DRISHTI

An Aid for Blind Elderly

A PROJECT REPORT

Submitted in partial fulfilment of the requirements for project on the course

Lean Start-up Management

Course Code: MGT1022 (Slot: TE2)

by

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Under the guidance of

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June, 2020

DECLARATION

We hereby declare that the project entitled **"DRISHTI"** submitted by us to Vellore Institute of Technology, Vellore is partial fulfilment of the requirement for the award of marks for the subject Lean Start-up Management (Course Code: MGMT1022**)** is a record of bonafide work carried out by us under the supervision of **Prof. John Rajan A.**

We further declare that the work reported in this project has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

Signature of the Candidates: Place: Vellore

Date: 03/03/2020

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CERTIFICATE

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Place: Vellore

Date:

Signature of the Guide

Internal Examiner **External Examiner**

ACKNOWLEDGEMENT

We would like to sincerely thank our respected faculty **Prof. John Rajan A** without whose guidance, it would have not been possible for us to do this project. His valuable guidance, support and supervision all through this project are responsible for attaining its present form.

We would like to extend our sincere thanks the department which helped us with all the resources. Thanks also go to our friends, colleagues and the department staffs for making this project a great experience. Finally, thanks to our family for their encouragement and support throughout my course of learning. In the course of doing this project we learnt many new things about how a wearable sensor, obstacle detection system, fall detection system can be made by using sensors and Microcontrollers.

ABSTRACT

Falls represent a major public health risk worldwide for the elderly people. A fall not assisted in time can cause functional impairment in an elder and a significant decrease in his mobility, independence and life quality. In that sense, the present work proposes an innovative IoT-based system for detecting falls of elderly people in indoor environments, which takes advantages of low-power wireless sensor networks, Microcontrollers, Application Development using Android Studio.

DRISHTI is a wearable belt which is connected to an App. This belt is made on the motivation to help elder Blind, cataract, glaucoma patients and the problems which they face in their everyday lives.

- The major issue which they face is while walking they cannot see any rear obstacles and that's why they fall down very frequently and when they fall it is not necessary that someone is always there to help them.
- Hence our technology will help them to be protected and from these accidents.

The third eye system produces vibrations whenever the person encounters any obstacle in his proximity while making a turn. The Vibrations are produced using the vibration sensor on the belt which will notify the user about the obstacle and hence will be saved from falling or any accident while making any turn (left or right).

For this purpose of Fall Detection, a 3D-axis accelerometer and Gyroscope is used with Node MCU (often known as Wi-Fi Module) device wearable is used, which is responsible for collecting data from movements of elderly people in real-time. To provide high efficiency in fall detection, the sensor readings are processed and analysed on a Smart IoT Gateway. If a fall is detected, an alert is activated and the system reacts automatically by sending notifications to the relevant groups responsible for the care of the elderly people. Finally, the system provides services built on IoT Gateway. From medical perspective, there is a storage service that enables healthcare professional to access to falls data for perform further analysis. On the other hand, the system can also provide a service leveraging this data to create a new machine learning model using decision Trees Algorithm each time a fall is detected. The results of experiments have shown high success rates in fall detection in terms of accuracy, precision and gain.

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INTRODUCTION

The World Health Organization (WHO) states that death by fall is the second leading cause of accidental or unintentional injury death worldwide. A study has estimated that an average of 646,000 individuals die from a fall globally. The percentage of adults over 65 years of age who become victims to this cause has increased to 30% from 2007 to 2016. A tremendous increase in the growth rate was observed among the adults of age 85 years and above with an increase of 4% every year. The prevailing situation not only affects the quality of life of the old but also inculcates a fear a falling syndrome (FoF) and sometimes leads to chronic disabilities. For instance, an elderly person who is physically weak cannot get up after collapsing and he/she tends to lie on the floor for more than an hour. This is a clear indication for the elderly to be suffering from pneumonia, dehydration, pressure sores or hypothermia. The probability of death of the elderly within the next few months is almost 50%. The common causes of falls are clutters, poor lighting, pets, slippery floors, obstructed ways and furniture. If an individual is suffering from disorders such as cataract or Glaucoma, they are more likely prone to falls than the average elderly population. The most life-threatening aspect of falling is lying on the floor for long periods of time without any aid. As a fast-moving technology influenced society, there is a need for us to ensure active and healthy aging of the elderly. This includes optimization opportunities for health, participation and security. The urgency of this plight requires an advanced attention. One of the most efficient ways of dealing with this problem is using an automatic easy-to-deploy system which would detect the obstacles and require minimal assistance. Commercializing this system into a wearable device is a prudent approach to adopt this strategy. Sensors present in these devices measure the body movements to predict falls. Even under the circumstances where in the patient loses consciousness, the sensors alert the guardians regarding the victim.

