IOT BASED PATIENT MONITORING SYSTEM

**This Project submitted in partial fulfillment of the requirements for
the Award of Degree of
Bachelor of Science in Electrical and Electronic Engineering**

Submitted by
MD. Mahamudul Hasan Shifat
ID: 153-33-3063

Mostak Ahammed
ID: 153-33-2880

MD. Mashiur Rahman
ID: 153-33-2942

Supervised by

Dr. Md. Abdus Satter
**Assistant Professor
Department of Electrical & Electronic Engineering
Faculty of Engineering**

**DEPARTMENT OF ELECTRICAL AND ELECTRONIC
ENGINEERING
FACULTY OF ENGINEERING
DECEMBER 2018**

Certification

This is to certify that this project entitled **"IOT Based Patient Monitoring System using Esp8266 and arduino"** is done by the following students under my direct supervision and this work has been carried out by them in the laboratories of the Department of Electrical and Electronic Engineering under the Faculty of Engineering of Daffodil International University in partial fulfillment of the requirements for the degree of Bachelor of Science in Electrical and Electronic Engineering.

Signature of the candidates

_____

MD. Mahamudul Hasan Shifat
 ID: 153-33-3063

_____

MD. Mostak Ahammed
ID: 153-33-2880

_____

MD. Mashiur Rahman
ID: 153-33-2942

Countersigned

_____

Mr. Md. Dara Abdus Satter

Assistant Professor

Department of Electrical and Electronic Engineering

Faculty of Science and Engineering

Daffodil International University

APPROVAL

The project entitled "**IOT BASEDP ASTIENT MONITORRING SYSTEM**" submitted by MD.MAHAMUDUL HASAN SHIFAT, ID: 153-33-3063, MD.MOSTAK AHAMMED, ID: 153-33-2880, MD.MASHIUR RAHMAN, ID: 153-33-2942, Session: Fall 2018 has been accepted as satisfactory in partial fulfillment of the requirements for the degree of **Bachelor of Science in Electrical and Electronic Engineering December 2018.**

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Dedicated to...

Our Beloved PARENTS

&

All of Our TEACHER

CONTENTS

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ACKNOWLEDGEMENT

First of all, we give thanks to Allah or God. Then we would like to take this opportunity to express our appreciation and gratitude to our project and thesis supervisor of Mr. Md. Dara Abdus Satter Assistant Professor & Associate Department of EEE for being dedicated in supporting, motivating and guiding us through this project. This project can't be done without his useful advice and helps. Also thank you very much for giving us opportunity to choose this project. Apart from that, we would like to thank our entire friends for sharing knowledge; information and helping us in making this project a success. Also thanks for lending us some tools and equipment. To our beloved family, we want to give them our deepest love and gratitude for being very supportive and also for their inspiration and encouragement during our studies in this University.

ABSTRACT

The Internet of Things (IoT) has been widely used to interconnect the available medical resources and offer smart, reliable, and effective healthcare service to the elderly people. Health monitoring for active and assisted living is one of the paradigms that can use the IoT advantages to improve the elderly lifestyle. In this paper, we present an IoT architecture customized for healthcare applications. The proposed architecture collects the data and relays it to the cloud where it is processed and analyzed. Feedback actions based on the analyzed data can be sent back to the user. A prototype of the proposed architecture has been built to demonstrate its performance advantages

LIST OF FIGURES

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List of Abbreviations

HRM   Heart Rate Monitor

HR   Heart Rate

Bpm   Beat per Minute

MCU   Microcontroller

MAXHR   Maximum heart rate

SMS   Short Message Service

ADC   Analog to Digital Converter

LED   Light Emitting Diode

IR   Infra-Red

PCB   Printed Circuit Board

IOT   Internet of Things

LAN   Local Area Network

Chapter-1

Introduction

In this chapter we gave the introduction to our ideas for this project, the motivation we got from and our objectives with this project.

In the presentation element we can observe what's net of factors about. How critical wellbeing monitoring is in present day time of social insurance also, extra essentially, why IOT must be in targeted to health checking to beautify the nature of management in human offerings department? In the later elements we will communicate about how we actualized the framework.

1.1   Introduction

The term "Internet of Things" is considered to be first coined in the starting of this century when work was done on MIT Auto-ID Center to make a smart identification technology which will help to reduce the error rate subsequently increasing efficiency and to automate. But since then, the concept of IOT has evolved rapidly in various ways, as now with the help of this huge number small networks which can remain connected to each other and can directly send data to the main network without any human interaction. Nature of administration in medicinal services has dependably been below regular analysis inside the cutting part duration, as it is a very unstable concern. Health observing fantastically for aged individuals is a fear and as a superb many humans in the superior events are paintings holders and feature so furious lifestyles. It is hard to figure out a way to hold a regular watch at the elderly of the residence. Keeping a medical attendant or maid is likewise an highly-priced difficulty nowadays. On this situation, far flung well-being looking at dependent on IOT can deal with the problem. IOT is giving the strategies via which it's far achievable to gather and spoil down records remotely with no human cooperation. Alongside these traces, this shows it's far achievable to differentiate and hold any future chance with exactness and conceivable to mindful the concerning expert like the relative or the doctor if there's any demanding situation. The fundamental motives IOT is vital for this challenge is proper off the bat it's miles automatic, so no human conversation is required. What's

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extra, additionally, because of mechanization the system have much less shot of having errors i.e. having a progressively effective framework showing a superior exceptional in se

1.2 PROBLEM DEFINITION

Within the present social safety device for patients who stays in domestic amid put up operational days checking is carried out both by way of administrator/healing overseer. Incessant looking won't be cultivated by using this framework, in mild of the fact that anything can trade in prosperity parameter within a part of seconds and in the midst of that point if watchman/expert is not within the premises reasons step by step tremendous mischief. So with this advancement made duration where web regulates the arena offers an concept to feature to every other sharp wellbeing mindfulness structure wherein time to time consistent checking of the affected person is practiced.

1.3 Objective

 Making a robotized framework that allows you to screen have remotely is our primary objective.

