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Detectionand Prediction Of Wakeup Stroke Through Iot

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ABSTRACT: The heart disease causes millions of death due to increase in the aging population and the rising of health care costs. Technological advancements in the field of medical electronics and communication can help to decrease the cost of health care. In this project a real time heart disease monitoring system is introduced heart stroke detection and prediction device used to save people's life. Therefore there is a strong need to develop a wireless system which monitors not only the elderly people but also cardiac disease people from time to time. The proposed system provides most secure system to cardiac people. This also alerts the victim's neighboring people in assisting the victim by producing a beep sound. An SMS message with the current location and consciousness of the victim is sent to the physician and to the registered contacts. The proposed system can reduces the time, easy to utilize. It is also used for self monitoring the patients anywhere at any time.

I.INTRODUCTION

With the increased changes in living habits of the person there arises multiple problems in health, mostly for the elderly ones. The proposed system assists elderly people when they move out of secure zone. Now a days the elderly people need more assistance for better surveillance. The System offers faster, reliable and effective processing in assisting elderly people. The designed product is positioned on victim's body to monitor the following body parameters like heartbeat rate, blood pressure, moving directions of the personandECG.ECG sensor is a little chip used to diagnose the cardiac diseases. From these sensors the signal is transmitted to Raspberry pi3.

[3] Studies have shown that in prevention of the patients at risk, the system must be discrete and reliable. In health-care, several indices for determining health condition are used and among them, heart rate variability is one important parameter for cardiac disease, autonomic nerve activity [1] and pulmonary dysfunctions [2].The wired transmission is used for communication between sensors and aurdino. When a person fall is diagnosed, the victims location is acquired by the global positioning system (GPS) and sent to the rescue center via the global system for mobile communication so that the end user can get immediate medical assistance.

The collected signal are transmitted to doctor or hospital and to the pre-defined contacts with the current location and conscious data of the victim is sent for further analysis and accordingly medical treatments are given to victim. Power consumption will be low and lifetime of devices will be more. Moreover the system supports security and privacy concern as

victim's health records contain sensitive data and they are to be stored securely. The victim's data will be maintained by the doctor and the victim's guardian.

One of the advantages in this project is forecast the heart condition. This is developed using the ARIMA algorithm it works based on time stamping. Forecast can be called as extrapolation. To do forecast we take ECG signals to analyze the heart condition. With this the people can know whether there is a chance of getting heart stroke or not. If any abnormalities found we can take precautions not to get the cardiac diseases.

II.HEART STROKE DETECTION AND PREDICTION

The proposed system is to monitoring the patients continuously using wearable sensors. Raspberry pi is used to process the data and is used as local data base in my project. The Inertial Measurement Unit (IMU) sensor monitors the body positioning of the patient. Electro Cardio Gram (ECG) is the main component in this project.ECG is used to diagnose the cardiac diseases as well as it detect the stroke. Three electrodes are connected to the ECG shield. Electrode1 is used to collect the upper body signals, electrode2 is used the lower body signals, and electrode3 is used as neutral point. Differential amplifier allows signals by eliminating noise, common rejection mode ratio only allows heart signals and eliminates remaining signals.

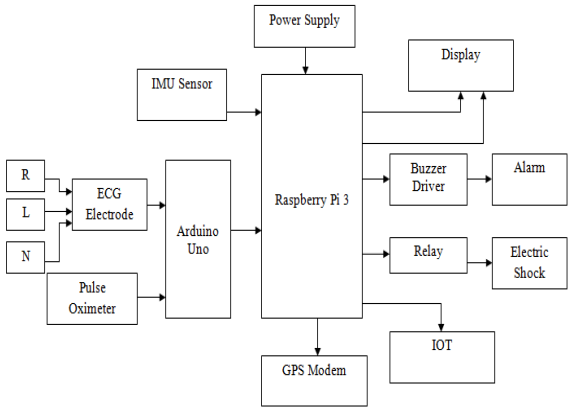

FIG. 1: BLOCK DIAGRAM OF PROPOSED SYSTEM

That acquires the ECG signal from the patient and stored in the database. The heart beat rate and blood pressure values are received through pulse oximeter which is stored in the IoT database. Here, ECG and Pulse oximeter values are send to arduino and it convert the analog to digital values. The sensor values are write to the IoT. IoT is used as data base.

This system continuously monitors the patient condition. This information can be updated for every 30 seconds. If the system detects any of these abnormalities, the buzzer will activate and it will alert the family members by sending a message with location by using GPS. Electric shock is activated whenever the patient is completely loss his conscious and not responding to any treatment. Using IOT the proposed system will be implemented. This detection of wake up stroke and prediction may benefit from reperfusion and help people to get notification before the stroke occurs. Results of this are expected to change the clinical methods and will be easy to identify before the stroke occurs.

