Automatic Smart Speed Breaker System Based on Vehicle Speed with IoT

Project Operation:

The Automatic Smart Speed Breaker System is designed to monitor the speed of oncoming vehicles and dynamically respond by activating a servo-controlled speed breaker if a vehicle is found to be over-speeding. The operation of the project is outlined below:
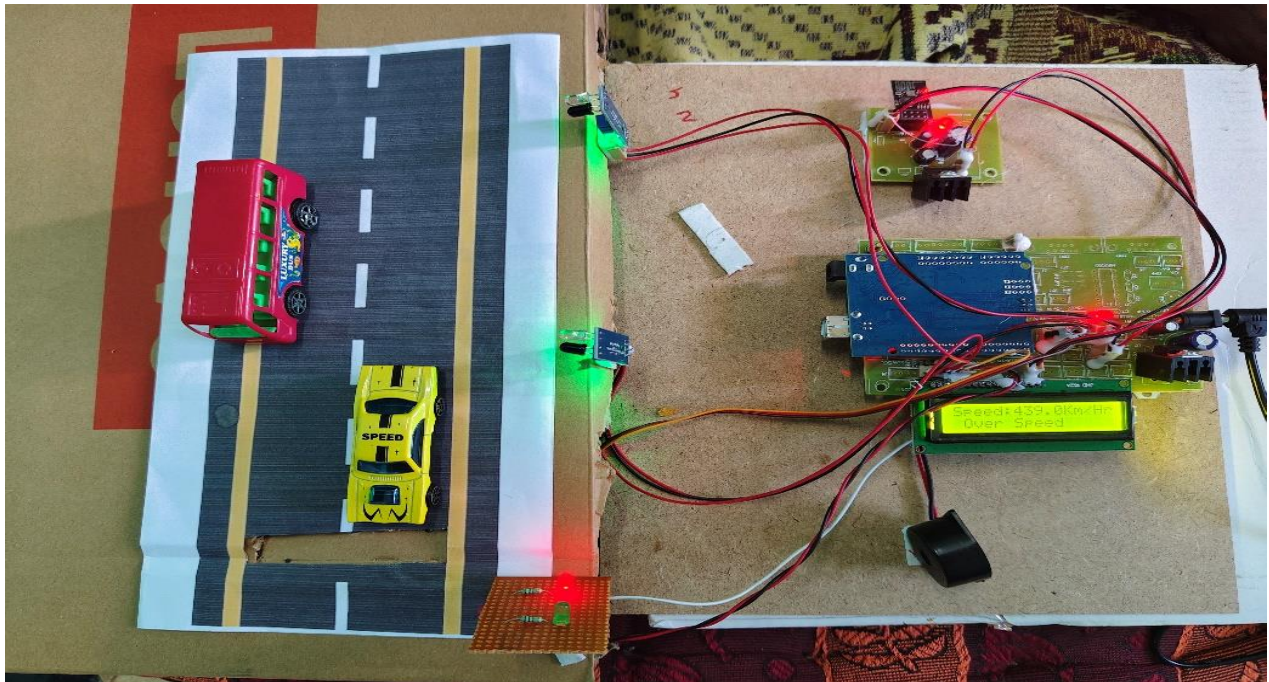

Fig 1 Circuit of Proposed Methodology

When the system is powered on, the 16x2 LCD screen initializes and displays the welcome message

Fig 2 Powering on Circuit

After powering up and initializing, the system tries to establish a Wi-Fi connection. At this stage, the LCD screen displays

Wi-Fi ID and Password Used

1. Wi-Fi SSID (ID): iotserver
2. Wi-Fi Password: iotserver123

Fig 3 Wi-fi Connection

Downloading and Using the Mobile Telnet App

To monitor the system's output and vehicle speed data wirelessly, we use the Mobile Telnet application.

