

# **MONITORING SYSTEM OF CHILDREN IN SCHOOL**

Submitted in partial fulfillment of the requirements for the award of  
Bachelor of engineering degree in Computer Science and Engineering  
by

GANTYADA SUNDEEP (Reg.No. 37110226)

GORLA SAI KRISHNA REDDY (Reg. No. 37110238)



**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**SCHOOL OF COMPUTING**

**SATHYABAMA**

**INSTITUTE OF SCIENCE AND TECHNOLOGY**

**(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC JEPPIAAR**

**NAGAR, RAJIV GANDHI SALAI,**

**CHENNAI – 600 119**

**MARCH - 2021**



# **SATHYABAMA**

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with "A" grade by NAAC

Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai – 600 119

[www.sathyabama.ac.in](http://www.sathyabama.ac.in)



## **DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

### **BONAFIDE CERTIFICATE**

This is to certify that this project report is the bonafide work of **GANTYADA SUNDEEP(Reg.No.37110226)** and **GORLA SAI KRISHNA REDDY (Reg. No.37110238)** who carried out the project entitled “ **MONITORING SYSTEM OF CHILDREN IN SCHOOL** ” under my supervision from **DECEMBER 2020** to **March 2021**.

#### **Internal Guide**

Mr. Albert Mayan J, M.E.,Ph.d.,

#### **Head of the Department**

---

Submitted for Viva voce Examination held on \_\_\_\_\_

**Internal Examiner**

**External Examiner**

## **DECLARATION**

I **GANTYADA SUNDEEP** hereby declare that the Project Report entitled "**MONITORING SYSTEM OF CHILDREN IN SCHOOL**" is done by me under the guidance of **Mr. ALBERT MAYAN J,M.E., Ph.D.**, Department of Computer Science and Engineering at Sathyabama Institute of Science and Technology is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Computer Science and Engineering.

**DATE:**

**PLACE: CHENNAI**

**SIGNATURE OF THE CANDIDATE**

## ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to **Board of Management of SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. T. Sasikala, M.E., Ph.D., Dean, School of Computing, Dr. S. Vigneswari, M.E., Ph.D., and Dr. L. Lakshmanan, M.E., Ph.D., Heads of the Department** of Computer Science and Engineering for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Mr. ALBERT MAYAN J, M.E., Assistant Professor**, for his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Computer Science and Engineering** who were helpful in many ways for the completion of the project.

## **ABSTRACT**

In real world, the children safety is a huge question mark in everyone's mind. Parents always expect their children should live in a secured place where they can spend their time and mind without any problem. But, typically half of them are facing so many issues.

This issue can be monitored by using IoT components and sensors to check in the child environment whether people with unaccepted behavior are moving. If children close with them, then the system has to give an alert message that someone stands with the child.

By tracing the locations of the children, the parents can able locate where the problem is and how they can help the child from such issues.

The heartbeat and vibration sensor are recommended along with Blood Pressure sensor to check whether the child in any abnormal conditions. By measuring the different input data and taking appropriate decisions may help the people to save the children

## TABLE OF CONTENTS

|                        |                                         |                     |
|------------------------|-----------------------------------------|---------------------|
|                        | <b>ABSTRACT</b>                         | <b>v</b>            |
|                        | <b>LIST OF FIGURES</b>                  | <b>viii</b>         |
| <b>CHAPTER<br/>No.</b> | <b>TITLE</b>                            | <b>PAGE<br/>No.</b> |
| <b>1.</b>              | <b>INTRODUCTION</b>                     | <b>1</b>            |
|                        | 1.1 RESEARCH AND SIGNIFICANCE           | 1                   |
|                        | 1.2 LITERATURE SURVEY                   | 2                   |
| <b>2.</b>              | <b>AIM AND SCOPE</b>                    | <b>5</b>            |
|                        | 2.1 AIM OF PROJECT                      | 5                   |
|                        | 2.1.1 OBJECTIVES                        | 5                   |
|                        | 2.2 SCOPES                              | 5                   |
|                        | 2.3 EXISTING SYSTEM                     | 6                   |
|                        | 2.3.1 DISADVANTAGES OF EXISTING SYSTEM  | 6                   |
|                        | 2.4 PROPOSED SYSTEM                     | 6                   |
|                        | 2.4.1 ADVANTAGES OF PROPOSED SYSTEM     | 6                   |
|                        | 2.5 SYSTEM REQUIREMENTS                 | 7                   |
| <b>3.</b>              | <b>SYSTEM DESIGN &amp; METHODOLOGY</b>  | <b>8</b>            |
|                        | 3.1 DESIGN                              | 8                   |
|                        | 3.1.1 CHARACTERISTICS                   | 9                   |
|                        | 3.1.2 APPLICATIONS                      | 10                  |
|                        | 3.2 POWER MANAGEMENT                    | 11                  |
|                        | 3.3 SENSORS                             | 13                  |
|                        | 3.4 METHODOLOGY                         | 17                  |
| <b>4.</b>              | <b>SOFTWARE DEVELOPMENT METHODOLOGY</b> | <b>18</b>           |
|                        | 4.1 GENERAL INTRODUCTION IOT            | 19                  |
|                        | 4.1.1 OVERVIEW                          | 20                  |
|                        | 4.1.2 CHALLENGES                        | 21                  |

|           |                                   |           |
|-----------|-----------------------------------|-----------|
|           | 4.2 INTRODUCTION TO ARDUINO IDE   | 22        |
|           | 4.3 UBIDOTS                       | 23        |
|           | 4.3.1 CREATING UBIDOTS            | 23        |
|           | 4.3.2 VARIABLES                   | 23        |
|           | 4.3.3 EVENTS                      | 24        |
| <b>5.</b> | <b>RESULTS AND DISCUSSION</b>     | <b>25</b> |
| <b>6.</b> | <b>CONCLUSION AND FUTURE WORK</b> | <b>28</b> |
|           | <b>REFERENCES</b>                 | <b>29</b> |
|           | <b>APPENDIX</b>                   |           |
|           | A. SOURCE CODE                    | 30        |

## LIST OF FIGURES

| FIGURE No. | FIGURE NAME             | PAGE No. |
|------------|-------------------------|----------|
| 3.1        | SYSTEM PROCESS          | 9        |
| 3.2        | POWER SUPPLY            | 11       |
| 3.3        | BLOCK DIAGRAM           | 13       |
| 3.4        | HEARTBEAT DIODE         | 15       |
| 3.5        | FLOWCHART OF VOICE      | 17       |
| 4.1        | LAYERED ARCHITECTURE    | 21       |
| 4.2        | ILLUSTRATION OF UBIDOTS | 24       |
| 5.1        | CHILDREN MONITORING SYS | 25       |
| 5.2        | GPS TRACKING            | 26       |
| 5.3        | UBIDOTS                 | 27       |
| 5.4        | ALERT MAIL              | 27       |

# **CHAPTER 1**

## **INTRODUCTION**

### **INTRODUCTION**

Internet of Things (IOT) is the latest technology that connects entire world. It establishes connectivity (through internet) among the various devices or services or systems in order to little by little make automation development in all areas. Safety is the most wanted power for everyone in today's world. Rape is the one of the major crime in India practiced against Child and Women. The crime rate is growing steadily since last few decades. According to latest National Crime Records Bureau (NCRB) 2013 annual report, 33,707 rape cases are reported across only India. The number of reported rape cases has been steadily increasing over the past decade. Technology is the best way to solve this problem.

