory discrimination, changes in skin conductance in hand and foot regions are also triggered quite impressively by emotional stimulation: the higher the arousal, the higher the skin conductance. It is noteworthy to mention that both positive (“happy” or “joyful”) and negative (“threatening” or “saddening”) stimuli can result in an increase in arousal – and in an increase in skin conductance. It is also equipped with heart beat sensors which work with light intensity and photo resistor. It is

## 4. BLOCK DIAGRAM

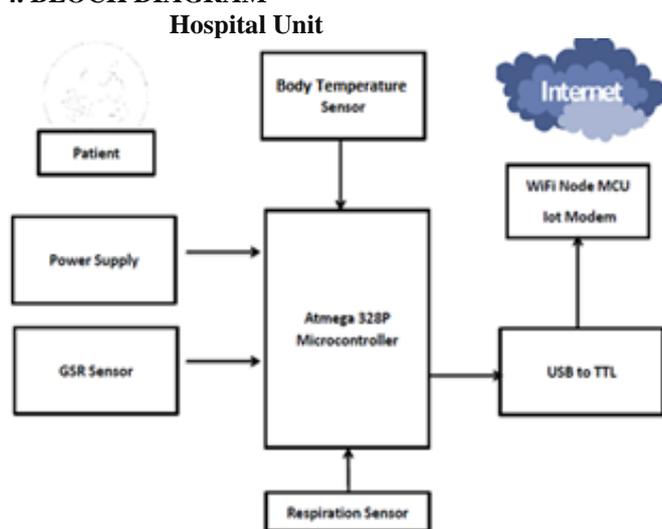


Fig. 2-Microcontroller/Sensor Unit

enabled with respiratory sensors to work in accordance and provide efficient results. Body temperature drops and rises based on different unlikely situations. That is also considered.

### 3.2 Proposed Approach

Our proposed system is a device which has combined approach of body temperature, respiration and GSR sensors. GSR measures the electrical conductance between 2 points, and is essentially a type of ohmmeter. GSR allows us to spot such strong emotions or body problems by simply attaching two electrodes to two fingers on one hand. In the severe panic condition or all abnormal condition the resistance values decreases to certain level. We calculate that and term them as abnormal condition based on GSR values. Even we have respiratory and temperature sensor to measure another 2 body parameter to find the wellness of user.

The system is far accurate compared to heartbeat monitoring alone which can change in normal conditions. System is really cost efficient and it's a real-time project which can be directly implemented in hospitals, the project is highly reliable in data transmission. Since it is based on IOT technology the output can be propagated anywhere at any time. This project can be used in real time to reduce the risk factor, it is used in ambulance to analyze the body condition of the patient. So doctors can monitor body parameters even when the patient is on move.

## Internet Reception Display Unit



Fig. 3-IoT Unit

## 5. ADVANTAGES

1. Highly accurate and reliable biomedical tool.
2. First in class, never implemented before with these many features.
3. Galvanic Skin Response is a new parameter implementation.
4. Project have possibility of adding further sensors like blood pressure, blood glucose, EMG etc.

5. Cheapest system available till date.

## 6. CONCLUSION

Thus we created a new concept of biomedical tool for body parameter measurement. If our system is implemented doctors from several countries can come together to work for a patient as they have digital display over internet and that too of GSR/ Respiration and Body

temperature level of high accuracy. Our system can be readily implemented in hospitals to check the body parameter value for body conductivity, respiration and body temperature. It's a self-independent system to analyze the body condition. The main feature is its ability to upload the data over cloud.

In future system can be designed in much smaller size to fit human wearable devices like watch or necklace .If stress increases beyond higher value then human body should get proper medicine automatically so heart attacks or panic attacks can be avoid. It can be used as anti-suicide device also if a person's stress level increases they think about suicide then it should send SMS to so family members to alert about the situation. If Anyone's body parameter malfunctions then body sweat activates and considers as abnormality. Which can be reported immediately using it. Using thissystem a lot of things can be done in future for drivers, police, and players.

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