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Intelligent Traffic Controlling and Monitoring System Based on Image Processing

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ABSTRACT: The change in automobile fleet size and consequently within the quantity of traffic isn't accompanied through boom within the space of the road in all of the time. This cause traffic congestion commonly in all the urban areas. In order to avoid traffic jams, we are in situation to come up with an new solution. In preceding decades many technology were evolved and designed solutions to make road transportation safer. Some amongst these techniques were conventional where as other are incorporated. New designed systems are capable of informing drivers about the traffic situations and feasible hazards of the road way with the help of Artificial Intelligent transportation system. This project work proposes Internet of Things-based approach that remedies troubles raised by using traffic congestion this offers strategy to raising traffic associated pollution also. This structure consists of two modules, 1. Hardware module and 2. Software program module. The device makes use of new technology for actual-time collection, employer and transmission which offer the statistics to estimate the correct site traffic density exploited by using traffic-conscious applications.

I. INTRODUCTION

The vehicles are detected by way of the camera device thru snap shots rather than the usage of digital sensors embedded in the pavement. A dig cam may be placed alongside the traffic light. It will capture photo sequences. Image processing is a better technique to manipulate the state change of the traffic light. It shows that it could decrease the traffic congestion and avoids the time being wasted via a green light on an empty lane.

It is also more reliable in estimating emergency vehicle presence and act accordingly as it makes use of actual traffic photos. It visualizes the practicality, so it functions a whole lot better than the ones systems that rely upon the detection of the automobiles' metal content. The machine has the capacity to revolutionize traffic surveillance and manipulate technology due to its low cost and capability for huge scale.

II. LITERATURE REVIEW

To utilize the utmost capacities of junctions with traffic signals, having preemptive and predictive capabilities with integrated traffic sensors are important elements for an intelligent traffic signal control system. Recently, an efficient and preemptive traffic signal control strategy known as iterative tuning (IT) has been developed by exploring repetitive characteristic of traffic demand on working days, whereas on weekends or days with special events, severe nonrepetitive disturbances limit the performance of IT strategy practically. This paper proposes a preemptive and

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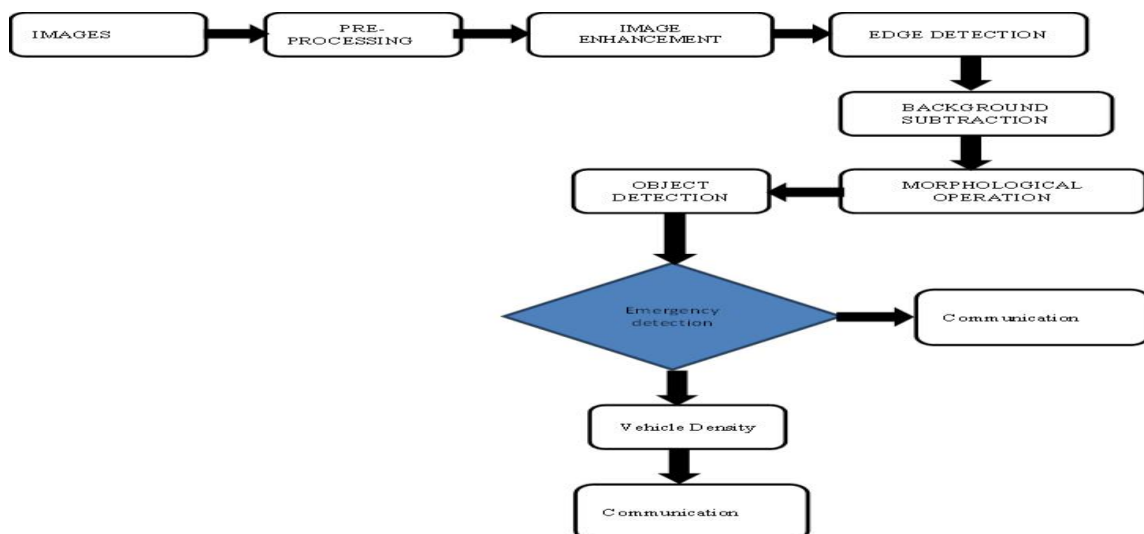
predictive methodology, i.e., IT strategy with reactive compensation (ITRC), to reduce network delay time and eliminate unnecessary stops for vehicles. With anticipation of repetitive traffic flows based on historical data, nominal traffic signals are tuned by IT controller over repetitions.

The reactive compensation, which is junction-based model predictive control strategy (JMPC), makes adjustments on nominal traffic signals and compensates the nonrepetitive elements. Rigorous analysis provides sufficient condition for guaranteeing the convergence of ITRC. Case study of Commonwealth Avenue in Singapore with heavy traffic from morning peak to evening peak hours is presented, and the simulation results show the effectiveness, robustness, and convergence of ITRC over pure IT strategy and pure JMPC strategy for scenarios with various traffic variations, respectively.

III. WORKING PRINCIPLE

Many techniques have been developed in Image Processing during the last four to five Decades .Most of the methods are developed for enhancing images obtained from unmanned space probes, spacecrafts and military reconnaissance flights. Image Processing systems are becoming widely popular due to easy availability of powerful personnel computers, large memory devices. graphics softwares and many more.

Image processing involves issues related to image representation, compression techniques and various complex operations, which can be carried out on the image data. The operations that come under image processing are image enhancement operations such as sharpening blurring, brightening, edge enhancement Traffic density of lanes is calculated using image processing which is done of images of lanes that are captured using digital camera. We have chosen image processing for calculation of traffic density as cameras are very much cheaper than other devises such as sensors Making use of the above mentioned virtues of image processing we propose a technique that can be used for traffic control. The block diagram of the proposed algorithm is given on next page.



