1.Introduction

An essential part of the present world society is the aging population of the world. The average life expectancy has substantially increased as the mortality rate has considerably decreased significantly because of the global advancements in economy, society and healthcare over the past few decades. As a direct outcome, the number of older people across the world has steadily increased. The average percentage of elderly people in the world today (person aged 65 or older) is 7 percent. Furthermore, the percentage of adults over the age of 65 in many nations outpaces the global average, such as 18.5 percent in Finland, 18 percent in Sweden and 15 percent on average for nations in the Organization for Economic Co-operation and Development (OECD) group. This percentage is also expected to increase in the near future. It is anticipated that by the year 2050, 24 percent of the world population of Sweden will be senior citizens, 10 percent of whom will be 80 or more.

IoT based technology can deliver a substantial amount of information regarding human, appliances, medical devices, and others. The combination of modern internet technological advancements and IoT provides a great deal of innovative products and services based on wireless communication using low-cost sensors. It offers more collection and processing of data and other services. Any object connecting to IoT demands a unique IP address or mode of identification that can be attained using IPv6.

There exists still several people around the globe whose health is affected by the lack of adequate access to hospitals. Wireless alternatives connected to Internet of things can enable remote monitoring of patients rather than visiting the hospital due to the latest wearable technology. A wide range of sensors that are attached to a patient's body could be used to securely obtain patient data, and the data collected can be examined and sent to the main server using various modes of transmission (3G/4G or Wi-Fi). All doctors have access to the data and can view the data, and decide accordingly on the type of treatment to provide. People acknowledge that health and well-being is the fundamental condition for promoting the economic development with the passing of time and the development of the society. Most people claim that in terms of time, the current public healthcare system and its support were challenged considerably. Globally, government and the private sector are continuing to invest billions for the development of IoT devices, some of which include the Ministry of Industry and IT's National IoT Plan for China, the European Research Cluster on IoT (IERC), Japan's u-Strategy, UK's Future Internet Initiatives, and Netergit's National Italian Project. Medical and health care IoT applications will benefit the patients significantly by using the finest medical assistance, the fastest treatment time, the most satisfactory service and the lowest medical costs.

There are several activities and approaches being applied to help reduce the reproduction rate of COVID-19. These include self-isolation methods such as working from home, improved basic hygiene such as increased hand washing and the deployment of personal protective equipment (PPE) to reduce the prospect of infection.

Smart and connected health care is of specific significance in the spectrum of applications enabled the Internet of Things (IoT). Networked sensors, either embedded inside our living system or worn on the body, enable to gather rich information regarding our physical and mental health. In specific, the accessibility of information at previously unimagined scales and spatial longitudes combined with the new generation of smart processing algorithms can expedite an advancement in the medical field, from the current post-facto diagnosis and treatment of reactive framework, to an early-stage proactive paradigm for disease prognosis combined with prevention and cure as well as overall administration of well-being rather than ailment. This paper sheds some light on the current methods accessible in the Internet of Things (IoT) domain for healthcare applications. The proposed objective is to design and create a healthcare system centered on Mobile-IoT by collecting patient information from different sensors and alerting both the guardian and the doctor by sending emails and SMS in a timely manner. It remotely monitors the physiological parameters of the patient and diagnoses the illnesses swiftly.

As there are the frequent contact comes with patient in corona ward there might be chances to be corona to health worker so that were proposed a system which will work on the evaluation of such system which automatically whole data from sensor connected to body of patient and monitor if any up comes or risk occur it will show the alert to doctor.

2.Literature Survey

Nitin P. Jain, et. al, presents An Embedded, GSM based, Multiparameter, Realtime Patient Monitoring System and Control – An Implementation for ICU Patients. In the implemented system a reliable and efficient real time remote patient monitoring system that can play a vital role improvising better patient care is developed.

Hasmah Mansor, et.al proposed an Body Temperature Measurement for Remote Health Monitoring System. Remote health monitoring system has been an interesting topic recently among medical practitioners, engineers as well as IT professionals. However, the application of remote health monitoring system where doctor's can monitor patients' vital signs via web is practically new in Malaysia and other countries.

Barger et al. made a smart house facility using a sensor network to monitor and track the movements of the patient in hoke and a prototype of the same is also being tested. The primary objective of their work is to check if their system is capable to outsmart the behavioral patterns and have discussed about the same in their work.

Purnima, et. al, presents an Zigbee and GSM Based Patient Health Monitoring System Care of critically ill patient, requires spontaneous & accurate decisions so that life-protecting & lifesaving therapy can be properly applied. Statistics reveal that every minute a human is losing his/her life across the globe.

Dwivedi et al. developed a framework in order to secure the clinical information that has to be transmitted over the internet for Electronic Patient Record (EPR) systems in which they propose a multi-layered healthcare information system framework which is a combination of Public Key Infrastructure, Smartcard and Biometrics technologies.

Gupta et al. proposed a model which measures and records ECG and other vital health parameters of the patient using Raspberry Pi and can be of a great use for the hospitals and patients as well as their family members.