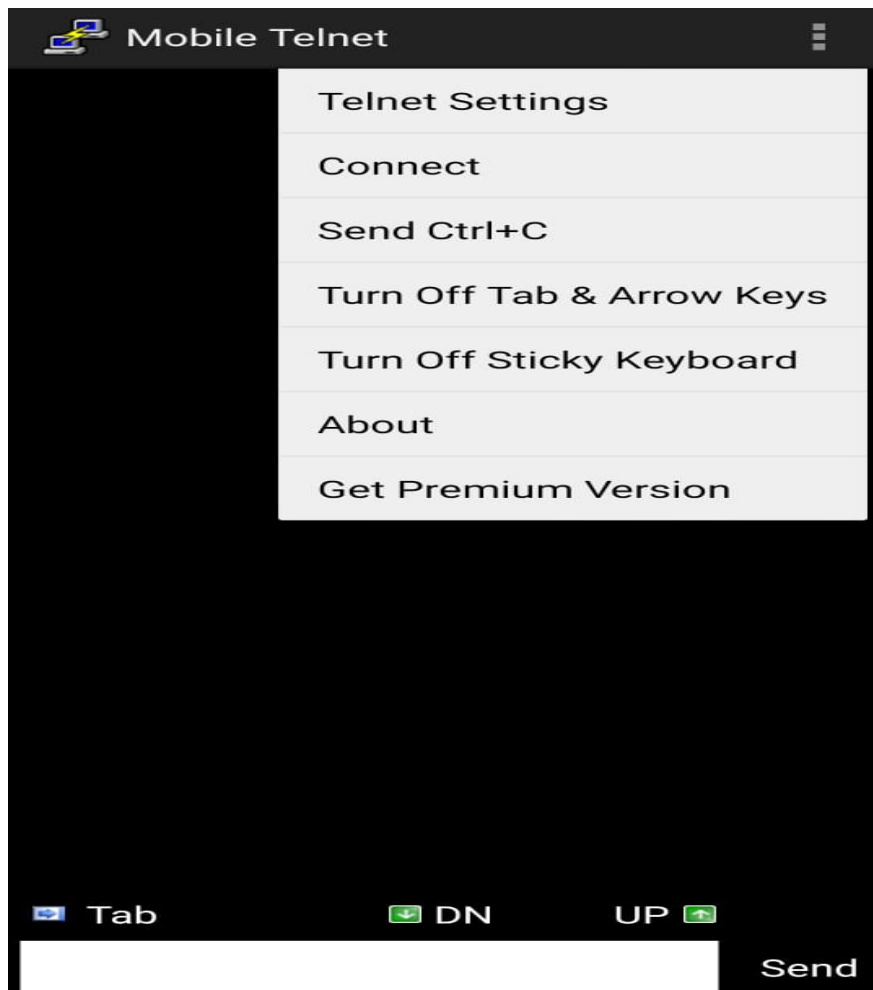The image shows the Mobile Telnet App home screen after installation.

