# BIO-MEDICAL SIGNAL MONITORING SYSTEM

**S.R.PANDIT[1], TEJASVINI JADHAV[2], SAHIL GAIKWAD[3], HARSHAD SHIRUDE[4]**

MVP'S Maratha Vidya Prasarak Samaj's Karmaveer Baburao Ganpatrao Thakare College of Engineering

***Abstract*: IOT health and ECG monitoring is depend upon the senosr. First one is a temperature sensor, second is Heartbeat sensor and the third one is humidity sensor. This project is very useful since the user can monitor health parameters just by visiting our application. And nowadays many IOT apps are also being developed. So now the doctor or family members can monitor or track the patient health through the Android apps. To operate IOT based health &ECG monitoring system project, you need a WiFi connection. The microcontroller or the Arduino board connects to the Wi-Fi network using a Wi-Fi module. This project will not work without a working WiFi network. You can create a WiFi zone using a WiFi module or you can even create a WiFi zone using Hotspot on your smartphone. The Microcontroller board continuously reads input from these 3 senses. Then it sends this data to the cloud .Ubiquitous vital signs sensing using wireless medical sensors are promising alternatives to conventional, in-hospital healthcare systems. The advent of modern age has shown a drastic shift in the way humans have worked leading into sedentary lifestyles. Change in dietary pattern where fresh food is replaced by processed and fast food along with the increase of stress has led to rise of cardio-vascular disease which is glaringly evident in developing countries. Especially, Asians are more prone to cardio-vascular diseases genetically. The ECG device is a diagnostic medical instrument which determines the electrical activity of the heart. We are providing the feature where it will give suggestion to perticlur ECG Situation.**

***Keywords*: IOT, Heath, ECG monitoring, Sensor, Connection, prediction.**

## INTRODUCTION

IoT concept can be utilized in versatile areas such as intelligent health care system, intelligent agriculture, environmental impact predictions, automation industries, etc. Rather than IoT, Cyber-Physical systems (CPS) can be considered as data-centric technology. CPS integrates innovative functionality processes that facilitate communication, computation, and control through IoT [9]. Moreover, it contributes to an advanced intelligence system that significantly affects social life [10]. CPS concept can be activated through Micro Electromechanical Systems for networking in monitoring, computing, and controlling the physical world.

ECG sensing tools are interfaced with the human chest, and requisite cardiovascular data is collected through an IoT device. These data are stored in the cloud incorporates with the MQTT and HTTP servers. An innovative IoT-based method for ECG monitoring systems on cardiovascular or heart patients has been suggested in this study

## MOTIVATION

Nearly 30 percent of the people in the rural areas of India are below the poverty level. Moreover, due to the unavailability of modernized healthcare-related technology, nursing and diagnosis facilities are limited for rural people. Therefore, rural people are deprived of proper healthcare. In this perspective, modern technology can be facilitated to mitigate their health problems.

## LITRATURE SURVEY

1. JiHye; Dong-Hee Noh; Young-Ho Sohn [1], The scientific article evaluates the current areas of health care management in the context of population aging. The peculiarities of population aging in some countries and regions (according to the level of economic development) have been clarified; including among women and men. The main structural reasons that determine the rate of population aging are identified: demographic, social, economic, environmental. The consequences of population aging for Ukrainian society, first of all its impact on the health care system, have been identified. The state of health of elderly people in Ukraine is analyzed and the priority directions of its preservation are substantiated. The methodological principles of calculating the health index and determining the characteristics of population inequality in terms of health from the standpoint of population aging (separately for men and women) are summarized. The main goals of health care development in the context of aging and the COVID-19 pandemic have been identified.

2. Harshkumar Prakashbhai Thakor; Sailesh Iyer [2], In order to overcome novel coronavirus pneumonia's vulnerability to public service and health system, and solve the shortage of medical resources caused by the explosive growth of patients, a novel British community health care system based on big data and artificial intelligence is proposed. Based on the characteristics of national health system and the theory of service design, the paper aims to build a national health system which is in line with user satisfaction on the basis of traditional national health system. Based on this, novel coronavirus pneumonia is collected by the big data technology, and the residents' living conditions and demands are collected. Combined with AI technology, the psychological counseling service platform and the medical consultation service platform are constructed. Through big data technology and artificial intelligence technology, we can comprehensively collect the national health information and realize the optimal allocation of medical resources. The results show that novel coronavirus pneumonia epidemic characteristics and

the vulnerability of current national health system are the focus of the study. Combined with big data and artificial intelligence, the system can indeed provide services for the medical and health field and optimize the allocation of medical resources.