Development of a reliable Fall Detection System (FDS) has become an area of interest for researchers and organizations in telemedicine that work for the welfare of the older community. A Fall Detection System is a binary classification system that distinguishes a falling event from the other regular activities of the user. An FDS could either be a Context-Aware-System (CAS), also known as surveillance-based system, or a wearable system. In a CAS, sensing units are present in the user's immediate environment. It is a vision-based tracking system which employs cameras, depth sensors, radars, microphones, acoustic sensors etc that monitors the user's movements in a given set of locations. The cameras and radars are generally mounted on the ceiling of the rooms which serves as a disadvantage because it monitors only a limited area on

the other hand, a wearable system is generally integrated into an everyday accessory which contains mobility sensors. This ensures the user's privacy and does not require him/her to adapt to the system. The sensors used in the latter type could either be single or a combination of two or more. Sensors like accelerometers, gyroscopes and in some cases, magnetometers, are gaining popularity in recent times due to their low power consumption capacity, low cost, portability and their ability to easily get embedded in any wearable device. The most common was of availing this method is using a smartphone. An FDS based smartphone makes use of an inertial measurement system and a multi-interface wireless communication technology. Fall detection primarily takes place by analysing the signals sent by the sensors. However, it is not always easy to predict or state a determined and definite reason for a fall. To overcome the traditional analysis, certain pattern is recorded and sent to the Microcontroller board. Further the results are sent to the smartphone application of the related group for taking up the necessary actions.

In this project, we have developed a waist mounted wearable for obstacle detection system and fall detection system (FDS). Unlike conventional belts developed solely based on FDS, our belt has a third eye detection system along with a fall detection system. The third eye system enables the patient to detect obstacles through ultrasonic sound waves with the help of vibrations or a vibration mechanism. It also indicates the location of the obstacle. The sections below give a detailed description on the procedures followed for developing the device and the properties tested.

PROJECT DESCRIPTION AND GOALS

This belt has two system attached to it with one being the third eye system (obstacle detection) and other being the fall detection system. The third eye system produces vibrations whenever the person encounters any obstacle in his proximity while making a turn. The Vibrations are produced using the vibration sensor on the belt which will notify the user about the obstacle and hence will be saved from falling or any accident while making any turn (left or right). Also, there is also a fall detection system which will help when the patient falls off or meets with some accident. When the patient falls off, the belt will start ringing through a buzzer on it. The relative and his doctor whoever will be added on his **Drishti App** will get an SMS and a pop up on their phone with the patient's exact location so that they can help him as soon as possible.

As the world elderly population is increasing rapidly, the use of technology for the development of accurate and fast automatic systems has become a necessity. Most of the fall detection systems are developed for specific devices which reduces the versatility of the fall detection system. This project proposes a centralized unobtrusive IoT based device-type invariant fall detection and rescue system for monitoring of a large population in real-time. Any type of devices such as Smartphones, Raspberry Pi, Arduino, NodeMCU, and Custom Embedded Systems can be used to monitor a large population in the proposed system. The device is worn like a belt. The accelerometer data from the device is continuously sent to a multithreaded server which hosts a pattern model that analyses the data to determine whether a fall has occurred or not. The server sends the classification results back to the corresponding devices. If a fall is detected, the server notifies the mediator of the user's location via an SMS. As a failsafe, the corresponding device alerts nearby individuals by sounding the buzzer and contacts emergency medical services and mediators via SMS for immediate medical assistance, thus saving the user's life. Finally, the proposed system can be implemented on a variety of devices and used to reliably monitor a large population with low false alarm rate, without obstructing the users' daily living, as no external connections are required.

TECHNICAL SPECIFICATION

The proposed system is mainly composed of four blocks: The obstacle detection using Arduino and Ultrasonic Sensors, data collection device containing the accelerometer unit, the multithreaded pattern model, the co-ordination centre: A smartphone Application developed on Android Studio, and the emergency services consisting of the Related groups and first-aid stations.

The Obstacle detection system consists the equipment like Arduino Uno, ultrasonic sensors, vibrating motor, LEDs, Jumper Cable, Power Bank and buzzers for detecting the obstacles and letting the user know about its obstacles in proximity. The wiring of the device is done in a following manner. The Ground of LED, buzzer and vibration motor are connected to GND of the Arduino, the +ve terminals of LEDs, Buzzers, and vibration motor to VCC/+5V pin of Arduino. The TRIG ECHO pins are connected to the Digital Pins of the Arduino which are coded using Arduino IDE.

