AIAIB

AI Based Speech Recognition

AIAIB-AI Based Speech Recognition

A Project Report

Submitted to Goa University
In partial fulfilment of the requirement
For the degree of
Bachelor in Computer Applications

By

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SPES Shri Gopal Gaonkar Memorial Goa Multi-Faculty College

Dharbandora-Goa, 2019-2020

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AIAIB-AI Based Speech Recognition

SPES Shri Gopal Gaonkar Memorial Goa Multi-Faculty College

Affiliated to Goa University

CERTIFICATE

This is to certify that the project on

"AIAIB-AI Based Speech Recognition"

Has been successfully completed and submitted by

Mast. Arafat Mulla

Mast. Nandhu Krishnan

Mast. Vasant Kalal

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Miss. Sanjana Gaude

Mrs. Nisha Sawant	**Dr. Shaikh Mohammad Parvez Al Usmani**
Internal Guide	**Principal**
Mrs. Nisha Sawant	External Rehan R. kukar
Project Coordinator	Examiner

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DECLARATION BY THE CANDIDATES

We declare that this project report has been prepared by usand to the best of our knowledge, it has not previouslyformed the basis for the award of any diploma or degree bythis or any other university.

Roll no	Name	Signature
7309	BhagyashreeGaude	
7310	Sanjana Gaude	
7313	Vasant Kalal	
7319	Nandhu Krishnan	
7322	Arafat Mulla	

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CERTIFICATE BY THE GUIDE

This is to certify that the project report is the record of the whole work done by the candidates themselves under my guidance during the period of study and that to the best of my knowledge; it has not previously formed the basis for the award of any diploma or degree by this on any other university.

Name of College: SPES Goa Multi-Faculty College

Program: Bachelor in Computer Applications (BCA)

Academic Year: 2019-2020

Mrs. Nisha Sawant

Project Guide

ACKNOWLEDGEMENT

It is our immense pleasure to present the project of "AIAIB- Artificial intelligence at its best". This project consumed huge amount of work, research and dedication towards the project. Still implementation would not have been possible if we did not have support of our teachers. Therefore, we would like to extend our sincere gratitude to all of them.

We would like to show our gratitude to our internal guide **Mrs. Nisha Sawant** for giving us good gratitude, motivation, inspiration, for this assignment throughout numerous consultations and guiding us to make this project a success.

We are also grateful to **Mrs. Shraddha Naik** for provision of expertise and support in the implementation. Without her superior knowledge and experience, the project would lack in quality of outcomes, and thus her support has been essential.

Nevertheless, we express our sincere gratitude towards the principal, staff members and colleagues for their kind co-operation, encouragement and valuable time in adding us in various ways to help us in competition of this project.

-The Project Team

PROJECT PROFILE

Project Name	AIAIB (Artificial Intelligence At Its Best)
Objective	AIAIB is a project that focuses on solving basic human life problem by introducing a module
Platform	Hardware
Front End Tools	ARDUINO IDE
Back End Tools	
Hardware requirements	Arduino
	PIR Sensors x2
	ESP8266
	Relay Board
	Breadboard
	Male to Female Jumper Wires
	Male to Male Jumper Wire
	Battery
	Bulb

Project Duration	1 year
Internal Guide	Nisha Sawant

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INTRODUCTION

INTRODUCTION

We read and fantasize endlessly about the concept of **AIAIB**, representation of this in the large imagination are in large part of influenced by movies (such as Iron Man 1), but, what does it mean in reality?

The room equipped with basic infrastructure to give a decent quality of life, a clean and sustainable environment for smart home solution.

The idea behind AIAIB is motivated by the optimization of cost, organisation, and well-being of house residents. AIAIB will detect humans and objects and will turn on the light of that room, and if the human leaves the room the light of that room will be turned off automatically.

ANALYSIS

Existing system

Essentially our modules are basically an upgrade/enhancement of already available modules which lack few features. So, we considered our competitors as new/ existing IoT startups.

As we considered the modules already existing, they lack many new functionalities which were a huge limitation due to the unavailability of new technology and resources.

And we also kept in mind that none of these concepts are essentially implemented or put forth across anywhere in Goa.

Limitations of existing system

The person has to go to the switch board and have to click the switch to on/offfor the lights.

If the person forgets to switch off the lights then a lot of electricity shall be wasted.

Chances of electric shock are higher.

Objectives

All modern buildings will have a heavy focus on automation and efficient usage of energy through IoT. Our project will enhance and improve the human life by detecting human action using sensors. Our other objective is to make the hands-free light switch board which a user can move in or out of the room without touching the board. As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control system. Also, it becomes more difficult for the older or specially abled people to reach to the switch board. Thus, Home Automation System provides the most modern solution.

Scope

AIAIB project focuses on smart day-to-day life by introducing module which automatically turns on and off the light by sensors and consumes less electricity. All modules are working wirelessly and use cloud storage to store the data. This is done without touching the kit. Standardization enables smart homes that can control appliances, lighting, environment and energy management.

Future scope for the home automation systems involves making homes even smarter.

Homes can be interfaced with sensors including motion sensors, light sensors and temperature sensors and provide automated toggling of devices based on conditions. More energy can be conserved by ensuring occupation of the house before turning on devices and checking brightness and turning off lights if not necessary. The system can be integrated closely with home security solutions to allow greater control and safety for home owners.

The next step would be to extend this system to automate a large-scale environment, such as offices and factories.

Home Automation offers a global standard for interoperable products.

Proposed system

AIAIB project helps when any person enters the room, the sensor will detect the motion of human object and then the light will glow and will turn off when the human object will move outside the room. It improves the quality of human life. And this project will help to reduce the power wastage.

Advantages of the proposed system

AIAIB provides hands-free service.

The person doesn't have to go towards the switch to on the light, it will automatically detect the object and will turn on the light.

