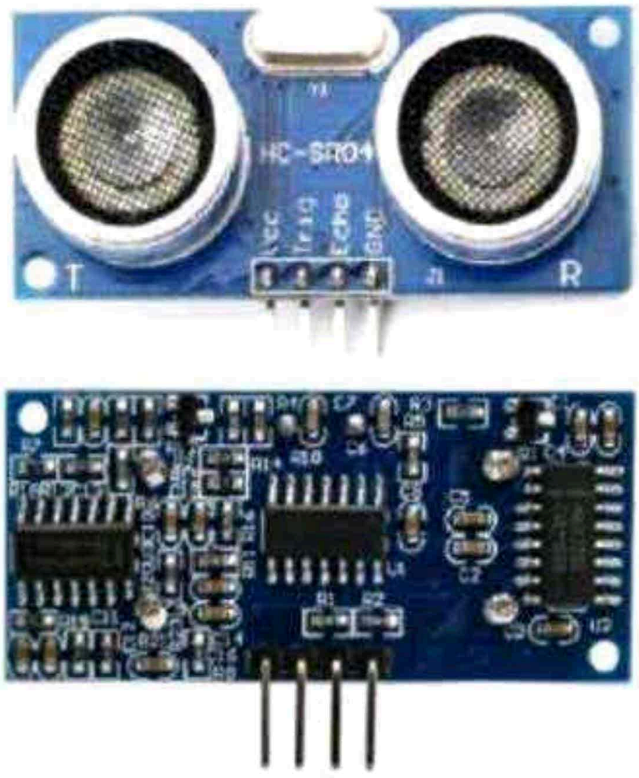
Project title: Traffic Management System – IoT

PHASE 2: INNOVATION

SENSOR:



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ULTRASONIC SENSOR

Definition for sensor:

Ultrasonic sensor (HC-SR04):

Ultrasonic sensor sends out sound wave and listens for them to bounce back. By timing how long. the bounce-back takes, it can tell how far away an object is. It's like using echoes to measure distance.

STEPS FOR FLOWCHART:

STEP 1: Start the program.

STEP 2: Initialization

i. Turn on the system.
ii. Initialize the ultrasonic sensors.
iii. Check connectivity with the traffic management control centre.

STEP 3: Data Collection:

i. Activate ultrasonic sensors.
ii. Measure distance of vehicles from the sensor.
iii. Use multiple sensors to measure vehicle speed.

STEP 4: Data Processing:

i. Compare the collected data against predefined thresholds.
ii. Calculate average speed of vehicles.

STEP 5: Decision Making:

i. If vehicle density is above a threshold, consider it as traffic Congestion.
ii. If average speed is below a threshold, consider it as Slow-moving traffic.

STEP 6: Traffic Management:

i. If congestion is detected, modify traffic light duration to Ease the congestion.
ii. If slow-moving traffic is detected, send alerts to nearby traffic Signals to warn drivers or adjust signal timings.
iii. Provide real-time data to the traffic management control Centre for manual interventions if needed.

STEP 7: Feedback Loop:

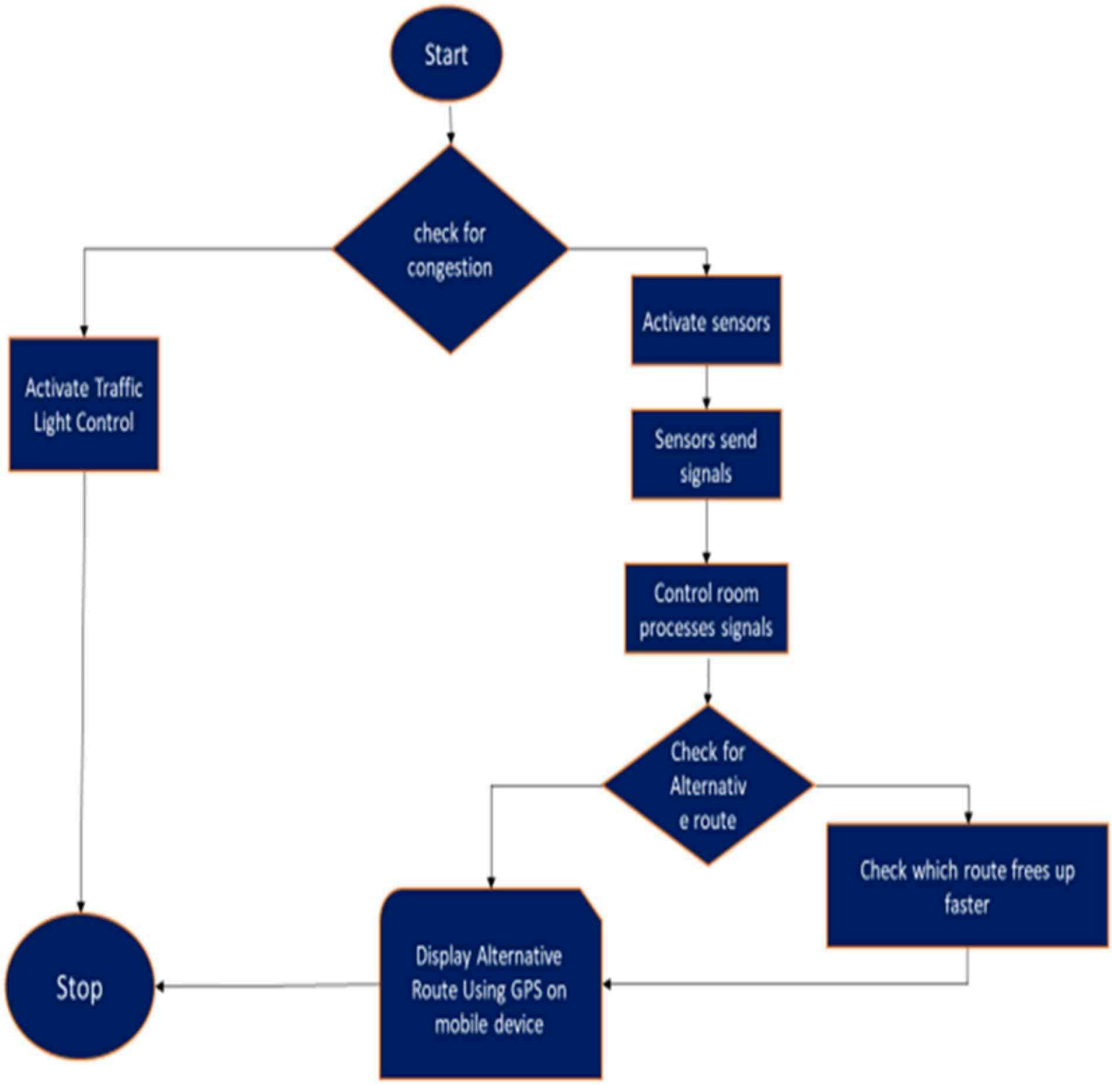
i. Continuously monitor the situation.
ii. If traffic eases, revert to normal traffic light durations.
iii. If traffic worsens, apply further modifications to the light Durations or send additional alerts.

STEP 8: Wait for a set time.

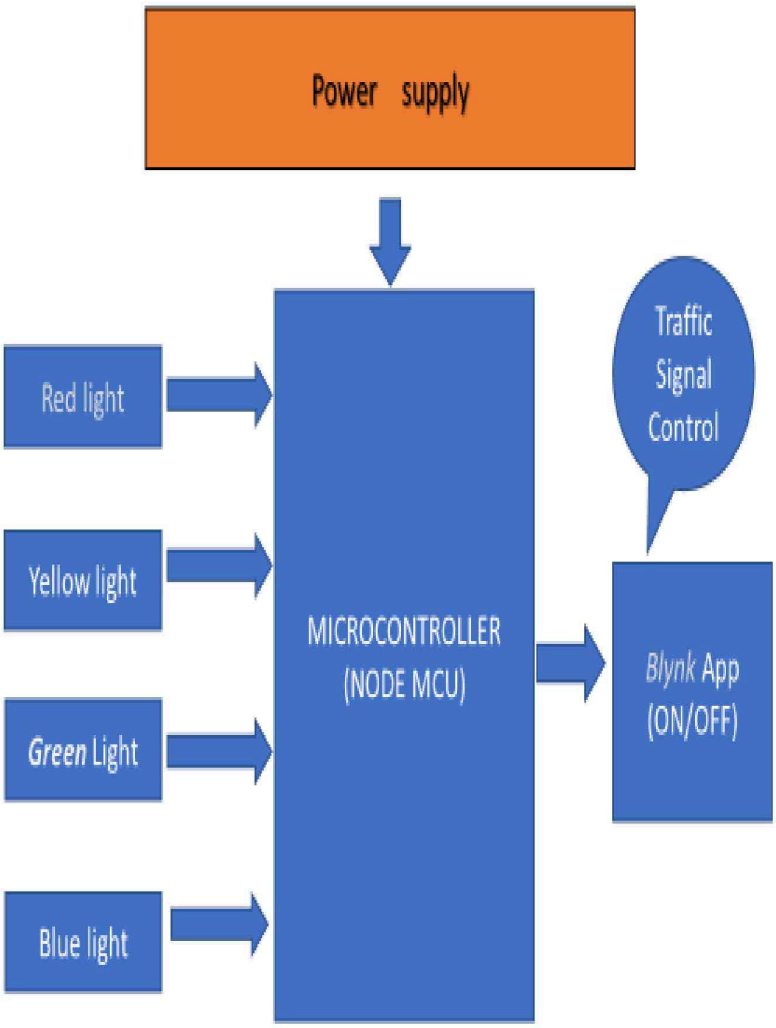
STEP 9: Repeat continuously to the end.