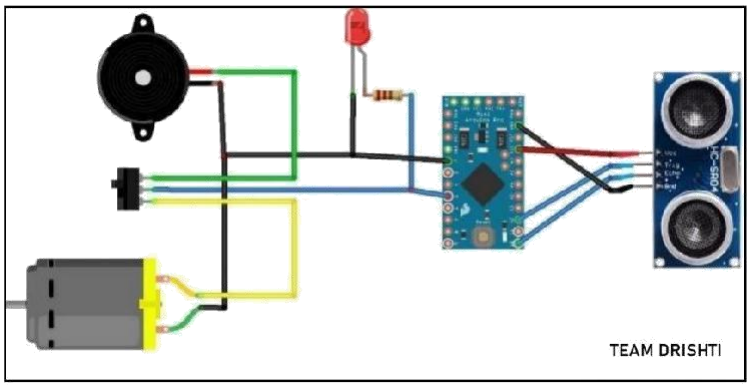


Fig 1: Circuit Diagram of Obstacle Detection System

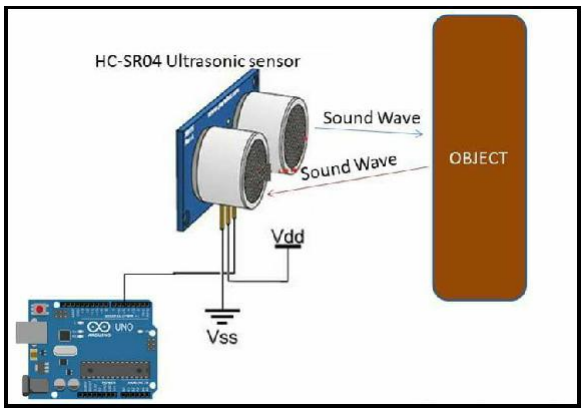


Fig 2: Working Principle of an Ultrasonic Sensor

A device used in both the data collection and co-ordination phase must contain or interface with the following modules: an accelerometer module, a Wi-Fi module, a GPS module, a GSM module, and a buzzer.

The device collects the user's movement data. The data for each second of movement is sent to the server. The server used in the proposed system also sends the data to the **smartphone Application**. Which enables related groups to track the user

The server keeps a record of the MAC addresses, which is sent from the ESP 8266 Module of Node MCU of the connected devices and their corresponding assigned room numbers. The server analyses the data and sends the classification result back to the respective device.

If a fall is detected, the server finds the corresponding location from the device's MAC address and relays that information to the mediator in charge of monitoring the users via an SMS.

As a failsafe, in the case of a fall scenario, the device immediately sounds the buzzer. The device then collects the location data via the GPS module and contact the mediator via emergency SMS. The SMS contains the location of the user. The mediator can be a relative or an emergency call centre operative or a completely automatic emergency response system. The device can also contact emergency service numbers via SMS or the mediator can contact them. As the emergency services can respond to the occurred fall in the shortest possible time, they can potentially save the user's life. As the sent emergency SMS contains geolocation info, the emergency responders can quickly pinpoint the location of the user. These failsafe actions are necessary to guarantee medical assistance to the distressed user. This system is cost-efficient if implemented in environments where monitoring of a large population is necessary, for example, in nursing homes, hospitals, retirement homes, etc.

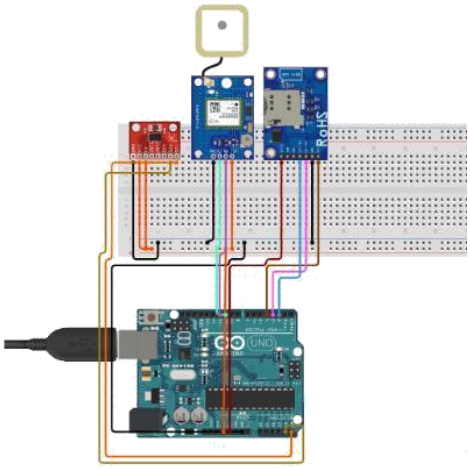


Fig. 3: Circuit diagram of a Fall Detection system

DESIGN APPROACH AND DETAILS

Components Required

Hardware:

- GSM Module
- WIFI Module Node MCU
- Arduino
- Buzzer
- Gaps module
- Vibration sensors
- Ultrasonic sensor(sonar)
- Accelerometer-Gyroscope (GY-521)

Software:

- Android Studio

Components Description

1.GSM MODULE:

It is a chip or circuit that is used to establish communication between a mobile device or a computing machine and a GSM or GPRS system.

This module helps in sending message in case of emergency to the Patient's relatives and doctors. It stands for global system for mobile communication (GSM). It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHzand 1900MHz.

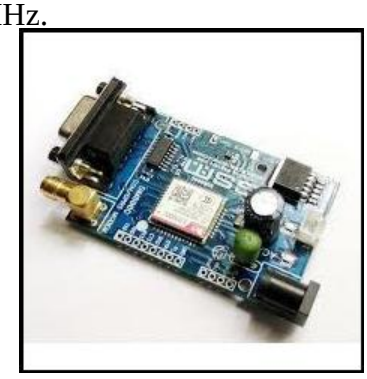


Fig 4. A GSM Module

Features of GSM Module:

- Improved spectrum efficiency
- International roaming
- Compatibility with integrated services digital network (ISDN)
- Support for new services.
- SIM phonebook management
- Fixed dialing number (FDN)
- Real time clock with alarm management
- High-quality speech
- Uses encryption to make phone calls more secure
- Short message service (SMS)

The security strategies standardized for the GSM system make it the most secure telecommunications standard currently accessible. Although the confidentiality of a call and secrecy of the GSM subscriber is just ensured on the radio channel, this is a major step in achieving end-to-end security.

2.WIFI MODULE/NODE MCU:

NodeMCU is an IoT Module based on ESP8266 Wifi Module. NodeMCU uses Lua Scripting language and is an open source Internet of Things (IoT) platform.

The Development Kit based on ESP8266, integrates GPIO, PWM, IIC, 1-Wire and ADC all in one board. Basically, this Module helps in connecting to internet and also uploading the location of the Patient on the app/cloud.