There are advantages as follows:

- Reduces the cost of maintenance & personnel
- Helps conservation of electricity
- Optimum utilization of resources
- Less cost
- Less wastage
- Shock-resistant system

Feasibility Studies

Technical feasibility

The project is technically feasible because the development team has used standard development tools and hardware modules to develop the system. We have used microcontrollers like Arduino UNO 3.0, ESP8266, relay board, GPIO and sensor like PIR (passive infra-red). They are easily available and affordable.Languages like C—+ and C were used for coding. Our modules may be compatible for future enhancement as additional feature can be added as well as it can be compatible with the latest updates.

Economic feasibility

AIAIB project is economically feasible because there is no high-end investment in developing the system. We have used various IoT Microcontrollers and sensors for designing our modules and Arduino IDE for coding the modules. The hardware parts are low cost and easily available hence can be used for small/wide scale projects.

Legal Feasibility

While implementing the module in home automation many constraints/obligations may arise such as data privacy if most of the smart homes may use these modules with many other features.
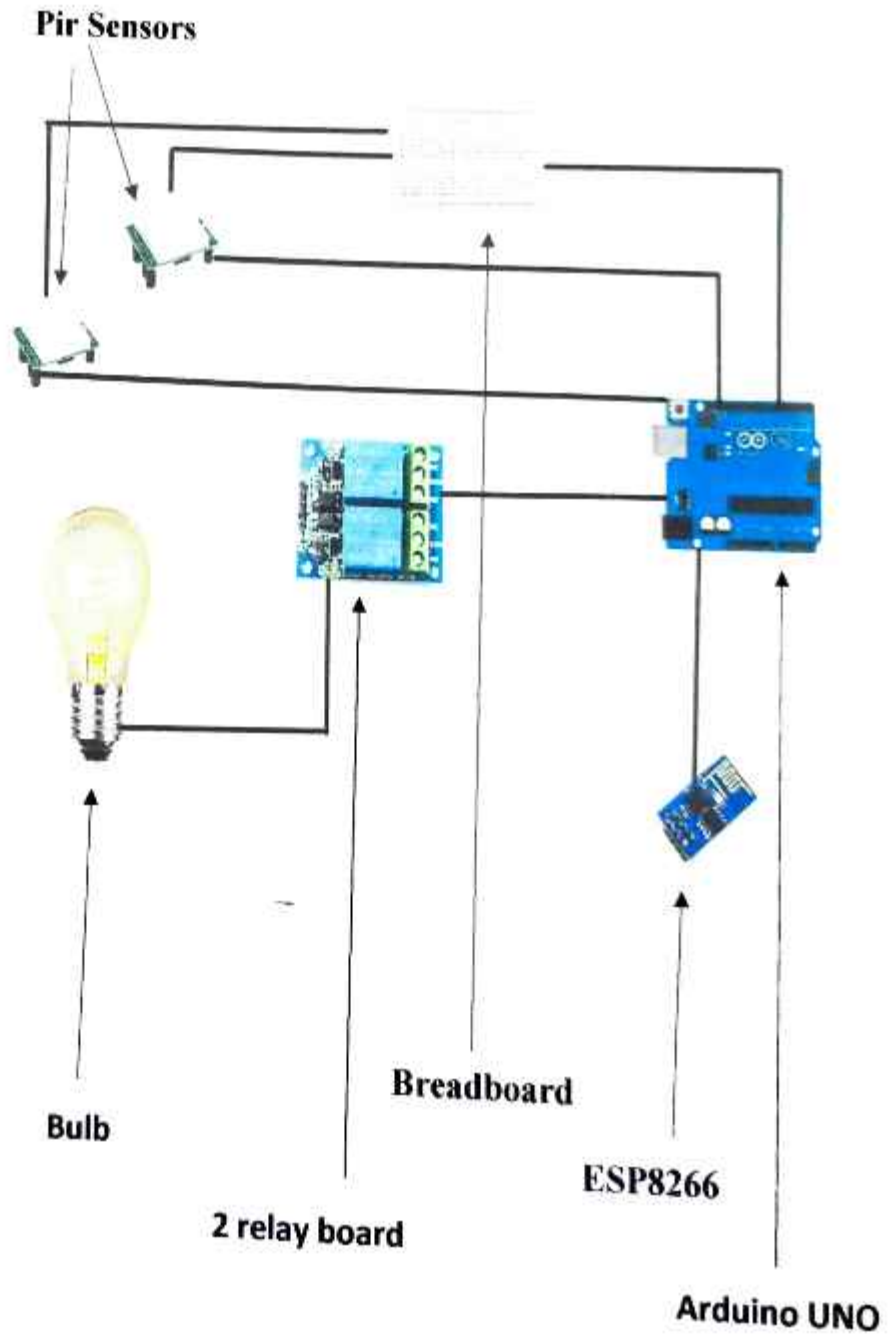
Operational Feasibility