STEP 10: End the program.

FLOW CHART:


Start
check for congestion
Activate Traffic Light Control
Activate sensors
Sensors send signals
Control room processes signals
Check for Alternativ e route
Check which route frees up faster
Display Alternative Route Using GPS on mobile device
Stop

BLOCK DIAGRAM:



Block Diagram Description:

1.Microcontroller (NODE MCU):

process it and This is the brain of the system, collecting data from sensors and Managing output actions and displays.

2.Red light:

Requires vehicles to come to a complete stop. It's usually placed facing the traffic that needs to stop and allows perpendicular traffic to proceed

3.Green light:

It's placed facing the Indicates it's safe to go traffic that has the right of way.

4.yellow light:

Warns that the signal about to change from green to red. Drivers should slow Down and prepare to stop if it's safe to do so.

5.Power supply:

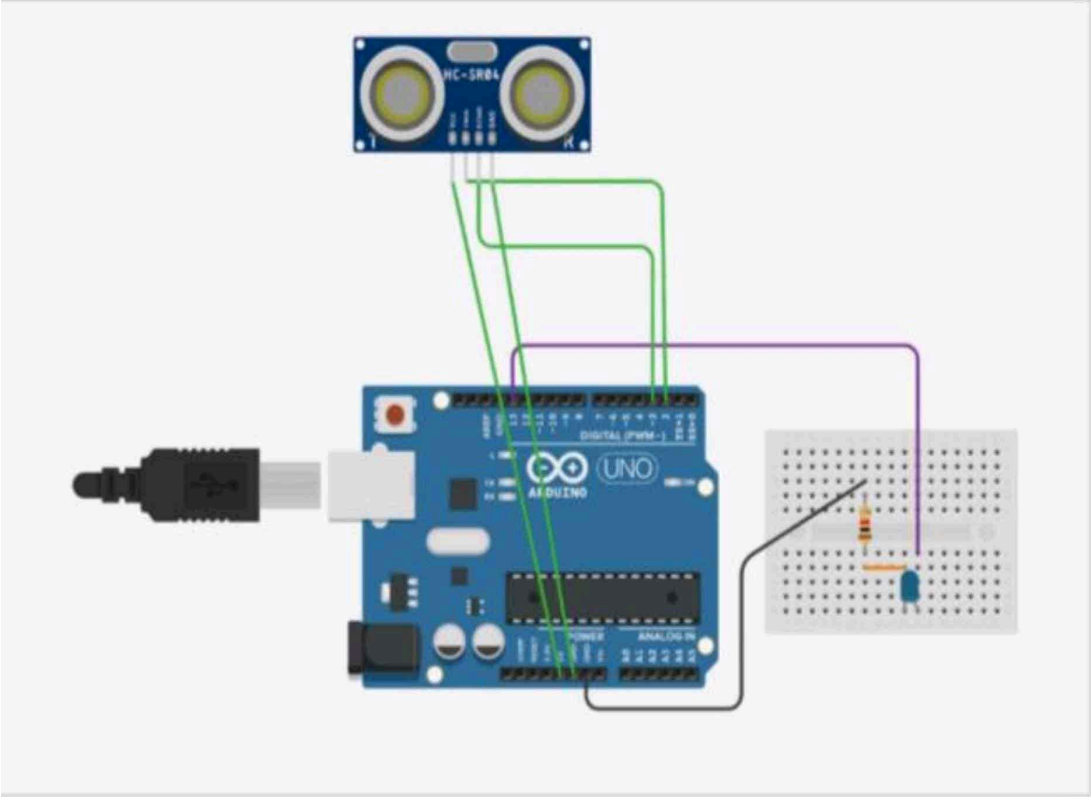
provides power to the entire system. This could be batteries, solar panels, or a direct power source.

6.Blynk (Traffic signal control) ON/OFF:

It facilitates remote control and monitoring of traffic signal in a traffic

management System through a smartphone app, enhancing flexibility and efficiency.

CIRCUIT DIAGRAM:



APPLICATION:

1. Real-time updates in instant traffic information keeps Users informed of road condition.
2. Navigation and Alternatives are in GPS to guide users, Suggesting routes to avoid congestion.
3. Traffic Alerts notifications are help users to adapt to Changing traffic conditions like accident or weather.