Fig 5. A NodeMCU board

Features of Node-MCU IoT Module:

- Open source IoT Platform
- Easily Programmable
- Low cost & Simple to Implement
- WI-FI enabled

3.Arduino

An open-source electronics platform based on easy-to-use hardware and software. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or breadboards (For prototyping) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers can be programmed using C and C++ programming languages.

In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

Fig 6. Arduino Board

These boards are able to read inputs - light on a sensor, a finger on a button etc. and turn it into an output - activating a motor, turning on an LED. This microcontroller helps in making the third eye system for the patient.

4.GPS Module:

The GPS concept is based on time and the known position of GPS specialized satellites. GPS stands for “Global Positioning System “The satellites carry very stable atomic clocks that are synchronized with one another and with the ground clocks.

Fig 7. A GPS Module

Each GPS satellite continuously transmits a radio signal containing the current time and data about its position. Since the speed of radio waves is constant and independent of the satellite speed, the time delay between when the satellite transmits a signal and the receiver receives it is proportional to the distance from the satellite to the receiver.

A GPS receiver monitors multiple satellites and solves equations to determine the precise position of the receiver and its deviation from true time.

At a minimum, four satellites must be in view of the receiver for it to compute four unknown quantities (three position coordinates and clock deviation from satellite time).
It is a radio navigation system that calculates the positioning of a particular object using man made reference points. This module helps in retrieving location of Patient.

5.Vibration Sensors:

This sensor uses the piezoelectric effects while measuring the changes within acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge. This Sensor is a part of Third eye system and hence will help the patient in walking by giving a Vibration sensation on left if there is an obstacle on the left and vice versa.

Fig 8: A Vibration Sensor

Examples of other applications where the vibration sensors are used: process control systems, aerial navigation and underwater-applications. Frequency range from 0.2 up to 2500 Hz. The operating temperature of these sensors is between -50°C and +85°C.

6.Ultrasonic Sensors:

As the name indicates, ultrasonic sensors measure distance by using ultrasonic waves. The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. ultrasonic sensors measure the distance to the target by measuring the time between the emission and reception.

This sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity.

Fig 9: An Ultrasonic Sensor

Distance calculation:

The distance can be calculated with the following formula:

Distance L = 1/2 × T × C

where L is the distance, T is the time between the emission and reception, and C is the sonic speed. (The value is multiplied by 1/2 because It is the time for go-and-return distance.)

7. Accelerometer-Gyroscope-GY-521:

The GY-521 module is a breakout board for the MPU-6050 MEMS (Microelectromechanical systems) that features a 3-axis gyroscope, a 3-axis accelerometer, a digital motion processor

(DMP), and a temperature sensor.

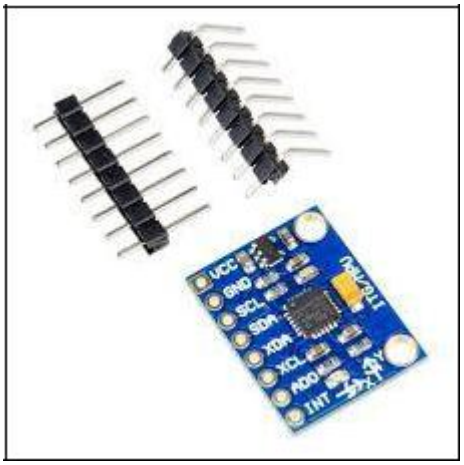


Fig 10: An Ultrasonic Sensor

The digital motion processor can be used to process complex algorithms directly on the board. GY-521 helps in detecting if the person falls or is in a case of emergency by the movement of person in 3- Axis.

Accelerometer and Gyroscope Applications:

Accelerometers have been used for a long time in automobiles for detecting car crashes and for triggering airbags at just the right moment. They have many applications in mobile devices like switching between portrait and landscape modes, tap gestures to change to the next song, tapping through clothing when the device is in a pocket, or anti-blur capturing and optical image stabilization.

CODES

For Obstacle Detection System:

```
#include <SoftwareSerial.h>
#define trigPin1 3
#define echoPin1 2
#define trigPin2 4
#define echoPin2 5
#define buzz1 10
#define buzz2 6
SoftwareSerial BTserial(11,12); // rx tx
long duration, distance, RightSensor,BackSensor,FrontSensor,LeftSensor;

void setup()
{
Serial.begin (9600);
BTserial.begin(9600);
pinMode(trigPin1, OUTPUT);
pinMode(echoPin1, INPUT);
pinMode(trigPin2, OUTPUT);
pinMode(echoPin2, INPUT);
pinMode(buzz1,OUTPUT);
pinMode(buzz2,OUTPUT);
}

void loop() {
SonarSensor(trigPin1, echoPin1);/
RightSensor = distance;
SonarSensor(trigPin2, echoPin2);
```