### **1.1 RESEARCH AND SIGNIFICANCE**

In today's world, over 80% of the world population, including children around the age of eight or seven, owns smart phones [1]. This is due to many reasons. One of them is the exceptional highlights and capacities that new advanced mobile phones offer particularly android based PDAs. With that numerous highlights, the requirement for clever applications rises. As we would see it, GPS offers exceptional capacities in finding position and this can be utilized to create ingenious application that helps in finding absent or lost youngsters. Studies led by Cyber Travel Tips [2] demonstrated that in Malaysia, missing kids are fundamentally ordered into two classifications. The primary class is vanishing, which incorporates fleeing from home. The other class is snatching or hijacking. Insights uncover that since 2004, an aggregate of 5,996 kids younger than 18 disappeared from their homes. Fortunately, around 4092 youths returned home or found by the police. Nonetheless, the other 1,904 kids are as yet absent. Those children are young fellows and young women with ages between 14 years and 17 years. Likewise, when watchmen need to go family trip, they for the most part stress over their youths' prosperity. Even worst, parents can lose sight of their children and fear the possibly of kidnapping or worst for them and aimed to help

locating missing or lost children. It takes advantage of the fact that many of today's children bring smart phones which is convenient for this kind of situation. In this work, GPS is combined with one of the basic service of a smart knowledge as this application runs in background and the major advantage of this feature is, if child reboots the Mobile phone the background process starts as the reboot is complete, so the process is never ending. This application sends all the data from the child's phone to the server and from the server to the parent's phone in every 10 minutes interval. This application is divided into 2 Apps, one is for the parent where they can see all the activities of their children and other is the Child Part, where the child can only see a calculator while the data is been fetched in the background without child's knowledge.

phone which is GSM, more specifically SMS, in one system. An application at the parent side will enable guardians to send an area demand to a youngster side at that point recover the area from the demand answer and shows it on a guide. Then again, the application at the kid's side assembles the fundamental data of the advanced cell that will be utilized to find the PDA. Information such as GPS coordinates and time are gathered and sent to the parent smart phone that's preregistered on the application. The correspondence between the parent and the kid applications is finished utilizing Short Message Service (SMS). SMS offers the system unique features. It will allow the system to work without the need of internet connection thus allows the application to be implemented on smart phones that don't support GPRS, 2G or 3G internet connectivity. The system sends the location of child's smart phone to parent's smart.

## **1.2 LITERATURE SURVEY**

### **A NOVEL APPROACH TO PROVIDE PROTECTION FOR WOMEN BY USING SMART SECURITY DEVICE**

Seelam and Prasanti(2018)[1] says that in today's world women are less secure and have many issues regarding their security purpose. This paper describes about safe and secured electronic system for women which comprises of an Arduino controller and sensors such as temperature LM35, flex sensor, MEMS accelerometer, pulse rate sensor, sound sensor. A buzzer, LCD, GSM and GPS are used in this project. When the woman is in threat, the device senses the body

parameters like heartbeat rate, change in temperature, the movement of victim by flex sensor, MEMS accelerometer and the voice of the victim is sensed by sound sensor. When the sensor crosses the threshold limit the device gets activated and traces the location of the victim using the GPS module. By using the GSM module, the victim's location is sent to the registered contact number.

## AN INTELLIGENT SAFETY SYSTEM FOR INDIVIDUAL'S SECURITY

Prof. Kiran et al(2017)[2] says that, in today's world, security is the major issue for an individual. In this project the system consists of a monitoring device, which gets activated when the device is tapped upon then a text message along with voice alert message is received by the respective emergency contacts. Further the person who receives the notifications can find and track the location without the interaction of the victim's application at each and every function.

## SMART SECURITY SOLUTION FOR WOMEN BASED ON INTERNET OF THINGS (IOT)

Harikiran et al(2016)[3] says that, today in the current global scenario, the prime question in every girl's mind, considering the ever rising increase of issues on women harassment in recent past is mostly about her safety and security. In this paper they propose to have a device which is the integration of multiple devices, hardware comprises of a wearable "Smart band" which continuously communicates with Smart phone that has access to the internet. The application is programmed and loaded with all the required data which includes Human behaviour and reactions to different situations like anger, fear and anxiety. This generates a signal which is transmitted to the smart phone. The software or application has access to GPS and Messaging services which is pre-programmed in such a way that whenever it receives emergency signal, it can send help request along with the location coordinates to the nearest Police station, relatives and the people in the near radius who have application. This action enables help instantaneously from the Police as well as Public in the near radius who can reach the victim with great accuracy.

## A SMART WATCH FOR WOMEN SECURITY BASED ON IOT CONCEPT 'WATCH ME'

Helen et al(2017)[8], designed a wearable smart watch. When a women or child wearing this 'watch me' is exposed to sexual or vulnerable attack, the sensor present in it detects the heart beat rate of a person which will be high at the moment by the secretion of epinephrine hormone from hpa axis and gets activated, this will not only

provide alarm sound to the attention of nearby people, it will automatically make a call to our registered contact and also through GPS/GSM it will detect the nearby police station.

## **CHAPTER 2**

### **AIM AND SCOPE**

#### **2.1 AIM**

The main aim of the proposed system is that these Days parents are worried about their children's so they want a complete track of them and monitor them all the time, This is physically not possible so we introduce Safety Monitoring system which is helpful for monitoring or tracking the child and their activities from anywhere in the world.

##### **2.1.1 OBJECTIVES**

The main objective of Children monitoring system is an advanced system can be built that can detect the location and health condition of person that will enable us to take action accordingly based on electronic gadgets like GPS receiver, GSM, pulse rate sensor, flex sensor, MEMS accelerometer, body temperature sensor. We can make use of number of sensors to precisely detect the real time situation of the women in critical abusive situations. The heartbeat of a person in such situations is normally higher which helps make decisions to detect the abnormal motion of the women while she is victimized.

#### **2.2 SCOPE**

This model will help in knowing the conditions of the children make them to be more aware about the condition of their respective children. This model helps us to keep a track on the children health conditions and monitor them closely.

## **2.3 EXISTING SYSTEM**

Having this concern in mind many developers have come up with creative applications. Some of such applications are: Codes like \*91# is used to provide emergency services, which will alert police control. Free mobile application 'Help me on mobile' to ensure safety of children was launched to assist those who need emergency. These applications need a single click to do this task. But when a children is in trouble, there can be times that the children is not capable of taking the phone and pressing button.

### **2.3.1DISADVANTAGES OF EXISTING SYSTEM:**

- By using Gsm and gps makes cost level increase its not affordable for all They require some strength to use.
- Maintenance needed periodically.

## **2.4 PROPOSED SYSTEM**

The proposed system uses voice commands to operate the wheelchair. To develop a system of improved facilities is the main aim of the proposed system. The proposed system can overcome the limitations of existing system. The proposed system will ensure that there is no need of any other human operator or care taker. The proposed system helps wheelchair to communicate with each other. This communication is used to know whether the task assigned to wheelchair is completed or not. Here we also monitor the health condition of the elderly person. When the person shows any signs of abnormal condition, an alert message is sent to the respective people like doctors, relatives.

