PROJECT 10 :TRAFFIC MANAGEMENT SYSTEM

PHASE-1(PROJECT DEFINITION & DESIGN THINKING)

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PROJECT DEFINITION

AIM OF THE PROJECT :

A smart traffic management system utilizing camera data, communication and automated algorithms is to be developed to keep traffic flowing more smoothly. The aim is to optimally control the duration of green or red light for a specific traffic light at an intersection. The traffic signals should not flash the same stretch of green or red all the time, but should depend on the number of vehicles present. When traffic is heavy in one direction, the green lights should stay on longer; less traffic should mean the red lights should be on for a longer time interval

This solution is expected to eliminate inefficiencies at intersections and minimize the cost of commuting and pollution

The Internet of Things (IoT), also sometimes referred to as the Internet of Everything (IoE), consists of all the web-enabled devices that collect, send and act on data they acquire from their surrounding environments using embedded sensors, processors and communication hardware. These devices, often called ”connected” or ”smart” devices, can sometimes talk to other related devices, a process called machine-to-machine(M2M) communication, and act on the information they get from one another

Humans can interact with the gadgets to set them up, give them instructions or access the data, but the devices do most of the work on their own without human intervention. Their existence has been made possible by all the tiny mobile components that are available these days, as well as the always-online nature of our home and business networks. Connected devices also generate massive amounts of Internet traffic, including loads of data that can be used to make the devices useful, but can also be mined for other purposes. All this new data, and the Internet-accessible nature of the devices, raises both privacy and security concerns. But this technology allows for a level of real-time information that we have never had before

DESIGN THINKING

SYSTEM DESIGN :

The Architecture system consists of six modules

1) Raspberry Pi

2) LED lights which are used for the purpose of signaling.

3) Traffic cameras which are used for monitoring traffic.

4) Node MCU Microcontroller

SYSTEM IMPLEMENTATION :

Steps in the proposed system for controlling traffic light

1. Camera: Continuously record traffic video.

2. Read Image: Read frames of the traffic image

3. Grayscale Image Conversion:

It converts color image to grayscale image. This method is based on different color transforms.According to the R, G, B value in the image, it calculates the value of grayscales and converts the image into a grayscale image.

4. Image Binarization: Grayscale image is converted into black and white image.

5. Traffic Signal Control: Based on vehicle count signal timings are changed and the respective LED glows. Steps for controlling traffic light

1. Initialize System

2. Configure ESP 8266 module for multi access point through AT commands

3. Connect WI-FI module to WI-FI network

4. Start UDP local port in WI-FI module

5. Establish UDP connection to Raspberry pi

6. Wait for data