NIMMI - AN INTEGRATED VOICE ASSITENT

A MINI-PROJECT REPORT

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BONAFIDE CERTIFICATE

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LIST OF ABBREVIATION

ABBREVIATION	ACCRONYM
IR - Sensor	Infra-Red Sensor
LCD	Liquid Crystal Display
I2C - Module	Inter Integrated Circuit
RFID	Radio Frequency Identification

ABSTRACT

This project introduces an In the rapidly evolving landscape of digital assistants, NIMMI emerges as a groundbreaking integrated voice assistant designed to seamlessly blend into the fabric of daily life. Developed with the aim of enhancing user interaction through advanced natural language processing (NLP) and machine learning algorithms, NIMMI offers a personalized and intuitive user experience, setting a new benchmark in the realm of voice-activated technology. At its core, NIMMI is engineered to understand and process complex queries with remarkable accuracy, leveraging state-of-the-art AI to deliver responses that are not only relevant but contextually aware. This capability ensures that NIMMI can assist with a wide array of tasks, from managing smart home devices and providing real-time information to assisting with personal productivity and offering entertainment solutions. What sets NIMMI apart is its integration versatility. Designed to be platform-agnostic, NIMMI can operate across various ecosystems, ensuring users have a consistent and reliable assistant regardless of the device or operating system.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The project “NIMMI- AN INTEGRATED VOICE ASSITENT” presents a solution for The front end and back end phase In an era where technological advancements continually reshape our interactions with digital platforms, the convergence of Natural Language Processing (NLP) and Machine Learning (ML) algorithms has paved the way for transformative innovations. Among these, Nimmi emerges as a pioneering solution, embodying the culmination of cutting-edge technologies to redefine user experiences through an integrated voice assistant.

1.2 SCOPE OF THE WORK

The “NIMMI- AN INTEGRATED VOICE ASSITENT”” has tremendous scope especially Nimmi, an integrated voice assistant, represents a groundbreaking fusion of advanced technologies aimed at revolutionizing human-computer interaction. Leveraging state-of-the-art Natural Language Processing (NLP) and Machine Learning (ML) algorithms, Nimmi offers more than just conventional command execution. It embodies a comprehensive understanding of language nuances, context, and user intent, providing a seamless and intuitive user experience. Now, let's delve into the proposed system architecture for Nimmi, outlining its key components and functionalities.

1.3 PROBLEM STATEMENT

Urban Design and develop Nimmi, an integrated voice assistance system, to enhance user experience and accessibility across various platforms and devices. Nimmi aims to provide seamless voice interaction capabilities, empowering users to perform tasks, retrieve information, and execute commands through natural language input. The system should be versatile, adaptable, and user-friendly, catering to a diverse range of user needs and preferences.

1.4 AIM AND OBJECTIVES OF THE PROJECT

The aim of this project is to design, develop, and deploy Nimmi, an integrated voice assistance system, with the goal of enhancing user experience, accessibility, and productivity across various platforms and devices.

CHAPTER 2

LITERATURE SURVEY

This paper [1]proposes usage of RFID in voice assitent to upgrade the user experience and elevate the control of parking cars in an efficient way. Using RFID introduces a lot more control and allow only authorized user to front end phases their vehicle on the available space.

This research [2] paper provides a look about traditional RFID methods and its difficulties in a way, which utilizes a lot of human labour. The proposed system in the paper reveals that to reduce the cost of implementing a IOT based voice assient systemfor vehicles, they have reduced the amount of sensors used into entry and exit sensor along with a slot counter to have a count of data speaked

This project paper[3] identifies the problems of faced in smart city with enormous population and the project predicts that India will have 100 smart cities by 2030. The project utilizes a ultrasonic sensors for each parking slot and calculates the availability based on the sensor's output.

This research [4] focuses on the faces and among the integerated voice assitent using ultrasonic sensors for empty slots and passes on the information through internet using wifi modules. The paper has a very unique approach of tackling parking problem in large cities making it fullyautonomous.

