Smart WheelChair Hardware project

By: Mohammad Adwan , “Moahammad Omar” Tanbour
Supervisor: Dr Bahaa Shaqor

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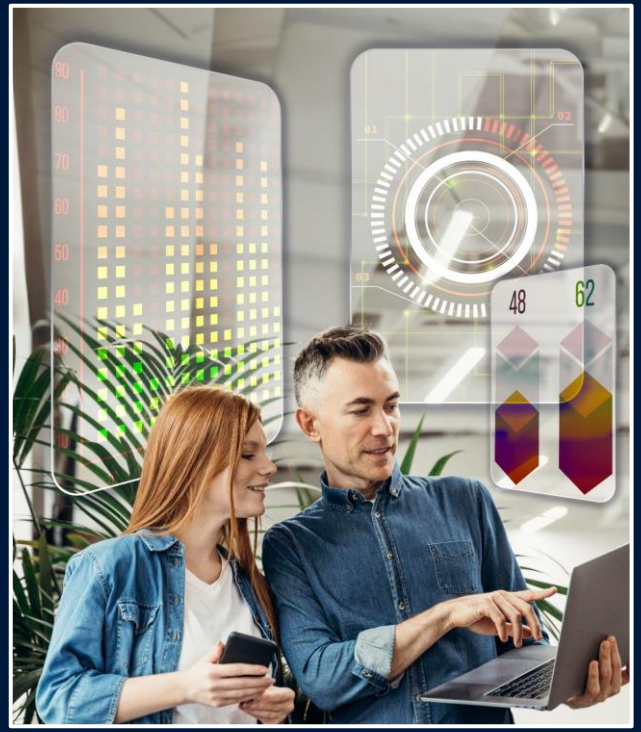
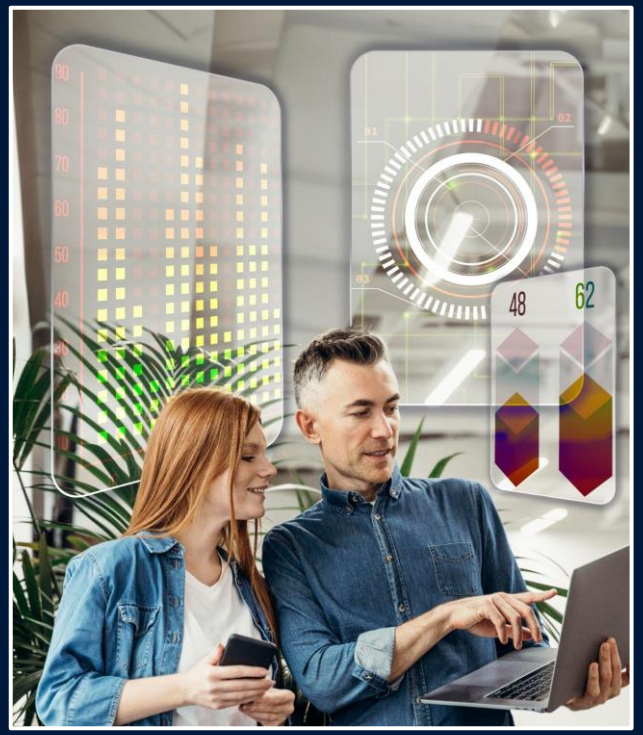


01

Introduction

Introduction

Smart wheelchair is a mobility aid aim to enhance the independence and comfort of disables, the children and elderly and others with physical disabilities who are too weak to move around independently. The aim of this project is to create and apply a smart wheelchair with health monitoring and alerts for children whose with physical disabilities.



02

Features

what does the project do?