Making an alert or reaction framework on the way to respond at something factor there's an alarming situation. Giving an method to remotely display screen the temperature, beat, tallying the interior discharge in multi day and moreover the mount of rest of the patient through assume talk. Breaking down the accumulated information utilizing the inherent Mat lab of the suppose speak separate to detect future perils. Sending stressful messages via e-mail and twitter to the concerning specialist or individuals if any version from the norm is recognized. Contributing inside the subject of IOT to clear a direction for future assignment inside the technological development.

1.4 Motivation

The center to our notion become to suppose ahead approximately our time and to make a commitment on the department net of things (IOT) that's surely the subsequent large issue at the modern market. Moreover, IOT has turned out to be a very handy belonging. The opportunity of this task got here to us through when you consider that it's so herbal to companion or coordinate

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the normal home machines with the net. This drove us to the separated wellness division which is as but falling in the back of from different companies as some distance as innovation. We watched many case even from our each day experience that within the feverish world we are living at this second, it's far tough to keep a watch over the entirety. Uniquely, to look at out for the aged individuals is tough and exorbitant too. Those authentic occasions gave us the mind and notion to coordinate the two components with the aim that it enables in developing this sort of venture with a purpose to make a monetary and powerful well-being checking framework and will put together for destiny paintings on the sector of IOT.

Chapter-2

Literature Review

This element examines approximately the concept of the undertaking we're endeavoring to execute, what type of work has just been done on formerly and how we are particular and more enhanced than those projects.

2.1 Concept

Monitoring health of elderly people is basically model for monitoring using different sensors. The reason we chose elderly people for monitoring is because, elderly people are usually more vulnerable to sickness and other aging factors. So, usually it becomes difficult for working people to monitor the senior members of the family the whole time. Even if it is possible to take care of the elderly during they stay at home, it becomes rather difficult to observe their activities and condition during the working hours. Thus, it was eminent to come with a solution that is toymaker a health monitoring system which can observe the daily basic activities of elderly people. A threshold value will already be provided to the system. The system will collect data of daily activities through sensors which will be placed according to the needs of the system. The retrieved data will then be compared with the provided threshold values. If everything remains normal then further analysis will not be done. But whenever any anomalies or abnormalities are recorded then the data's are further analyzed using the appropriate predictive algorithm. Then with the help of those predictions the system will decide how serious the situation is. If it is really that serious then a message will be send to the concerning relatives about the recent condition of the patient and about the prediction of the system. The basic things that will be tried to be monitored in this research are pulse rate, temperature, usage of wash room, as well as amount sleep of the patient. The sensors used in the research will work in following steps:

1. The sensors will send the data collected from the host in a regular basis after definite span of time.
2. The data thus collected will undergo a comparison with the given threshold value to the system.
3. If the data set concurs with the threshold value then the situation will be considered to be normal thus the system will not take any further action.
4. The data set thus retrieved if contains any abnormities, will then go for further analysis to predict how serious the condition of the person is. And also send   alarming message to concerning authorities

2.2 Related Works

present day system scientific technology is developing by using jumps and bounds over the maximum latest few a long time for his or her considerable aim towards faraway and e-health checking systems providing far off observing of sufferers. Be that as it could, the devices used to manipulate health conditions are monotonous to hold up and limited to explicit quantity of parameters. The systems being complicated and hard to work likewise improve the cost of social insurance administrations and healing facility prices which is not affordable to financially examined community. In mid1960's, Koresh applied a framework, which includes several matters specially glucose sensor, a processor and a pump to govern glycerin in patients with diabetes. To manage complicated situations, the siphon will require several MEMS primarily based sensors to screen extra parameters like glucose, pulse, temperature and ECG and so forth. A few associated discoveries utilized explicit fashions for the wellbeing checking perspective. Just like the abstraction of model pushed Tree Reference version (MDTRM) in which they clarified the need of this display within the wellbeing area and additionally distinguishing the complexities of the models. They also benched denoted the fashions which came extraordinarily handy for the underlying duration of this exploration. A few different related model we observed are preferred domain model architecture (GDMA) the health checking and detecting with cloud handling become likewise an accommodating source in the back of their search, as it changed into helpful for developing mind to get crude statistic's from wearable gadgets which are compatible and fit for estimating numerous physical esteem which we are able to use to obtain meaningful effects.

A wellbeing display screen for scientific circumstance gathers records and remotely transmits it for non-stop showcase. This gives high dreams display of facts better graphical abilities. It additionally has a touch primarily based UI. Be that as it can, because it very well can be now expected how savvy it will be, it cannot send an alert message to tell for any crises. Unfastened Scale domestic health Hub reference level shop know-how statistics to cloud via means of various sensors, in which the general populace recognized with the affected person may have an entrance. This stage additionally cannot tell for any disturbing situation to the general populace drew in with the patient.

2.3 System and overview

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The Block chart of the proposed framework is seemed in Fig 2.1. The sensors Temperature, Heartbeat and Accelerometer is associated with the arduino board. The traits from the Microcontroller is given to the net Server utilizing Ethernet guard.
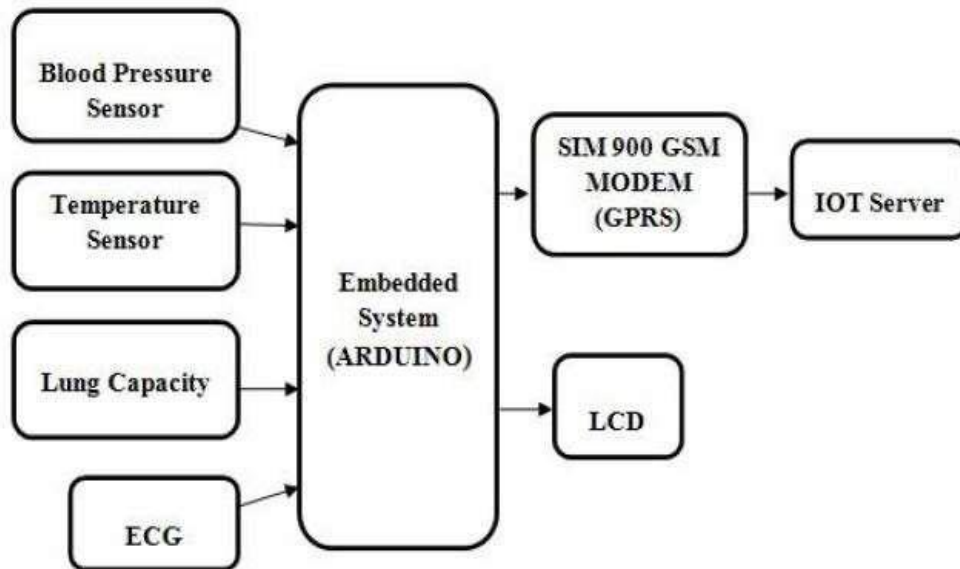
Fig. 2.3: Block Diagram