This study [5] notes existing problems in the manual data system that involves lot of manual works and also prone to human errors in identifying by the reaction. The proposed system seems to claim that the maintenance cost is low compared to other systems.

CHAPTER 3

SYSTEM SPECIFICATIONS

3.1 HARDWARE SPECIFICATIONS FOR APPLICATION

Processor	:	Pentium IV Or Higher
Memory Size	:	256 GB (Minimum)
HDD	:	40 GB (Minimum)

3.2 SOFTWARE SPECIFICATIONS

Operating System	:	WINDOWS 10 AND PLUS
Application	:	ARDUINO IDE

3.3 HARDWARE COMPONENTS FOR PROTOTYPE

Sensor	:	IR-Sensor
Board	:	Arduino Uno
Actuator	:	Micro Servo Motor 9g
Screen	:	16x2 LCD Display & I2C Module

CHAPTER 4

MODULES DESCRIPTION

Arduino Uno

This is microcontroller setup for the car parking system which acts as the CPU of the whole system. This takes inputs from the Sensors and triggers the actuators.

IR - Sensor

This sensor is used to trigger an event at the time of car's entry or exit and sends the information to the controller.

LCD Module

This module is used to notify about the availability of slots in the parking.

Servo Motor

This module is the actuator of the system which controls the gate based on the decisions taken by the controller of the system.

I2C Module

This is used as a communication medium between the LCD module and Controller just utilizing 4 pins from the controller whereas to connect LCD directly it needs more pins.

CHAPTER 5

SYSTEM DESIGN

5.1 FLOW CHART

A flowchart is a type of diagram that represents an algorithm, workflow or process. The flowchart shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows. This diagrammatic representation illustrates a solution model to a given problem.