Nagavelli and Rao proposed a novel method to predict the severity of the sickness from the patient's medical record using mining based statistical approach which they said as degree of disease probability threshold. And in order to meet their goal they have revamped an0 algorithm that is mostly needed to derive the hyperlink weight of the websites.

Lopes et al. proposed a framework based on IoT for the disabled people so as to study and find the IoT technologies in healthcare segment that can benefit them and their community. They took two use cases to study the latest IoT technologies and its application that can be used mainly for the disabled people.

Sahoo et al. studied the healthcare management system and about the large amount of patient data that is generated from various reports. They further analyzed the health parameters to predict the future health conditions of the patient or the said subject. They use a cloud based big data analytic platform to achieve the same using the means of probability.

Tyagi et al. explored the role of IoT in healthcare and studied its technical aspects to make it reality and identify the opportunities for which they propose a cloud based conceptual framework in which the patients' medical data and information can be securely transferred, with the permission of patient and their family by building a network among patient, hospital, doctors, Labs etc. The primary reason behind this is to relieve patient from the expensive clinical aid, overcome the shortage of doctors and therefore providing enhanced care and service to patients.

Chiuchisan et al. proposed a framework to prevent the threats to patient in smart ICUs. The proposed system intimates the patient's relatives and doctors about any inconsistency in their health status or their body movements and also about the atmosphere of the room so that the necessary precautionary measures can be taken.

3.Problem Statement

- Overall work related to development of Prediction and Recommendation system for Covid-19 using raspberry pi which consist of microcomputer equipped with various sensors like Heart beat sensor, ECG sensor, body Temperature sensor, blood pressure sensor which is connected directly to internet through on board Wi-Fi and health related monitoring can be done. At present, no portable healthcare system is available.
- The main disadvantage to design health monitoring system is large size.
- For designing of Health care monitoring system using Intel Galileo and database stored on local server using XAMPP server gives higher delay with larger hardware required. So, as to reduce the delay and to minimize the power consumption we can use node mcu with database stored on internet.
- Hence, designing of IOT based health monitoring system using node mcu with high speed and less area will be the probable outcome of this proposed work.
- In existing there is not any kind of data evaluation done. So that it is necessary to develop a system which will work with more and highly efficient data manipulation technique.
- Coronaviruses are zoonotic. This means they first develop in animals before developing in humans. For the virus to pass from animal to humans, a person has to come into close contact with an animal that carries the infection.
- Once the virus develops in people, coronaviruses can be spread from person to person through respiratory droplets. This is a technical name for the wet stuff that moves through the air when you cough or sneeze.
- The viral material hangs out in these droplets and can be breathed into the respiratory tract (your windpipe and lungs), where the virus can then lead to an infection.
- It is becoming a history and we are facing it from more than a year. Every disease we have seen but this, that is corona virus COVID-19 is declared as pandemic by WHO. It's a spreading disease and we can't say anything about its ending nature because social distancing plays vital role but it's also the problem of bread and butter situation playing duality because other areas are affecting that is also a big concern.

4.Objectives

- To develop and implement health emergency condition prediction based on Machine Learning approach.
- To implement auto prediction system for reducing the risk of doctors and nurses in CORONA hospital.
- To monitor the live data and apply enhance emergency prediction.
- Interactive alert system with integration
- To integrate the system with diet plan recommendation for the patients with specific and more vulnerable chronic medical conditions.
- To help in monitoring patients from anywhere and anytime.
- To design and create a healthcare system centered on Mobile-iot by collecting patient information from different sensors and alerting both the guardian and the doctor by sending emails and SMS in a timely manner.

5.Algorithm

5.1.Naive Bayes classification algorithm: Naive Bayes classifiers0T is probabilistic classifiers based on applying Bayes' theorem with strong (naive) assumptions between the features. A Naive Bayesian model is easy to build, with no complicated iterative parameter estimation which makes it particularly useful in the field of medical science for diagnosing heart patients. Despite its simplicity, the Naive Bayesian classifier often does surprisingly well and is widely used because it often outperforms more sophisticated classification methods. Bayes theorem provides a way of calculating the posterior probability, P(c|x), from P(c), P(x), and P(x|c). Naive Bayes classifier assumes that the effect of the value of a predictor (x) on a given class (c) is independent of the values of other predictors. This assumption is called class conditional independence

$$\underbrace{P(c \mid x)}_{\text{Posterior Probability}} = \frac{\overbrace{P(x \mid c)}^{\text{Likelihood}}\,\overbrace{P(c)}^{\text{Class Prior Probability}}}{\underbrace{P(x)}_{\text{Predictor Prior Probability}}}$$

$$P(c \mid X) = P(x_1 \mid c) \times P(x_2 \mid c) \times \cdots \times P(x_n \mid c) \times P(c)$$

- P(c|x) is the posterior probability of class (target) given predictor (attribute).
- P(c) is the prior probability of class.
- P(x|c) is the likelihood which is the probability of predictor given class.
- P(x) is the prior probability of predictor

Where C and X are two events (e.g. the probability that the train will arrive on time given that the weather is rainy). Such Naïve Bayes classifiers use the probability theory to find the most likely classification of an unseen (unclassified) instance. The algorithm performs positively with categorical data but poorly if we have numerical data in the training set.

