Khulna University of Engineering and Technology

Department of Computer Science and Engineering

Course no : CSE3104

Course Title : Peripherals & Interfacing Laboratory

Project name: Camera live stream car with pan,tilt camera mount control using app.

Submitted by,

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Under the Guidance of :

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Objectives:

- It has the ability to enter enemy territory and transmit all information to us via its small camera eyes.
- It can be sent to hazardous places where continuous supervision and security is needed.
- Further it can also be sent to the places destroyed by earthquakes to rescue people or animals.

Significance of the project:

- To serve a valuable impact to the society by its significant usefulness.

Scope of the Project:

- To rescue people who are in need.
- To observe enemies position

Introduction:

The Surveillance Car project aims to develop a specialized vehicle equipped with advanced surveillance and monitoring capabilities. The car is designed to enhance security measures, enable efficient patrolling, and provide real-time situational awareness for various applications, such as law enforcement, public safety, and private security.

Key Features and Components:

1. Integrated Camera System: The surveillance car incorporates a comprehensive camera system consisting of high-resolution cameras strategically placed on the exterior and interior of the vehicle. These cameras capture and record video footage to provide a 180-degree view of the surroundings and enable remote monitoring.
2. Live Video Streaming: The car is equipped with technology that enables live video streaming from the cameras to a central command center or any designated monitoring station. This allows security personnel to have real-time access to the footage, enabling them to respond quickly to potential threats or incidents.

3. Night Vision Capabilities: To ensure surveillance capabilities are not compromised during low-light or nighttime conditions, the car is equipped with night vision cameras. These cameras use technology to capture clear images and footage even in the absence of visible light.

Overall, the Surveillance Car project aims to provide a mobile and technologically advanced solution for surveillance and monitoring, enhancing security measures and enabling prompt response to potential threats or incidents.

Methodology :

In this project we are going to establish a car with a camera module .There was a camera mountain fixed in the front portion of the car. The camera will scan the surroundings and capture the photos ,and the pictures will be sent to the phone . The phone will be connected through wifi and through it a screen will appear and it will show the scenarios captured by the phone.

We used a 3.7 volt 2 Li-ion battery rechargeable. we used ESP-32 cam module as micro-controller.It will empowers all the components connected to it,and it will control the behavior of the overall management.the pant tilt camera mountain is attached at the top,it will scan the pictures,pan and tilt option will rotate the camera 180-degree,

There was a L298n motor driver module which will control the gear motor.All the mentioned components need a definite amount of voltage,for this case we used buck converter ,that will step down the voltage supplied by the DC battery to 5V.

All the connections were given according to the circuit diagram.

We also needed jumper wires,breadboard,double sided tape ,glue gun.

Arduino was needed for uploading code in the ESP-32 CAM module.

Flowchart :