2.4 Processing Software

Programming dialects for the visible expressions which can help any computerized craftsman make complicated liveliness and interactive institutions. managing is an amazing and fun to make use of programming dialect that become initially created to assist coding fanatics take inside the nuts and bolts of programming but from that factor ahead, it has developed into something appreciably more special.

Currently it's miles an open source development instrument which emphasizes on the visible portrayal of the code, targeting each propelled customers and experts. The language expands at the Java dialect, yet makes use of a simplified linguistic shape and designs programming version. It has user-accommodating interface, it holds the advantages of effortlessness. The

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number one window is worried from commonly thirteen determined components in any code editor, specifically a toolbar, undertaking tabs, content material tool, message area and a reassure.

2.5 Arduino AVR Microcontroller

Arduino is an open source bodily computing platform depending on a primary information/yield (I/O) board and an advancement domain that executes the Processing dialect. Arduino can be utilized to develop standalone wise articles or can be related to software to your computer. Arduino equipment is an open-source circuit board with a chip and input/yield (I/O) pins for correspondence and controlling bodily articles (LED, servos, buttons, and so on.). The board will often be fueled by way of USB Oran outer power supply which accordingly allows it to control other gadget and sensors

Chapte-3

THE ORETICAL MODEL

This chapter discusses the hardware required for the project implementation, discusses with figure the circuit connections and pseudo codes for the implementation.

3.1 Methodology and Implementation

3.1.1 Temperature Sensor

The LM35 arrangement are exactness coordinated circuit LM35 temperature sensors, whose yield voltage is straightly relative to the temperature in Celsius (Centigrade). The LM35 sensor therefore has leverage over direct temperature sensors, aligned in °Kelvin, because the purchaser isn't required to subtract an expansive consistent voltage from its yield to get wonderful centigrade scaling. The LM35 sensor does no longer require any outdoor adjustment or trimming to give not unusual correct nesses of ±¼°C at room temperature and ±¾°cover a full - fifty five to +a hundred and fifty °C temperature pass. The LM35's low yield impedance, direct yield, and exact natural adjustment make interfacing to readout or manage hardware in particular simple. Because it attracts just 60 µA from its supply, it has low self-warming, beneath zero.1°C in nonetheless air.
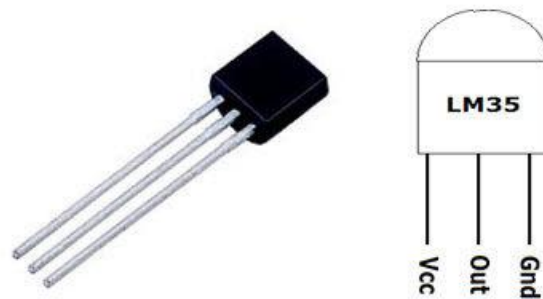

Fig 3.1.1: Temperature Sensor LM35

3.1.2 Pulse Sensor

For gathering the beat charge facts from the host we picked the model SEN-11574. The Pulse Sensor is a fitting and-play pulse sensor for arduino. It very well may be utilized by any character who desires to easily consolidate live pulse facts. Substance it's far an incorporated optical improving circuit and noise dishing out with circuit sensor. It is anything however hard to apply through reduce-out the pulse Sensor to the hosts earlobe or fingertip and attachment it into the arduino. This sensor can give statistics resembles Pulse charge, aerobic Graph and Inter Beat c language. Anyway for our benefit we just applied the heart beat Rate per minute from the sensor. The facts from the sensor may be recovered from the host by's on the tip of the host's finger or the flap of the ear.

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Fig 3.1.2: Pulse Sensor SEN-11547

3.1.3 Wi-Fi Module (ESP8266)

ESP8266 offers a self-status c084d04ddacadd4b971ae3d98fecfb2a networking with TCP/IP convention stack that could supply Wi-Fi connection to any microcontroller. ESP8266 when connected on-board it has capability and processing capabilities for this reason may be effortlessly related to the sensors based on the application. The ESP8266 module is a to a notable degree Wi-financially savvy board. The module facilitates to transmit the sensor information to think speak disbursed garage. It remains related to the Arduino and connects with the server through net and sends the facts to that server.
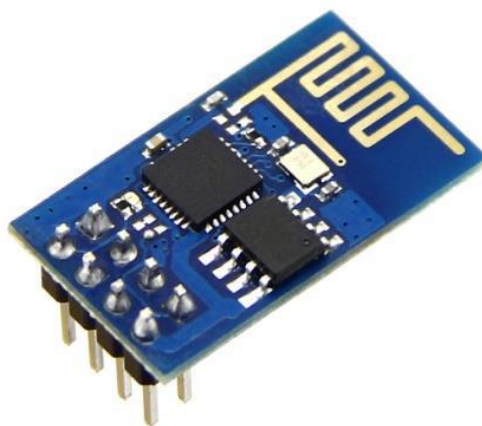

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Fig 3.1.3: ESP-8266 (Wi-Fi Module)

3.1.4 Arduino

We applied Arduino Uno with the give up purpose of this challenge. Each one of the sensors are related to the Arduino. Uno is a microcontroller board depending on the ATmega328P. It has 14digital statistics/yield pins of which 6 may be utilized as PWM yields, 6 simple statistics assets, a sixteen MHz quartz treasured stone, a USB Wi-filiation wireless, a strength jack, an ICSP header and a reset capture. The sensors are managed from the Arduino Uno so is the c084d04ddacadd4b971ae3d98fecfb2a   module.   The   c084d04ddacadd4b971ae3d98fecfb2a module is getting the data's from the sensors via this Arduino Uno.