AIAIB project is operationally feasible because the throughput is high and the response time taken is less. This is possible because we have used standard industrial based technologies (hardware) and tools that are easily accessible as they use basic assembly and programming knowledge.
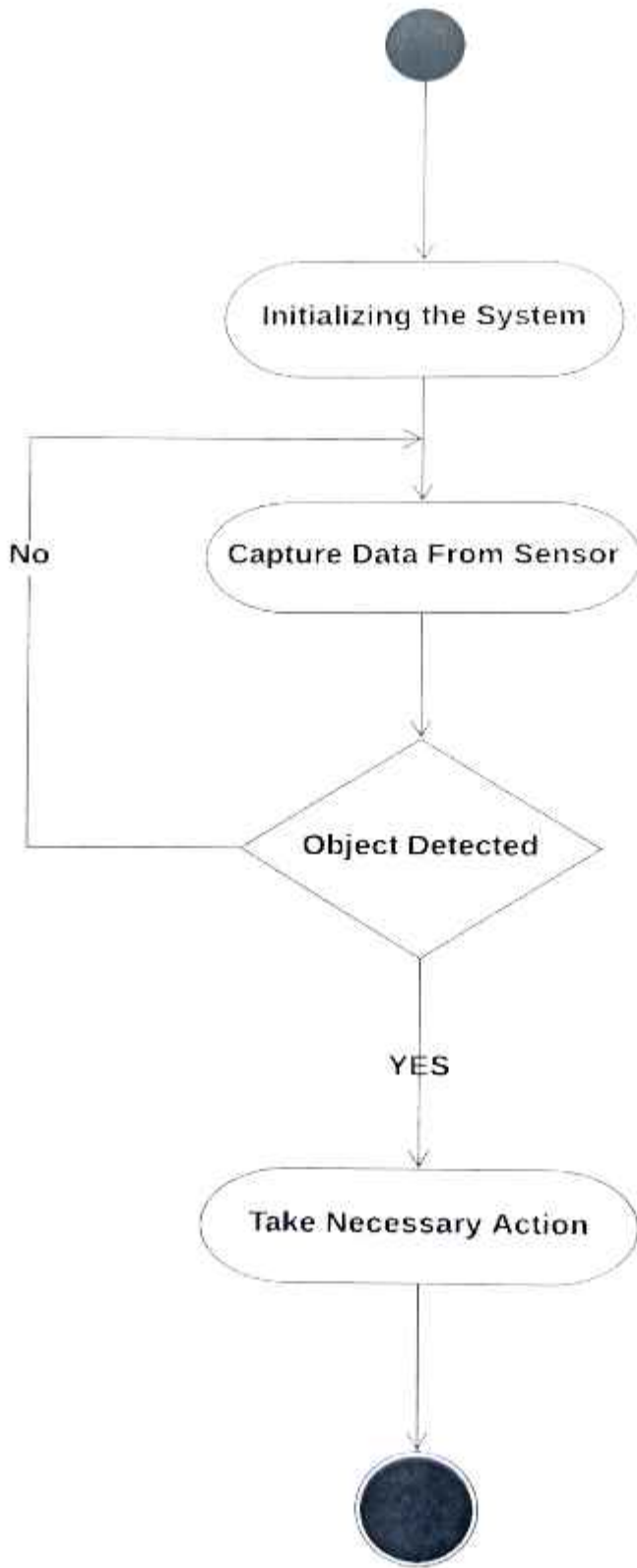
Social Feasibility

Our AIAIB project is designed to overcome with present circumstances used by the people like using switch to on and off the lights etc. Our modules are environment friendly thus helping the society in various forms.
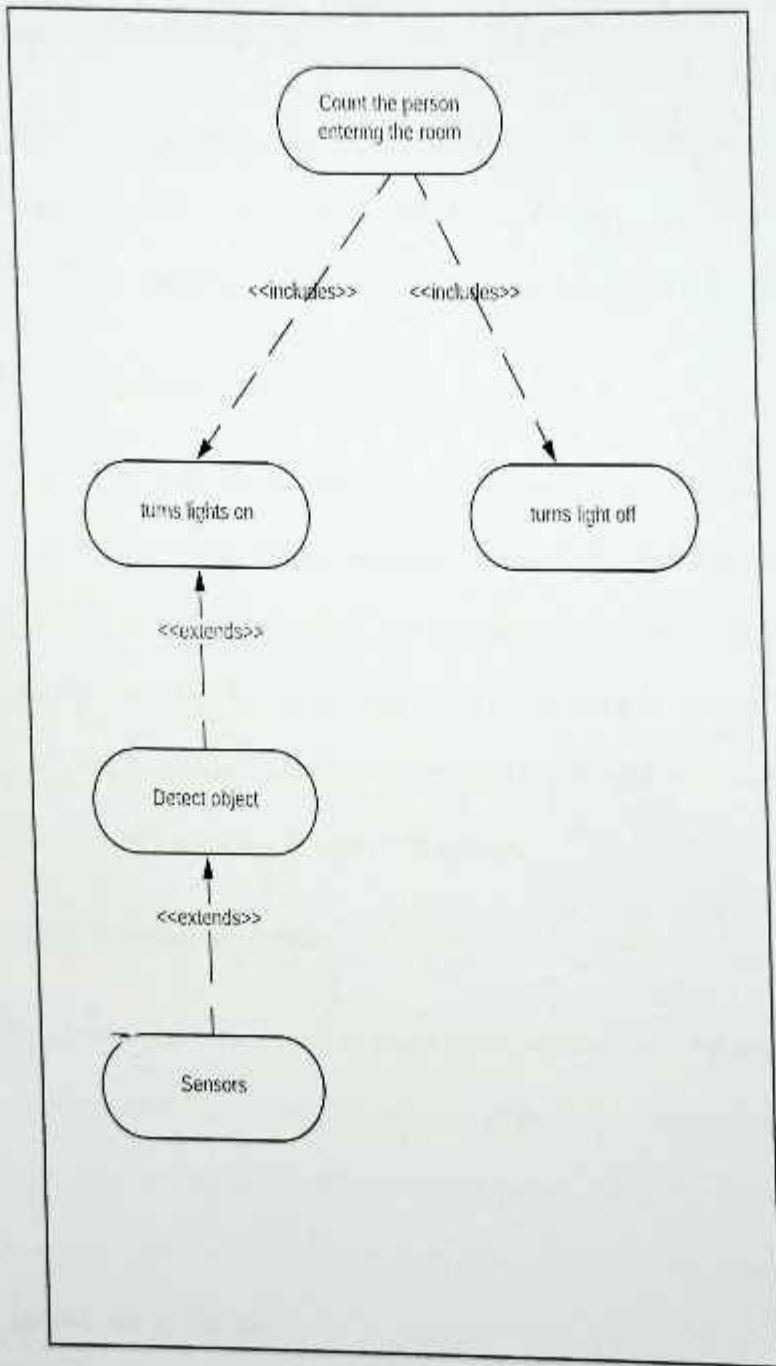
DESIGN

Circuit Diagram

Pir Sensors

Breadboard

Bulb

2 relay board

ESP8266

Arduino UNO

Activity Diagram

```
                    ●  (initial node)
                    │
                    ▼
        ┌───────────────────────┐
        │ Initializing the System│
        └───────────────────────┘
                    │
      ┌─────────────┤
      │             ▼
      │   ┌───────────────────────────┐
 No   │   │ Capture Data From Sensor  │
      │   └───────────────────────────┘
      │             │
      │             ▼
      │           ◇ Object Detected ◇
      └───────────┘       │
                          │ YES
                          ▼
              ┌───────────────────────┐
              │ Take Necessary Action │
              └───────────────────────┘
                          │
                          ▼
                          ◉  (final node)
```

Use Case Diagram

SUCCESS SCENARIOOF USE CASE DIAGRAM

Main Success Scenario

AIAIB project focuses on smart day-to-day life. It helps in making life easier & time saving. So, when the person is entering the room, sensor detects the object, sends detection to the Arduino UNO and then lights are turned on.