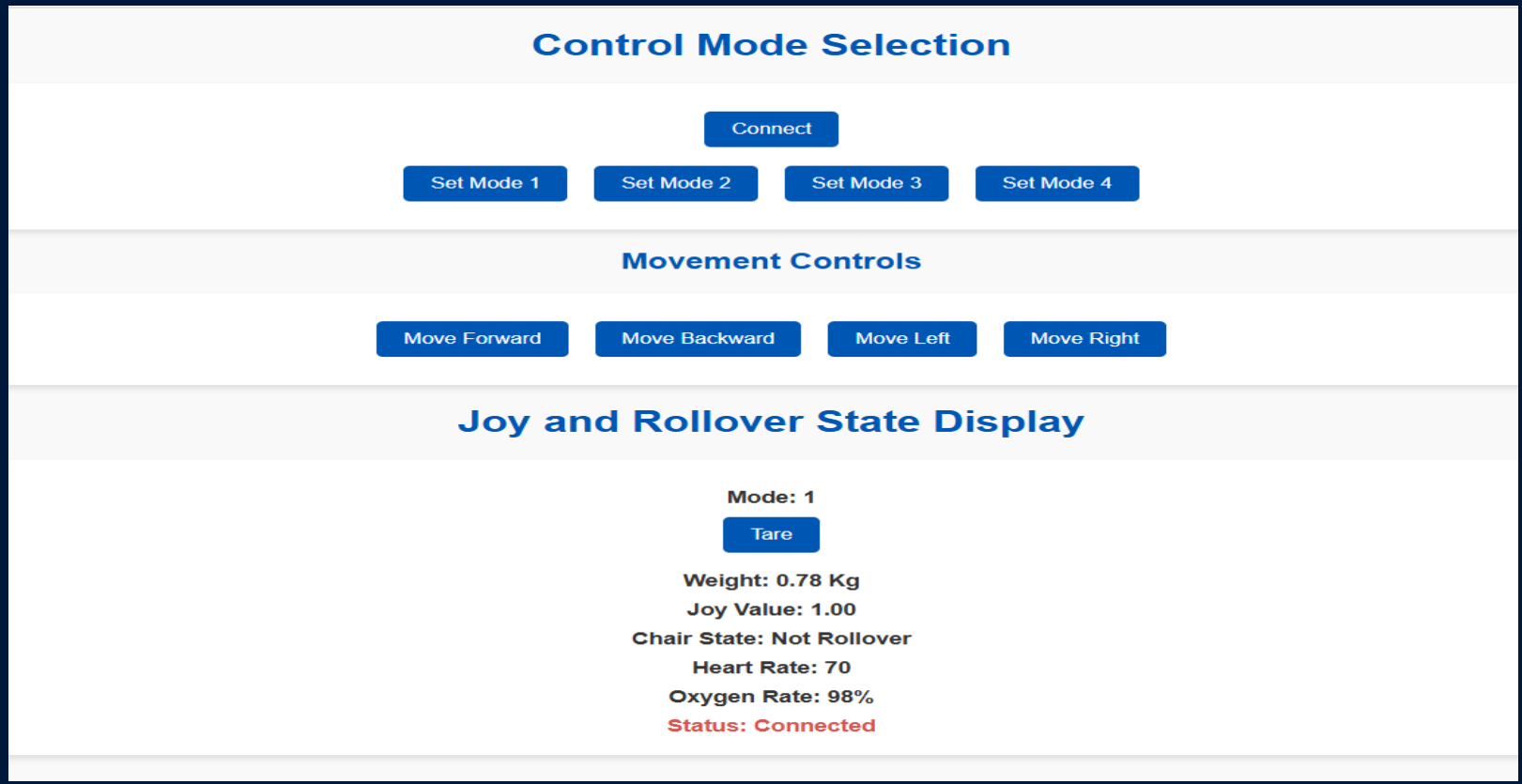
MAIN FEATURES

1. MOBILTY & AVOID RISKS
2. HEALTH AND PYSICAL STATUS
3. REMOTE CONTROLLING
4. WEB PAGE & MONITORING

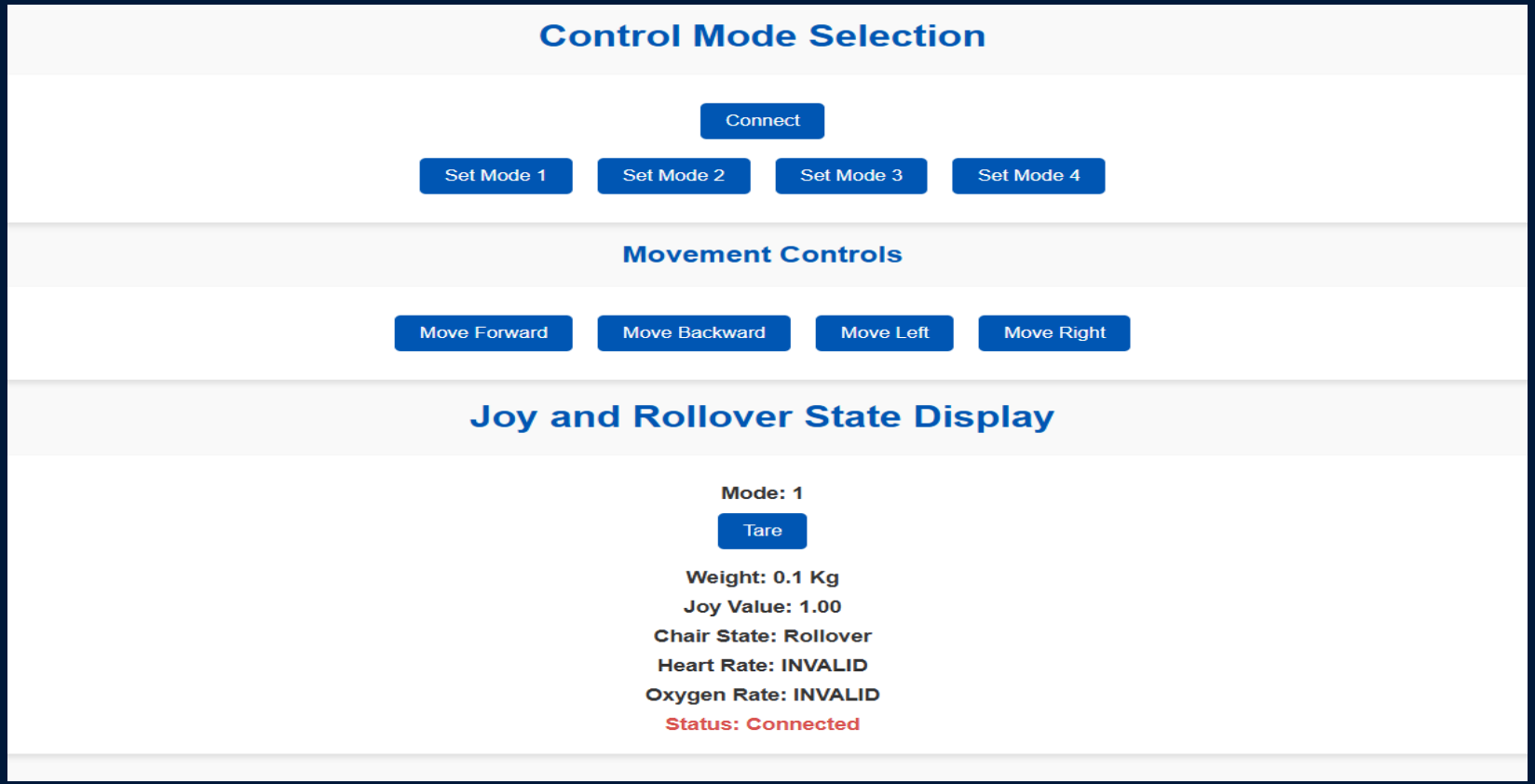
- Improve user safety by integrating sensors that detect obstacles.
- It also helps in monitoring the health by providing continuous real-time monitoring of the user’s heart rate .
- It also promotes user comfort by allowing the users to control the wheelchair comfortably through a joystick while automating hazard detection.
- A weight sensor is incorporated into the system to track whether the user is seated.
- Detect any tilt or possible overturning of the wheelchair in order to prevent accidents.
- All of the sensor data is sent over Wi-Fi to a mobile phone using web page.

- Four movement modes :
- Play-Around : The chair have full control so it does automatic movement depend on sensor .
- Semi-Automatic : The user have a controller but if obstacle detected then the sensor will take an action to avoid the obstacles.
- Manual with recommendation : The user have a control but if obstacle detected then the chair will give him recommendation to avoid the obstacles.
- Manual : The user have the full control and all sensor will be off.

