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SMART CONTROL OF TRAFFIC LIGHT USING ARTIFICIAL INTELLIGENCE

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Abstract: - *Traffic light management is one of the intense technical hazards of the urban areas in almost every country around the world. This is due to speedy increase in number of vehicles in order to decrease the time and complexity. The project developed by us will enable the traffic light to switch from red to green based on traffic density. The easy way to control a traffic light by using timer for each section since, we proposed a system for controlling the traffic light by image processing. The system can notice vehicles through pictures and also the image sequence can then be analyzed victimization digital image process for vehicle detection, and in line with traffic conditions on the road stoplight will be controlled.*

Key Words: **Computer Vision, Traffic management, Traffic light system, Traffic congestion, Artificial intelligence, Smart surveillance**

1. INTRODUCTION

In India traffic is enlarge four times faster than population. Nowadays, so many countries suffer from the traffic congestion issues that affect the transportation method in cities and cause serious trouble. Even though replacing traffic officers and custodian by automatic traffic systems, the optimization of the heavy traffic jam is still a big issue to be faced, especially with several junction nodes. Traffic jams also build many other critical issues and problems which straightly affect the human routine lives and sometime reason for death for example if there is an emergency vehicle like ambulance on the roadway going with critical patient. In that situation if an ambulance gets stuck in a large traffic j am then there are high chances that the patient can't reach the hospital on time. It is very key to design an advanced traffic system which controls traffic intelligently to avoid accidents, collisions and traffic jams. If one path has less traffic and the other path with high traffic but the duration of green light for both paths is same then this is the waste of available time and is inefficient. By considering the above example if the path with higher traffic density should glow green signal light for a longer period than the path with lesser density. This technique is based on the calculation of the traffic density by correlating the live traffic image with a reference image. The large difference is, higher traffic density is noticed. However, the traffic problem is very tricky due to the involvement of various parameters. First, the traffic flow depends on the time of the day where the traffic high hours are generally in the morning and in the afternoon. On the days of the week where weekends reveal minimum traffic while Mondays and Fridays generally show heavy traffic oriented from cities to their outskirts and in reverse direction respectively and time of the month as leaves and summer. Secondly, now a days traffic light system executed with hard coded delays where the light glows time slots are fixed generally and do not depend on real time traffic flow. The third point is concerned with the state of one light junction that influences the flow of traffic at adjacent junctions. Also, the generally traffic system a crucial issue is related to the smooth motion through junctions of emergency vehicles of higher priorities such as ambulances, rescue vehicles, fire brigade, police and V.I.P persons that could get poke in the mob. The regular traffic system needs to improve to solve the severe traffic congestion, alleviate transportation troubles, reduce traffic volume and waiting time, minimized over all travel time and enlarge the benefits in health, economic and environmental divisions. This paper proposes a simple low budget, traffic light control system that aims to defeat many defects and improve that traffic management

2. SYSTEM DESCRIPTION:

The congestion of urban traffic is turning into one among the important problems with increasing population and vehicles in cities. Traffic jams not only cause further delay and stress for the drivers, however additionally increase fuel consumption, add transportation prices, and increase pollution. though it looks to interpenetrate everyplace, megacities area unit those most stricken by it. And it's increasing nature makes it imperative to understand the road traffic density in period of time for higher signal management and effective traffic management. The traffic controller is one in every of the important factors touching traffic flow. this traffic management systems that are in place area unit usually static, which implies that they do not regulate per the requirements of the traffic flow.

Proposed Method:

Our proposed system aims to present a traffic light controller based on Computer Vision that can adapt to the current traffic situation. It uses live video feed from the CCTV cameras at traffic junctions for real-time traffic density calculation by detecting the vehicles at the signal and setting the green signal time accordingly. The vehicles are classified as car, bus/truck, or rickshaw to obtain a more accurate estimate of the green signal time. We have used object detection like computer vision in order to detect the number

of vehicles for each direction. We then set the timers of these traffic signals according to vehicle density in each direction and hence the system becomes adaptive. This helps to optimize the green signal times, and traffic is cleared at a far quicker rate than a static system, therefore reducing the unwanted delays, congestion, and waiting time, which in turn will reduce the fuel consumption and pollution

3. IMPLEMENTATION

An implementation may be a realization of a technical specification or algorithmic rule as program, computer code parts, or different system although programming and readying. various implementations might exist for specifications or norms. Implementation literally suggests that to place into product or to carry out.