### **2.4.1 ADVANTAGES OF PROPOSED SYSTEM**

- All the sensors are very small in size and portable to handle at any condition
- User friendly
- Internet Connected to module so monitor at anywhere there is no distance prob

## 2.5 SYSTEM REQUIREMENTS

*Hardware required:*

- NodeMCU
- Heartbeat sensor
- Pressure sensor
- Vibration sensor

*Software required:*

- Embedded C
- Arduino IDE

## **CHAPTER 3**

### **SYSTEM DESIGN & METHODOLOGY**

#### **3.1DESIGN**

##### **EMBEDDED SYSTEM**

An embedded system is a microprocessor-based computer hardware system with software that is designed to perform a dedicated function, either as an independent system or as a part of a large system. At the core is an integrated circuit designed to carry out computation for real-time operations. In contrast, a general-purpose computer, such as a personal computer, can do many different tasks depending on programming. Embedded systems have become very important today as they control many of the common devices we use.

Since the embedded system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product, or increasing the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale.

Physically, embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, or the systems controlling nuclear power plants. Complexity varies from low, with a single microcontroller chip, to very high with multiple units, peripherals and networks mounted inside a large chassis or enclosure.

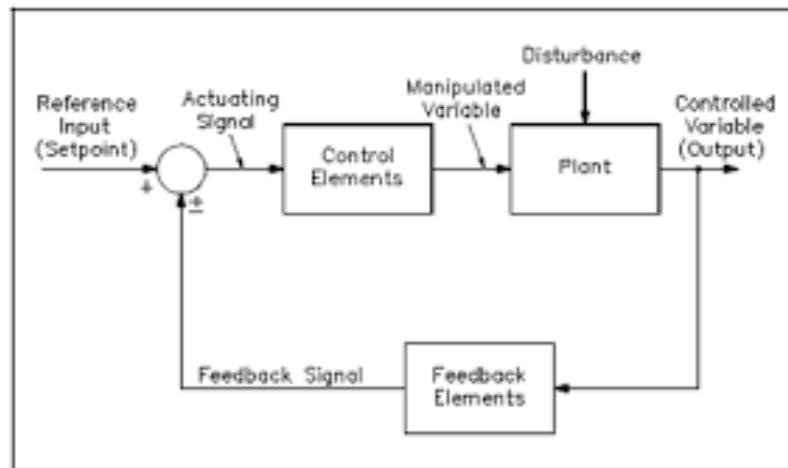
In general, "embedded system" is not an exactly defined term, as many systems have some element of programmability. For example, Handheld computers share some elements with embedded systems — such as the operating systems and microprocessors which power them — but are not truly embedded systems, because they allow different applications to be loaded and peripherals to be connected.

Embedded systems provide several functions :

- Monitor the environment; embedded systems read data from input sensors. This data is then processed and the results displayed in some format to a user or users

- Control the environment; embedded systems generate and transmit commands for actuators.
- Transform the information; embedded systems transform the data collected in some meaningful way, such as data compression/decompression

Although interaction with the external world via sensors and actuators is an important aspect of embedded systems, these systems also provide functionality specific to their applications. Embedded systems typically execute applications such as control laws, finite state machines, and signal processing algorithms. These systems must also detect and react to faults in both the internal computing environment as well as the surrounding electromechanical systems.



**FIG 3.1:SYSTEM PROCESS**

### **3.1.1 Characteristics of embedded systems**

Embedded systems are characterized by a unique set of characteristics. Each of these characteristics imposed a specific set of design constraints on embedded systems designers. The challenge to designing embedded systems is to conform to the specific set of constraints for the application.

### **3.1.2 Application Specific Systems**

Embedded systems are not general-purpose computers. Embedded system designs are optimized for a specific application. Many of the job characteristics are known before the hardware is designed. This allows the designer to focus on the specific

design constraints of a well-defined application. As such, there is limited user reprogram ability. Some embedded systems, however, require the flexibility of reprogram ability. Programmable DSPs are common for such applications.

#### *Harsh environment:*

Many embedded systems do not operate in a controlled environment. Excessive heat is often a problem, especially in applications involving combustion (e.g., many transportation applications). Additional problems can be caused for embedded computing by a need for protection from vibration, shock, lightning, power supply fluctuations, water, corrosion, fire, and general physical abuse.

#### *System safety and reliability:*

As embedded system complexity and computing power continue to grow, they are starting to control more and more of the safety aspects of the overall system. These safety measures may be in the form of software as well as hardware control. Mechanical safety backups are normally activated when the computer system loses control in order to safely shut down system operation. Software safety and reliability is a bigger issue. Software doesn't normally "break" in the sense of hardware. However software may be so complex that a set of unexpected circumstances can cause software failures leading to unsafe situations. Discussion of this topic is outside the scope of this book, but the challenges for embedded designers include designing reliable software and building cheap, available systems using unreliable components. The main challenge for embedded system designers is to obtain low-cost reliability with minimal redundancy.

#### *Small and low weight:*

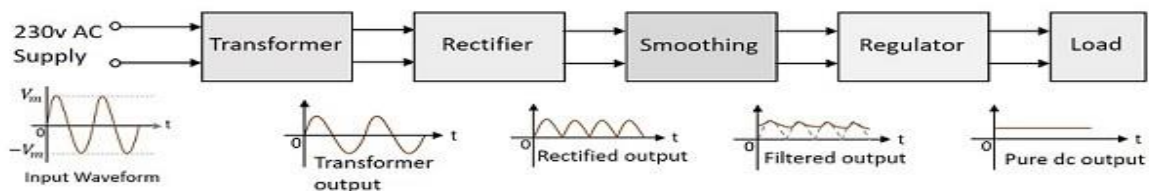
Many embedded computers are physically located within some larger system. The form factor for the embedded system may be dictated by aesthetics. For example, the form factor for a missile may have to fit inside the nose of the missile. One of the challenges for embedded systems designers is to develop non-rectangular geometries for certain solutions. Weight can also be a critical constraint. Embedded automobile control systems, for example, must be light weight for fuel economy. Portable CD players must be light weight for portability purposes.

### Cost sensitivity:

Cost is an issue in most systems, but the sensitivity to cost changes can vary dramatically in embedded systems. This is mainly due to the effect of computer costs have on profitability and is more a function of the proportion of cost changes compared to the total system cost.

## 3.2 POWER MANAGEMENT:

Embedded systems have strict constraints on power. Given the portability requirements of many embedded systems, the need to conserve power is important to maintain battery life as long as possible. Minimization of heat production is another obvious concern for embedded systems. All electronic circuits works only in low DC voltage, so we need a power supply unit to provide the appropriate voltage supply for their proper functioning .This unit consists of transformer, rectifier, filter & regulator. AC voltage of typically 230volts rms is connected to a transformer voltage down to the level to the desired ac voltage. A diode rectifier that provides the full wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation . A regulator circuit can use this dc input to provide dc voltage that not only has much less ripple voltage but also remains the same dc value even the dc voltage varies some what, or the load connected to the output dc voltages changes.



**Fig 3.2.General Block Of Power Supply Unit**

### *TRANSFORMER:*

A transformer is a static piece of which electric power in one circuit is transformed into electric power of same frequency in another circuit. It can raise or lower the voltage in the circuit, but with a corresponding decrease or increase in current. It works with the principle of mutual induction. In our project we are using a step down transformer to providing a necessary supply for the electronic circuits. Here we step down a 230volts ac into 12volts ac.

### *RECTIFIER:*

A dc level obtained from a sinusoidal input can be improved 100% using a process called full wave rectification. Here in our project for full wave rectification we use bridge rectifier. From the basic bridge configuration we see that two diodes(say D2 & D3) are conducting while the other two diodes (D1 & D4) are in off state during the period  $t = 0$  to  $T/2$ . Accordingly for the negative cycle of the input the conducting diodes are D1 & D4. Thus the polarity across the load is the same.