Fig. 11: Arduino IDE code for Third Eye System

Link for the above Code:

https://github.com/mananmodi99/WeCare/blob/master/Blind_eye/Blind_eye.ino

For Fall Detection System:

```
#include <Adafruit_MPU6050.h>
#include <Adafruit_Sensor.h>
#include <Wire.h>
Adafruit_MPU6050 mpu;
#include <TinyGPS++.h>
#include <SoftwareSerial.h>
#include <ESP8266WiFi.h>
TinyGPSPlus gps;  // The TinyGPS++ object
SoftwareSerial ss(4, 5); // The serial connection to the GPS device
const char* ssid = "Qwerty";
const char* password = "qwerty123";
float latitude , longitude;
int year , month , date, hour , minute , second;
String date_str , time_str , lat_str , lng_str;
int pm;
int count=500;
int flag=0;
WiFiServer server(80);
float ax=0, ay=0, az=0, gx=0, gy=0, gz=0;
//int data[STORE_SIZE][5]; //array for saving past data
//byte currentIndex=0; //stores current data array index (0-255)
boolean fall = false; //stores if a fall has occurred
boolean trigger1=false; //stores if first trigger (lower threshold) has occurred
boolean trigger2=false; //stores if second trigger (upper threshold) has occurred
boolean trigger3=false; //stores if third trigger (orientation change) has occurred

byte trigger1count=0; //stores the counts past since trigger 1 was set true
```

Fig 12: Arduino IDE code for Fall Detection System

Link to the above Code:

https://github.com/mananmodi99/WeCare/blob/master/Fall_detection/Fall_detection.ino

For data transfer to the server:

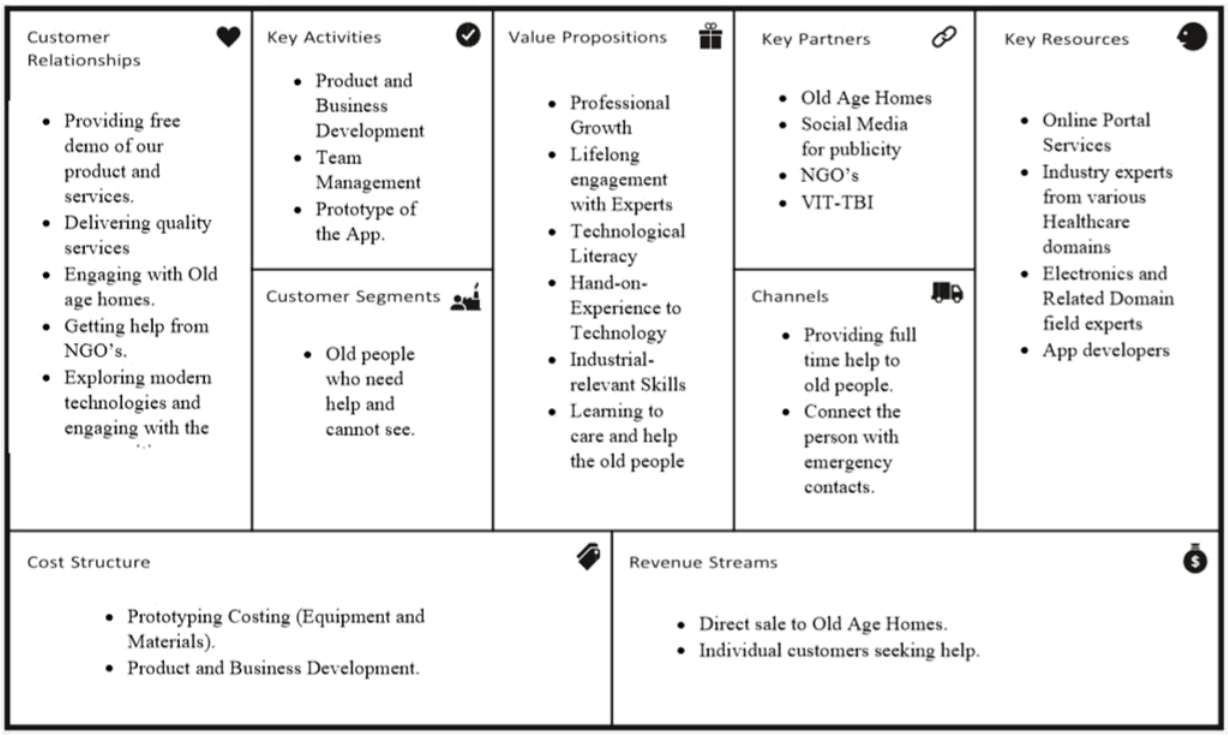
```
  Serial.begin(115200);
  ss.begin(9600);
  Serial.println();
  Serial.print("Connecting to ");
  Serial.println(ssid);

  WiFi.begin(ssid, password);

  while (WiFi.status() != WL_CONNECTED)
  {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");

  server.begin();
  Serial.println("Server started");

  // Print the IP address
  Serial.println(WiFi.localIP());

}
void loop()
{}
  // Check if a client has connected
  WiFiClient client = server.available();
```

Fig 13: Arduino IDE code for MAC address and Data

Transfer Link to the above Code:

https://github.com/mananmodi99/WeCare/blob/master/gps_module_nodemcu/gps_module_nodemcu.ino