3. Soontharee Koompairojn; Chakrit Puitrakul; Thailand Bangkok; Nattawat Riyagoon; Somchoke Ruengittinun [3], Care pathways (CPWs) are "multidisciplinary care plans that detail essential care steps for patients with specific clinical problems." While CPWs impact on health or cost outcomes is vastly studied, an in-depth analysis of the real-world implementation of the CPWs is an area that still remains underexplored. The present work describes how to apply an existing process mining methodology to construct the empirical CPW process models. These process models are a unique piece of information for health services research: for example to evaluate their conformance against the theoretical CPW described on clinical guidelines or to evaluate the impact of the process in health outcomes. To this purpose, this work relies on the design and implementation of a solution that a) synthesizes the expert knowledge on how health care is delivered within and across providers as an activity log, and b) constructs the CPW process model from that activity log using process mining techniques. Unlike previous research based on ad hoc data captures, current approach is built on the linkage of various heterogeneous real-world data (RWD) sets that share a minimum semantic linkage. RWD, defined as secondary use of routinely collected data as opposite to ad hoc data extractions, is a unique source of information for the CPW analysis due to its coverage of the caregiving activities and its wide availability. The viability of the solution is demonstrated by constructing the CPW process model of Code Stroke (Acute Stroke CPW) in the Aragon region (Spain).
4. Tharindu Madushan Bandara; Wanninayaka Mudiyanselage; Mansoor Raza [4] ,In order to solve the contradiction between the pressure of young people's life and the health care of the elderly, and how to make the young people work well and take care of the elderly at the same time, this paper designs an intelligent health care system, which uses the Internet of Things and embedded technology to record and monitor the blood pressure, weight, heart rate, etc. of the elderly at home. This intelligent health care system takes the main approach of STM32 with a modular structure and finally displays the situation of the elderly at home through a GUI interface. The test results show that the system allows young people to monitor their parents' physical condition and deal with it in time, which can effectively improve the happiness index of the elderly at home

## LIMITATION OF EXISTING SYSTEM

• Costing: The Existing system is high cost and this is main reason most of the system is failed.

• Technology Complexity: Most of system is the complex to understand, Not user friendly as compare to our proposed system

• Time Consuming Feature: In existing system, the performance is low and most of the time system gets hanged due to load.

• Not Easy to Understand: Systems re complex to understand and they were not user friendly

## EXPERIMENTAL SETUP

**Android Studio** is the official[7] integrated development environment (IDE) for Google's Android operating system, built on JetBrains' IntelliJ IDEA software and designed specifically for Android development.[8] It is available for download on Windows, macOS and Linux based operating systems or as a subscription-based service in 2020.[9][10] It is a replacement for the Eclipse Android Development Tools (E-ADT) as the primary IDE for native Android application development. Android Studio was announced on May 16, 2013, at the Google I/O conference. It was in early access preview stage starting from version 0.1 in May 2013, then entered beta stage starting from version 0.8 which was released in June 2014.[11] The first stable build was released in December 2014, starting from version 1.0

**NODE MCU** board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards ('shields') or breadboards (for prototyping) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs. The microcontrollers can be programmed using the C and C++ programming languages, using a standard API which is also known as the Arduino language, inspired by the Processing language and used with a modified version of the Processing IDE. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) and a command line tool developed in Go.

**Firebase** evolved from Envolve, a prior startup founded by James Tamplin and Andrew Lee in 2011. Envolve provided developers an API that enables the integration of online chat functionality into their websites. After releasing the chat service, Tamplin and Lee found that it was being used to pass application data that were not chat messages. Developers were using Envolve to sync application data such as game state in real time across their users. Tamplin and Lee decided to separate the chat system and the real-time architecture that powered it.[2] They founded Firebase as a separate company in 2011 and it launched to the public in April 2012.[3] Firebase's first product was the Firebase Realtime Database, an API that synchronizes application data across iOS, Android, and Web devices, and stores it on Firebase's cloud. The product assists software developers in building real-time, collaborative applications.