In the bridge rectifier the diodes may be of variable types like 1N4001, 1N4003, 1N4004, 1N4005, 1N4007 etc.... can be used. But here we use 1N4007, because it can withstand up to 1000v.

### *FILTERS:*

In order to obtain a dc voltage of 0 Hz, we have to use a low pass filter. So that a capacitive filter circuit is used where a capacitor is connected at the rectifier output & a dc is obtained across it. The filtered waveform is essentially a dc voltage with negligible ripples & it is ultimately fed to the load.

### *REGISTERS:*

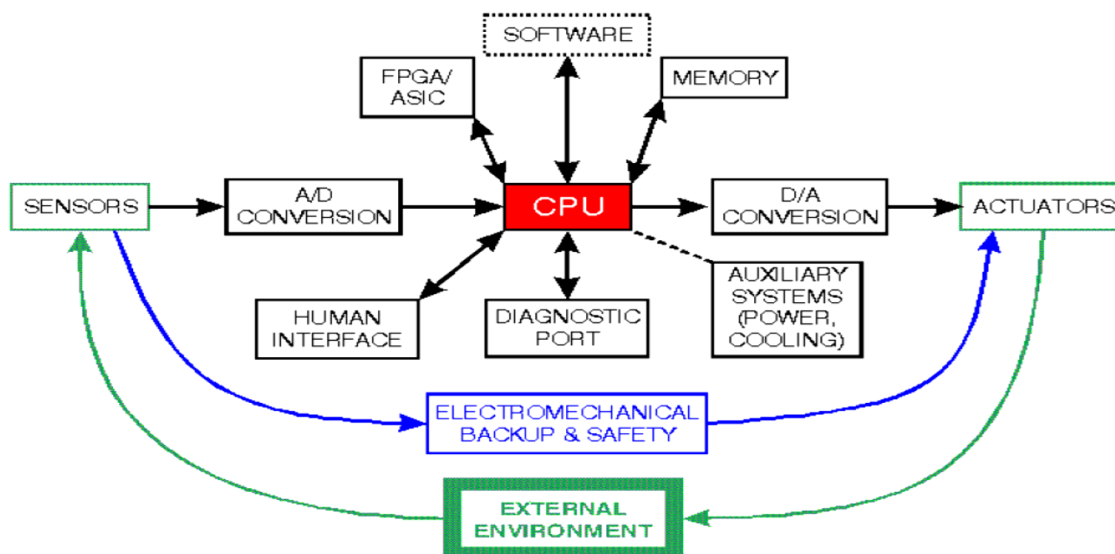
The controller IC has two 8 bit registers, an instruction register (IR) and a data register (DR). The IR stores the instruction codes and address information for display data RAM (DD RAM) and character generator RAM (CG RAM). The IR can be written, but not read by the MPU.

When an address code is written to IR, the data is automatically transferred from the DD RAM or CG RAM to the DR. data transfer between the MPU is then completed

when the MPU reads the DR. likewise, for the next MPU read of the DR, data in DD RAM or CG RAM at the address is sent to the DR automatically. Similarly, for the MPU write of the DR, the next DD RAM or CG RAM address is selected for the write operation.

### *REGULATORS:*

The output voltage from the capacitor is more filtered & finally regulated. The voltage regulator is a device, which maintains the output voltage constant irrespective of the change in supply variations, load variations & temperature changes. Here we use fixed voltage regulator namely LM7805. The IC LM7805 is a +5v regulator which is used for microcontroller.



**FIG 3.3:Block diagram**

## **3.3 SENSORS**

### **HEARTBEAT SENSOR**

A person's heartbeat is the sound of the valves in his/hers heart contracting or expanding as they force blood from one region to another. The number of times the

heart beats per minute (BPM), is the heart beat rate and the beat of the heart that can be felt in any artery that lies close to the skin is the pulse.

### *Principle of Heartbeat Sensor*

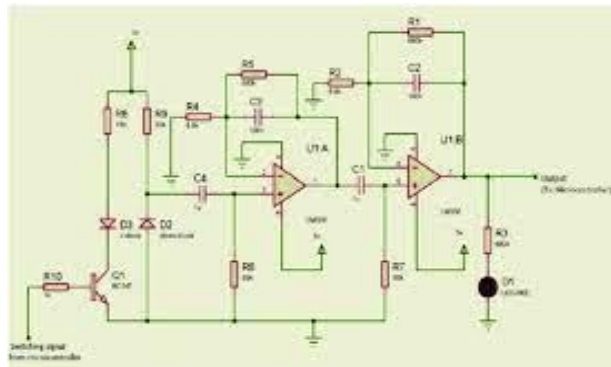
The principle of heart beat sensor, when the finger tissue is illuminated using a light source, the light is transmitted after getting modulated i.e. a part getting absorbed by the blood and the rest being transmitted. This modulated light is received by the light detector.

Here a Light Dependent Resistor (LDR) is used as a light detector. It works on the principle that when light falls on the resistor, its resistance changes. As the light intensity increases, the resistance decreases. Thus the voltage drop across the resistor decreases.

Here a comparator is used which compares the output voltage from the LDR to that of the threshold voltage. The threshold voltage is the voltage drop across the LDR when the light with fixed intensity, from the light source falls directly on it. The inverting terminal of the comparator LM358 is connected to the potential divider arrangement which is set to the threshold voltage and the non-inverting terminal is connected to the LDR. When a human tissue is illuminated using the light source, the intensity of the light reduces. As this reduced light intensity falls on the LDR, the resistance increases and as a result the voltage drop increases. When the voltage drop across the LDR or the non-inverting input exceeds that of the inverting input, a logic high signal is developed at the output of the comparator and in case voltage drop being lesser a logic low output is developed. Thus the output is a series of pulses. These pulses can be fed to the Microcontroller which accordingly processes the information to get the heart beat rate and this is displayed on the Display interfaced to the Microcontroller.

The basic heartbeat sensor consists of a light emitting diode and a detector like a light detecting resistor or a photodiode. The heart beat pulses causes a variation in the flow of blood to different regions of the body. When a tissue is illuminated with the light source, i.e. light emitted by the led, it either reflects (a finger tissue) or

transmits the light. Some of the light is absorbed by the blood and the transmitted or the reflected light is received by the light detector. The amount of light absorbed depends on the blood volume in that tissue. The detector output is in form of electrical signal and is proportional to the heart beat rate.



**FIG 3.4 HEARTBEAT SENSOR DIODE**

To achieve the task of getting the AC signal, the output from the detector is first filtered using a 2 stage HP-LP circuit and is then converted to digital pulses using a comparator circuit or using simple ADC. The digital pulses are given to a microcontroller for calculating the heart beat rate, given by the formula-BPM(Beats per minute) =  $60 \cdot f$  (f-frequency)

## DHT11 SENSOR

The DHT11 sensor can also be used to sense the body temperature. The DHT11 sensor comes in a single row 4-pin package and operates from 3.5 to 5.5V power supply. It can measure temperature from 0-50 °C with an accuracy of  $\pm 2^\circ\text{C}$  and ranging from 20-95% with an accuracy of  $\pm 5\%$ . The sensor provides fully calibrated digital outputs for the two measurements. It has got its own proprietary 1-wire protocol, and therefore, the communication between the sensor and a microcontroller is not possible through a direct interface with any of its peripherals. The protocol must be implemented in the firmware of the MCU with precise timing required by the sensor. The following timing diagrams describe the data transfer protocol between a MCU and the DHT11 sensor. The MCU initiates data transmission by issuing a *Start* signal. The MCU pin must be configured as output for this purpose. The MCU first pulls the data line low for at least 18 ms and then pulls it

high for next 20-40 s before it releases it. Next, the sensor responds to the MCU *Start* signal by pulling the line low for 80s followed by a logic high signal that also lasts for 80s. Remember that the MCU pin must be configured to input after finishing the *Start* signal. Once detecting the response signal from the sensor, the MCU should be ready to receive data from the sensor. The sensor then sends 40 bits (5 bytes) of data continuously in the data line.