An Alternate Scenario

The idea behind AIAIB is motivated by the optimization of the cost andwell-being of city resident. AIAIB will detect human kind object and will glow on the lights of that particular room. But you have to enter the room where the connected sensor of the room could easily detect you from the entrance of the room. If the detection is failed or incomplete it will again initialize the system & try to detect an object & lights will turn on.

An Exception Scenario

It represents the most common way that the use case plays out successfully and contains the most common sequence of the system interactions. Exception flows represent an undesirable path to the person. So, in this project exceptioncould be where sensor could detect an object or command, or signals are not sent by the sensor.

SYSTEM

IMPLEMENTATION

Back-End&Front-EndTools

- **Arduino IDE**
  - The Arduino Integrated Development Environment is a cross-platform application (for windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload program to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.
  - It contains text editor for writing codes. It connects to the Arduino board and other hardware components to upload programs and communicate with them.

Hardware Components

Boards

- ### Arduino UNO

    Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller. The board is equipped with the sets of digital and analogue input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.

    The board has 14 Digital pins, 6 analog pins and programmable with Arduino IDE (Integrated Development Environment) via a type B USB cable.
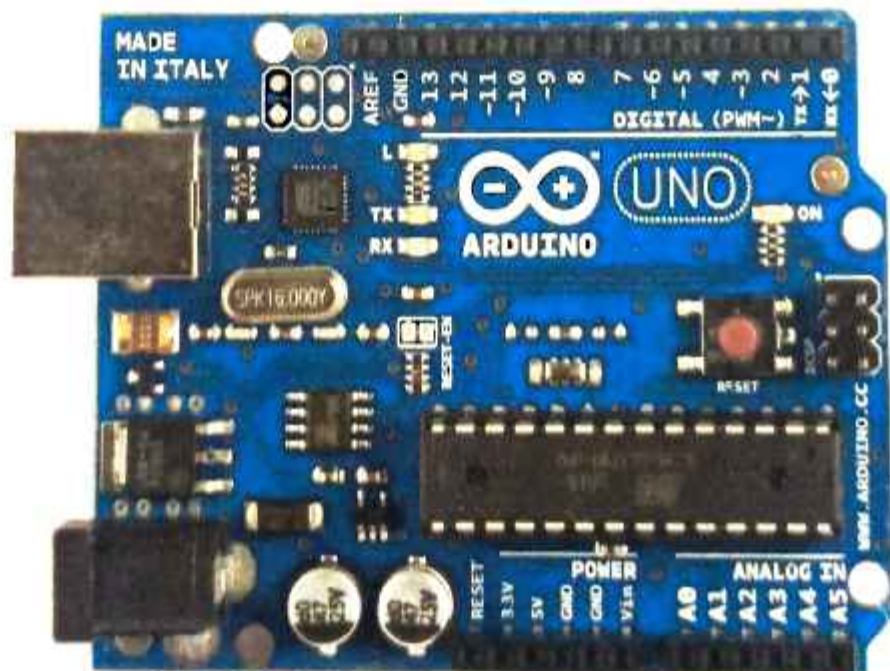
- **Passive infrared sensor (PIR sensor)**

  PIR sensor is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors detect general movement, but do not give information on who or what moved. For that purpose, an Active IR sensor required.
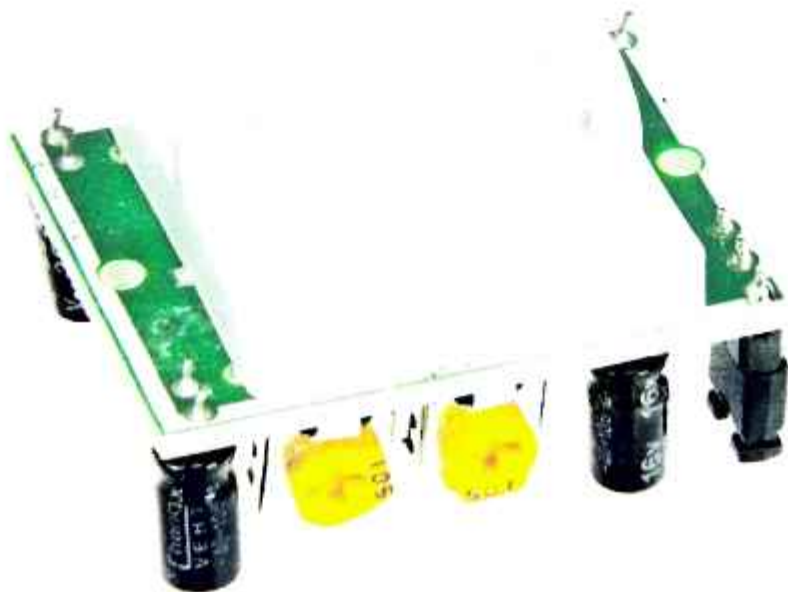
- **2 Channel Relay board**