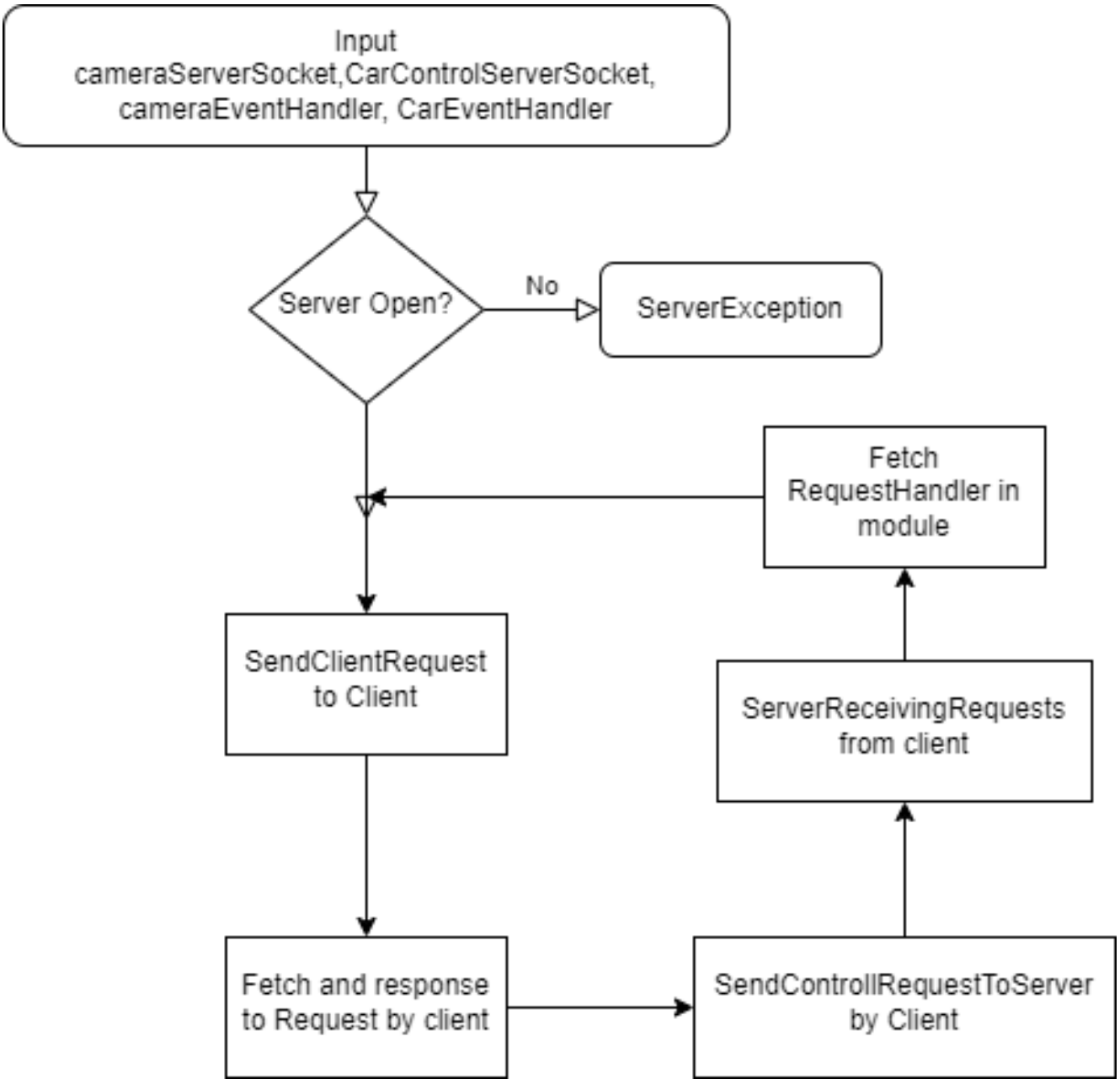
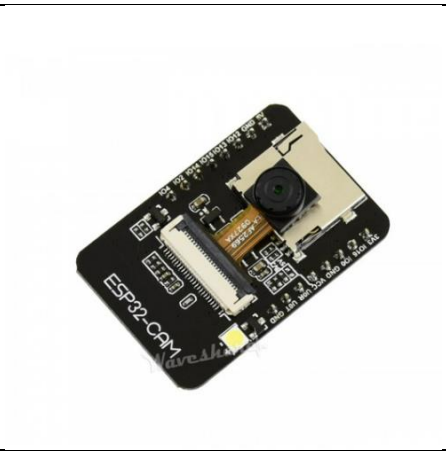
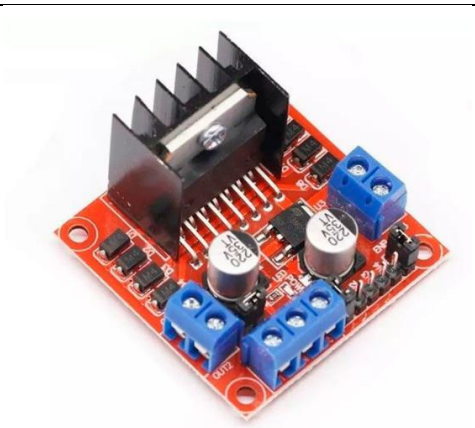