## **PRESSURE SENSOR**

A pressure sensor measures pressure, typically of gases or liquids. Pressure is an expression of the force required to stop a fluid from expanding, and is usually stated in terms of force per unit area. A pressure sensor usually acts as a transducer; it generates a signal as a function of the pressure imposed. For the purposes of this article, such a signal is electrical.

Pressure sensors are used for control and monitoring in thousands of everyday applications. Pressure sensors can also be used to indirectly measure other variables such as fluid/gas flow, speed, water level, and altitude. Pressure sensors can alternatively be called pressure transducers, pressure transmitters, pressure senders, pressure indicators, piezometers and manometers, among other names.

Pressure sensors can vary drastically in technology, design, performance, application suitability and cost. A conservative estimate would be that there may be over 50 technologies and at least 300 companies making pressure sensors worldwide.

There is also a category of pressure sensors that are designed to measure in a dynamic mode for capturing very high speed changes in pressure. Example applications for this type of sensor would be in the measuring of combustion pressure in an engine cylinder or in a gas turbine. These sensors are commonly manufactured out of piezoelectric materials such as quartz.

Some pressure sensors, such as those found in some traffic enforcement cameras, function in a binary (off/on) manner, i.e., when pressure is applied to a pressure sensor, the sensor acts to complete or break an electrical circuit. These types of sensors are also known as a pressure switch.

### 3.4 METHODOLOGY

Microcontrollers depend on a host computer for developing and compiling programs. The software used on the host computer is known as an integrated development environment, or IDE. For the Arduino, the development environment is based on the open source Processing platform ([www.processing.org](http://www.processing.org)) which is described by its creators as a “programming language and environment for people who want to program images, animation, and interactions.” The Arduino programming language leverages an open source project known as Wiring ([wiring.org.co](http://wiring.org.co)). The Arduino language is based on good old- fashioned C. If you are unfamiliar with this language, don’t worry; it’s not hard to learn, and the Arduino IDE provides some feedback when you make mistakes in your programs.

The Arduino Uno has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The '16U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer (but not for serial communication on pins 0 and 1).

A Software Serial library allows for serial communication on any of the Uno's Repositories that extend core programming functionality. Libraries let you re- use code without having to physically copy and paste it into all your programs. The standard Arduino software installation comes with several libraries you may use, and you can download others from the Arduino support pages and from third-party websites that publish Arduino library code. A good example of a library you'll use with the Robot and likely many other robot projects is Servo. This library allows you to connect one or more hobby R/C servos to the

Arduino's digital I/O pins. The Servo library comes with the standard Arduino installation package Library->Servo. This adds the line

```
#include <Servo.h>
```

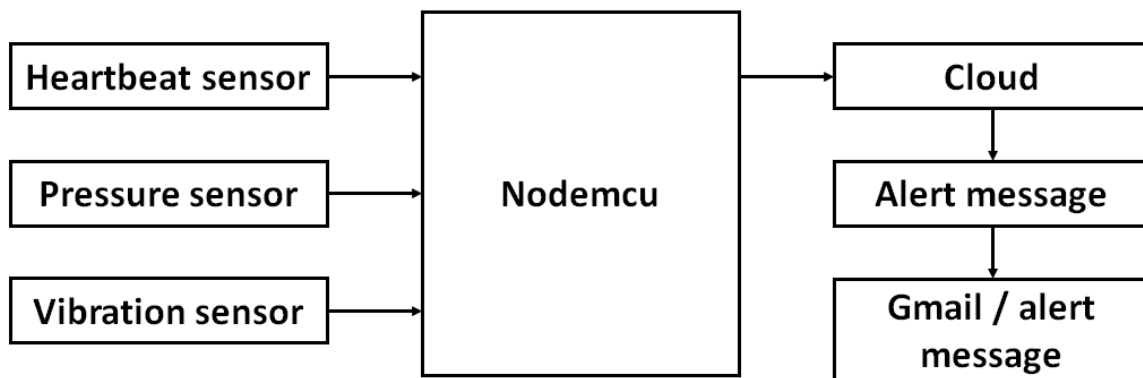
Which tells the Arduino IDE that you wish to include the Servo library in your sketch. With the functionality of the library now available to you, you can use its various functions to control one or more servos. For example, you can use the write function to rotate a servo to a specific position, from 0 to 180 degrees. The following code

```
myServo.write(90);
```

Moves a servo to its midpoint, or 90 degree position. Structurally, Arduino sketches are very straightforward and are pretty easy to read and understand. The Arduino program contains two main parts: setup () and loop (). These are programming functions that do what their names suggest: setup () sets up the Arduino hardware, such as specifying which I/O lines you plan to use, and whether

They are inputs or outputs. The loop () function is repeated endlessly when the Arduino is operating.

Arduino IDE (Integrated development environment) is used to write the program and dump into the Arduino board



**FIG 3.5: FLOWCHART OF CHILDREN MONITORING SYSTEM**

## CHAPTER 4

### SOFTWARE DEVELOPMENT METHODOLOGY

#### 4.1 GENERAL INTRODUCTION OF INTERNET OF THINGS (IOT)

The Future Internet goal is to provide an infrastructure to have an immediate access to information about the physical world and its objects. Physical objects can be applicable to different application domains, such as e-health, warehouse management, etc. Each application domain may have different types of physical devices. Each physical device can have its own specifications, which is required to use in order to interact with it. To achieve the future Internet goal, a layered vision is required that can facilitate data access. Internet of Things (IoT) is a vision that aims to integrate the virtual world of information to the real world of devices through a layered architecture.

The term Internet of Things consists of two words, namely *Internet* and *Things*. *Internet* refers to the global network infrastructure with scalable, configurable capabilities based on interoperable and standard communication protocols. Things are physical objects or devices, or virtual objects, devices or information, which have identities, physical attributes and virtual personalities, and use intelligent interfaces. For instance, a virtual object can represent an abstract unit of sensor nodes that contains metadata to identify and discover its corresponding sensor nodes. Therefore, IoT refers to the *things* that can provide information from the physical environment through the Internet.

Middleware is as an interface between the hardware layer and the application layer, which is responsible for interacting with devices and information management. The role of a middleware is to present a unified programming model to interact with devices. A middleware is in charge of masking the heterogeneity and distribution problems that we face when interacting with devices.

#### 4.1.1 OVERVIEW

Internet of Things (IoT) has increasingly gained attention in industry to interact with different types of devices. IoT can have influence on industry and society by integrating physical devices into information networks. IoT impacts can be on different perspectives, namely for private and business users. From the perspective of a private user, IoT has effect on both working and personal fields, such as smart homes and offices, e-health and assisted living. From the aspect of a business user the impacts would be in fields such as automation and industrial manufacturing, logistics, business process management, intelligent transportation of people and goods.