  This module contains two relays that are electrically isolated
  from the controlling input. The relays can be used to switch
  higher voltage and current load than a microcontroller can
  traditionally accomplish
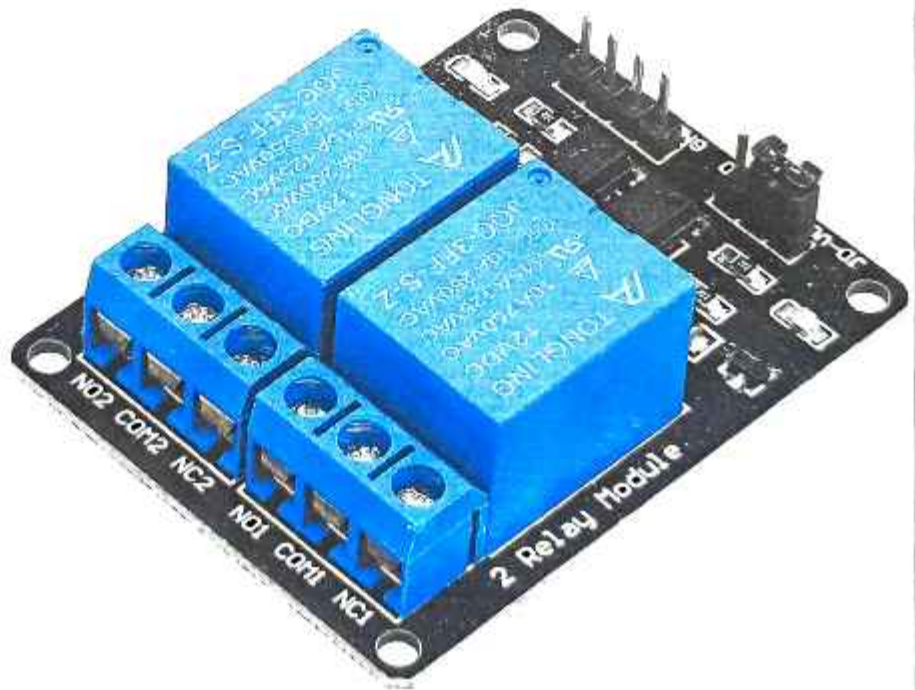
- **ESP8266**

  The ESP8266 is a Wi-Fi microchip with full TCP/IP stack and microcontroller capability. The ESP8285 is an ESP8266 with 1MiB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi.

  The successor to these microcontroller chips is ESP32, released in 2016.
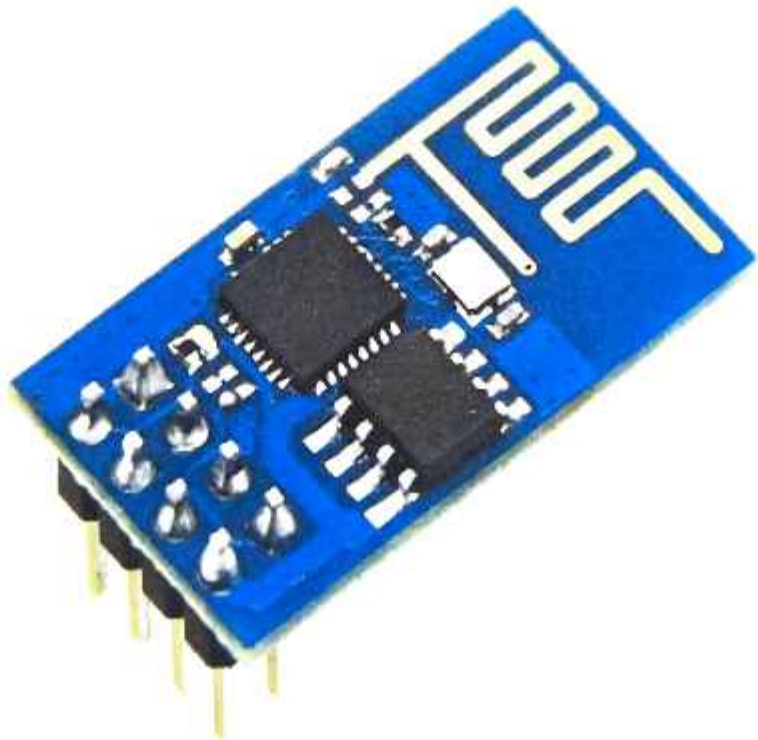
- **General-purpose input/output**