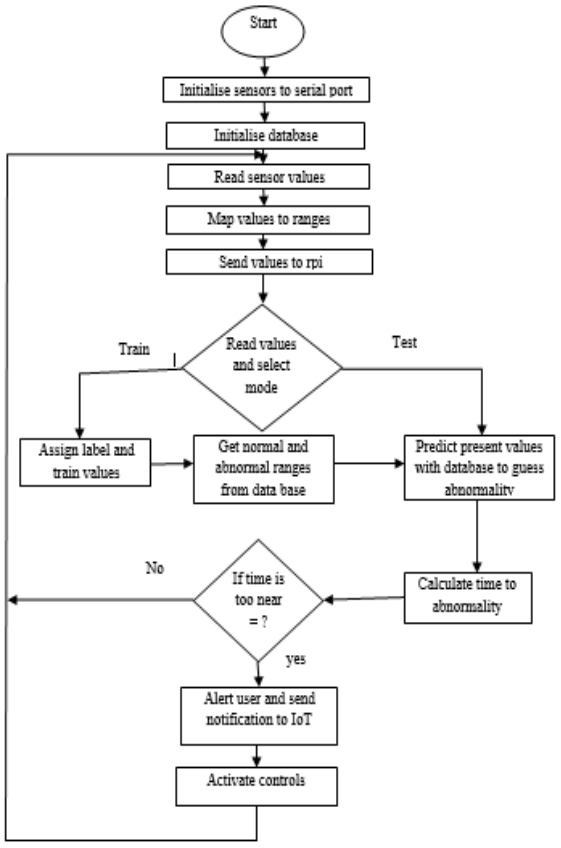

FIG 2. FLOW CHART

Initially, the patient should wear medical devices like electrodes, pulse oximeter and IMU sensor. We initialize all the sensors and set the controller to the serial port. We read all those sensor values like ECG and pulse oximeter at aurdino. Then, map the values to ranges and send data to the raspberry pi3 using serial port interface (SPI). Parallely, IMU sensor sent the values directly to the raspberry pi. We are initializing two modes such as testing and training. In training state we will train the values and assigned labels to the values. These values are stored at data base. In testing mode we will predict the patient condition with respect to the data base values. If any abnormality found in the values then immediately alarm will activate and send SMS to their family members. When the person loss his conscious then automatically active the controls (electric shock).

III.RESULTS

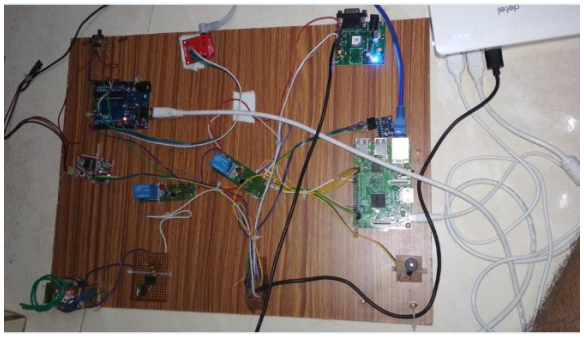

FIG 3. HARDWARE IMPLEMENTATION FOR DETECTING AND PREDICTING OF HEART STROKE THROUGH IOT

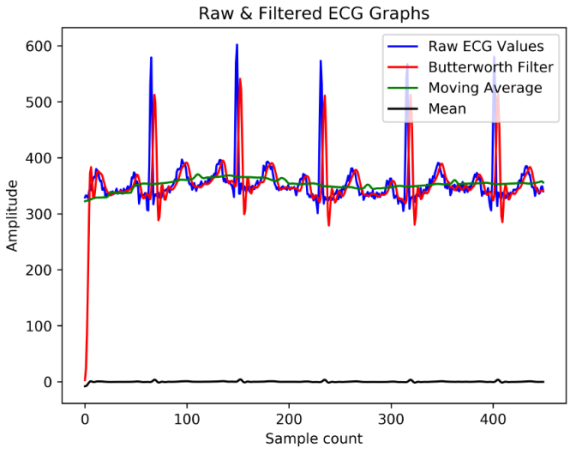

FIG 4. ECG GRAPH

The above graph shows the ECG values of the patient. The graph is plotted by considering amplitude and sampling count. Butterworth filteris usedto enhance the noise.

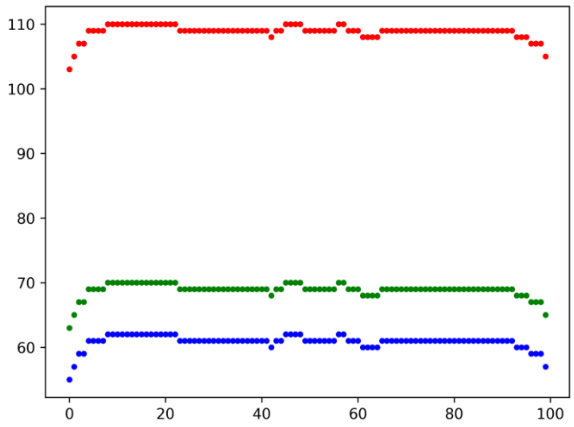

FIG 5. DETECTING THE HEART BEAT RATE

The above graph shows the heart beat rate and blood pressure of the patient. The amount of blood pressure in arteries during the contraction of heart muscle is known as systolic pressure. The blood pressure when heart muscle is between beats is known as diastolic pressure. The systolic blood pressure is representing in red and diastolic blood pressure represent in green. BP measurement is representing in blue. Median filter is used to eliminate the noise.