IoT integrates physical things into information networks. IoT covers the overall infrastructure, including software, hardware and services, which is used to support these information networks. The integrated physical things can exchange data about the physical properties and information that they sense in their environment. To identify devices, we can use identification technologies like for example RFID, which allow each device be uniquely identified.

IoT has a layered architecture designed to answer the demands of various industries, enterprises and society shows a generic layered architecture for IoT that consist of five layers, which are discussed, in the following:

- Application layer :

This is a hardware layer that consists of embedded systems, RFID tags, sensor networks and all of the other sensors in different forms. This hardware layer can perform several functions, such as collecting information from a system or an environment, processing information and supporting communication.

- Support layer :

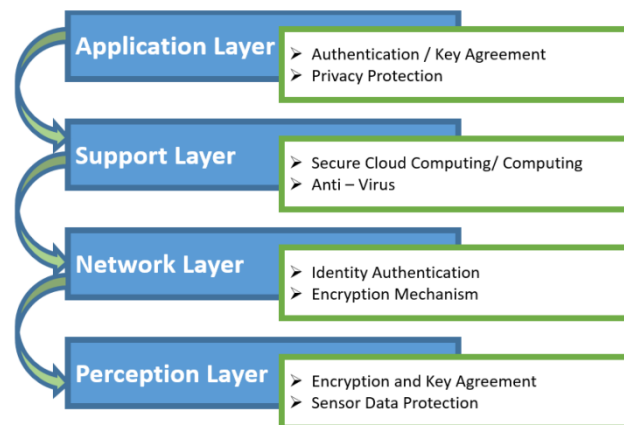
This layer is concerned with data handling, and is responsible for publishing and subscribing the services that are provided by the *Things*, message routing, and hovelling the communication between platforms.

- Network layer :

This layer has some critical functionality, such as aggregating and filtering the received data from the hardware devices, performing information discovery and providing access control to the devices for applications.

- Application layer :

This layer is responsible for delivering various application services. These services are provided through the middleware layer to different applications and users in IoT-based systems. The application services can be used in different industries such as, logistics, retail, healthcare, etc.



**Fig4.1 Layered architecture of the Internet of Things (IoT)**

#### **4.1.2 CHALLENGES**

IoT-based systems can be used for different purposes and areas, so that, we have to face different challenges. In this section, we explain some of the challenges that need to be considered in research activities:

Edge technology:

At the hardware level, more research efforts are required to develop the technology of embedded devices, sensors, actuators and (passive and active) identification, since an IoT-based system must be able to gather sufficient information about the real world by

employing a large variety of devices and environments. Thus, there more work is still required to connect heterogeneous devices and deploy them in IoT applications, and to provide support for new devices.

Networking technologies :

In IoT, *things* are connected through different kinds of networks, i.e. mobile, wired and wireless network. These networks support bi-directional communication at different levels among the real world objects, applications and services that are employed by the IoT applications. This highly distributed structure should provide interconnection with low energy consumption, while distributed data can cause privacy issues.

Middleware system :

In IoT, we have heterogeneous devices and networks. Their heterogeneity can potentially increase with new technologies. To facilitate the use of these devices by IoT applications, we should shield their heterogeneity. Therefore, we need to develop a secure, scalable and semantically enriched service-oriented middleware to cope with the heterogeneity of devices.

Platform services :

They support a superior management of all involved devices in an integrated way, ensuring scalability, high availability, and the safe and secure execution of the requested functionality from devices.

## **4.2 INTRODUCTION TO ARDUINO IDE**

The Arduino IDE (Integrated Development Environment) is used to write the computer code and upload this code to the physical board. The arduino IDE is very simple and this simplicity is probably one of the main reason arduino became so popular. We can certainly state that being compatible with the arduino IDE is now one of the main requirements for a new microcontroller board. Over the years, many useful features have been added to the arduino IDE and can now be managed by third-party libraries and boards from the IDE, and still keep the simplicity of programming the board. The arduino board is connected to a

computer via USB, where it connects with the IDE. The user writes the arduino code in the IDE, and then uploads it to the microcontroller which executes the code, interacting with inputs and outputs such as sensors, motors and lights.

## **4.3 UBIDOTS**

A Ubidots' device is a virtual representation of a data-source or simply, an asset taking sensor data and transmitting said data through a connection protocol to Ubidots' cloud.

### **4.3.1 Creating UBIDOTS:**

- Devices are created automatically in Ubidots the first time a dot is received to a user's private TOKEN or an Organizational TOKEN.
- Clicking the "+" icon in the top right corner of any single device's screen.
- Creating a Device Type which then creates a new device with pre-determined device properties, appearance, and variables and automate the on-boarding of thousands of devices.

### **4.3.2 Variables:**

Once a device is created and receiving data from your hardware or another 3rd party data-source, the data will be presented in its raw or calculated form as a variable.

Types of Variables:

- Default - raw data coming from devices (people counted).
- Synthetic - correspond to statistical or arithmetical operations of default variables in a determined time-frame (e.g. average daily traffic this month).

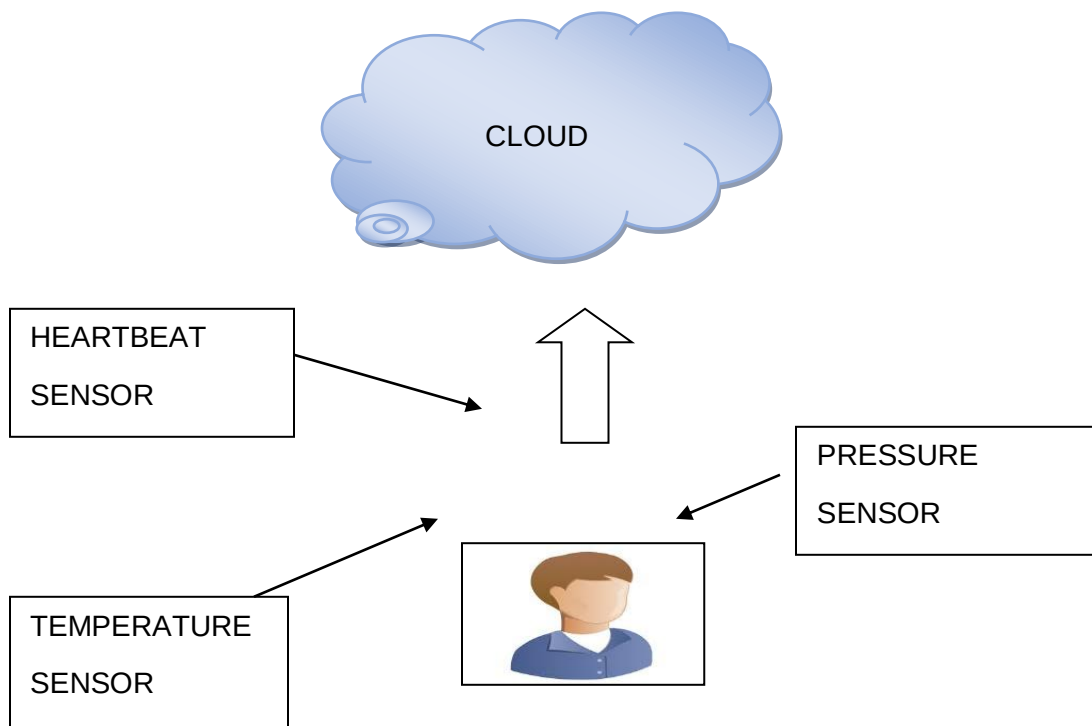
Creating variables: There are two ways to create variables.