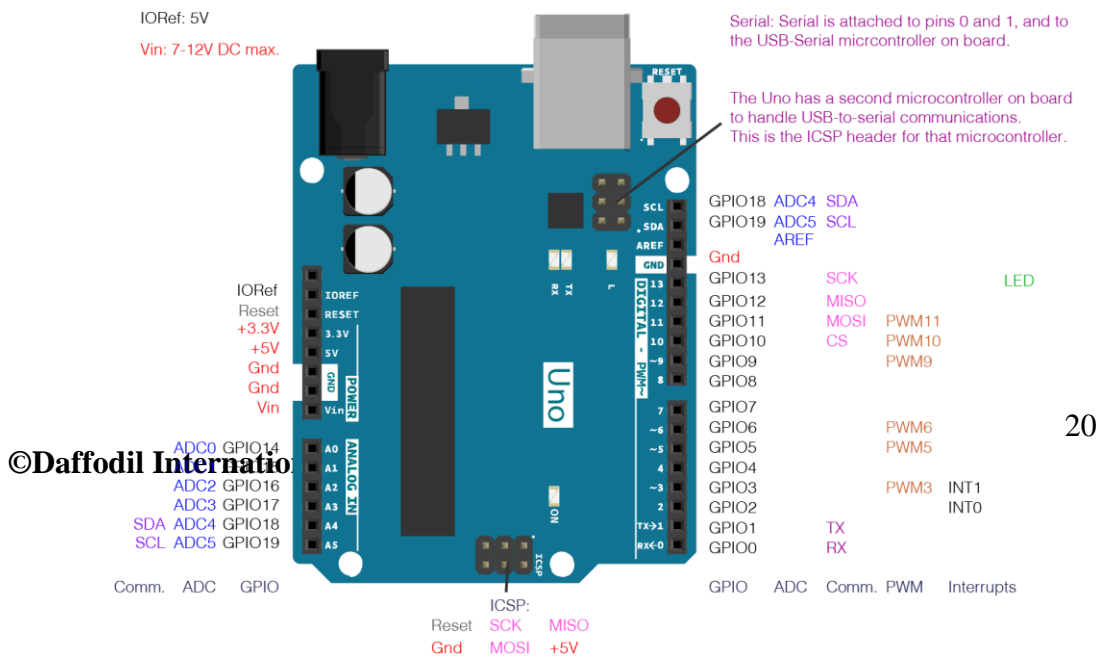Fig 3.1.4: Arduino Uno

3.1.5 Specification of Arduino Uno r3

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Fig: 3.1.5 Specification of Arduino Uno r3

3.2.1 Pin Description

Power	Pin Name	Pin Name
Power	Vin, 3.3V, 5V, GND	Vin: Input voltage to arduino when using an external power source. 5V: Regulated power supply used to power microcontroller and other components on the board. 3.3V: 3.3V supply generated by on-board voltage regulator. Maximum current draw is 50mA. GND: ground pins.
Reset	Reset	Resets the microcontroller.
Analog Pins	A0 – A5	Used to provide analog input in the range of 0-5V
Analog Pins	A0 – A5	Used to provide analog input in the range of 0-5V
Input/output Pins	Digital Pins 0 - 13	Can be used as input or output pins.
Serial	0(Rx), 1(Tx)	Used to receive and transmit TTL serial data.
External Interrupts	2, 3	To trigger an interrupt.
PWM	3, 5, 6, 9, 11	Provides 8-bit PWM output.

SPI	10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK)	Used for SPI communication.
Inbuilt LED	13	To turn on the inbuilt LED.
TWI	A4 (SDA), A5 (SCA)	Used for TWI communication.
AREF	AREF	To provide reference voltage for input voltage.

3.2.2 Arduino Uno technical Specifications

Microcontroller	ATmega328P – 8 bit AVR family microcontroller
Operating Voltage	5V
Recommended Input Voltage	7-12V
Input Voltage Limits	6-20V
Analog Input Pins	6 (A0 – A5)
Digital I/O Pins	14 (Out of which 6 provide PWM output)
DC Current on I/O Pins	40 mA
DC Current on 3.3V Pin	50 mA
Flash Memory	32 KB (0.5 KB is used for Boot loader)
SRAM	2 KB
EEPROM	1 KB
Frequency (Clock	16 MHz

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Speed)	

3.2.3 Display module

Liquid crystal display screen is an electronic presentation module and locate a wide scope of utilizations. A 16x2 liquid crystal display show is extraordinarily important module and is usually utilized in one of a kind gadgets and circuits. Those modules are desired extra than seven fragments and different multi element LEDs. The reasons being: LCDs are sparing; efficaciously programmable; don't have any obstacle of displaying uncommon or even custom characters, activities hence on. A 16x2 led implies it can display sixteen characters for every line and there are 2 such traces. In this liquid crystal display each character is proven in 5x7-pixel lattice. This led has registers, to be particular, Command and statistics.
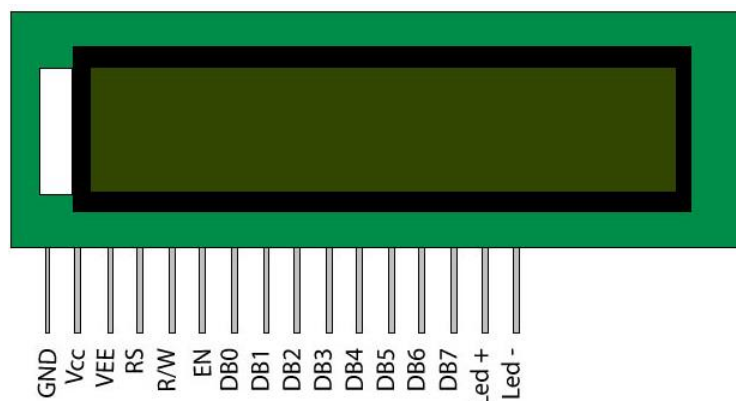
Fig: 3.2.3 Display Module (16x2)