Fig 1: flowchart of the project

Apparatus Required :

Name	Quantity	Image	Ratings
ESP-32 CAM	1		Dual Core,4MB Flash Memory,2MP Camera,802.11(2.4GHz), Operating Voltage : 5V,180mA power consumption
Pan Tilt Servo Assembly	1		---
SG90S Servo Motor	2		Operating Voltage: 4.8V - 6V Stall Torque: 1.8 kg/cm (at 4.8V), 2.2 kg/cm (at 6V) Speed: 0.12 sec/60° (at 4.8V), 0.10 sec/60° (at 6V)

N20 Gear Motor	4		Operating Voltage: Typically 3V - 12V RPM : 100-300 RPM Stall Torque: 0.15-2 kg-cm
L298N motor Driver	1		Peak Output Current: Up to 2A per channel Continuous Output Current: Up to 1.5A per channel Logic Voltage: 5V
Buck Converter	1		Input voltage : 5-35 Output voltage : 5v Output current : 3A
Arduino UNO	1		Operating Voltage: 5V Input Voltage (recommended): 7-12V Input Voltage (limits): 6-20V

Li-ion Rechargeable Battery	2		Input Voltage : 3.72V each Input Current : 7800mAh
Wheels	4		---
PVC Board	1		---
Breadboard	1		---