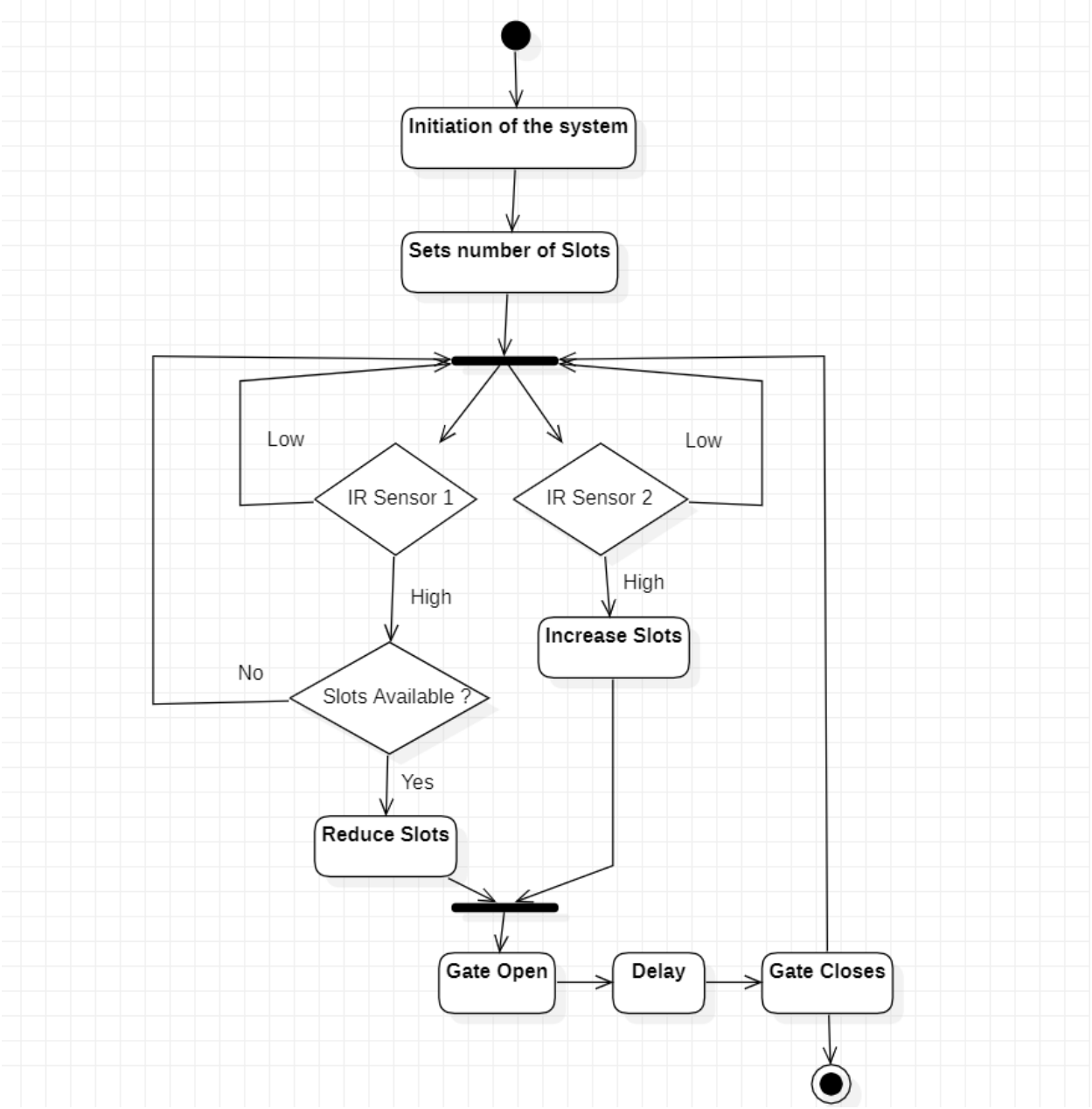

Figure 5.1 Flow Chart

5.2 CIRCUIT DIAGRAM

The circuit diagram explains the connections made with the hardware components and the board. The ESP 32 is connected with the breadboard as the INMP441 and MAX98357A are connected with the rails. The Sensors, LCD and Servo motor is given connection with the rails and the other input/output pins are connected to digital as per the requirements. And finally we will get the result through the speaker and display board.