Web Page Design :



Web Page Design :



Web Page Design :

Purpose of the Page:

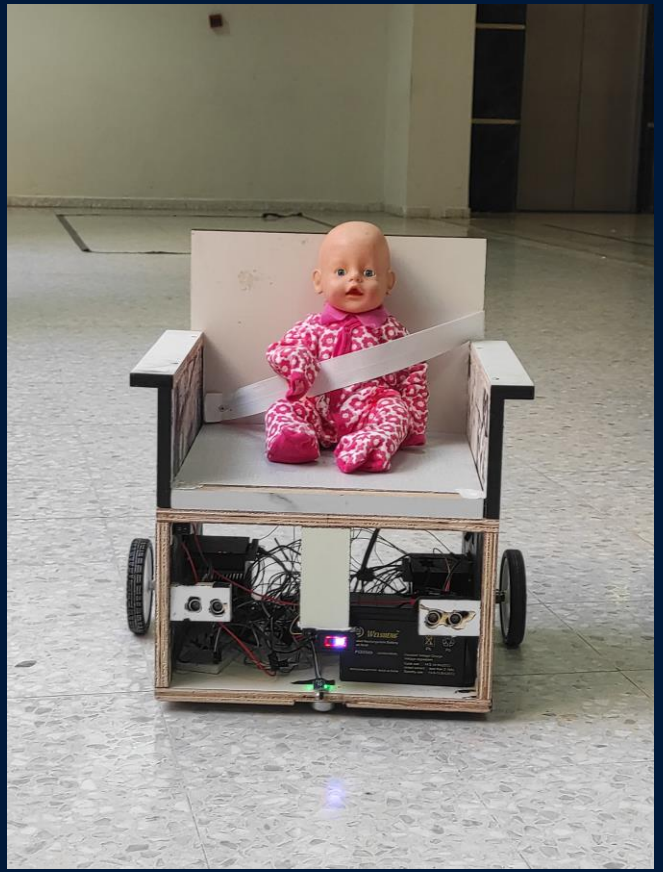
This interface is used for:

- Device Monitoring: To view the device's operational status and sensor readings (e.g., weight, heart rate, oxygen levels).

- Device Control: To manage the movement and mode of operation.

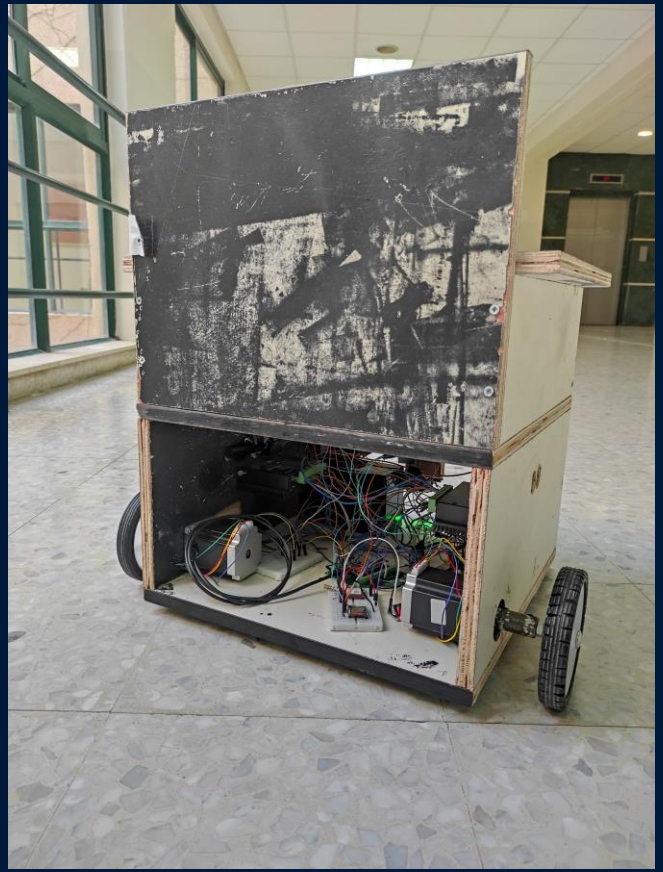
Chair Design :

Front Side :



Chair Design :

Back Side :