3.2.4 A Pin Function of Display Module

Display Module	
GND	Ground Pin
VCC	Power Supply +5.0V
VEE	Contrast adjustment; through a variable resistor
RS	Register Selector
R/W	Read/Write

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EN	Enable
D1 to D7	Data Pins
LED +	Backlight VCC +5.0v
LED -	Backlight GND

3.2.5 Power Supply

We use Battery as electricity supply or strength source. Batteries are an accumulation of at the least one cells whose compound responses make a flow of electrons in a circuit. All batteries are created from 3 fundamental elements: an anode, a cathode, and a few type of electrolyte at the point when the anode and cathode of a battery is related to a circuit, a compound reaction happens among the anode and the electrolyte. This reaction makes electrons course via the circuit and once more into the cathode in which another synthetic response takes place.

At the point whilst the cloth in the cathode or anode is wolfed or no longer equipped to be applied within the reaction, the battery cannot create energy. We make use of two form of battery, primary is 3.2.5-volt li-polymer battery for transmitter circuit within cap, and wide variety two is 12-volt sulfuric corrosive battery from bike for Receiver Circuit.

Fig: 3.2.5 Li-Polymer Battery.   Fig: 3.2.5 Sulfuric Acid Battery.

3.2.6 Power Switch

In electric designing, a transfer is an electrical part that can "make" or "break" an electrical circuit, interfering with the flow or redirecting it starting with one transmitter then onto the next. The instrument of a switch expels or reestablishes the main manner in a circuit when it is worked. A transfer may have at least one lots of contacts, which may fit on the equal time, consecutively, or however. Switches in effective circuits need to paintings quickly to counteract

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dangerous arcing, and can contain unusual highlights to useful resource quick intruding on a considerable contemporary.

Fig: 3.2.6 SPDT Switch.

3.2.7 Power Connector

Barrel connectors are normally determined on minimum attempt purchaser hardware which may be connected to divider control with the aid of cumbersome AC divider connectors. Divider connectors are extensively on hand, in an assortment of depth value determinations and voltages, making barrel connectors a normal strategies for interfacing ability to little ventures.

The girl barrel connector can be acquired in a few assortments: PCB set up link mount, or board mount. A portion of those connectors may have an extra contact that permits the application to pick out whether a strength deliver is connected to the barrel jack or no longer, therefore enabling the device to stay clear of batteries and spare battery life when running on outdoor power.
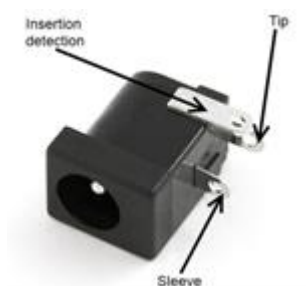

Fig: 3.2.7 Female Power Connector Port.

3.2.8 Connecting Wire

A wire is a solitary, normally spherical and whole, adaptable strand or pole of metal. Wires are utilized to keep up beneath mechanical burdens or electricity and media communications signals. Cord is normally formed with the aid of instance the metal via a gap in a kick the bucket

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or draw plate. Cord checks come in different general sizes, as communicated concerning a degree range. The time period wire is moreover utilized all of the more freely to allude to a heap of such strands, as in 'multi stranded twine', that's all the more accurately named a cord rope in mechanics, or a link in strength.

Fig: 3.2.8 Connecting Wire

Chapter-4

HARDWARE DESCRIPTION

This chapter are discuss using Sensor, Microcontroller Board and Flash Memory system

4.1 Introduction

Stage software reminiscence lock exact with MCS-51 products

•4 Kbytes of Reprogrammable Flash reminiscence

•Endurance: 1,000 Write/Erase Cycles

•2.7 V to six V working variety

•Completely Static Operation: 0 Hz to 24 MHz
•128 x 8-Bit internal RAM

•32 Programmable I/O lines

Two 16-Bit Timer/Counters

•Six Interrupt resources

•Complete Duplex UART Serial Channel

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•Watchdog Timer

•bendy ISP Programming

•Low power Idle and strength Down Modes

4.1.2 Description

The device is produced utilizing Atmel's high thickness nonvolatile memory technology and is right with the enterprise popular MCS-51 steerage set and pinot. By using joining an adaptable 8-bit CPU with glimmer on a strong chip, the AtmelAT89S51 is a ground-breaking microcomputer which gives a completely adaptable and financially savvy answer for a few implanted control programs.

4.1.3 Flash Memory

Streak reminiscence is a kind of EEPROM, which has a framework of sections and columns with a cell that has two transistors at each crossing factor. A skinny oxide layer isolates the two transistors from each other. One of the transistor is referred to as the skimming door and specific because the control entryway. The gliding doors just hook up with the column, or 'word line', is through the manage entryway. For anything length of time that this connection is installation, the cell has an estimation of '1'. This esteem may be modified to'0' utilizing the Fowler-nordheim burrowing technique. Burrowing is utilized to change the situation of electrons within the skimming entryway. An electrical rate, for the most component 10-thirteen volts, is attached to the drifting door. The fee originates from the phase, or bit line, which enters the drifting entryway and channels to ground. This charge makes the drifting door transistor act like an electron firearm. The energized electrons are driven through and stuck on the other side of the skinny oxide layer, giving it negative rate. These Contrarily charged electrons pass about as a boundary among the manipulate door and the coasting entryway a unique system called cell sensor screens the dimension of the charge going via the gliding entryway. At the off risk that

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the direction via the door is greater distinguished than 50 percentage of the rate, it has an estimation of '1'.