Fig 4 Mobile Telnet Connection

This image shows the full view of the Smart Speed Monitoring and Control System setup when no vehicle is detected between the sensors.
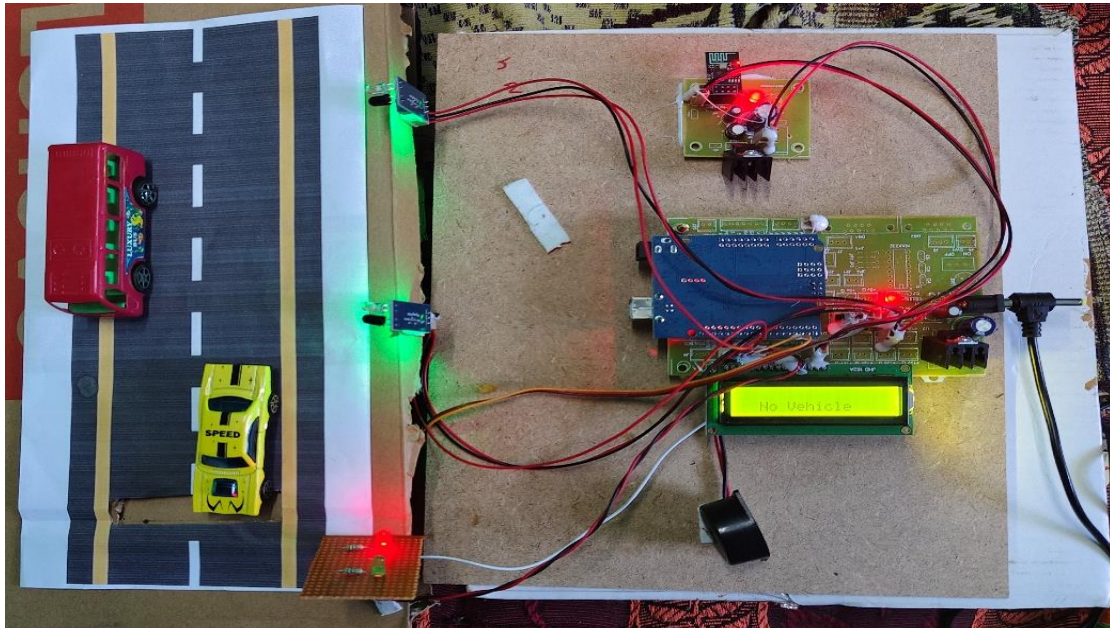

Fig 5 Vehicle Detection

The message Waiting on the LCD indicates that no vehicle has been detected yet between the two IR sensors. It shows the system is actively monitoring and ready to measure the vehicle speed once a vehicle crosses the sensors.

Fig 6 Waiting for Vehicle

The vehicle's speed is calculated based on the time taken to travel a fixed distance (5 meters), using two IR sensors.

- The computed speed is displayed on a 16x2 LCD.