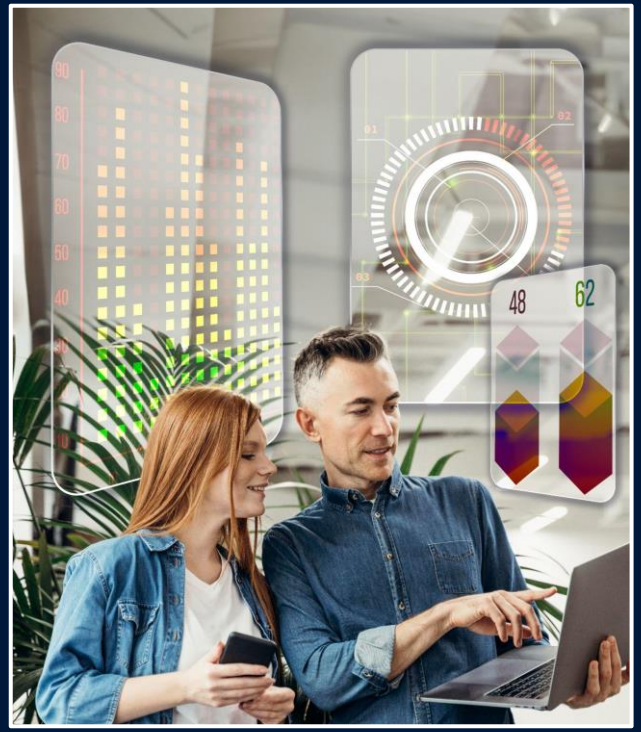
Chair Design :

Left Side :

Chair Design :

Right Side :

*For more Videos And Demo use this Link.



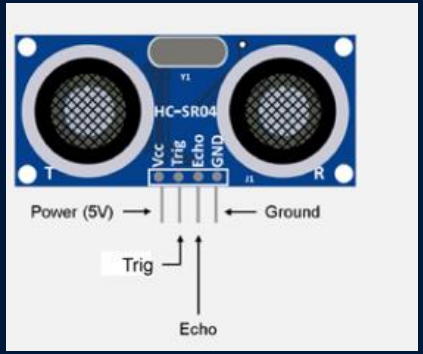
03

Electronic Components

Electronic Components

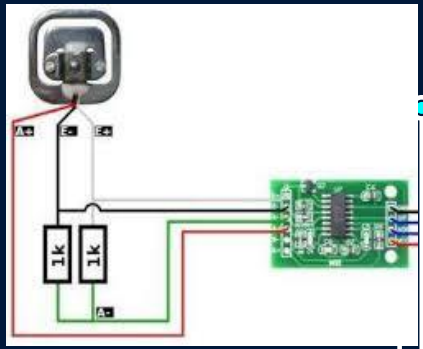
Ultrasonic Sensors

A device that measures distance using sound waves is called an ultrasonic sensor



Load cell

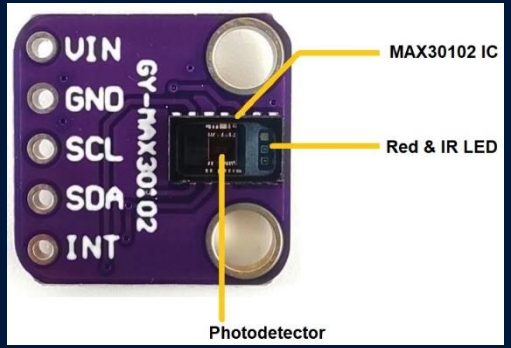
is an electro-mechanical sensor used to measure force or weight



Electronic Components

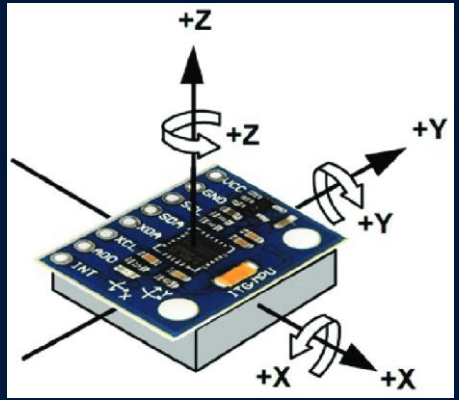
Max30102

are electronic devices and rotary or linear actuators that rotate and push parts of a machine with precision.