    A general-purpose input/output is an uncommitted digital signal pin on an integrated circuit or electronic circuit board whose behaviour -including whether it acts as input or output -is controllable by the user at the run time.
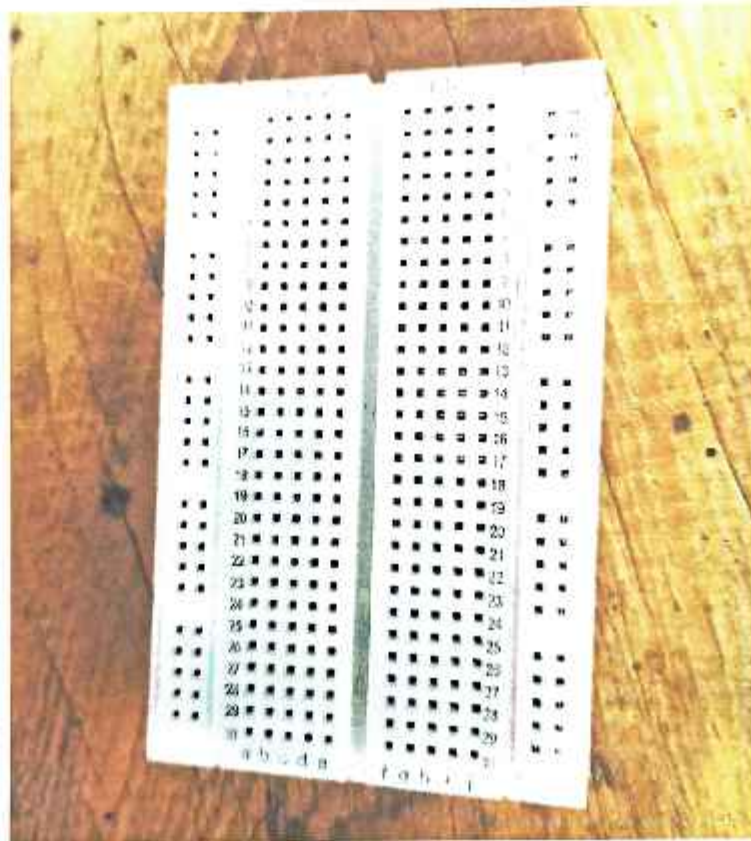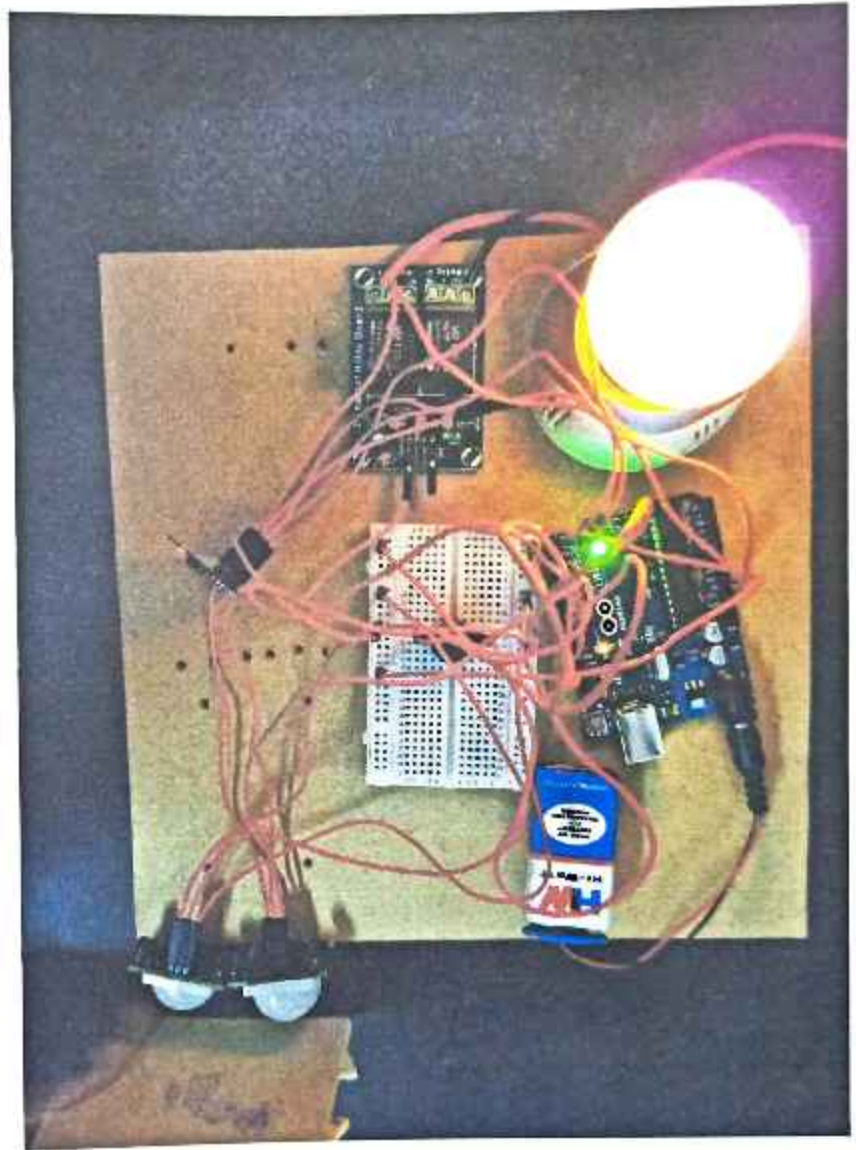
TESTING
AND
VALIDATION

When sensors are not detecting an object.
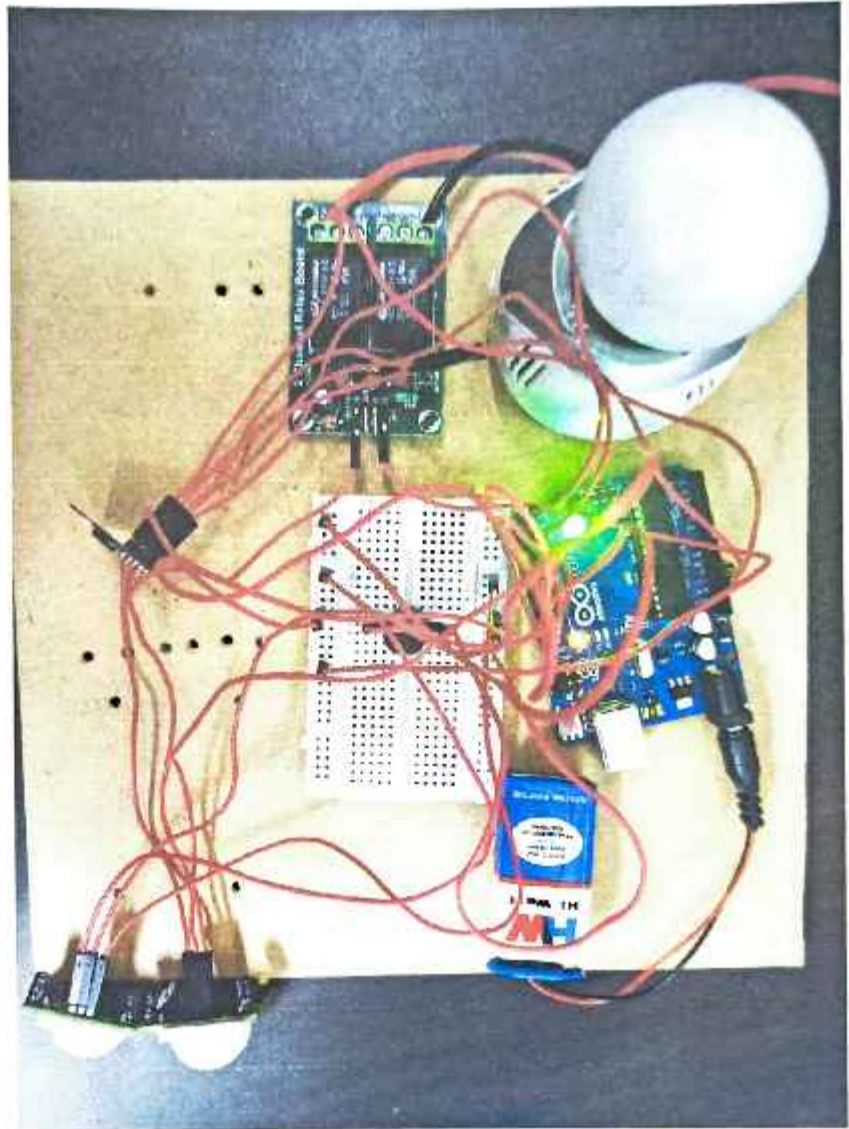
In the above picture the Arduino UNO board is connected to breadboard, 2-channel relay board, two PIR sensors and ESP8266 using male to male and male to female jumper wires. 2-channel relay board connects Arduino UNO board to the bulb.