Working of Naive Bayes' Classifier:

Working of Naïve Bayes' Classifier can be understood with the help of the below example:

Suppose we have a dataset of **weather conditions** and corresponding target variable "**Play**". So using this dataset we need to decide that whether we should play or not on a particular day according to the weather conditions. So to solve this problem, we need to follow the below steps:

1. Convert the given dataset into frequency tables.
2. Generate Likelihood table by finding the probabilities of given features.
3. Now, use Bayes theorem to calculate the posterior probability.

Problem: If the weather is sunny, then the Player should play or not?

Solution: To solve this, first consider the below dataset:

	Outlook	**Play**
0	Rainy	Yes
1	Sunny	Yes
2	Overcast	Yes
3	Overcast	Yes
4	Sunny	No
5	Rainy	Yes
6	Sunny	Yes
7	Overcast	Yes
8	Rainy	No
9	Sunny	No
10	Sunny	Yes
11	Rainy	No
12	Overcast	Yes
13	Overcast	Yes

Fig 5.1.Dataset

Weather	Yes	No
Overcast	5	0
Rainy	2	2
Sunny	3	2
Total	10	5

Fig 5.2 Frequency table for the Weather Conditions

Weather	No	Yes	
Overcast	0	5	5/14= 0.35
Rainy	2	2	4/14=0.29
Sunny	2	3	5/14=0.35
All	4/14=0.29	10/14=0.71	

Fig 5.3 Likelihood table weather condition

Applying Bayes'theorem:

P(Yes|Sunny)= P(Sunny|Yes)*P(Yes)/P(Sunny)

P(Sunny|Yes)= 3/10= 0.3

P(Sunny)= 0.35

P(Yes)=0.71

So P(Yes|Sunny) = 0.3*0.71/0.35= **0.60**

P(No|Sunny)= P(Sunny|No)*P(No)/P(Sunny)

P(Sunny|NO)= 2/4=0.5

P(No)= 0.29

P(Sunny)= 0.35

So P(No|Sunny)= 0.5*0.29/0.35 = **0.41**

So as we can see from the above calculation that **P(Yes|Sunny)>P(No|Sunny)**

Hence on a Sunny day, Player can play the game.

Advantages of Naive Bayes Classifier:

- Naïve Bayes is one of the fast and easy ML algorithms to predict a class of datasets.
- It can be used for Binary as well as Multi-class Classifications.
- It performs well in Multi-class predictions as compared to the other Algorithms.
- It is the most popular choice for **text classification problems**.

Disadvantages of Naive Bayes Classifier:

- Naive Bayes assumes that all features are independent or unrelated, so it cannot learn the relationship between features.

Applications of Naive Bayes Classifier:

- It is used for **Credit Scoring**.
- It is used in **medical data classification**.
- It can be used in **real-time predictions** because Naïve Bayes Classifier is an eager learner.
- It is used in Text classification such as **Spam filtering** and **Sentiment analysis**.

Types of Naive Bayes Model:

There are three types of Naive Bayes Model, which are given below:

- **Gaussian**: The Gaussian model assumes that features follow a normal distribution. This means if predictors take continuous values instead of discrete, then the model assumes that these values are sampled from the Gaussian distribution.
- **Multinomial**: The Multinomial Naïve Bayes classifier is used when the data is multinomial distributed. It is primarily used for document classification problems, it means a particular document belongs to which category such as Sports, Politics, education, etc.
  The classifier uses the frequency of words for the predictors.
- **Bernoulli**: The Bernoulli classifier works similar to the Multinomial classifier, but the predictor variables are the independent Booleans variables. Such as if a particular word is present or not in a document. This model is also famous for document classification tasks.

5.2.Secure Cloud Storage Architecture & Machine Learning: Medical information obtained from patients must be stored securely for continued use. Doctors benefit from knowing a patient's medical history, and machine learning is not effective unless large databases of information are available to it. Based on the literature, cloud storage is the most viable method for storing data. However, providing accessibility for healthcare professionals without compromising security is a key concern that should be addressed by researchers developing healthcare IoT systems. Additionally, machine learning has repeatedly been identified in the literature as a means for improving healthcare systems ,though it has not been widely explored. Machine learning offers the potential to identify trends in medical data that were previously unknown, provide treatment plans and diagnostics, and give recommendations to healthcare professionals(such as Doctors) that are specific to individual patients. Machine learning algorithm predict the data(temperature, oxygen level & pulse rate) on the basis of this data machine learning algorithm give recommendations to the Doctors. As such, cloud storage architectures should be designed to support the implementation of machine learning on big data sets.

