**Project Report**

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**VOICE CONTROL**

**WHEEL CHAIR**

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**Introduction:**

The introduction section provides background information on the project, including its objectives, significance, and relevance in addressing the needs of individuals with mobility impairments. It also outlines the structure of the report.

**Aim :**

The aim of the project is to develop a voice-controlled wheelchair system using Arduino, Bluetooth, and DC motors, with the objective of providing enhanced mobility and independence for individuals with mobility impairments.

**Hardware Required :**

1. Arduino UNO
2. Motor Driver - L298N
3. Bluetooth Module
4. DC Motors
5. 9v Battery
6. Jumber Wires
7. Connecting cables

**Procedure :**

**Hardware Connections:**

Establish connections between the components according to the circuit diagram. Connect the DC motors to the L298N motor driver, ensuring proper polarity and wiring. Connect the Bluetooth module to the Arduino for wireless communication.

**Power Supply Configuration:**

Connect the battery to power the Arduino and the motor driver. Verify the voltage and current requirements to ensure safe operation of all components.

**Arduino Programming:**

int data;

int i;

int j;

void setup() {

pinMode(8,OUTPUT);

pinMode(9,OUTPUT);

pinMode(10,OUTPUT);

pinMode(11,OUTPUT);

Serial.begin(9600);

}

void Stop(){

digitalWrite(8,LOW);

digitalWrite(9,LOW);

digitalWrite(10,LOW);

digitalWrite(11,LOW);

}

void loop() {

if(Serial.available()){

data=Serial.read();

Serial.println(data);

Serial.println("voice accept");

if (data=='F'){

digitalWrite(8,HIGH);

digitalWrite(9,LOW);

digitalWrite(10,HIGH);

digitalWrite(11,LOW);

Serial.println("forward worked");

i=0;

i++;

}

if (data=='B'){

digitalWrite(8,LOW);

digitalWrite(9,HIGH);

digitalWrite(10,LOW);

digitalWrite(11,HIGH);

Serial.println("backward worked");

i++;

j=0;

}

if (data=='S'){

digitalWrite(8,LOW);

digitalWrite(9,LOW);

digitalWrite(10,LOW);

digitalWrite(11,LOW);

Serial.print("stop worked");

i++;

j++;

}

if(data=='L'){

digitalWrite(8,LOW);

digitalWrite(9,LOW);

digitalWrite(10,HIGH);

digitalWrite(11,LOW);

Serial.println("LEFT worked");

delay(1000);

Serial.println("delay worked");

Stop();

}

if (data=='R'){

digitalWrite(8,HIGH);

digitalWrite(9,LOW);

digitalWrite(10,LOW);

digitalWrite(11,LOW);

Serial.println("right worked");

delay(1000);

Serial.println("delay r worked");

Stop();

}

if (data=='Q')

{

digitalWrite(8,HIGH);

digitalWrite(9,LOW);

digitalWrite(10,HIGH);

digitalWrite(11,LOW);

delay(1700);

Stop();

}

if (data=='W')

{

digitalWrite(8,LOW);

digitalWrite(9,HIGH);

digitalWrite(10,LOW);

digitalWrite(11,HIGH);

delay(1700);

Stop();

}

}

else if (i==1){

digitalWrite(8,HIGH);

digitalWrite(9,LOW);

digitalWrite(10,LOW);

digitalWrite(11,HIGH);

Serial.println("i worked");

}

else if (j==0){

digitalWrite(8,LOW);

digitalWrite(9,HIGH);

digitalWrite(10,HIGH);

digitalWrite(11,LOW);

Serial.println("j worked");

}

}

**Voice Recognition Calibration:**

Calibrate the voice recognition module to accurately recognize and respond to specific commands. Test the system with a variety of voice inputs to ensure robust performance across different accents and speech patterns.

**Motor Control Implementation:**

Develop the motor control logic to translate voice commands into wheelchair movements, including forward, backward, left, and right directions. Ensure smooth and responsive control of the wheelchair based on user inputs.

**Integration Testing:**

Integrate the hardware components and software modules to create a functional prototype. Conduct thorough testing to verify the system's performance, including voice recognition accuracy, motor responsiveness, and overall reliability.

**User Interface Design:**

Design a user-friendly interface for initiating voice commands and monitoring wheelchair movements. Implement features such as status indicators and error handling to enhance usability and accessibility.

**Optimization and Refinement:**

Fine-tune the system parameters and algorithms to improve efficiency, accuracy, and user experience. Address any performance issues or limitations through iterative testing and optimization.

**Documentation and Evaluation:**

Document the project details, including circuit diagrams, code snippets, and user instructions. Evaluate the final prototype in real-world scenarios with target users to assess usability, functionality, and potentialfor further improvement.

**System Design:**

This section delves into the design architecture of the Voice Control Wheelchair system, detailing the hardware components, such as microcontrollers and sensors, as well as the software components, including the voice recognition algorithm and wheelchair control software. It explains how these elements work together to enable voice-controlled mobility.

**Voice Recognition Module:**

Here, the report focuses on the voice recognition technology employed in the system. It discusses the speech processing algorithms, command recognition accuracy, and the integration of the voice recognition module with the overall system architecture.

**Wheelchair Control Mechanism:**

This section explains the motorized wheelchair system, including the motors, actuators, and navigation sensors used for movement and maneuverability. It also discusses how voice commands are translated into wheelchair control actions.

**Integration Process:**

The integration process section outlines the steps taken to integrate the voice recognition module with the wheelchair control mechanism. It discusses any challenges encountered during integration and the solutions implemented to overcome them.

**Testing and Validation:**

Here, the report details the testing procedures conducted to validate the functionality, reliability, and safety of the Voice Control Wheelchair system. It includes descriptions of simulation tests, real-world trials, and user feedback.

**Conclusion:**

In the conclusion section, the report summarizes the key findings and outcomes of the project. It highlights the contributions of the Voice Control Wheelchair system in improving mobility and independence for individuals with disabilities and discusses potential future directions for the project.

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