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IV.HARDWARE AND SOFTWARE

DESCRIPTION

Microcontroller

All the functions required on a single chip. A microcontroller differs from a microprocessor, which is a general-purpose chip that is used to create a multi-function computer or device and requires multiple chips to handle various tasks. A microcontroller is meant to be more self-contained and independent, and functions as a tiny, dedicated computer.

They are typically designed using CMOS (complementary metal oxide semiconductor) technology, an efficient fabrication technique that uses less power and is more immune to power spikes than other techniques. There are also multiple architectures A microcontroller is an integrated chip that is often part of an embedded system. The microcontroller includes a CPU, RAM, ROM, I/O ports, and timers like a standard computer, but because they are designed to execute only a single specific task to control a single system, they are much smaller and simplified so that they can include used, but the predominant architecture is CISC (Complex Instruction Set Computer), which allows the microcontroller to contain multiple control instructions that can be executed with a single macro instruction. Some use a RISC (Reduced Instruction Set Computer) architecture, which implements fewer instructions, but delivers greater simplicity and lower power consumption.

Early controllers were typically built from logic components and were usually quite large. Later, microprocessors were used, and controllers were able to fit onto a circuit board. Microcontrollers now place all of the needed components onto a single chip. Because they control a single function, some complex devices contain multiple microprocessors.

Microcontrollers have become common in many areas, and can be found in home appliances, computer equipment, and instrumentation. They are often used in automobiles, and have many industrial uses as well, and have become a central part of industrial robotics. Because they are usually used to control a single process and execute simple instructions, microcontrollers do not require significant processing power.

PIC16F877A

The term PIC, or Peripheral Interface Controller, is the name given by Microchip Technologies to its single – chip microcontrollers. PIC micros have grown to become the most widely used microcontrollers in the 8- bit microcontroller segment.

The PIC16F877A CMOS FLASH-based 8-bit microcontroller is upward compatible with the PIC16C5x, PIC12Cxxx and PIC16C7x devices. It features 200 ns instruction execution, 256 bytes of EEPROM data memory, self programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, a synchronous serial port that can be configured as either 3-wire SPI or 2-wire I2C bus, a USART, and a Parallel Slave Port.

SOUND SENSOR

GENERAL DESCRIPTION

The Sound sensor is a small board that combines a microphone and some processing circuitry. It provides not only an audio output, but also a binary indication of the presence of sound, and an analog representation of its amplitude. It detects sound from silence and outputs digital trigger signal. The digital signal can have an adjustable trigger level. LEDs indicate power and output signal.

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PRODUCT DESCRIPTION

The sound sensor is able to measure noise levels in decibels (dB) at frequencies around 3-6 kHz where the human ear is most sensitive. It is a sensor whose mode of detection utilizes sound waves. It extracts a sound signal from a modulated signal, such as that of an FM transmission. The threshold-sensitivity can be adjusted on the sensor. It is highly sensitive and easy to use.

SOFTWARE DESCRIPTION

MATLAB:

GETTING STARTED

If you are new to MATLAB, you should start by reading *Manipulating Matrices*. The most important things to learn are how to enter matrices, how to use the: (colon) operator, and how to invoke functions. After you master the basics, you should read the rest of the sections below and run the demos.

At the heart of MATLAB is a new language you must learn before you can fully exploit its power. You can learn the basics of MATLAB quickly, and mastery comes shortly after. You will be rewarded with high productivity, high-creativity computing power that will change the way you work.

Introduction - describes the components of the MATLAB system.

Development Environment - introduces the MATLAB development environment, including information about tools and the MATLAB desktop.

Manipulating Matrices - introduces how to use MATLAB to generate matrices and perform mathematical operations on matrices.

Graphics - introduces MATLAB graphic capabilities, including information about plotting data, annotating graphs, and working with images.

Programming with MATLAB - describes how to use the MATLAB language to create scripts and functions, and manipulate data structures, such as cell arrays and multidimensional arrays.

V. PROPOSED SYSTEM

The vehicles are detected by way of the camera device thru snap shots rather than the usage of digital sensors embedded in the pavement. A dig cam may be placed alongside the traffic light. It will capture photo sequences. Image processing is a better technique to manipulate the state change of the traffic light. It shows that it could decrease the traffic congestion and avoids the time being wasted via a green light on an empty lane. It is also more reliable in estimating emergency vehicle presence and act accordingly as it makes use of actual traffic photos. whole lot better than the ones systems that rely upon the detection of the automobiles' metal content. The machine has the capacity to revolutionize traffic surveillance and manipulate technology due to its low cost and capability for huge scale.

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VI. CONCLUSION

Traffic control using image processing" technique that we propose overcomes all the limitations of the earlier (in use) techniques used for controlling the traffic. Earlier in automatic traffic control use of timer had a drawback that the time is being wasted by green light on the empty. This technique avoids this problem. Upon comparison of various edge detection algorithms, it was inferred that Canny Edge Detector technique is the most efficient one. The project demonstrates that image processing is a far more efficient method of traffic control as compared to traditional techniques.

The increased response time for these vehicles is crucial for the prevention of loss of life. Major advantage is the variation in signal time which control appropriate traffic density using Image matching. The accuracy in calculation of time due to single moving camera depends on the registration position while facing road every time Output of GUI clearly indicated some expected results. It showed matching in almost every interval that were decided as boundaries like 10%, 35%, 68% etc.

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