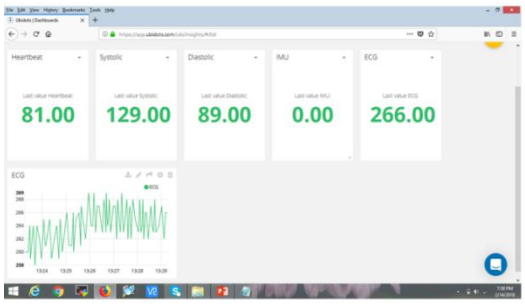

FIG 6: WRITING VALUES TO IOT

The information about patient is stored in the data base and the data is send to the doctor, without going to the hospital we can consult the doctor. Family members also can see this data. It is shown in above figure.

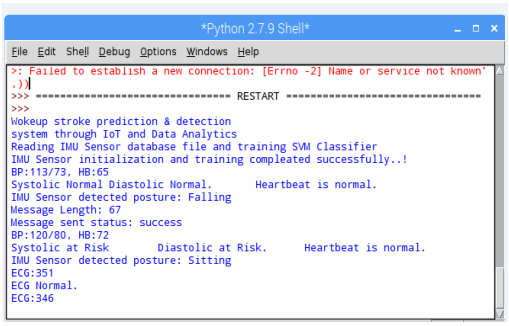

FIG 7: DETECTION OF PERSON FALL

When the patient falls then it alerts the neighbours and family members through buzzer and send notifications.

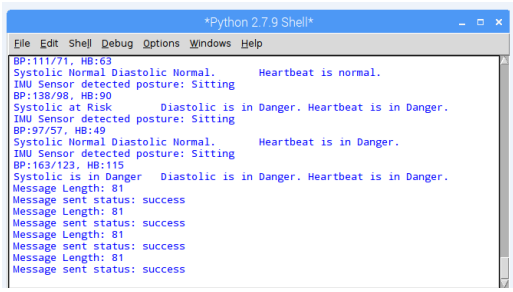

FIG 8: DETECTION OF HEART BEAT IN ABNORMAL CONDITION.

If any abnormalities found in heart beat and blood pressure it alerts the patient and family members through buzzer and send notifications.

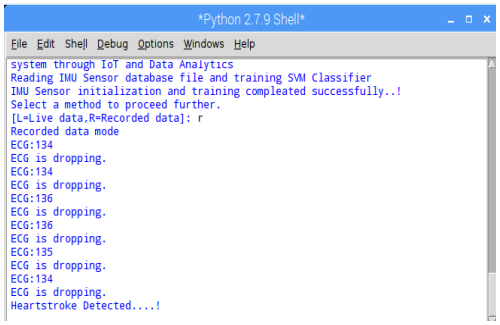

FIG 9: DETECTION OF HEART STROKE

If heart stroke occur immediately it alerts the family members through buzzer and sends sms to the doctor as well as family members

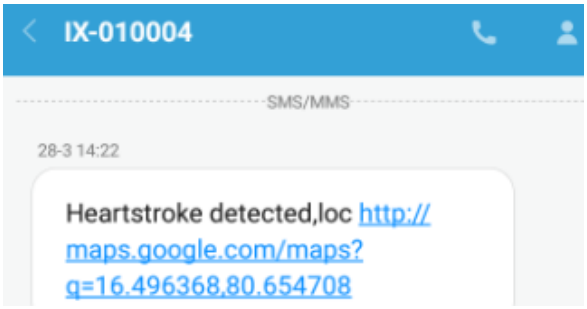

FIG 10: SMS NOTIFICATION WITH GPS LOCATION

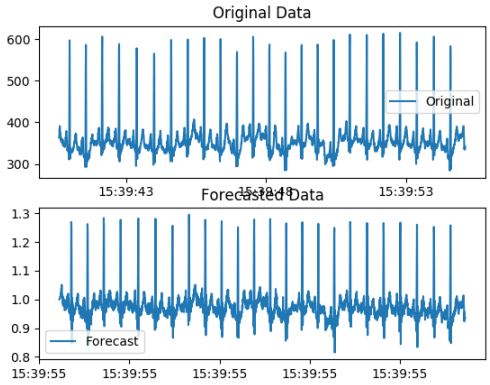

FIG 11: FORECAST THE HEART CONDITION

Based on the time stamp it forecast the heart function. Before only we can take precautions.

IV.CONCLUSION

The proposed system plays an important role in real time health monitoring device. This device diagnosis the all health parameters such as heart beat, blood pressure, ECG. This device successfully detect the person fall by using Imu sensor. Using ECG shield perfectly detect the heart stroke as well as prediction and forecasting the cardiac functioning is developed by ARIMA algorithm. Also tracking the patient location using GPS is success. The concerned person will receive the SMS in case any of the parameter goes beyond the normal range or if fall is detected. Every person can easily operate this device. It is available for less expensive and also save time. Perfectly this proposed system save the people lifes.

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