Double Sided Tap	1		---
Jumper Wires	As Required		

Design & Circuit Connection

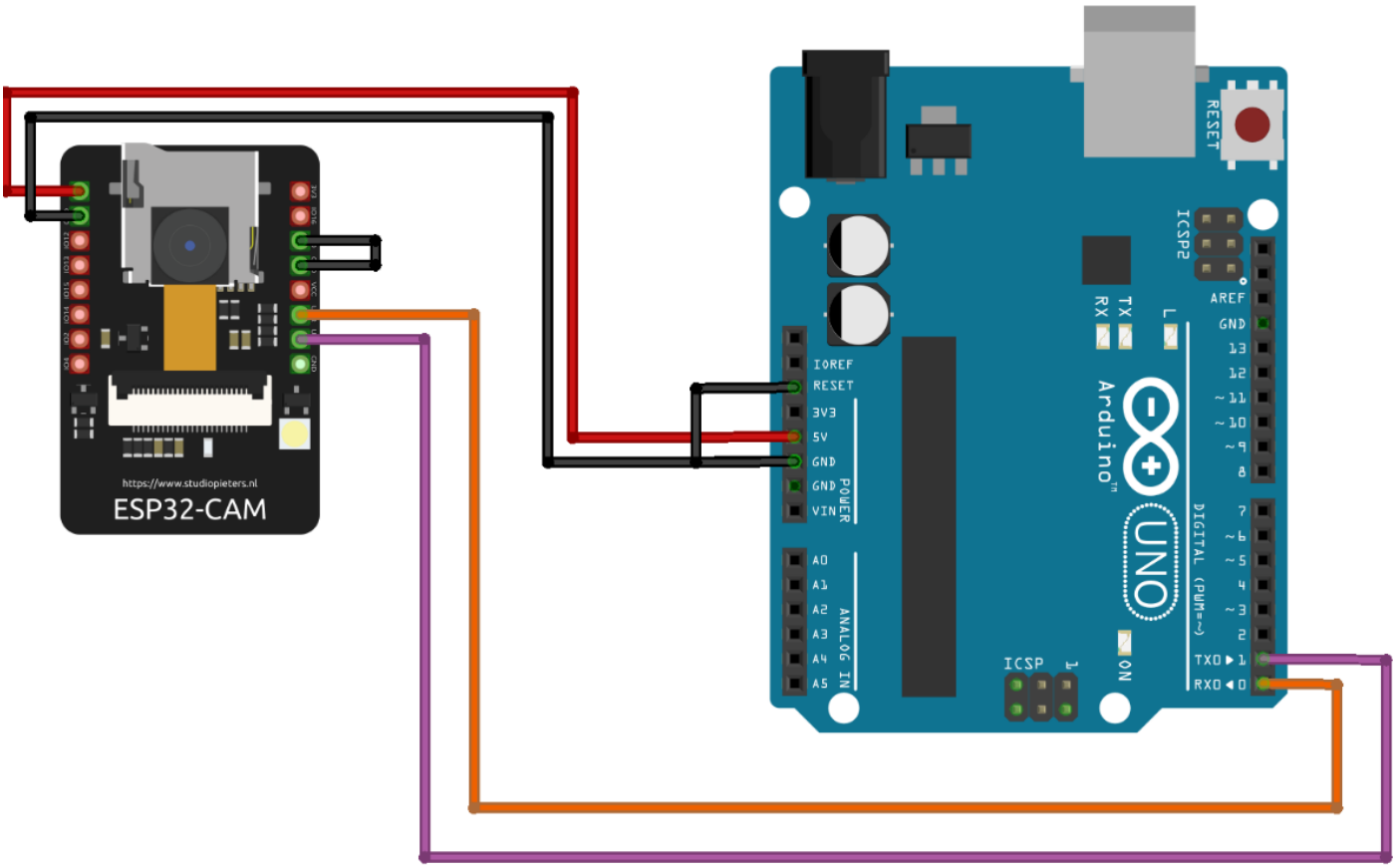