At the factor whilst the price going thru the door dips beneath the 50 percentage facet, the esteem changes to 'zero'. A clean EPROM has the majority of the doors completely open, giving every mobile an estimation of '1'.The electrons in the cells of a glimmer reminiscence chip may be come returned to the everyday '1'state with the aid of usage of an electric area (a higher-voltage price). Streak memory utilizes in-circuit wiring to use the electric field to the entire chip or to the foreordained areas known as squares. The targeted on area of the chip is deleted, which can be remodeled. Streak memory works a lot quicker than conventional EEPROMs in light of the fact that in preference to removing one byte at any given moment, it deletes a rectangular or the complete chip and after that reworks it. An excellent reminiscence sub-framework is one that has high thickness, can be perused brief and guard facts in non-unstable circumstance, and is anything but difficult to software/reconstruct and realistic. Various reminiscence advances meet at the least this kind of requirements relatively. Heartbeat monitoring machine well, however have sure restrictions that keep the item from becoming a licensed arrangement, specifically in extra up to date programs. Streak memory is a non-unstable memory joining the upsides of EPROM/EEPROM, ROM, and DRAM. There is probably contrasts among the explicit improvements used by numerous makers however their essential trendy is identical. For example, Intel Flash reminiscence use NOR doorways, even as Samsung reminiscence makes use of NAND entryways. The innovation utilized by Intel is moreover characterized dependent on the middle memory cell. the principle innovation is the first single-piece/cellular streak memory which permits a solitary piece of data to be placed away in each cell (1=erased and zero=programmed).the second one and the contemporary innovation makes use of a staggered cell structure, as an example, Intel Strata Flash reminiscence. This innovation permits two bits of records to be actually placed away in a solitary transistor. Programming a mobile (fee scenario) and browsing (detecting) have to be absolutely controlled with a view to include 4 states inner a solitary transistor. As according to Intel, the staggered mobile streak memory makes use of a dependable NOR-based totally engineering and is preferably ideal for excessive-thickness packages.

4.1.4 Microcontroller Board

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The board applied for the proposed assignment is a universally beneficial development board for 89S51 microcontroller. The board substance the segments required the microcontroller accurately. The DIO pins of microcontroller are accessible at the connector. Microcontroller utilizes capacitor C1 and resistor R1 for resetting the microcontroller. The Crystal oscillator utilized right here with 2 capacitors U1, U2 is of eleven.0952MHZ. Microcontroller moreover assessments for information inside the variety heartbeat (65 to 85) and if the circumstance isn't fulfilled makes the right pass like sending a SMS.
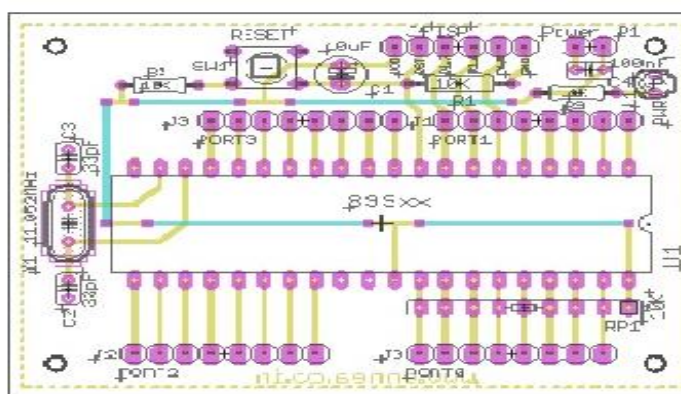

Fig: 4.1.4 Microcontroller Board

4.2.1 Using the sensor

Interface controlled DC control deliver of five Volts. Darkish cord is floor, next middle twine is Brown which is yield and crimson wine is certain deliver. Those wires are additionally set apart on PCB to check sensor you simply need control the sensor through interface wires +5V and ND. You can depart the yield twine for what it's worth. at the point while Beat LED is off the yield is at 0V. Positioned finger on the checked position, and you may see the beat LED flickering on every heartbeat.

• The yield is dynamic high for each beat and can be provided particularly to microcontroller for
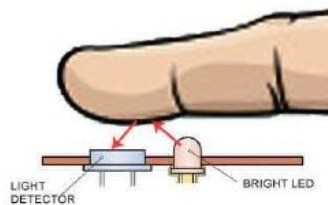
• interfacing application.

Fig: 4.2.1 Using the Sensor

4.2.2 The working

The sensor incorporates of a very terrific red LED and mild finder. The LED have to be excessively superb as the most extreme light have to bypass spread in finger and diagnosed through locator. Presently, while the coronary heart siphons a beat of blood via the veins, the finger seems to be quite gradually dark therefore less mild carried out the locator. With each coronary heart heartbeat the locator flag fluctuates.

This variety is changed over to electric heartbeat. This signs more suitable and activated through an enhancer which yields +5V motive degree flag. The yield flag is additionally confirmed by way of a LED which sparkles on every heartbeat .Following discern indicates flag of heart beat and sensor flag yield diagram. Fig.4.2.1 shows real coronary heart beat gotten through identifier (Yellow) and the trigger motive of sensor (red) after which the sensor yields superior flag (Blue) at 5V level.

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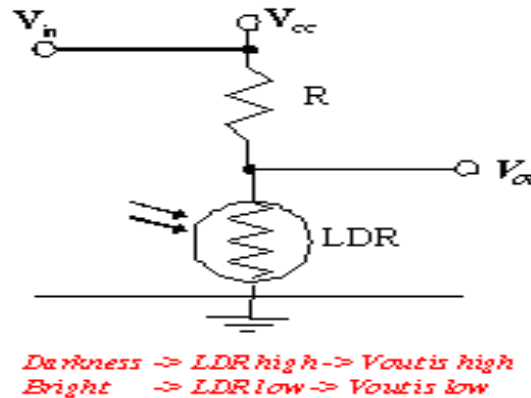## 4.2.3 Light intensity calculation

Fig: 4.2.3 Light intensity calculation

Yield crosswise over LDR is given to any easy stick of Arduino due. On the point while mild is falling on LDR its opposition diminishes .at that point voltage over its abatements, ADC perusing diminishes. At the point when no mild is falling on LDR its opposition expands .at that point voltage over its builds, ADC perusing additionally increments. ADC analyzing=analog Read (A2); Voltage= ADC analyzing*five/ (1023); ADC reading =400 to 650 whilst brilliance ADC studying =700 to 1023 whilst dimness. SOUND

4.2.4 Computational analysis of sensor parameters

Here we comprise a few fundamental explanatory techniques to discern the Sensors parameters, just like Temperature, Humidity, and mild power and Sound dimensions inside the encompassing situation.