The buzzer is placed on the breadboard to make sound when an object passed through the PIR sensors. The PIR sensors are not detecting the object around it so the bulb is not glowing.

When the sensors Detect an object

In the above picture the Arduino UNO board is connected to breadboard, 2 channel relay board, two PIR sensors and ESP8266 using male to male and male to female jumper wires. 2 channel relay board connects Arduino UNO board to the bulb. The buzzer is placed on the breadboard to make sound when an object passes through the PIR sensors.

When the object is around the PIR sensors it detects an object and the bulb will turn on. If an object moves away from the sensors the bulb will automatically stop glowing.

AUXILIARY

TOOLS

•Lucidcharts

Lucid chart helps users sketch and share professional flowchart diagrams, providing designs for anything from brainstorming to project management.

Lucid chart is supported in all modern web browsers like Google Chrome, Firefox, Safari, Microsoft Edge and Internet Explorer 8+.

- **Microsoft Word**

Microsoft Word helps users to create a e-document on the desktop. It can also create the diagrams, can upload pictures from the desktop.

Microsoft Word is supported in all platforms like wind\ows7+ and Mac OS. It is also supported by the mobile OS like Android and IOS.

FUTURE ENHANCEMENT AND CONCLUSION

FUTURE ENHANCEMENT

1) The project can be upgraded by adding Voice Recognition to the system to enable the voice command control for efficient usage.

2) The user may also control the system through their smartphones.

3) Additional features and advanced sensors for other home appliances for betterment of human life and it may be used to control smart homes.

CONCLUSION

The AIAIB project was a challenging experience for us as we had made this project without having much or nearly any knowledge of the hardware that has to be used. It was overall a great experience as we had to learn about the new things like sensors, microcontrollers, Arduino UNO, relay board, ESP8266. We had come up with the different ideas and ways with which we could achieve our goals and project with the best result.

With the completion of this project we have achieved our goals of making everyday human life easier and more advanced with cost efficiency. It is very simple to implement and use and does not require any special knowledge.

The goals achieved by our system are:

- Less cost
- Easy installation
- Optimum utilization of resources
- One-time investment
- Value for money
- Advanced technology implementation
- Simple to use

This project has helped us to gain the knowledge of new technologies, understand the importance and benefits and teamwork. The ATAIB project has given us a great learning and teamwork experience which will be very useful in the years to come.

REFERENCES

Websites

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- https://www.skyfilabs.com/

- https://www.quora.com/

- https://www.youtube.com/

- https://www.arduino.cc/

- https://www.en.m.wikipedia.org/wiki/

Annexure III

WORK RECORD/DIARY

Name of the College: GOA MULTI-FACULTY COLLEGE

Name of the Candidate: ARAFAT MULLA

Course: BCA

Year: 2019-2020

Title of the Project: AIAIB-AI Based Speech Recognition

Library/Laboratory Fieldwork	Description of work	Date	Time spent	Signature of Authority	Counter Signature of Guide & Date
CLASS	-MEETING GUIDE -DISCUSS ON TOPIC	25/06/2019 26/06/2019	2HRS 2HRS		
CLASS	-FINALIZATION OF TOPIC	15/07/2019	3HRS		
FIELDWORK	-REQUIREMENT GATHERING -FINALIZING ONLINE COURSE	10/08/2019 17/08/2019 24/08/2019	2HRS 2HRS 2HRS		
CLASS	-ONLINE COURSE	Sep to Dec	38HRS		
LABORATORY	-DESIGN -CIRCUIT DIAGRAM -ACTIVITY DIAGRAM	06/12/2019 06/12/2019	8 DAYS		
	-IMPLEMENTATION -ASSEMBLING	13/12/2019 20/12/2019	8 DAYS		
	-TESTING - CASING	30/12/2019 31/12/2019	8 DAYS		
CLASS	-STATUS REPORT -REPORT PERFORMANCE -CONTROL CHANGES	03/01/2020 03/01/2020 10/01/2020	2 DAYS 1 DAY		