6.System Block diagam

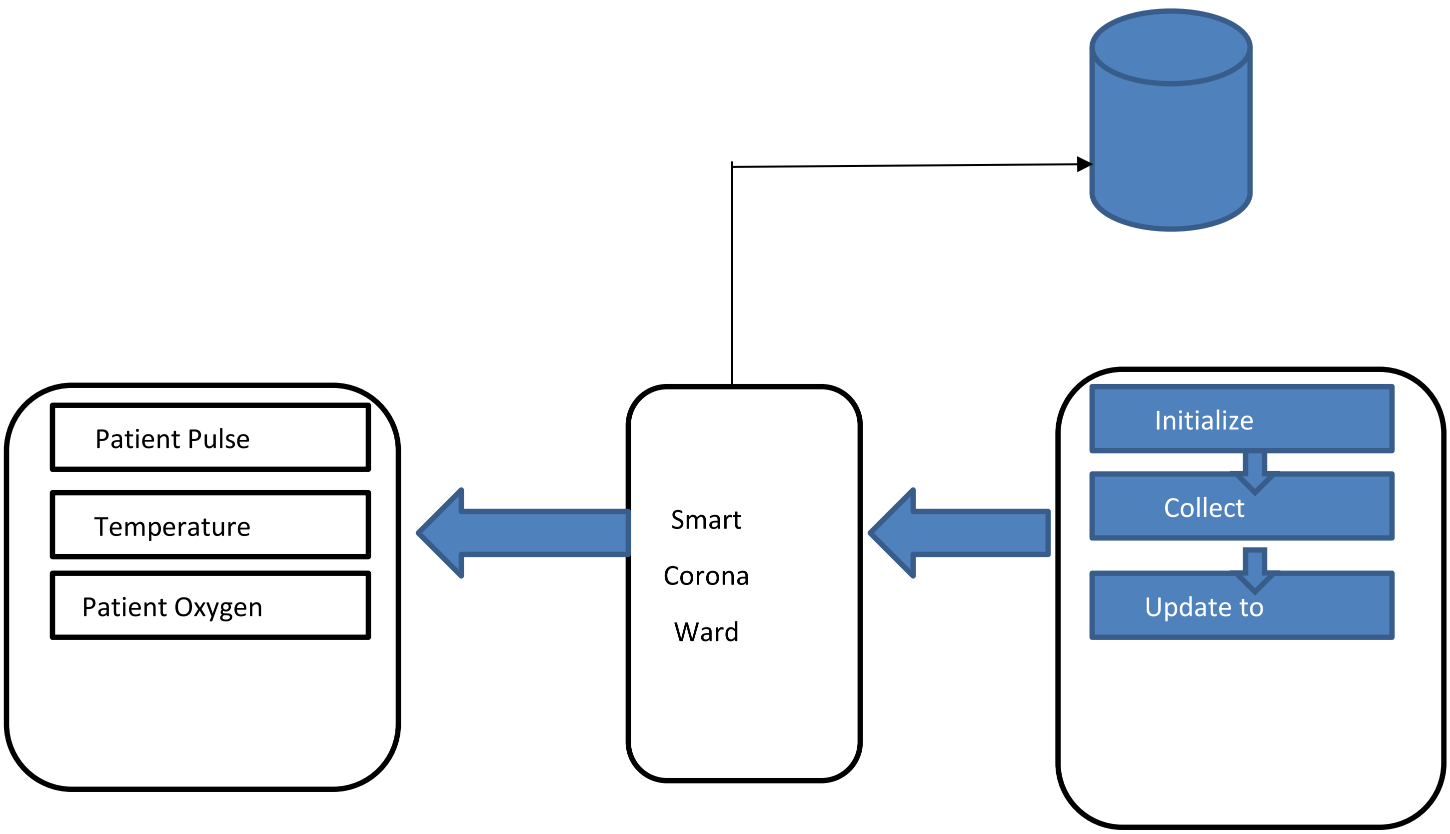

Fig 6.1.Block Diagram

7.System Flow

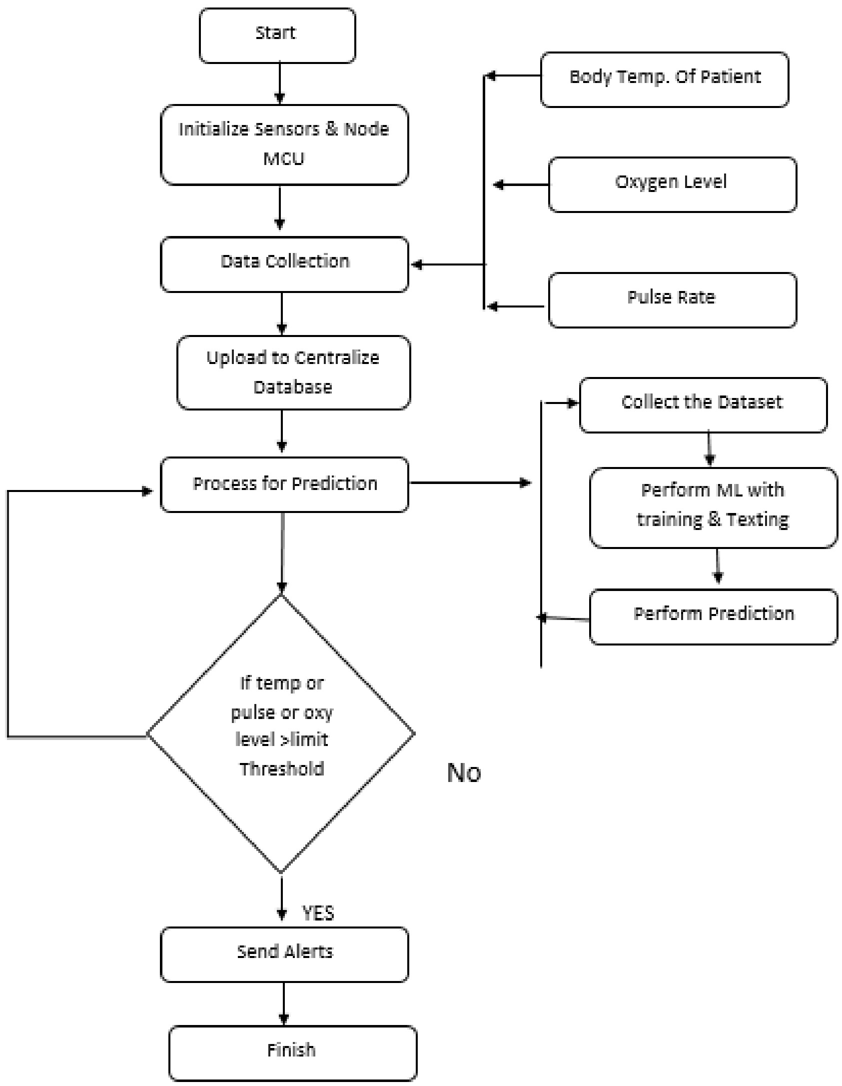

Fig 7.1.System Flow

8.Hardware requirements

8.1.DHT11

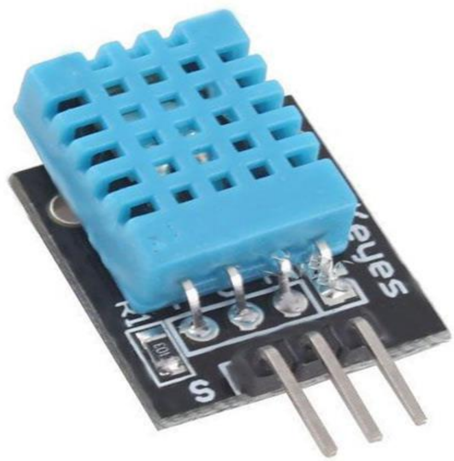

Fig 8.1.DHT11

No:	Pin Name	Description
For DHT11 Sensor		
1	Vcc	Power supply 3.5V to 5.5V
2	Data	Outputs both Temperature and Humidity through serial Data
3	NC	No Connection and hence not used
4	Ground	Connected to the ground of the circuit

For DHT11 Sensor module		
1	Vcc	Power supply 3.5V to 5.5V
2	Data	Outputs both Temperature and Humidity through serial Data
3	Ground	Connected to the ground of the circuit

Fig 8.2.Pin Identification and Configuration

DHT11 Specifications:

- Operating Voltage: 3.5V to 5.5V
- Operating current: 0.3mA (measuring) 60uA (standby)
- Output: Serial data
- Temperature Range: 0°C to 50°C
- Humidity Range: 20% to 90%
- Resolution: Temperature and Humidity both are 16-bit
- Accuracy: ±1°C and ±1%

The **DHT11** is a commonly used **Temperature and humidity sensor.** The sensor comes with a dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data. The sensor is also factory calibrated and hence easy to interface with other microcontrollers.The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of ±1°C and ±1%. So if you are looking to measure in this range then this sensor might be the right choice for you.

8.2.Pulse Oximeter

Fig 8.3.Pulse Oximeter

The sensor is integrated **pulse oximetry** and **heart-rate monitor** sensor solution. It combines two **LED's, a photodetector, optimized optics**, and low-noise analog signal processing to detect pulse and heart-rate signals. It operates from **1.8V** and **3.3V** power supplies and can be powered down through software with negligible standby current, permitting the power supply to remain connected at all times.

Features of MAX30100 Pulse Oximeter

1. Consumes very low power (operates from 1.8V and 3.3V)
2. Ultra-Low Shutdown Current (0.7µA, typ)
3. Fast Data Output Capability

Working of MAX30100 Pulse Oximeter and Heart-Rate Sensor

The device has two **LEDs, one emitting red light, another emitting infrared light**. For pulse rate, only the **infrared light** is needed. Both the **red light** and **infrared light** is used to measure oxygen levels in the blood.

When the heart pumps blood, there is an increase in **oxygenated blood** as a result of having more blood. As the heart relaxes, the volume of oxygenated blood also decreases. By knowing the time between the increase and decrease of oxygenated blood, the **pulse rate** is determined.