Temperature and Humidity Calculation: LM35 Temperature sensor offers yield voltage 10 mv for 1°C.this sensor yield is associated with any easy stick of arduino due. Due proselytes easy voltage into computerized making use of on chip ADC.

ADC reading=analog Read (A1); Voltage= ADC reading*5/ (1023); Temperature=Voltage*one hundred;

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4.2.5 Human-Heart rate graph plotted with respect to time
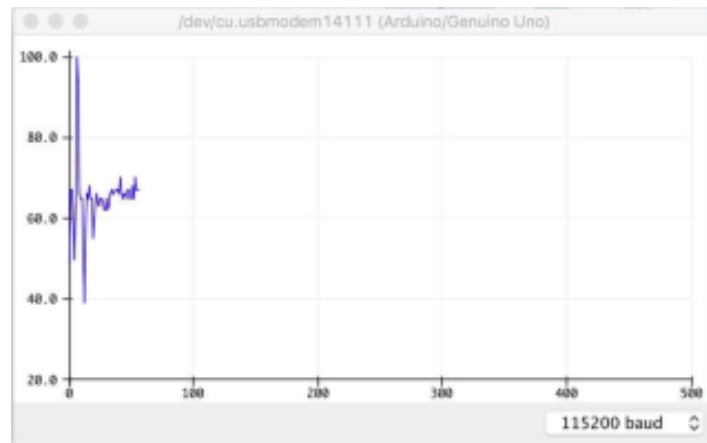

Fig: 4.2.5 Human-Heart rate graph plotted with respect to time

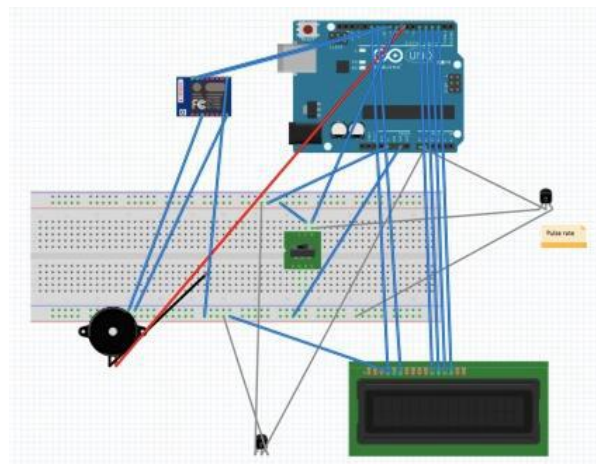## 4.2.6 Pin connections of all the sensors in sensing module

Fig: 4.2.6 Pin connections of all the sensors in sensing module

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Chapter-5

RESULTS AND DISCUSSIONS

This Chapter discuss results and program sate to Arduino

5.1 Introduction

On this fragment in the wake of executing the code we are able to speak approximately how it is shown within the suppose communicate record of a customer and how response or input is sent on the email and twitter. The records' we got inside the wake of transmitting is spared in the billow of suppose communicate server and from that point with the assistance the highlights gave from assume speak we are able to display information and ship worrying message.

5.1.2 Result Display

Within the think speak server it takes 15 second deferrals for every datum section. The facts entered within the capacity is then graphically depicted within the showcase. The facts entered inside the ability is channel and field express. That means it'll go the express field of that channel that is given by the purchaser. For, consolation of the professional of the aged we opened a distinct channel for them. The patient who's under belief of that specialist is then placed on various fields of that professional's channel.

We gave extraordinary professionals for this situation for diverse hosts. What is more, the exhibit is absolutely safety ensured. Fat is, the consumer can maintain the channel open for open survey or it has a tendency to be made private overview for consolation. Next to deciding on the predetermined channel the consumer can see the accompanying discipline of the host's every day refreshed diagrams for gazing.

5.1.3 Pulse graph

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The pulse graph which is taken at first gives three different values of parameters, which are already discussed above. The first figure shows the three different column, the first column being the pulse rate, the second being the IBI and the third being the pulse signal.
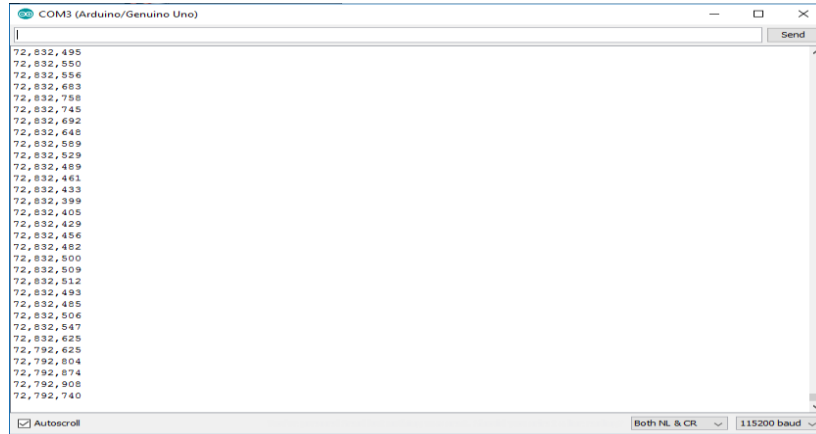