Fig 2: Setup for uploading code into ESP32

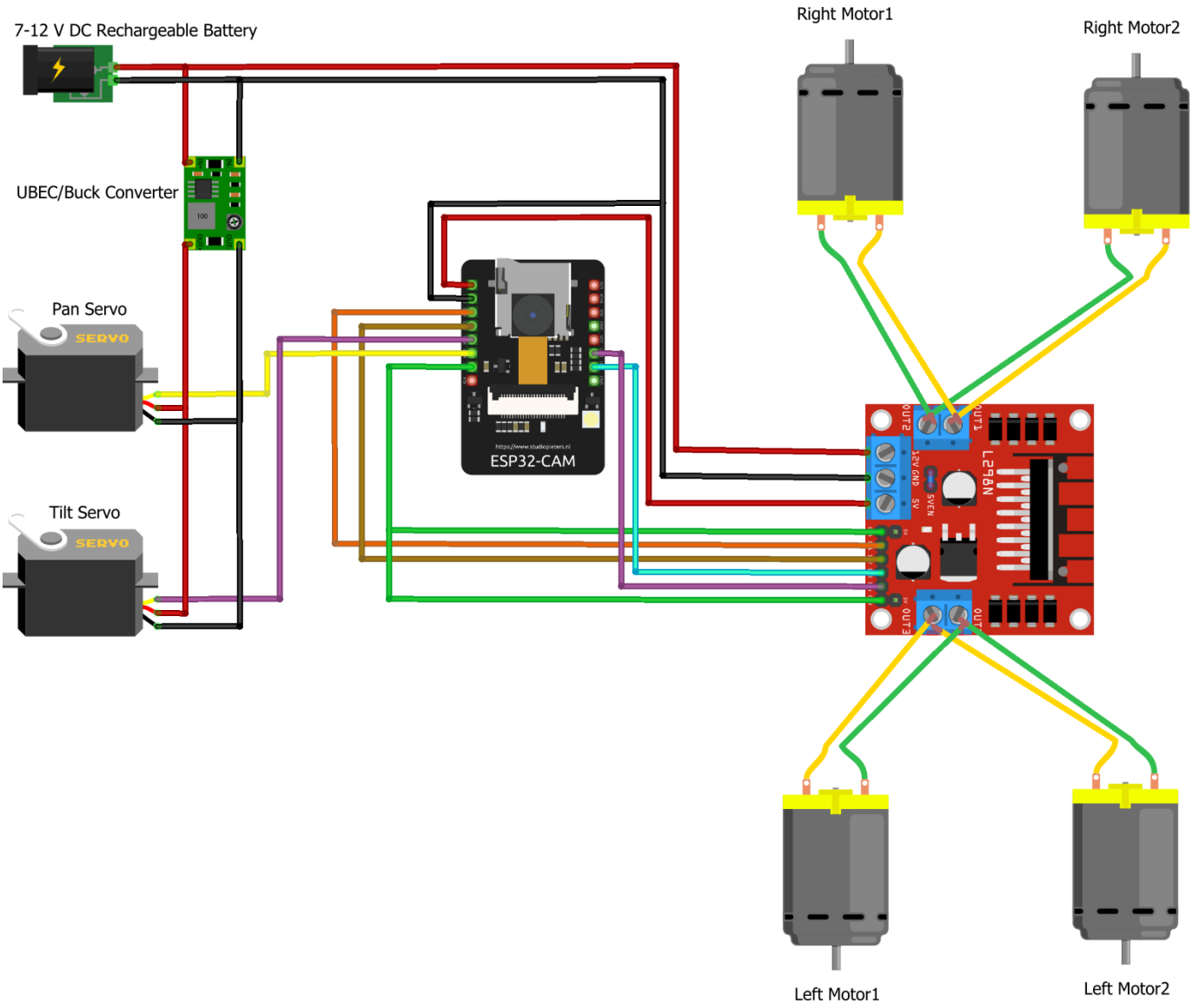


Fig 3: Circuit diagram

Final View of The Project:

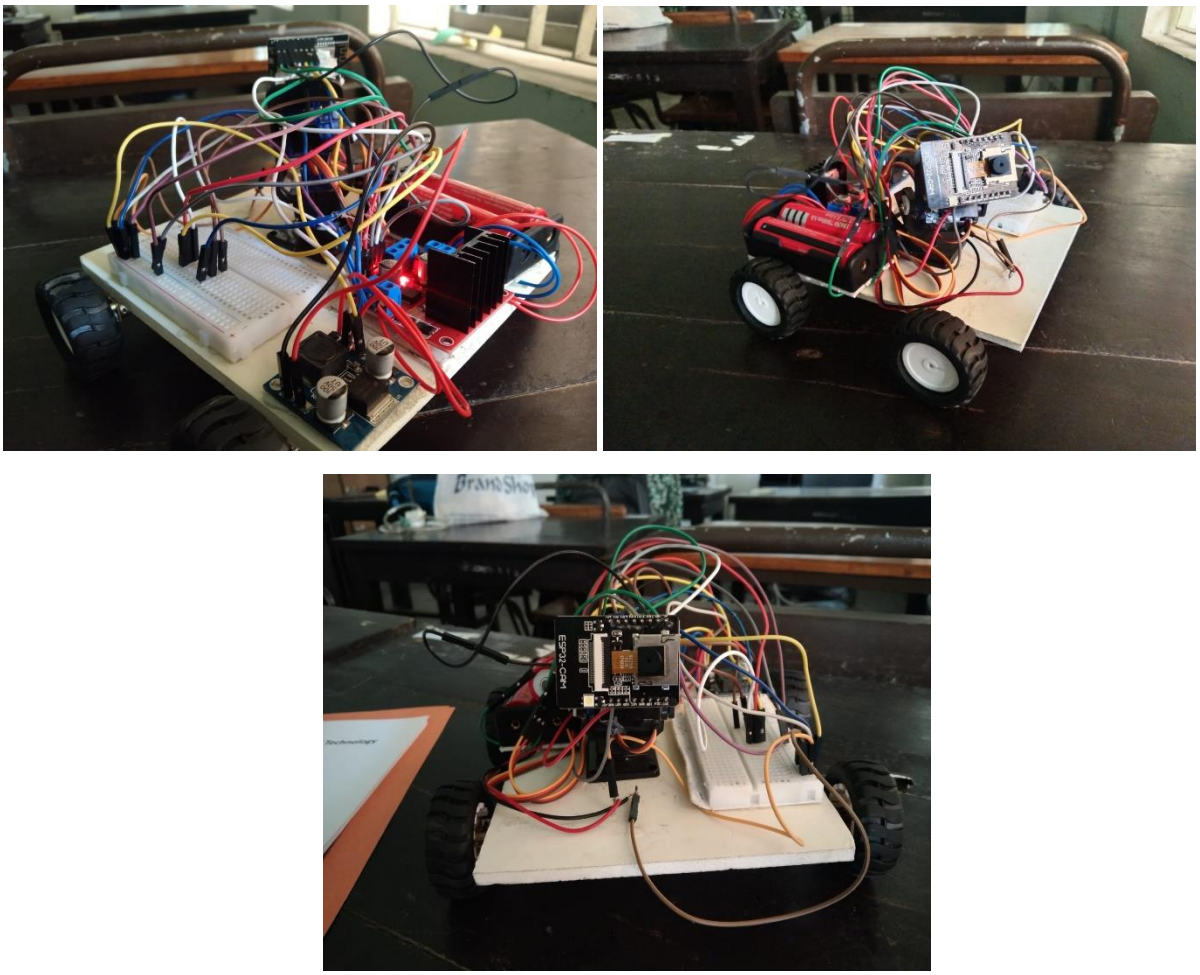


Fig 4: Image of the project from different angles.

Pseudo code :

```
Import required libraries and dependencies

Define motor pins and constants

Define WebSocket URLs, HTML code, and other constants

Create instances of the AsyncWebServer, AsyncWebSocket, and Servo classes

Define functions for controlling the motors, handling web requests, and
```

```
WebSocket events

Define a function for setting up the camera

Define the setup function:
  - Initialize Serial communication
  - Set motor pins as outputs
  - Attach servo objects to the corresponding pins
  - Configure LEDC channels for speed and light control
  - Connect to Wi-Fi using provided credentials
  - Set up routes and handlers for web server
  - Begin the server
  - Call the setupCamera function

Define the loop function:
  - Handle any pending WebSocket events

Define the setupCamera function:
  - Configure camera pins and settings
  - Initialize the camera using the provided configuration

Define event handlers for WebSocket events:
  - Handle WebSocket connect, disconnect, data, pong, and error events

Define request handlers for web server:
  - Handle root path and not found requests

Define functions for controlling the car's movements and sending commands to
the car:
  - rotateMotor: Control the motor direction based on the motor number and
direction
  - moveCar: Control the car's movements based on the input value (UP, DOWN,
LEFT, RIGHT, STOP)
  - sendButtonInput: Send button input commands to the WebSocket server

Initialize the WebSocket connections and start the setup process
```

Cost analysis:

Name	Price * Unit (TK)
ESP32	750

Servo Motor SG90	150 * 2
Motor Driver	180
N20 Gear motor	350 * 4
Li-ion Rechargeable Battery	80 * 2
Breadboard	100
PVC board	100
Pan Tilt Camera Mount Assembly	480
Buck Converter	180
Wheels	110 * 4
Total	**4100**

Discussion:

We successfully ended our project But There were many components troubling the projects.Our several components worked but got wrecked. As a result,we bought those components again,it costs a lot for us as students.

At the end of the final project we couldn't show our project working as several components didn't work,but we took a video when it was working fine.

Conclusion:

A surveillance car is a vehicle equipped with various technologies and systems to gather information and monitor a specific area or situation. It can be used for security purposes, law enforcement, or even private investigations. In conclusion, a surveillance car project involves the development and deployment of a vehicle equipped with advanced technology and sensors for monitoring and surveillance purposes. It is essential to define clear objectives, select appropriate equipment and sensors, ensure reliable power and connectivity, and establish robust data storage and transmission systems.