- Based on the speed:
- If speed ≤ 100 km/h (Normal Speed):
- Normal Speed is displayed on the LCD.
- Green LED is turned ON, Red LED is OFF.
- Buzzer remains OFF.
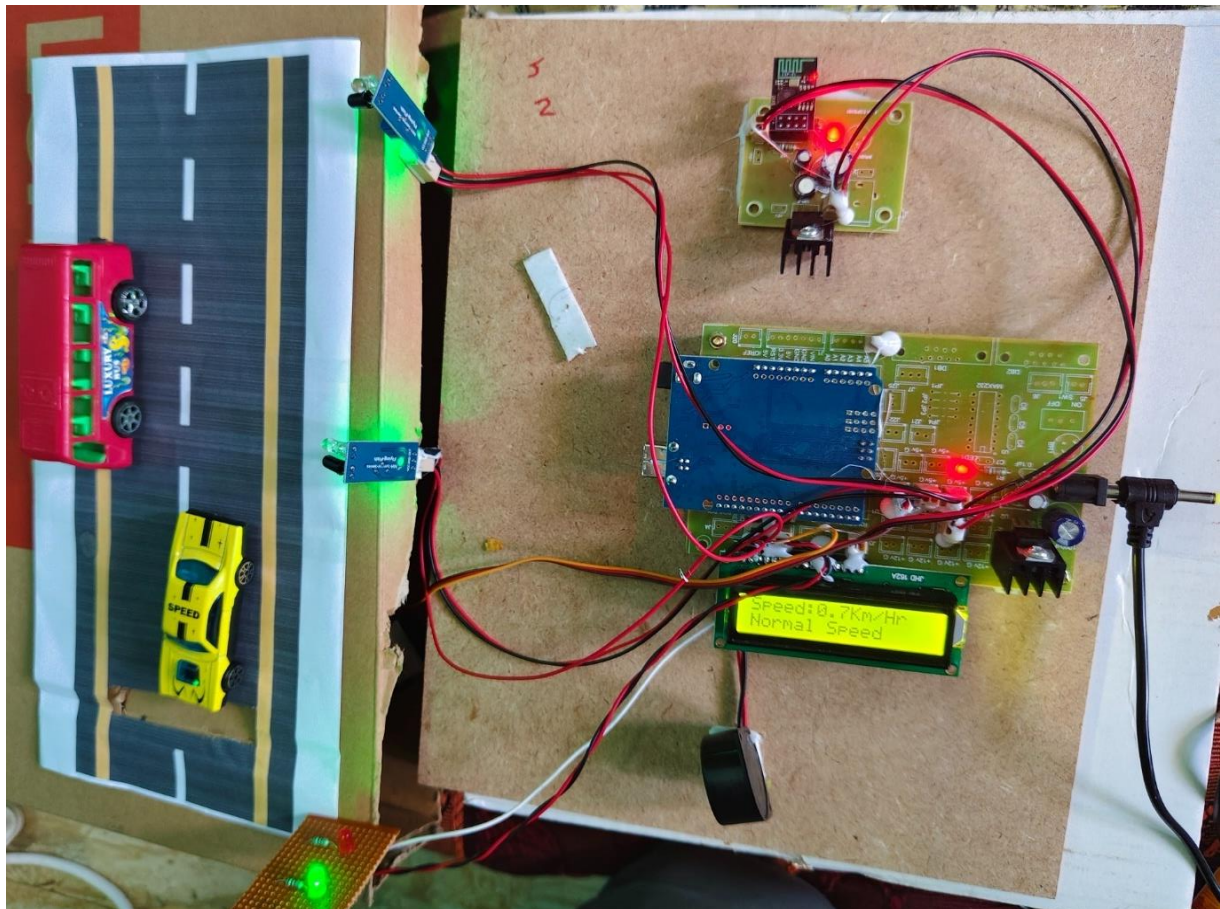- Speed data is transmitted to the cloud server via ESP8266 using an HTTP GET request.

Fig 7 Vehicle Passed with normal speed

if speed > 100 km/h (Over-Speeding):
- Over Speed is displayed on the LCD.
- Buzzer and Red LED are activated, Green LED is OFF.
- The servo motor raises the speed breaker by rotating to 110 degrees.
- An alert and speed data are sent to the cloud server.

- After a delay, the servo motor resets the breaker to its original position (10 degrees).
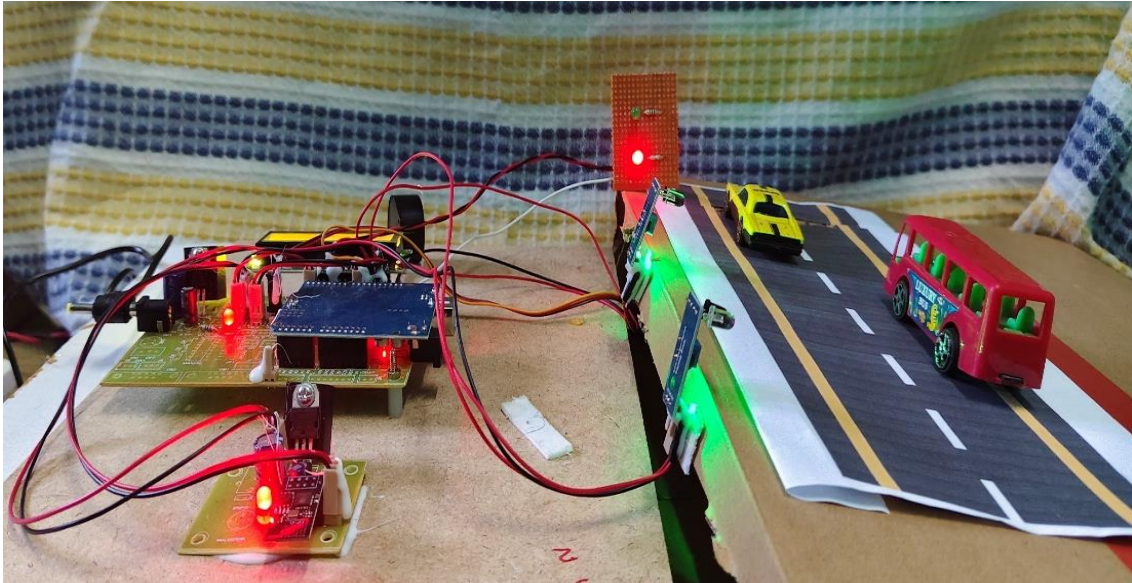