MPU-6050

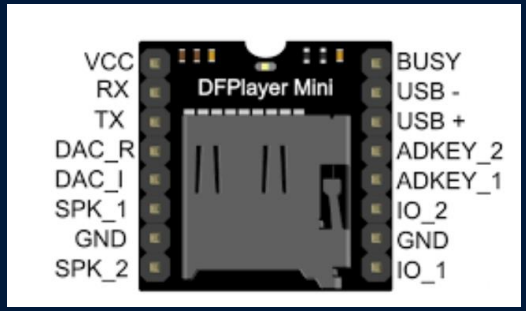
The MPU-6050 is a motion-tracking device that contains both a 3-axis accelerometer and a 3-axis gyroscope .



Electronic Components

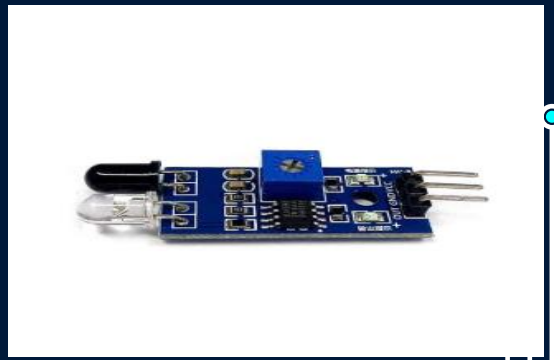
Df Player

A small and reasonably priced MP3 module , enabling you to play MP3 files straight from a microSD card



IR sensor

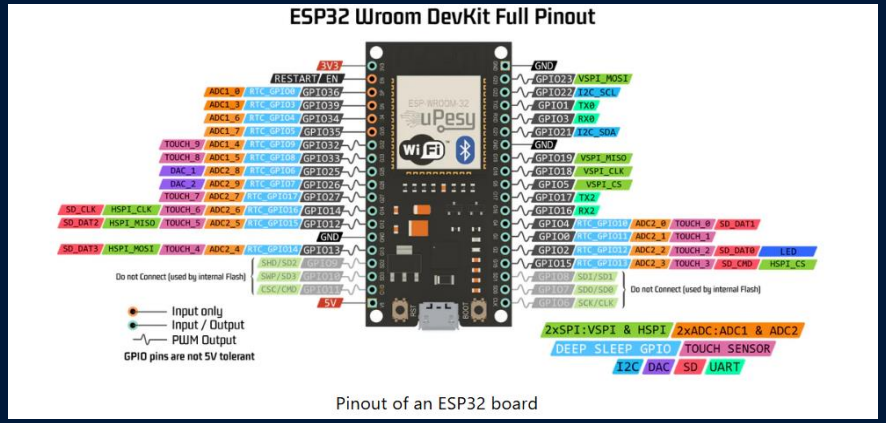
An IR (infrared) sensor is a tool for pattern recognition, proximity measurement, and object detection.



Electronic Components

Esp32

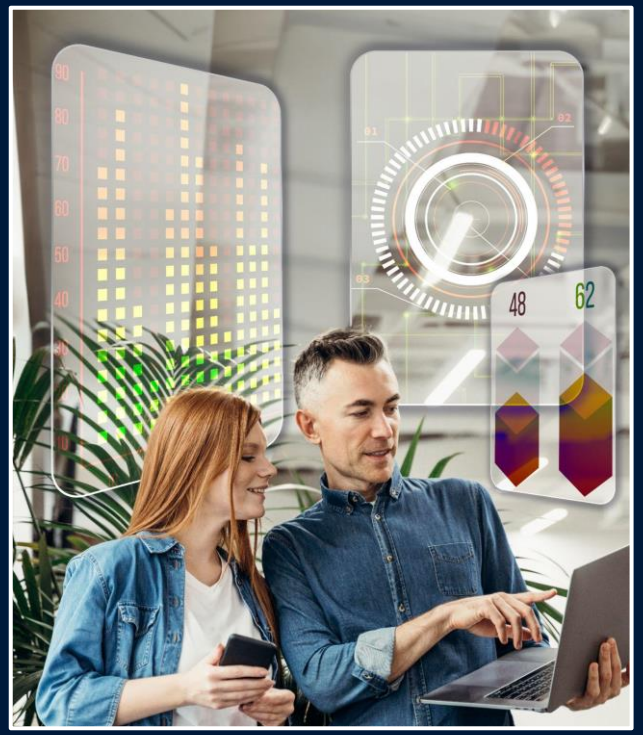
A low-cost, low-power system-on-chip (SoC). And it combines Wi-Fi and Bluetooth capabilities with a wide range of input/output possibilities.