BUSINESS MODEL



THE SMARTPHONE APPLICATION

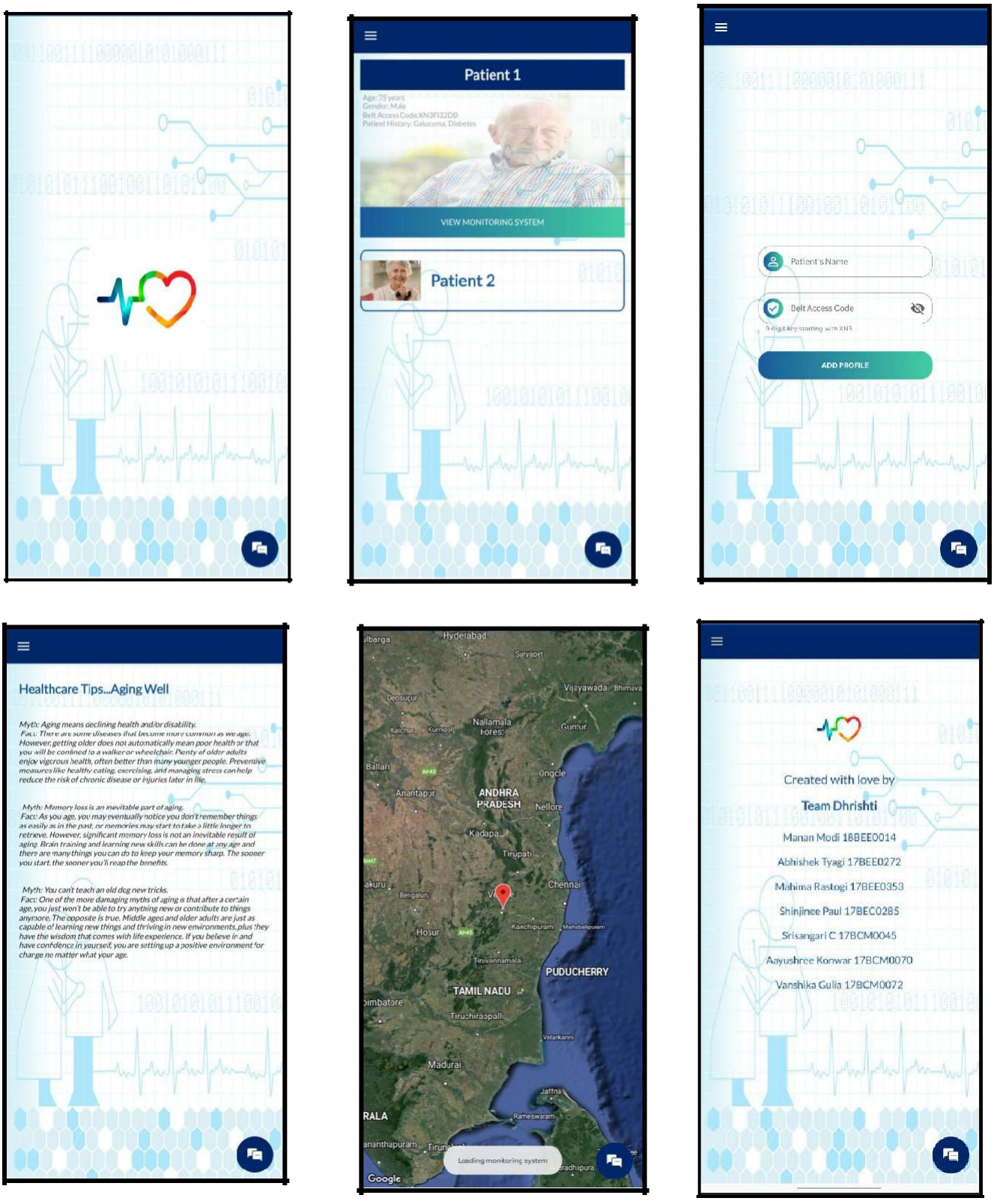


Fig 14: Snippets from the Smartphone Application

IMPLEMENTATION

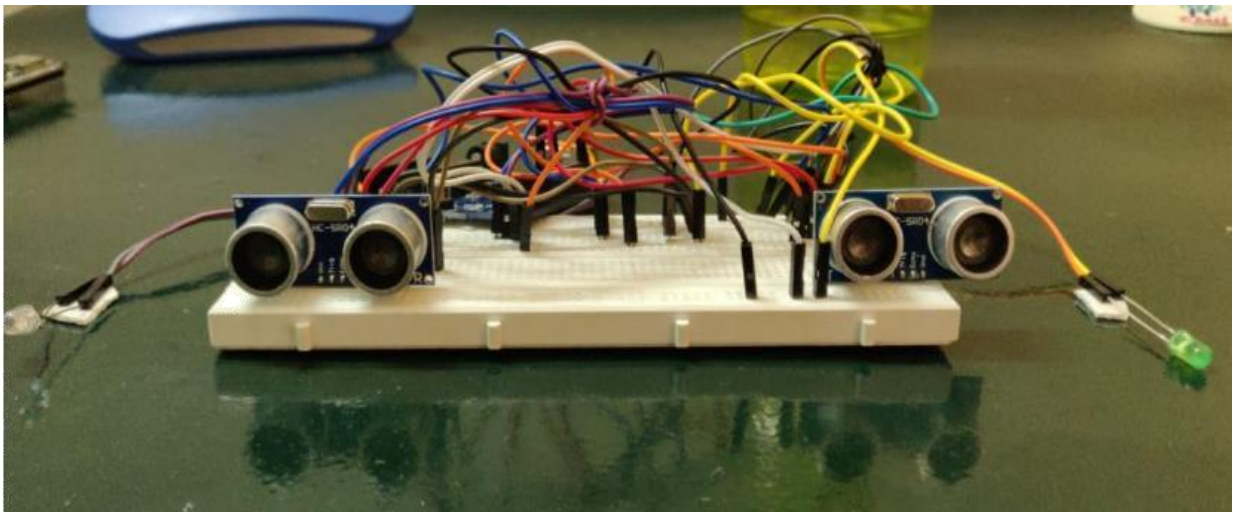


Fig 15: Prototype of the Circuit

Fig 16: Wearable being tested on a Subject

RESULTS AND DISCUSSION

Ultrasonic distance sensor with analogue output 0 – 10V has been selected for testing. The sensor uses 300 kHz sound frequency. Measurement range is from 120 mm up to 1000 mm and it has linear characteristic. Repeat accuracy is ±0.15% and resolution 0.037 mm.

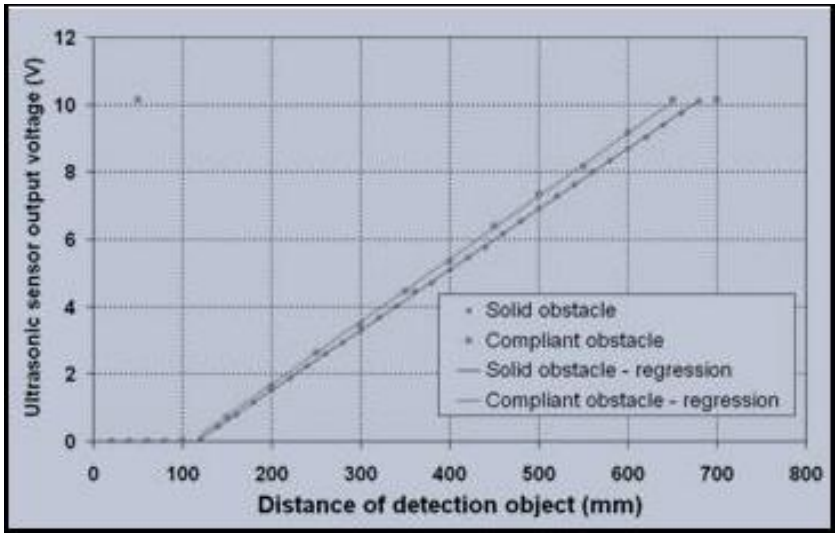


Fig16 : A Plot for detection of Objects

Experimental testing has been executed with solid and compliant (vibration absorbent) material. Results from these testing are visible on Figure.

Result of graph- The sensor has linear characteristic with dead zone, it means that it is not able to measure distances less than 120 mm. Total measurement range is up to 700 mm and after this value sensor has constant value of output voltage. There is also visible difference (change of slope of the characteristic) between the measurement realized with solid material and compliant material.

COST ANALYSIS

Budget:

Considering the breakdown of all components we will use in our project; the Budget of our wearable would be approximately around Rs. 5630

Components	Cost (in rupees)
Arduino	500
Ultrasonic sensors*2	180
LEDs (as vibration sensor) *5	10
Wires	25
Node MCU	320
GY-521	300
Vibration Sensors*2	120
GPS Module	600
GSM Module	929
PCB Fabrication	755.92
App Development	1888.61
Total	5628.53

FUNDING