Fig: 5.1.3 The initial values of from the serial monitor of Arduino

In the serial plotter of arduino the following graph is obtained. The blue colored indicates the pulse rate, the red color shows the Inter beat Interval (IBI) and the green graph shows the pulse signal.
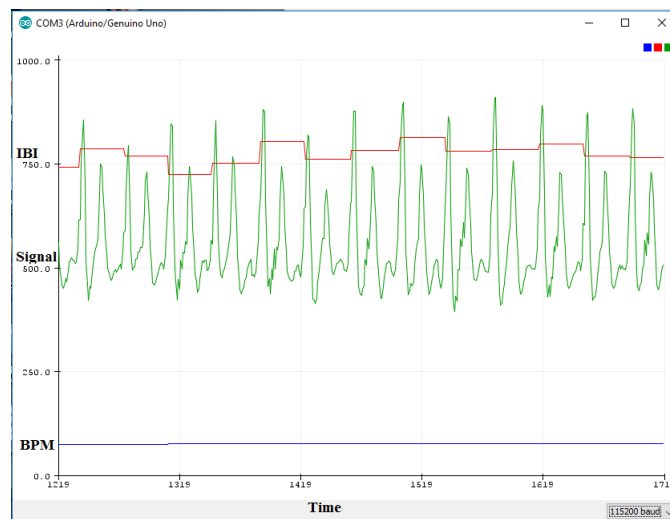

Fig: 5.1.4 Serial plotter view of the data received from pulse sensor

From this data set for the convenience of this project we only selected the pulse rate data as a criterion for monitoring. After implementing the ESP-8266 code with this pulse sensor data, it is

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formed in the Think speak as following graph of a host. Initially there are some values which are a little high for noise factor. But, with time normal pulse starts to appear as we can see in the following graph
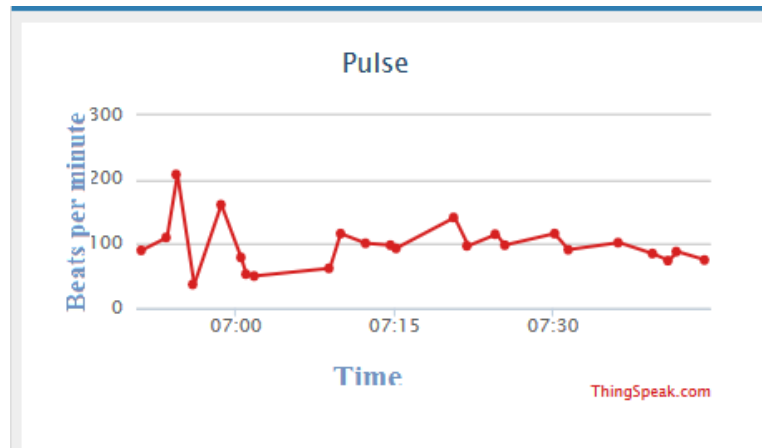

Fig: 5.1.5 The Think speak graph of a host corresponding to the plotter graph

5.2.1 Program of patient monitoring

#define USE_ARDUINO_INTERRUPTS true

#include <PulseSensorPlayground.h>

#include<LiquidCrystal.h>;

constintPulseWire = A0;   //Heart rate sensor

constint LED13 = 13;

inttemp_pin = A1;   //Tem sensor

inttemp_value = 0;

int Threshold = 530;

int BPM = 0;

PulseSensor PlaygroundpulseSensor;

LiquidCrystallcd (7, 6, 5, 4, 3, 2); // RS, E, D4, D5, D6,D7

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```
Void setup()

{

pinMode(temp_pin, INPUT);

Serial.begin(9600);

lcd.begin(16,2);

lcd.clear();

pulseSensor.analogInput(PulseWire);

pulseSensor.blinkOnPulse(LED13);

pulseSensor.setThreshold(Threshold);

  if (pulseSensor.begin())

 {

lcd.setCursor(0,0);

lcd.print("HEART RATE AND");

lcd.setCursor(0,1);

lcd.print("TEMP: MONITOR");

   delay(3000);

lcd.clear();

lcd.setCursor(0,0);

lcd.print("PLEASE PLACE");

lcd.setCursor(0,1);

lcd.print("YOUR FINGER");

   delay(3000);

  }

}
```

```
void loop()

{

temp_value = analogRead(temp_pin);

 float mv = (temp_value/1024.0)*5000;

 float cel = mv/10;

intmyBPM = pulseSensor.getBeatsPerMinute();

 if (pulseSensor.sawStartOfBeat())

 {

   BPM=(myBPM/3.1);

   if(BPM>60)

 {

lcd.clear();

lcd.setCursor(0,0);

lcd.print("HEART RATE:");

lcd.setCursor(12,0);

lcd.print(BPM);

lcd.setCursor(0,1);

lcd.print("TEMP IS:");

lcd.setCursor(9,1);

lcd.print(cel);

lcd.setCursor(14,1);

lcd.setCursor(14,1);

lcd.print("c");

     delay(1000);
```

```
lcd.clear();

  }

  }

lcd.clear();

lcd.setCursor(0,0);

lcd.print("HEART RATE:");

lcd.setCursor(0,1);

lcd.print("TEMP IS:");

lcd.setCursor(9,1);

lcd.print(cel);

lcd.setCursor(14,1);

lcd.print("c");

  delay(500);
```

Chapter-6 CONCLUSIONS

6.1 Our main objective in this project was to successfully monitor the basic four criteria's namely temperature, pulse, using of toilet and sleep and react during emergency situation without any human interaction. We wanted to make a mark on the field of IoT with the health sector. With the rise of IoT, the era of technology moving towards a far superior dimension. In order to keep pace with the new technologies, this project can sure make way for the advancement in this sector. Though our model is tested and implemented, it will be difficult to continue the project without superior quality hardware support along with a lot of new integration. The real benefit of this work can only be fully realized when it can be implemented in full scale.

6.2 Future Scope

☐Integrating more sensors for more specific data acquisition and analysis.

☐Will be applicable in army services in active situation.

☐Will be used to provide health service to rural areas in affordable price.

☐Huge database will be built for doctors to diagnose people from different areas and cultures. Our project can be considered as platform to develop in the field of IOT on the health sector. In developing countries like ours, this kind of innovative and cost effective project can improve the future of technology. So, we are looking forward to implement the project in order to make an impact in the new era of technology.

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