Pinout of an ESP32 board

NEMA 23 stepper motor 23HS7628

High-torque NEMA 23 stepper motors like the 23HS7628 are frequently found in robots, CNC machines, and 3D printers, among other precision applications. It provides significant power for moving moderate to heavy weights with accurate control

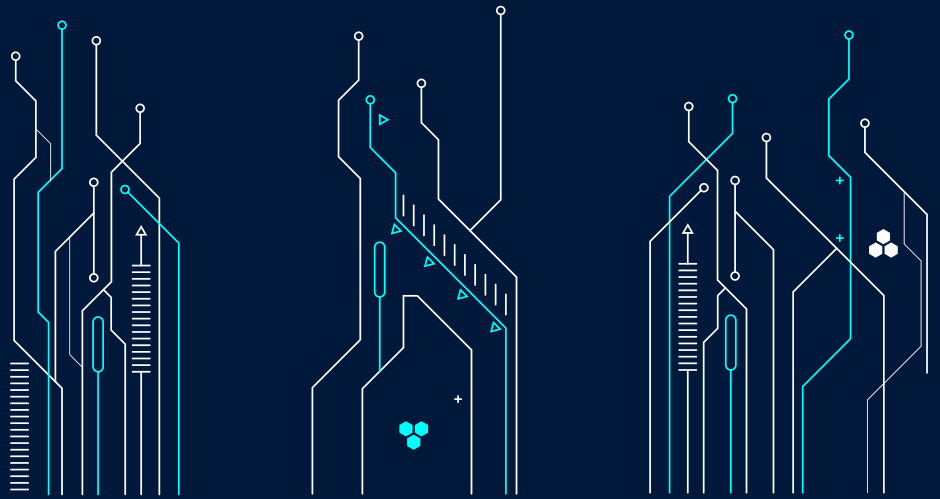


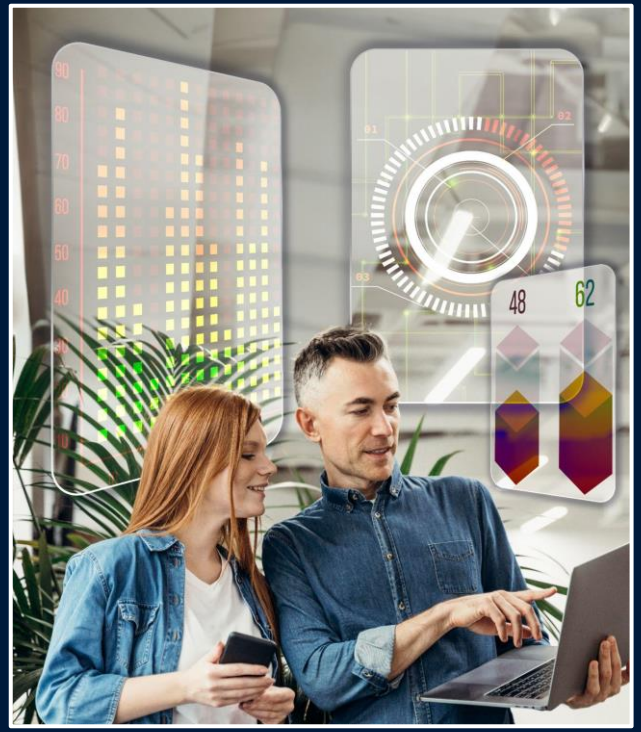
04

Future Work

Future Work

- Real-time location tracking
- voice-command functionality.
- People tracking system.





05

Conclusion

Conclusion :

The project aimed to close the gap between people with mobility issues and accessible technology by creating a simple efficient smart wheelchair system. The cutting-edge features of wheelchair, like its friendly controls and obstacle detection, show the successful of this project . Users' quality of life is greatly enhanced by the smart features, which make it simpler to move around safely and effectively.

THANKS!