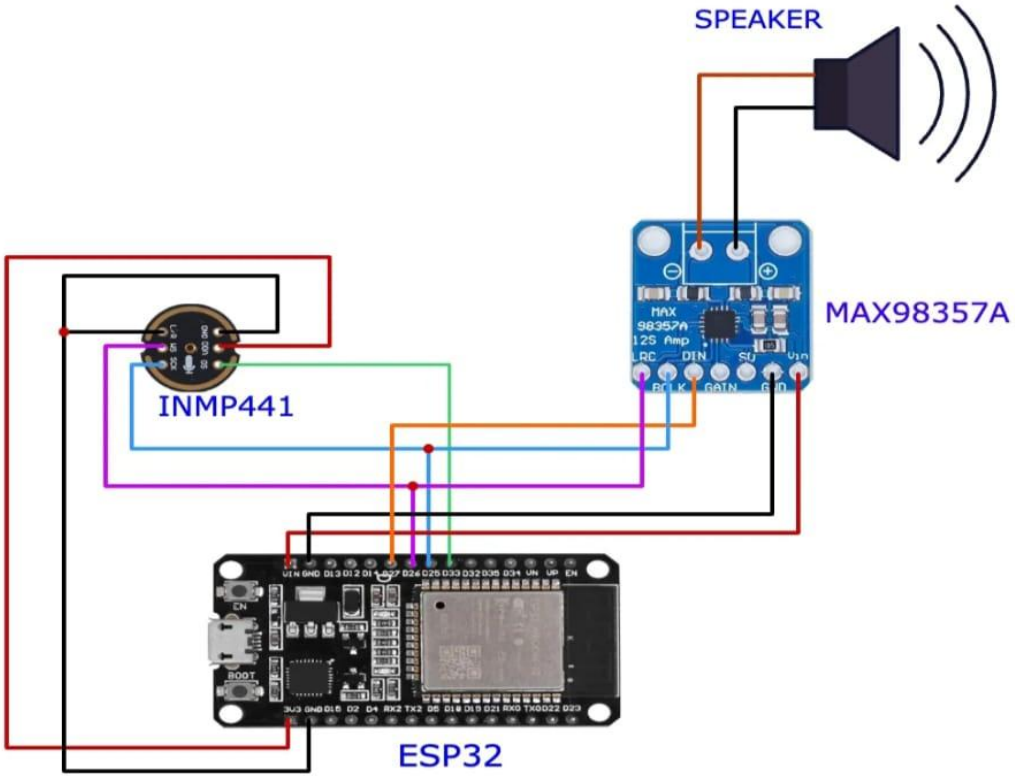

Figure 5.2 Circuit diagram

From the above figure 5.2, the connections are made

CHAPTER 6

CODING

1. Setup

```
i2s_audio:
  - id: i2s_in
    i2s_lrclk_pin: GPIO26   #WS / LRC
    i2s_bclk_pin: GPIO25    #SCK /BCLK

microphone:
  - platform: i2s_audio
    adc_type: external
    pdm: false
    id: mic_i2s
    channel: right
    bits_per_sample: 32bit
    i2s_audio_id: i2s_in
    i2s_din_pin: GPIO33    #SD

speaker:
  - platform: i2s_audio
    id: my_speaker
    dac_type: external
    i2s_dout_pin: GPIO27   #DIN
    mode: mono
    i2s_audio_id: i2s_in


voice_assistant:
  microphone: mic_i2s
  id: va
  noise_suppression_level: 2
  auto_gain: 31dBFS
  volume_multiplier: 4.0
  use_wake_word: false
  speaker: my_speaker

  on_error:
   - if:
        condition:
          switch.is_on: use_wake_word
        then:
          - switch.turn_off: use_wake_word
          - switch.turn_on: use_wake_word
```

```
  on_client_connected:
    - if:
        condition:
          switch.is_on: use_wake_word
        then:
          - voice_assistant.start_continuous:

  on_client_disconnected:
    - if:
        condition:
          switch.is_on: use_wake_word
        then:
          - voice_assistant.stop:


binary_sensor:
  - platform: status
    name: API Connection
    id: api_connection
    filters:
      - delayed_on: 1s
    on_press:
      - if:
          condition:
            switch.is_on: use_wake_word
          then:
            - voice_assistant.start_continuous:
    on_release:
      - if:
          condition:
            switch.is_on: use_wake_word
          then:
            - voice_assistant.stop:


switch:
  - platform: template
    name: Use wake word
    id: use_wake_word
    optimistic: true
    restore_mode: RESTORE_DEFAULT_ON
    entity_category: config
    on_turn_on:
      - lambda: id(va).set_use_wake_word(true);
      - if:
```

```
      condition:
        not:
          - voice_assistant.is_running
      then:
        - voice_assistant.start_continuous

on_turn_off:
  - voice_assistant.stop
  - lambda: id(va).set_use_wake_word(false);
```

CHAPTER 7

SCREEN SHOTS

1. CONNECTION

Figure 7.1 Connection Setup

Upon successful connection, light will be light up in the LCD module and one out of the two lights in the IR sensors will light up denoting power supply and successful connection. In the figure(see 7.1) if the left most IR sensor, detects motion of any vehicle, it will activate the servo motor and will in turn reduce the number of parking slots available. When the number of speakers slots reduce to 0, the servo motor will not activate even if the first infrared sensor detects an object. The second infrared sensor helps in increasing the number of slots available as each time this sensor detects an object, it will increase the number of parking slots available thereby activating the servo motor.

CHAPTER 8

CONCLUSION AND FUTURE ENHANCEMENT

In conclusion, the project aimed to design, develop, and implement Nimmi, an integrated voice assistance system, with the objective of enhancing user experience and accessibility across various platforms and devices. Throughout the project, several key components and features were identified and addressed, drawing upon insights from a comprehensive literature survey and leveraging state-of-the-art technologies and methodologies.

For future enhancements its core, NIMMI is engineered to understand and process complex queries with remarkable accuracy, leveraging state-of-the-art AI to deliver responses that are not only relevant but contextually aware. This capability ensures that NIMMI can assist with a wide array of tasks, from managing smart home devices and providing real-time information to assisting with personal productivity and offering entertainment.

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