WiFi Based UGV Operation

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Contents

***Abstract*—This manual shows how to develop a web controller to operate on UGV**

1 Building UGV

1.1 Use the below manual for assembly and to configure the connections of the UGV (ESP32, Motor Driver and Motors).

```
https://github.com/gadepall/EE5161/blob/main
    /ugv/manual.pdf
```

2 Implementation of the Web Controller

2.1 Get the required code from

```
https://github.com/Chaitanya−Varun/Intro−to−
    UAV/blob/main/WiFi_UGV_Controller/
    WiFi_UGV_Controller.ino
```

2.2 Now change the SSID and password in the required field in the code corresponding to the local WiFi you use for operation.

2.3 Compile and Upload the code to ESP32 using a microUSB (or wirelessly) and open the Serial Monitor in Arduino IDE. While uploading the code make sure to press the boot key on the ESP32 to flash the code into memory.

2.4 Obtain the IP Address of ESP32 and paste it on any web browser. If the IP Address is not visible, press the enable key on ESP32 to rerun the initialization.

3 Using the Web Controller

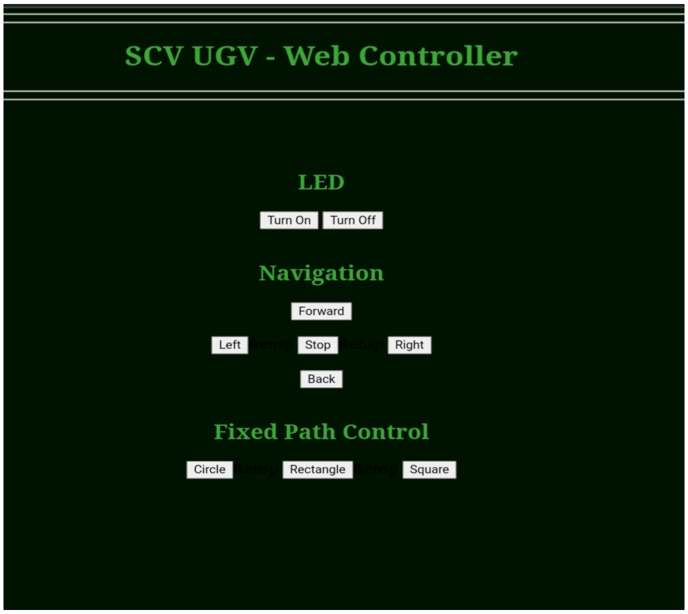

Fig. 4: User Interface

The web interface would be as shown in the figure 4. As it runs on a web platform, it can be used on any device (laptop or mobile). The functionalities cover

- Turning the LED ON and OFF.
- Navigation Commands which include
  - Forward : For making the bot move forward.
  - Back : For making the bot move backward.
  - Left : For making the bot move left.
  - Right : For making the bot move right.
  - Halt : For making the bot to halt.
- Trace fixed paths such as
  - Rectangle
  - Square
  - Circle*

The web interface is written in basic HTML code directly from the Arduino IDE. When a button is presssed, a corresponding string request will be sent to local WiFi server. The server then broadcasts onto the connected devices, where our ESP32 acts as a client. The received string is decoded to its required functionality.