1. Assigning a label as a variable within your hardware's code.

2. Clicking the "+" icon found in any single device screen and assign a name which will also correspond to the variable's label. By default, Ubidots assigns an additional unique identifier to the variable called Variable ID. To find both the variable's ID and variable's label, select the "i" icon from the variables card.

#### 4.3.3Events

In Ubidots, Events are messages triggered and delivered through Email, SMS, Telegrams, Slack, Voice Call or web messages based on a customized design rule created in the application.



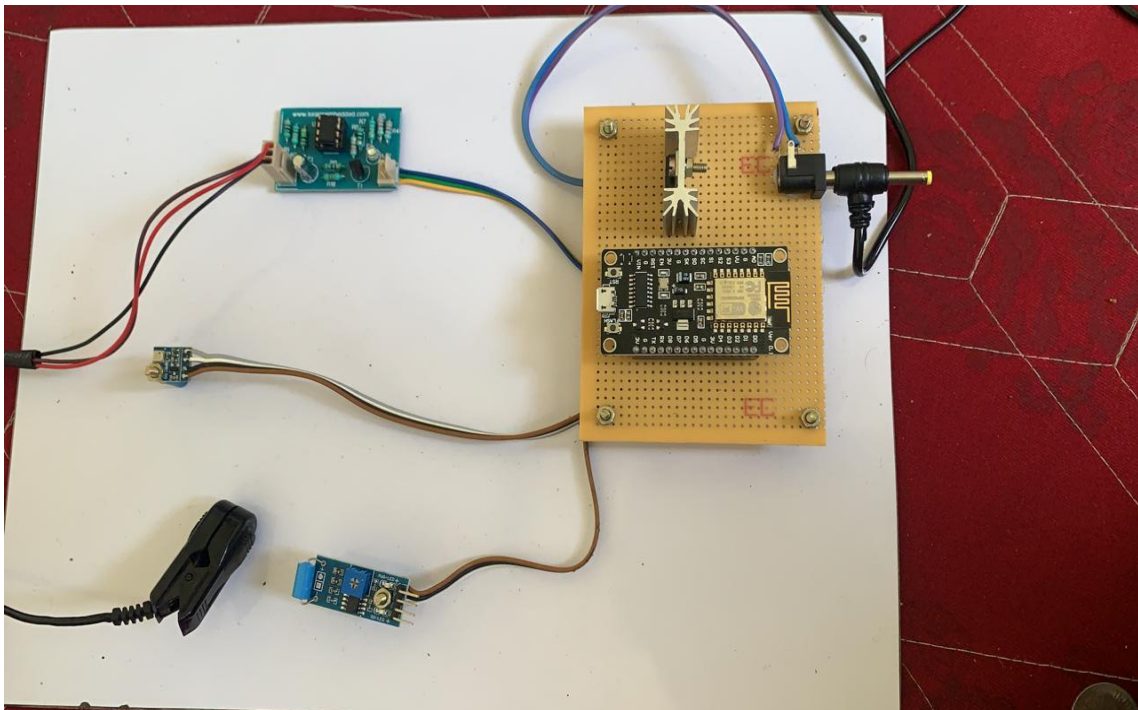
**FIG 4.2 ILLUSTRATION OF UBIDOTS**

## CHAPTER 5

### RESULT AND DISCUSSION

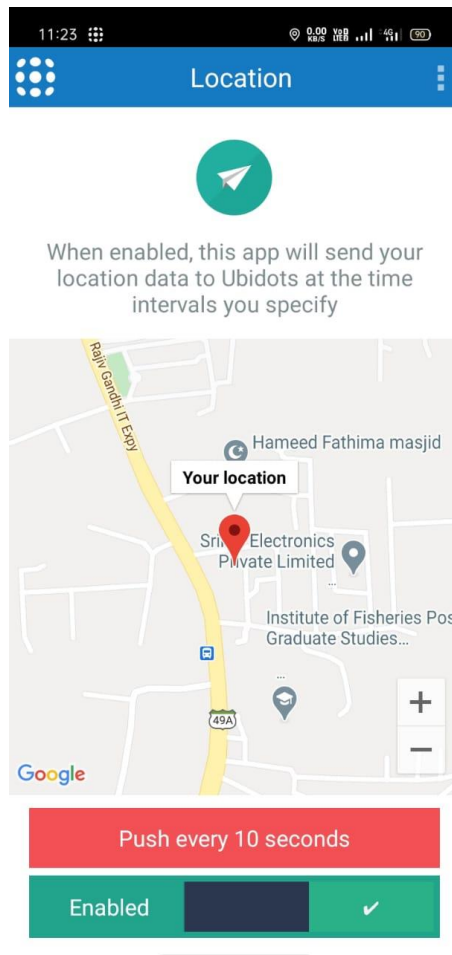
#### 5.1 RESULTS

Here we created a mobile/system children monitoring system which is connected to the power source , nodemcu to which all the sensors such as the heartbeat sensor,dht11 sensor, pressure sensor are connected with wires.



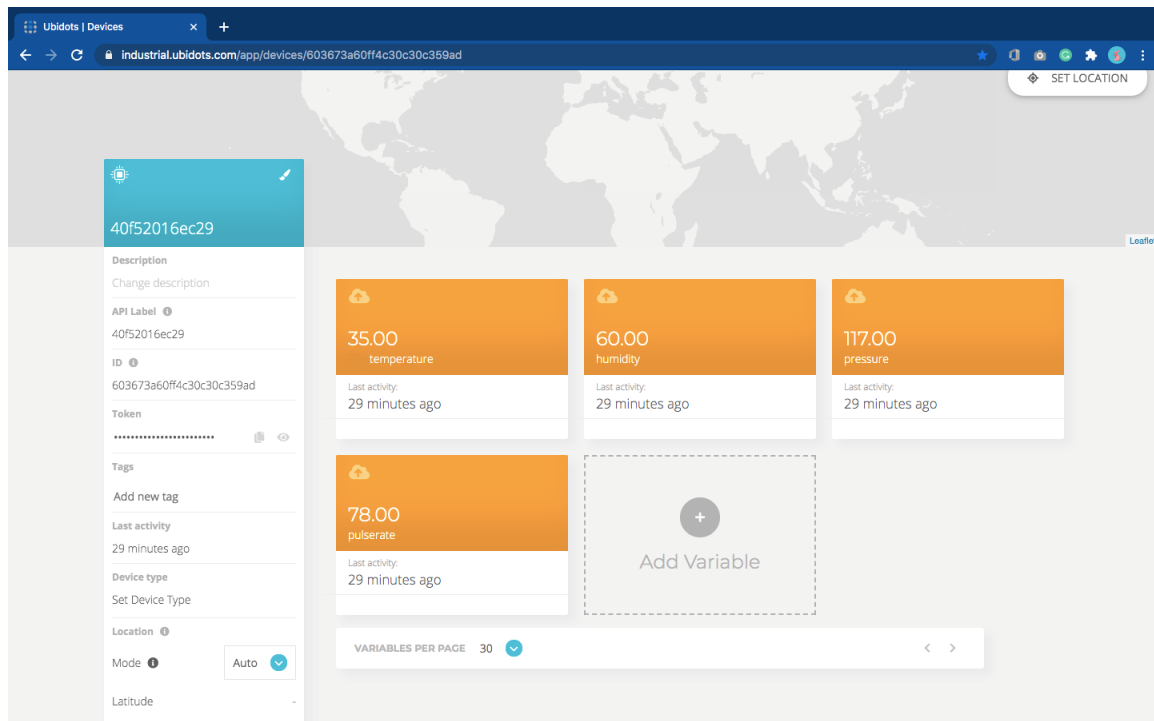
**FIG 5.1 Children Monitoring System**

The arduino is controlled by a wifi controlled application which should be downloaded on the person's mobile/laptop..