We have planned to obtain the initial investment through Stand-Up India programme, under the Start-up India scheme. Following is an attached form for registering a loan through this scheme.

The Stand-Up India Initiative can supply a loan up to INR 5lacs to entrepreneurs, for their start-up endeavours.

Fig17. The Stand-Up India Initiative

Other avenues for funding include the following:

(a) ANGEL INVESTORS: Also called angel funder and seed investor is an individual who pays capital for a business start-up. They invest online and form networks called angel groups to share investments. They basically focus on companies they are sure can make good profit. They screen the proposals and offer advices along with the capital. Many prominent companies like Google, Yahoo etc. were assisted by angel investors.

The Chennai Angels is a group of angel investors. It is mentored by more than 70 experienced entrepreneurs who are ready to nurture success and fund start-up ideas.

Various professors from the top colleges of India and a number of businessmen and engineers serve as the angel investors and nurture new start-up ideas.

- Ventures with unique ideas with potential for rapid, scalable growth within a reasonable time frame.
- Businesses with proprietary technology, early market lead and other strong barriers to entry.
- A strong management team to execute the business plan, with relevant and successful experience.
- Entrepreneurs who can provide evidence of the validation of their concept and particularly those who have begun to engage with the market have a stronger proposition.
- A credible exit strategy for investors.
    - Preference for ventures from South India. A credible exit strategy for investors.
    - Preference for ventures from South India.