Fig 8 Vehicle Passed with Over speed

The device is connecting to the local IP 192.168.4.1 on port 23 (Telnet port).

- It is receiving speed data from the Arduino system, which is sent via ESP8266 Wi-Fi module using AT commands (AT+CIPSEND in the code).
- Any speed greater than 100 Km/hr is flagged as "Over Speed".
- If speed <= 100, it's labeled Normal Speed.
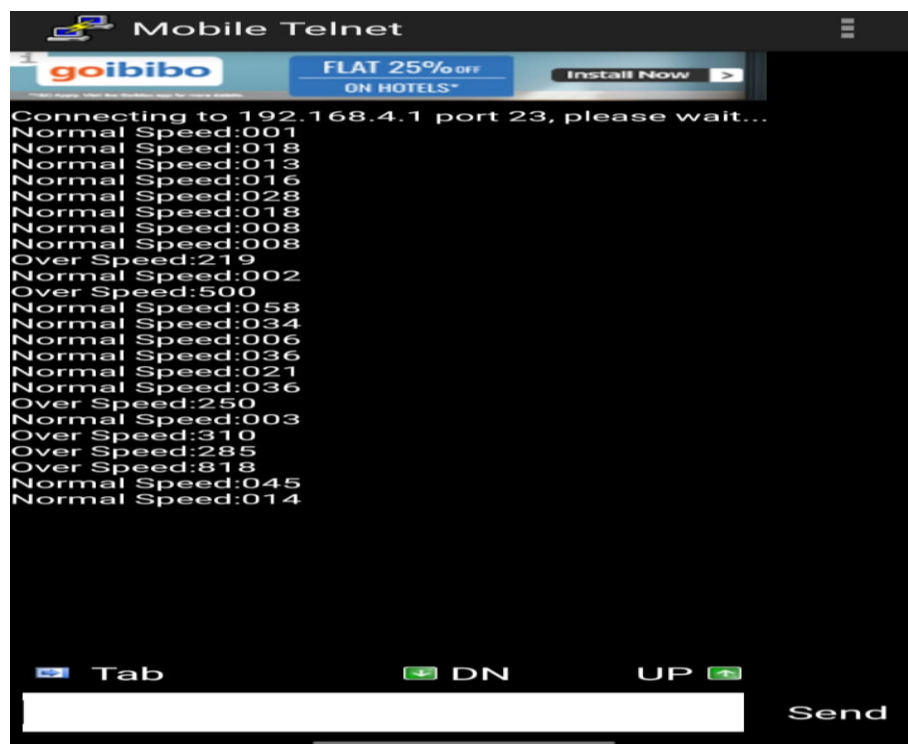- These messages are sent via Wi-Fi to a connected device using:

Fig 9 Storing the data on Mobile telnet

Speed Readings vs Speed Breaker Status

Vehicle ID	Speed (km/h)	Speed Limit (km/h)	Status	Speed Breaker Action
1	30	100	Normal	No Action
2	45	100	Normal	No Action
3	108	100	Over Speed	Take Action
4	120	100	Over Speed	Take Action
5	35	100	Normal	No Action

Table 1 Speed Readings vs Speed Breaker Status