It turns out, **oxygenated blood** absorbs more infrared light and passes more red light while **deoxygenated blood** absorbs red light and passes more infrared light. This is the main function of the **MAX30100**: it reads the absorption levels for both light sources and stored them in a buffer that can be read via I2C.

8.3.NodeMCU

Fig 8.4.NodeMCU

NodeMCU is an open source Lua based firmware for the ESP8266 WiFi SOC from Espressif and uses an on-module flash-based SPIFFS file system. NodeMCU is implemented in C and is layered on the Espressif NON-OS SDK.The firmware was initially developed as is a companion project to the popular ESP8266-based NodeMCU development modules, but the project is now community-supported, and the firmware can now be run on *any* ESP module. NodeMCU is an open source firmware for which open source prototyping board designs are available. The name "NodeMCU" combines "node" and "MCU" (micro-controller unit).[8] The term "NodeMCU" strictly speaking refers to the firmware rather than the associated development kits.

8.4.RAM of 8 GB

Fig 8.5.RAM of 8GB

8.5.I3 processor

Fig 8.6.I3 Processor

8.6.500 GB of hard disk

Fig 8.7.500 GB Hard Disk

9.Software requirements

9.1.Android Studio:

Android Studio is the official Integrated Development Environment (IDE) for android application development. Android Studio provides more features that enhance our productivity while building Android apps.

Android Studio was announced on 16th May 2013 at the Google I/O conference as an official IDE for Android app development. It started its early access preview from version 0.1 in May 2013. The first stable built version was released in December 2014, starts from version 1.0.

Since 7th May 2019, Kotlin is Google's preferred language for Android application development. Besides this, other programming languages are supported by Android Studio.

Features of Android Studio

- It has a flexible Gradle-based build system.
- It has a fast and feature-rich emulator for app testing.
- Android Studio has a consolidated environment where we can develop for all Android devices.
- Apply changes to the resource code of our running app without restarting the app.
- Android Studio provides extensive testing tools and frameworks.
- It supports C++ and NDK.
- It provides build-in supports for Google Cloud Platform. It makes it easy to integrate Google Cloud Messaging and App Engine.

9.2.JDK 8.0:

The **Java Development Kit** (**JDK**) is an implementation of either one of the Java Platform, Standard Edition, Java Platform, Enterprise Edition, or Java Platform, Micro Edition platforms released by Oracle Corporation in the form of a binary product aimed at Java developers on Solaris, Linux, macOS or Windows. The JDK includes a private JVM and a few other resources to finish the development of a Java application. Since the introduction of the Java platform, it has been by far the most widely used Software Development Kit (SDK).The JDK is available for 64-bit x64 macOS (and that version also works with Rosetta 2), while an early access build (developer preview) from Microsoft is also available to support recent Apple M1 Macs.The JDK has as its primary components a collection of programming tools, including:

- appletviewer – this tool can be used to run and debug Java applets without a web browser
- apt – the annotation-processing tool
- extcheck – a utility that detects JAR file conflicts
- idlj – the IDL-to-Java compiler. This utility generates Java bindings from a given Java IDL file.
- jabswitch – the Java Access Bridge. Exposes assistive technologies on Microsoft Windows systems.
- java – the loader for Java applications. This tool is an interpreter and can interpret the class files generated by the javac compiler. Now a single launcher is used for both development and deployment. The old deployment launcher, jre, no longer comes with Sun JDK, and instead it has been replaced by this new java loader.
- javac – the Java compiler, which converts source code into Java bytecode
- javadoc – the documentation generator, which automatically generates documentation from source code comments
- jar – the archiver, which packages related class libraries into a single JAR file. This tool also helps manage JAR files.
- javafxpackager – tool to package and sign JavaFX applications
- jarsigner – the jar signing and verification tool
- javah – the C header and stub generator, used to write native methods

- javap – the class file disassembler
- javaws – the Java Web Start launcher for JNLP applications
- JConsole – Java Monitoring and Management Console
- jdb – the debugger
- jhat – Java Heap Analysis Tool (experimental)
- jinfo – This utility gets configuration information from a running Java process or crash dump. (experimental)
- jmap Oracle jmap - Memory Map - This utility outputs the memory map for Java and can print shared object memory maps or heap memory details of a given process or core dump. (experimental)
- jmc – Java Mission Control
- jpackage – a tool for generating self-contained application bundles. (experimental)
- jps – Java Virtual Machine Process Status Tool lists the instrumented HotSpot Java Virtual Machines (JVMs) on the target system. (experimental)
- jrunscript – Java command-line script shell.
- jshell - The new jshell introduced in java 9.
- jstack – utility that prints Java stack traces of Java threads (experimental)
- jstat – Java Virtual Machine statistics monitoring tool (experimental)
- jstatd – jstat daemon (experimental)
- keytool – tool for manipulating the keystore
- pack200 – JAR compression tool
- policytool – the policy creation and management tool, which can determine policy for a Java runtime, specifying which permissions are available for code from various sources.
- VisualVM – visual tool integrating several command-line JDK tools and lightweight performance and memory profiling capabilities
- wsimport – generates portable JAX-WS artifacts for invoking a web service.
- xjc – Part of the Java API for XML Binding (JAXB) API. It accepts an XML schema and generates Java classes.