3.1. PROJECT MODULES

The modules incorporated in this project are:

1. User login module
2. Uploading file module
3. Simulation module
4. Vehicle detection module
5. Signal switching module

3.2 MODULE DESCRIPTION

3.21 User login Module:

In the User login module, the user can login through user id and password.

3.22 Uploading file module:

After successfully login, we can upload the video file.

3.23 Simulation Module:

A simulation is developed from scratch using computer vision library to simulate traffic signals and vehicles moving across a traffic intersection.

3.24 Vehicle Detection Module:

In this module we are detecting the number of vehicles in the image received as input from the camera. More specifically, it will allow output as the number of vehicles of each vehicle class such as car, bike, bus, truck, and rickshaw.

3.25 Signal Switching Algorithm:

This algorithm upgrades the red, green, and yellow times of all signals. These timers are set bases on the count of vehicles of each class collected from the vehicle detection module and many other factors such as the number of lanes, average tempo of each class of vehicle, etc.

3.3 TECHNOLOGIES USED

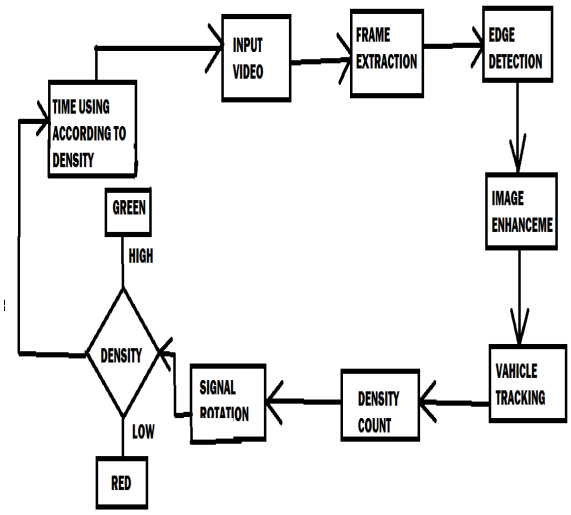
1. The .NET Framework

Microsoft .NET could be a set of Microsoft software system technologies for apace building and group action XML internet services, Microsoft Windows-based applications, and internet solutions. The .NET Framework could be a language-neutral platform for writing programs which will simply and firmly interoperate. There's no barrier with .NET: there are various languages on the market to the developer together with Managed C++, C#, Visual Basic and JavaScript. The .NET framework provides the muse for components to act seamlessly, whether or not regionally or remotely on utterly totally different platforms. It standardizes common information varieties and communications protocols in order that parts created in several languages will simply interoperate. The multi-language capability of the .NET Framework and Visual Studio .NET permits developers to use their existing programming skills to make every type of applications and XML internet services. The .NET framework supports new versions of Microsoft's previous Visual Basic and C++ (as VB.NET and Managed C++), however there are variety of latest additions to the family. ".NET" is additionally the aggregate name given to different programming parts based upon the .NET stage. These will be the two items (Visual Studio.NET and Windows.NET Server, for example) and administrations.

2. SQL SERVER

SQL Server is a perfect knowledge set stage to be used in shared and devoted internet facilitating conditions. Of the various SQL Server releases, simply SQL Server specific need to never be utilized in Shared Hosting things, this version was supposed for application improvement conditions because it were. The SQL Server readying steerage for internet Hosting Environments provides best practices to transcription SQL Server to boost security, occupier confinement, and also the presentation of your expedited SQL Server organization. check scripts for provisioning shoppers and knowledge sets to be used in shared facilitating are incorporated.

3.4 ARCHITECTURE



4. CONCLUSION:

This provides a solution to reduce traffic congestion on roads overriding the older system of hard coded lights which cause unwanted delays. Reducing congestion and waiting time will lesser the number of accidents and also reduces fuel consumption which in turn will help in controlling the air pollution. Moreover, the purview of our project can be augmented for Coordination Control which places traffic signals on a coordinated system so that drivers encounter long strings of green lights.

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