**COMPARITIVE ANALYSIS:**

| Sr. no | Name of System | Drawback |
|---|---|---|
| 1 | Design of a Novel Portable ECG Monitor for Heart Health | Costing , Low performance |
| 2 | Smart and Wearable ECG monitoring system as a Point of Care (POC) device | Uses SCADA system |
| 3 | IoT Based Portable ECG Monitoring Device for Smart Healthcare | Low Accuracy |

**SCOPE:**

Sudden and unexpected death due to heart failure is a major cause of mortality among middle aged and elderly people. An efficient heart monitoring system can find out the malformation of heart conditions and that can also be helpful in diagnose at critical ambience. Sometimes the distance between patients and doctors is the main barrier that people do not have access to quality health services and thus having trouble for their regular health examine.

**PROBLEM STATEMENT:**

ECG sensing tools are interfaced with the human chest, and requisite cardiovascular data is collected through an IoT device. These data are stored in the cloud incorporates with the MQTT and HTTP servers. An innovative IoT-based method for ECG monitoring systems on cardiovascular or heart patients has been suggested in this study.

**SYSTEM ARCHITECTURE**

IoT-based method for ECG monitoring systems on cardiovascular or heart patients has been suggested in this study. The ECG signal parameters P, Q, R, S, T are collected, preprocessed, and predicted to monitor the cardiovascular conditions for further health management. The machine learning algorithm is used to determine the significance of ECG signal parameters and error rate. The logistic regression model fitted the better agreements between the train and test data. The prediction has been performed to determine the variation of PQRST quality and its suitability in the ECG Monitoring System. Considering the values of quality parameters, satisfactory results are obtained.

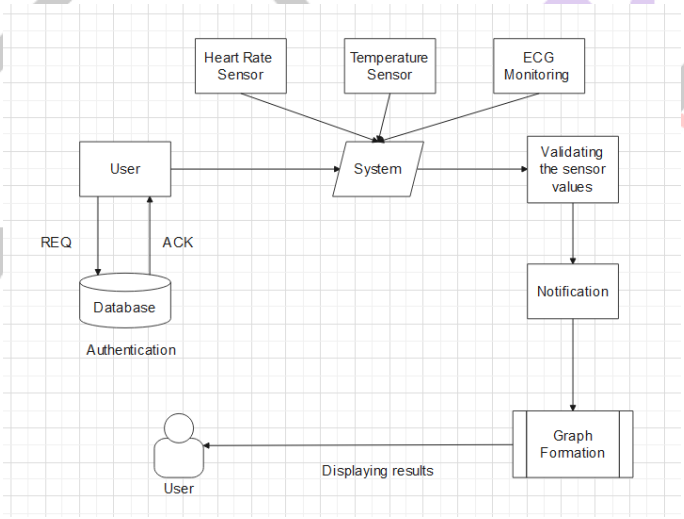


**Fig -1**: System Architecture Diagram

**ADVANTAGES**

1. Innovative.
3. Centralised Database.
4. Easy to use.
5. Efficient cost.

**APPLICATION:**

1. Hospitals
2. Personals
3. Organizations

## METHODOLOGY

The single problem can be solved by different solutions. This considers the performance parameters for each approach. Thus considers the efficiency issues.

- Problem Solving Methods are concerned with efficient realization of functionality. This is an important characteristics of Problem Solving Methods and should be deal with it explicitly.

- Problem Solving Methods achieve this efficiency by making assumptions about resources provided by their context (such as domain knowledge) and by assumptions about the precise definition of the task. It is important to make these assumptions explicit as it give the reason about Problem Solving Methods.

- The process of constructing Problem Solving Methods is assumption-based. During this process assumptions are added that facilitate efficient ope rationalization of the desired functionality

## 5. CONCLUSION

We have created and executed an ECG monitoring system that is entirely based on current IoT technologies. The IoTbased ECG monitoring system is constructed based on the proposed design. IoT-based healthcare platform links with smart sensors affixed to the human body for health monitoring. We talked about IoT-based patient monitoring systems in this article. Smartphones or gadgets use intelligent technologies, and we have discussed the advantages, disadvantages, and opportunities. Continuous remote monitoring is required for observing the medical patient. Our research work provides the ability to monitor patients via web app services and mobile massage services continuously. This research also contrasted the early medical system to modern health monitoring. The work will bring change in medical science and be a blessing for rural areas. The research work has proved its benefits already. We are planning for the further development of the project by promising that one day every people of our country will get immediate medical treatment with the help of our project

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