9.3.Arduino IDE:

Arduino is an open source microcontroller which can be easily programmed, erased and reprogrammed at any instant of time. Introduced in 2005 the Arduino platform was designed to provide an inexpensive and easy way for hobbyists, students and professionals to create devices

that interact with their environment using sensors and actuators.

We use Arduino IDE software to program nodemcu sensor and sending information(reading of sensor) over the internet.

10.Result and Implementation

System is designed for monitoring vital body parameters like temperature, heart rate and oxygen saturation of blood in terms of rate. The values of these parameters are transmitted to Android Smartphone where it will get processed. Whenever the values of these body parameters falls out of the pre- defined range, Automatically Android Smartphone will use Short Message Service (SMS) facility to alert the Doctor. This will grab the quick attention of Doctors & Relatives & immediate medical help can be made available. Thus relatives need not be with patient all time, neither patient is required to be in Hospital environments all time to monitor health changes. Figure. Bellow shows the Android proto type application, These are screen shots of Android application developed. First Screenshot shows the login credentials of users. .In android also have the features to show all users on that are connected through this app. It also shows all details of person this are shown in Screenshot 2. Naïve bayes classifier algorithm predict the output and result to the android app. body temperature, oxygen level, pulse rate, ECG all this patient data are stored in sql in table format. Naive bayes algorithm compared the data with database and predict it.

Fig 10.1.Regisration and login

Fig 10.2.Main Page Interface

Fig 10.3.Add Patient

Fig 10.4.View all Patients

Fig 10.5.Add Data of the Patient

Fig 10.6.Check Details of the Patient

Fig 10.7.Oxygen level analytics

Fig 10.8.Heart Rate Diagnosis

Fig 10.9.Patient at risk

10.1.Results by Recommendation System:

Patient	Temp	Heart Rate	Oxy Level	Prediction	Is Positive
Aditya	102.00	120.00	87.00	High Risk	yes
Karnika	98.23	89.00	60.00	Low Risk	yes
Monika	98.00	98.00	87.00	High Risk	no
Rahul	97.89	97.67	90.00	Low Risk	yes
Nikhil	103.15	97.56	89.00	High Risk	yes
Nishant	98.00	95.00	98.00	High Risk	no
Kumar	99.00	85	84	Low Risk	no
Sagar	97.01	95.00	86.00	Low Risk	Yes
Shyam	97.76	85.00	87.00	Low Risk	Yes

Fig 10.10.Results by Recommendation System

T (D) Total Number of patient Data=9

T(R) No. of Truly Patient Recommended =6

T(F) No. of Falsely Patient Recommended =3

Recall Calculated = T(R)/T(D)   =6/9= 0.66

Precision Calculated = T(F)/T(D)   =3/9= 0.33

10.2.Results By Proposed Work:

Patient	Temp	Heart Rate	Oxy Level	Prediction	Is Positive
Aditya	102.00	120.00	87.00	High Risk	yes
Karnika	98.23	89.00	60.00	Low Risk	yes
Monika	98.00	98.00	87.00	No Risk	yes
Rahul	97.89	97.67	90.00	Low Risk	yes
Nikhil	103.15	97.56	89.00	High Risk	yes
Nishant	98.00	95.00	98.00	No Risk	Yes
Kumar	99.00	85	84	Low Risk	No
Sagar	97.01	95.00	86.00	Low Risk	Yes
Shyam	97.76	85.00	87.00	Low Risk	Yes