- Major investors as Angel investors include:
    - Ashok Jhunjhunwala, Institute Professor at IIT Madras
      K Jagannathan, Larsen & Turbo
    - Gopal Srinivasan, TVS Capital Funds Limited
      S. Premkumar, HCL Infosystems
    - Sreehari Sundaram, director of Pan Asia Group

(b) MICROSOFT FOR START-UPS: Microsoft has partnered with a number of start-up accelerators and incubators all over the world to offer exclusive benefits. Some of its sponsors are:

- Gen Next Hub (Reliance)
- Entrepreneur's Roundtable Accelerator
- Startech
- Zone Start-ups
- India TechStars

Microsoft offers engagements with other start-ups, along with access to recent technology, and new community spaces that promote collaboration across local and global ecosystems.

Digital and social campaigns to promote your solution at launch

- A customized Go-To-Market plan to maximize joint marketing with Microsoft Targeted industry co-marketing and account planning

(c) LETSIGNITE CROSS BORDER (INDIA'S FIRST GLOBAL INVESTOR SUMMIT):

Letsignite Cross Border is the first investor summit aimed at providing global investments for start-ups. Being sponsored by NetApp Accelerator and PayU, it is a joint initiative by LetsVenture and Swissnex India, the Consulate General of Switzerland.

(d) GOVERNMENT PROGRAMS THAT OFFER START-UP CAPITAL:

Indian government has launched 10,000 Crore start-up fund and the Bank of Ideas and Innovations Program. The popular Pradhan Mantri Micro units Refinance Agency Limited (MUDRA) is launched by the government that extends profits to 10 lakhs to small and medium enterprises. Once the business plan is approved, the loan is sanctioned and a MUDRA card is provided which can be used for the expenses for the start-up.

(e) NASSCOM'S 10000 START-UPS:

'10000 start-ups' is an initiative by NASSCOM to

enable funding and support for 10000 start-ups in India. Being leaded by the President Debjani Ghosh, it has Start-up Haryana, Government of Karnataka, Government of Kerala, Indian Angel Network, Webel etc. as its partners. The aim is to identify and groom high potential start-ups through the best of global market exposure, industry connects and market access. It is funded mainly by SAIF Partners, Axilor, and ICP-Inventus.

MICROFINANCE PROVIDERS (OR NBFCs):

If qualifications for the bank loan are not met, Microfinance Providers and Non-Banking Financing Corporations are helpful. These corporations provide banking services without meeting the legal requirements of a bank.

(g) BANK LOANS: Funding from banks involves usual process of sharing the business plans on the basis of which the loan is sanctioned. Leading banks like Axis Bank, HDFC, ICICI, Bank of Baroda have a variety of options to offer loans.

MEET THE TEAM

WORK CONTRIBUTION:

1. MANAN MODI (18BEE0014):

He is the Electronic Project Developer of the project.
His job was to look out the overall functioning of the 2 systems present in this project.
He worked on the Electronics related domain of the Project.

2. ABHISHEK TYAGI (17BEE0272):

He is the Software Project Developer for our Project.
He looked out for all the technical related information needed for establishing Server connections and App Development.
He also helped in website and Logo designing.

3. SHINJINEE PAUL (17BEC0285):

She is the HR of the Project.
She worked for all the market analysis.
She also helped in the implementation and collecting the result

4. VANSHIKA GULIA (17BCM0072):

She is the Finance Head for our project.
She was responsible for all the Budget and Cost Analysis.
She also helped in market survey.

5. SRI SANGARI (17BCM0045):

She is the Public Relation Head of the Project.

She helped in market survey and analysis.

Her main job was to get the ideas for marketing and how to publicize our start-up.

6. AAYUSHREE KONWAR (17BCM0070)

She is the Documentation Head of the project.

She has worked on the paper works and reports.

She managed the project into a manageable chunk.

She has collected the data for reference.

7. MAHIMA RASTOGI (17BEE0353)

She is the overall manager of the project.

She coordinated the members to work.

She was responsible for the proper functioning.

She was a support to the tech and software designer.

EACH MEMBER OF THE GROUP CONTRIBUTED IN EVERY FIELD EQUALLY.

CONCLUSION

Envisioning the role of technology in transforming everyday life, we serve people who are suffering from cataract glaucoma. The problems faced by these patients puts their life in danger and at Drishti, we work on technology to transform everyday life of these patients. We constantly strive to provide the best solutions for the problems faced by visually impaired patients.

The system is based on a client server architecture. The multi-threaded server hosts a model of pattern for fall. The devices connect with threads of the server and continuously send motion data from the accelerometer to the server. The server predicts if a fall has occurred or not and responds accordingly. The devices receive the response message. If a fall is detected, the server sends an emergency message containing the distressed client's location and other relevant information to the mediator. As a failsafe, the device sounds the buzzer and contacts emergency services and mediators via SMS containing location data of the device. The monitored person can thus get immediate medical assistance. This system can be implemented in large-scale environments where real-time monitoring of a lot of persons is necessary, such as hospitals, nursing homes, etc. The developed linear classifier model used in this system achieved 99.7% accuracy, 96.3% sensitivity, and 99.6% specificity. The developed system is very fast as the response time is very fast, approximately, 190ms. This means, within approximately 190ms of sending the motion data to the server, the server and client's device knows whether a fall has occurred or not.

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