1. Signature of the Student: _____

2. Signature of the Guide: Ms. Nisha Sawant _____

3. Signature of Project Coordinator: Ms. Nisha Sawant _____

Annexure III

WORK RECORD/DIARY

Name of the College: GOA MULTI-FACULTY COLLEGE

Name of the Candidate: SANJANA GAUDE

Course: BCA

Year: 2019-2020

Title of the Project: AIAIB-AI Based Speech Recognition

Library/Laboratory Fieldwork	Description of work	Date	Time spent	Signature of Authority	Counter Signature of Guide & Date
CLASS	-MEETING GUIDE -DISCUSS ON TOPIC	25/06/2019 26/06/2019	2HRS 2HRS	*Nab*	*Nab* 17/7/19
CLASS	-FINALIZATION OF TOPIC	15/07/2019	3HRS	*Nab*	*Nab* 16/7/19
FIELDWORK	-REQUIREMENT GATHERING -FINALIZING ONLINE COURSE	10/08/2019 17/08/2019 24/08/2019	2HRS 2HRS 2HRS	*Amille*	*Nab* 30/08/19
CLASS	-ONLINE COURSE	Sep to Dec	38HRS	*Nab*	*Nab* 12/12/19
LABORATORY	-DESIGN -CIRCUIT DIAGRAM -ACTIVITY DIAGRAM	06/12/2019 06/12/2019	8 DAYS	*Nab*	*Nab* 12/12/19
	-IMPLEMENTATION -ASSEMBLING	13/12/2019 20/12/2019	8 DAYS	*Nab*	*Nab* 4/01/2020
	-TESTING - CASING	30/12/2019 31/12/2019	8 DAYS	*Nab*	*Nab* 4/01/2020
CLASS	-STATUS REPORT -REPORT PERFORMANCE -CONTROL CHANGES	03/01/2020 03/01/2020 10/01/2020	2 DAYS 1 DAY	*Nab*	*Nab* 15/01/2020

1. Signature of the Student: *Gaude*

2. Signature of the Guide: Ms. Nisha Sawant *Sawant 15/01/2020*

3. Signature of Project Coordinator: Ms. Nisha Sawant *Sawant 15/01/2020*

WORK RECORD/DIARY

Name of the College: **GOA MULTI-FACULTY COLLEGE**

Name of the Candidate: **NANDHU KRISHNAN**

Course: **BCA**

Year: **2019-2020**

Title of the Project: **AIAIB-AI Based Speech Recognition**

Library/Laboratory Fieldwork	Description of work	Date	Time spent	Signature of Authority	Counter Signature of Guide & Date
CLASS	-MEETING GUIDE -DISCUSS ON TOPIC	25/06/2019 26/06/2019	2HRS 2HRS	*signature*	*signature* 13/7/19
CLASS	-FINALIZATION OF TOPIC	15/07/2019	3HRS	*signature*	*signature* 15/7/19
FIELDWORK	-REQUIREMENT GATHERING -FINALIZING ONLINE COURSE	10/08/2019 17/08/2019 24/08/2019	2HRS 2HRS 2HRS	*signature*	*signature* 30/08/19
CLASS	-ONLINE COURSE	Sep to Dec	38HRS	*signature*	*signature* 13/12/19
LABORATORY	-DESIGN -CIRCUIT DIAGRAM -ACTIVITY DIAGRAM	06/12/2019 06/12/2019	8 DAYS	*signature*	*signature* 12/12/19
	-IMPLEMENTATION -ASSEMBLING	13/12/2019 20/12/2019	8 DAYS	*signature*	*signature* 4/01/2020
	-TESTING - CASING	30/12/2019 31/12/2019	8 DAYS	*signature*	*signature* 4/01/2020
CLASS	-STATUS REPORT -REPORT PERFORMANCE -CONTROL CHANGES	03/01/2020 03/01/2020 10/01/2020	2 DAYS 1 DAY	*signature*	*signature* 15/01/2020

1. Signature of the Student: _____ *signature*

2. Signature of the Guide: Ms. Nisha Sawant _____ *signature* 15/01/2020

3. Signature of Project Coordinator: Ms. Nisha Sawant _____ *signature* 15/01/2020

Annexure III

WORK RECORD/DIARY

Name of the College: GOA MULTI-FACULTY COLLEGE

Name of the Candidate: BHAGYASHREE GAUDE

Course: BCA

Year: 2019-2020

Title of the Project: AIAIB-AI Based Speech Recognition

Library/Laboratory Fieldwork	Description of work	Date	Time spent	Signature of Authority	Counter Signature of Guide & Date
CLASS	-MEETING GUIDE -DISCUSS ON TOPIC	25/06/2019 26/06/2019	2HRS 2HRS		
CLASS	-FINALIZATION OF TOPIC	15/07/2019	3HRS		
FIELDWORK	-REQUIREMENT GATHERING -FINALIZING ONLINE COURSE	10/08/2019 17/08/2019 24/08/2019	2HRS 2HRS 2HRS		
CLASS	-ONLINE COURSE	Sep to Dec	38HRS		
LABORATORY	-DESIGN -CIRCUIT DIAGRAM -ACTIVITY DIAGRAM	06/12/2019 06/12/2019	8 DAYS		
	-IMPLEMENTATION -ASSEMBLING	13/12/2019 20/12/2019	8 DAYS		
	-TESTING - CASING	30/12/2019 31/12/2019	8 DAYS		
CLASS	-STATUS REPORT -REPORT PERFORMANCE -CONTROL CHANGES	03/01/2020 03/01/2020 10/01/2020	2 DAYS 1 DAY		

1. Signature of the Student: _____

2. Signature of the Guide: Ms. Nisha Sawant

3. Signature of Project Coordinator: Ms. Nisha Sawant

Annexure III

WORK RECORD/DIARY

Name of the College: GOA MULTI-FACULTY COLLEGE

Name of the Candidate: VASANT KALAL

Course: BCA

Year: 2019-2020

Title of the Project: AIAIB-AI Based Speech Recognition

Library/Laboratory Fieldwork	Description of work	Date	Time spent	Signature of Authority	Counter Signature of Guide & Date
CLASS	-MEETING GUIDE -DISCUSS ON TOPIC	25/06/2019 26/06/2019	2HRS 2HRS		
CLASS	-FINALIZATION OF TOPIC	15/07/2019	3HRS		
FIELDWORK	-REQUIREMENT GATHERING -FINALIZING ONLINE COURSE	10/08/2019 17/08/2019 24/08/2019	2HRS 2HRS 2HRS		
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1. Signature of the Student:

2. Signature of the Guide: Ms. Nisha Sawant

3. Signature of Project Coordinator: Ms. Nisha Sawant