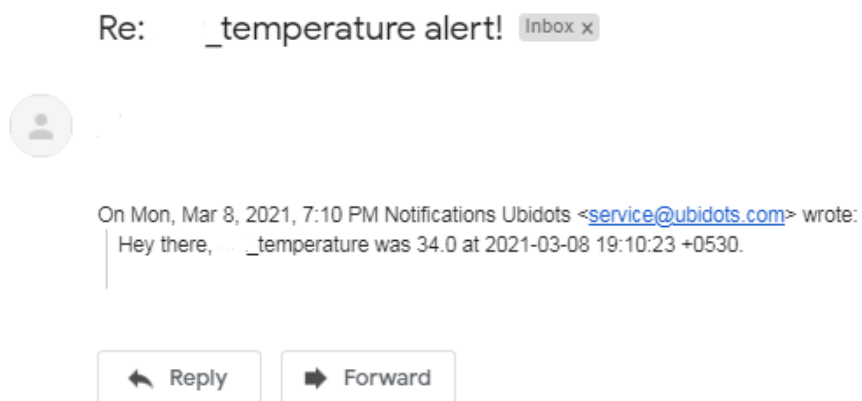


**FIG 5.2 TRACKING IMAGE**

The health conditions of the person can also be monitored. We have a clip like thing attached to the fingers which monitors the pulse and pressure of the person. The health data is stored in a cloud platform called ubidots. The ubidots shows the data when logged in. And if the temperature or pulse exceeds it also sends an alert mail to the saved id.



**FIG 5.3 DATA IN UBIDOTS**



**FIG 5.4 ALERT MAIL**

## **CHAPTER 6**

### **CONCLUSION AND FUTURE WORK**

#### **6.1 CONCLUSION**

This paper is all about the existing applications for women security and comes out with an innovative idea for security and protection for women and more research is possible with introducing smart technology where people and objects form a network. This will help to solve them technologically with compact equipment and ideas. Using screaming alarms and also alerting the emergency contacts by sending the messages with the location is helpful for women's security. This system can overcome the fear that scares every woman in the country about her safety and security.

#### **6.2 FUTURE WORK**

Children monitoring system module is used to develop the children tracing system. It helps the parents or grown up adults who have to keep an eye on their children, it also have the gps tracking system in order to locate up the particular children whereabouts. The alert message will be sent to the registered system, through mail registration in the mobile/laptop. Obstacle avoidance sensors are used.

## REFERENCES

- [1] Vamil B. Sangoi, "Smart security solutions," International Journal of Current Engineering and Technology, Vol.4, No.5, Oct-2014.
  
- [2] Simon L. Cotton and William G. Scanlon, "Millimeter - wave Soldier –to soldier communications for covert battlefield operation," IEEE communication Magazine, October 2009.
  
- [3] Alexandrous Plantelopoulous and Nikolaos.G.Bourbakis, "A Survey on Wearable sensor based system for health monitoring and prognosis," IEEE Transaction on system, Man and Cybernetics, Vol.40, No.1, January 2010.
  
- [4] B.Chougula, "Smart girls security system," International Journal of Application or Innovation in Engineering & Management, Volume 3, Issue 4, April 2014.
  
- [5] Hock Beng Lim, "A Soldier Health Monitoring System for Military Applications," International Conference on Body Sensor Networks.
  
- [6] Palve Pramod, "GPS Based Advanced Soldier Tracking With Emergency Messages & Communication System," International Journal of Advance Research in Computer Science and Management Studies Research Article, Volume 2, Issue 6, June 2014.

## A.APPENDIX

### SOURCE CODE:

```
#include "UbidotsESP8266.h"
#include <ESP8266WiFi.h>
#define TOKEN "A1E-8IIIULHpMaoylq0mLcianbwAWpWqsT"
#define ID_1 "5c826aeac03f97454812f67c"
#define ID_2 "5c581827c03f9755fc92e40f"
#define ID_3 "5c826b5fc03f974566e0d0ae"
#define ID_4 "5c726bd4c03f976cacb42db0"

#define WIFISSID "suresh" // Put here your Wi-Fi SSID
#define PASSWORD "123456789" // Put here your Wi-Fi password

#include <SFE_BMP180.h>
#include <Wire.h>
You will need to create an SFE_BMP180 object, here called "pressure":
SFE_BMP180 pressure;

#define ALTITUDE 1655.0 // Altitude of SparkFun's HQ in Boulder, CO. in meters
#define I2C_SCL D2
#define I2C_SDA D1
#define DHTTYPE DHT11
#include "DHT.h"
#define DHTPIN 2

DHT dht(DHTPIN, DHTTYPE);

Ubidots client(TOKEN);
void setup()
```

```

{
  Serial.begin(115200);

  Serial.println(F("DHTxx test!"));

  dht.begin();
}
client.wifiConnection(WIFISSID, PASSWORD);
Serial.println("REBOOT");
pinMode(smoke, INPUT);
pinMode(dht, INPUT);
Initialize the sensor (it is important to get calibration values stored on the device).

if (pressure.begin())
  Serial.println("BMP180 init success");
else
{
  Serial.println("BMP180 init fail\n\n");while(1); // Pause forever.
}
}

void loop()
{

  char status;
  double T,P,p0,a;

  // Serial.println();
  // Serial.print("provided altitude: ");
  // Serial.print(ALTITUDE,0);

```

```

// Serial.print(" meters, ");
// Serial.print(ALTITUDE*3.28084,0);
// Serial.println(" feet");
//
//
// status = pressure.startTemperature();
// if (status != 0)
// {
//   // Wait for the measurement to complete:
//   delay(status);
//
//   // Retrieve the completed temperature measurement:
//   // Note that the measurement is stored in the variable T.
//   // Function returns 1 if successful, 0 if failure.

// status = pressure.getTemperature(T);
// if (status != 0)
// {
//   // Print out the measurement:
//   Serial.print("temperature: ");
//   Serial.print(T,2);
//   Serial.print(" deg C, ");
//   Serial.print((9.0/5.0)*T+32.0,2);
//   Serial.println(" deg F");
////   client.add(ID_2, T);

// status = pressure.startPressure(3);
// if (status != 0)
// {
//   // Wait for the measurement to complete:
//   delay(status);

```



```

        Serial.println(State1);
        int State = random(80,85);
        client.add(ID_4, State);

//      int sensorValue = analogRead(A0);
//      Serial.println(sensorValue);
//      if (sensorValue > 600) {
//          int pulse =random(60,120);
//          client.add(ID_3, State);

                }
        client.sendAll(false);
    }
    else Serial.println("error retrieving pressure measurement\n");
    }
    else Serial.println("error starting pressure measurement\n");
    }
    else Serial.println("error retrieving temperature measurement\n");
    }
    else Serial.println("error starting temperature measurement\n");
    delay(5000); // Pause for 5 seconds.
}

```