Fig 10.11 Results By Proposed Work

T(D) Total Number of patient Data=9

T(R) No. of Truly Recommended Patient =8

Recall Calculated=T(R)/T(D) = 8/9= 0.88

Precision Calculated = T(F)/T(D) =1/9= 0.11

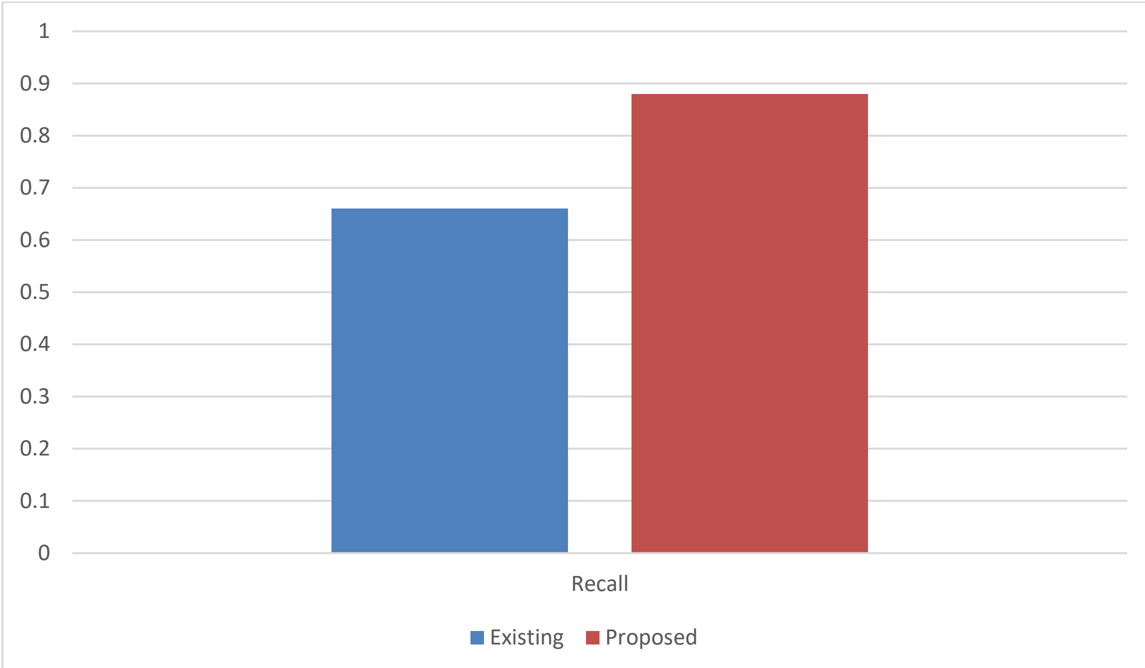

Fig 10.12Recall

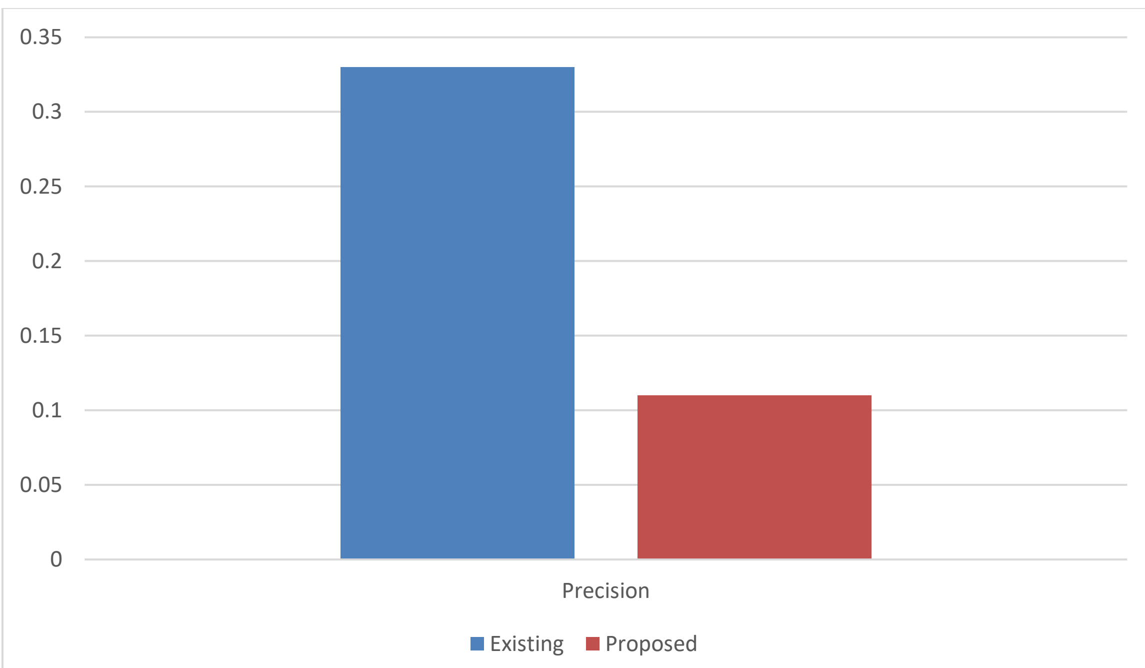

Fig 10.13Precision

11.Conclusion

In this work, we have developed a unique model for future IoT-based healthcare systems, which can be applied to both general systems and systems that monitor specific conditions. We then presented a thorough and systematic overview of the state-of-the-art works relating to each component of the developed model. Several wearable, non-intrusive sensors were presented and analyzed, with particular focus on those monitoring vital signs, blood pressure, and blood oxygen levels.

12.Future Scope

The system can also be in future be integrated with the current healthcare monitoring system. Also the monitoring with such a remote monitoring system can be more easier and safier for the medical personnel to operate. Besides from the current scenario of this devastating pandemic being present, in the course of upcoming times the system can also be used to collect and classify the some additional medical parameters along with the ones which the system currently implements in itself. Also the various other health sectors or simply say the medical sectors such as cardiological, neurological, diabetical, orthopedical, nefrological and many such other branches of medical sciences can make use of such systems. Also the instruments required and medical tests needed can be done remotely which will truly add value to such systems.

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