Design of Traffic Light Based on Camera Intelligent Setting

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Abstract: With the progress of science and technology in today's world and the rapid development of China's economy, it has become a common phenomenon that every family has a car, so the traffic problem should also come. Traffic jam has become a serious problem, especially when there are fewer cars in the green direction and traffic jam in the red direction. At present, how to improve the traffic with the least influence on people's travel habits has become a big problem. Therefore, based on intelligent traffic light setting design, the camera adopts geographic information system to analyze terrain and USES tree camera image to realize intelligent control, in order to effectively relieve traffic congestion, facilitate people's travel, save travel time and realize optimal control of traffic control system.

1 Introduction

Based on camera device design of intelligent traffic lights, is the use of intelligent monitoring technology, the function of digital clock an intelligent multi-function traffic light, it can real-time electronic monitoring traffic light intersection traffic condition, connect different intersections traffic information, intelligent monitoring, management, dredge traffic, so as to realize the optimization of traffic control of a kind of technology. At present, in traditional traffic light intersections, the number of red and green seconds is fixed under any road conditions, which wastes travel time. Drivers are likely to violate traffic laws for personal reasons, causing traffic accidents, road congestion and other problems. Based on the network technology, the intelligent traffic light realizes the acquisition, connection and management of road conditions. Due to the functions of digital clock and electronic monitoring, the device can intelligently adjust the traffic light duration of the vehicles. Because of its real-time characteristics, the intelligent traffic light can play a great role in solving traffic problems. How to use intelligent traffic lights, intelligent monitoring, how to maximize the convenience of people to travel, save travel time, to ensure the safety of travel, the solution of existing traffic problems is an important problem to be solved by intelligent traffic lights.

2 Research Background and Significance

At the beginning of the founding of new China, China's transportation situation is very backward due to economic constraints, almost in a state of paralysis. Only 80,800 roads and 51,000 civilian cars are open to traffic. With the reform and opening up in 1978, China's economy began to usher in the spring. In 1988, China achieved the zero breakthrough of high-speed, and in 2013, the network of traffic routes has been created. Up to now, the roads that can be opened to traffic have been everywhere, and even civilian cars have become regular visitors to every family, even bringing a variety of traffic problems. Therefore, the emergence of intelligent transportation is essential. Intelligent transportation system also known as intelligent transportation system, it is mainly the use of modern technology means will be advanced science and technology (information technology, computer technology, data communication technology, sensor technology, electronic control technology, artificial intelligence, etc.) and the contemporary world traffic closely linked together. With a more economical manpower and material resources, but more accurate method serve the

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contemporary transportation. An integrated transportation system ensures road, vehicle, and personnel efficiency, environmental improvement, and energy conservation. Intelligent traffic light design based on camera equipment has also become a boon for improving traffic.

3 Intelligent Traffic Light Designs

3.1 The Theoretical Design

Although the current number and driving restrictions have alleviated the traffic problem to some extent, they have brought inconvenience to most citizens, and have not substantially solved the problem, which is in urgent need of change. The design of intelligent traffic lights should take into account traffic rules, people's travel habits, and road safety and so on. The intelligent electronic cameras are arranged in the four directions of east, south, west and north respectively. With the detectability, recording and remote observation of the intelligent cameras, we can observe the traffic of the vehicles in all directions at any time, mainly including the real-time formation of the vehicles and the accumulated traffic in the current period. The observation range of the camera must be accurate. When the camera records the vehicle, the best shooting area should be the middle of the driving lane, down to the stop line including the vehicle. At the same time, the installation and operation of the camera must be firm to prevent deviation in the recording process. (The specific section adopts the method of adjusting measures to local conditions to consider the installation direction of the intelligent camera in detail.)Finally, the duration of traffic lights in all directions can be adjusted intelligently in a timely manner through the centralized summary of the processor and the information feedback of various images.

3.2 The Structure Design

Intelligent cameras set up traffic light design based on traffic congestion hinder social development main solutions: intelligent traffic light of the application of artificial intelligence technology, data analysis method, when a vehicle is mainly composed of cameras to record the number of traffic and the length of the team, by the central microprocessor connected to the terminal signal traffic light control system of the equipment, to change the color of the light, when detected abnormal problem (emergency vehicles), test equipment will be tested, finally traffic returned to normal. Make pedestrians, vehicles by the safest protection, in the fastest and most orderly way through, reduce the congestion of vehicles.

3.3 Principle of Traffic Flow Monitoring

Intelligent monitoring monitors the length of vehicles and congestion, and calculates the volume of traffic in certain periods or even different periods. Main principle for the device contains sensitive infrared system, compared with the traditional mode of induction coil, more sharp precision infrared system, due to the direct connection within the system can transmit information directly to the terminal computer PLC system and timely summary to the info shop, input and output with high strength, have strong ability of driving at the same time, because the system is mainly as a conduit of information processing, so with a strong reserve space and fast speed. The schematic diagram of the detection module is as follows：

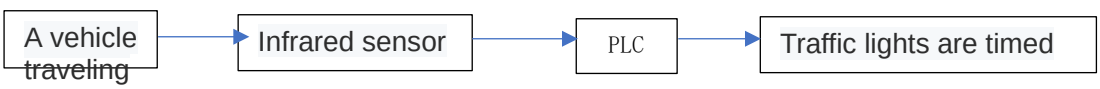

Figure 1 schematic diagram of the detection module

3.4 Operation of Sensor

The sensor detects the traffic condition of the vehicle and analyzes the vehicle condition, so as to accurately control the traffic lights. Based on the number and length of the fleet, as well as the rush

hour and holiday peak traffic, the system will start to intelligently determine the color of the traffic lights in all directions. Traffic lights and digital clocks can drive the LCD, so that the LCD display road conditions, traffic flow results, the number of circuit, forming a complete system. The operation of the sensor is the core of the intelligent traffic light. It detects the traffic condition of vehicles, and the traffic condition and traffic flow information can be transmitted to the background through the sensor, so as to control the traffic signal, which can effectively alleviate the traffic congestion problem and make people travel more convenient and shorter. The sensor operation diagram is shown as below：

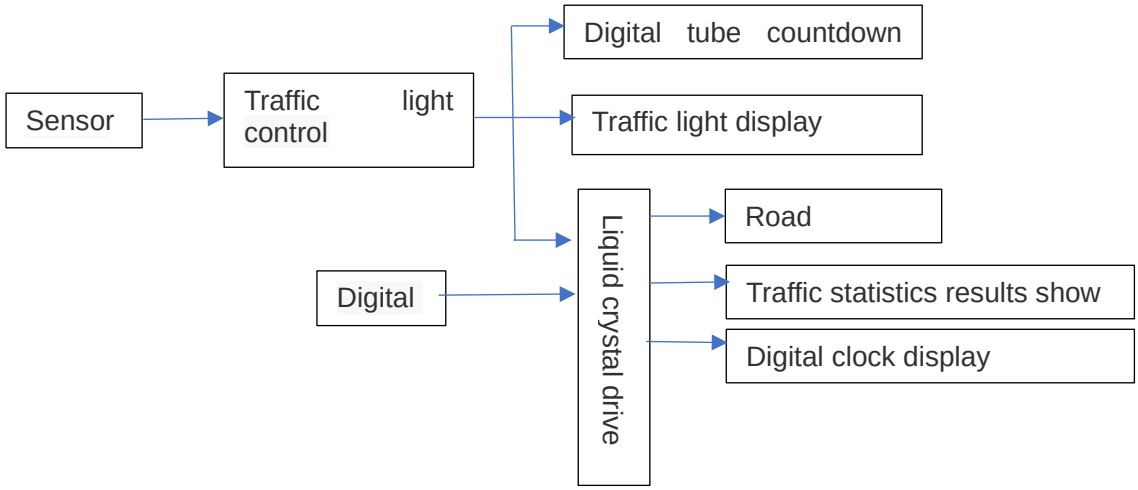

Figure 2 operation diagram of sensor detection

4 Technical Preparations

4.1 Information and Image Processing Technology

Information processing technology: since the development of information we have in the reform, in order to meet the need of social progress of our information processing technology, from the human long ago in manpower and material resources to carry on the simple, clumsy information records, storage and transportation to the computer's birth and widely used has become the information processing of the era of the second leap. From the period of manual processing to the period of mechanical information processing to the period of computer processing, our processing capacity and storage capacity have been greatly improved. Nowadays, efficient and accurate processing of information on the premise of labor liberation can provide reliable basis for prediction and decision-making in management activities in a timely manner.

Image processing technology: image processing technology is to use the computer to process the information on the image of the technology. The intelligent traffic light equipment mainly applies the enhancement of image technology, image data coding and image recognition. According to the image processing technology, we can grasp the road condition information in real time more efficiently.

4.2 System Software Composition

（1）Linux operating system

Linux is an open source operating system, there is no black box technology: its kernel small, efficient, kernel update speed;With good stability and portability, strong network functions, excellent file system support, rich standard API, and TCP/IP network protocol;Linux is a free OS that is competitively priced.Therefore, it is selected as the operating system of our system.Its operating system is as follows:

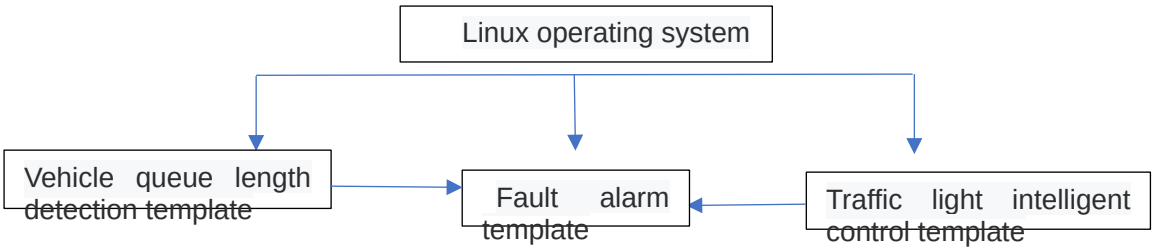

Figure 3 Linux operating system diagram

（2）Vehicle queue length detection module

The main function of the vehicle queue length detection module is to obtain the vehicle queue image of the intersection from the camera regularly, obtain the vehicle queue length of the corresponding direction through image processing, and pass the length parameter to the traffic light intelligent control module.

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（4）Fault alarm module

The main function of the fault alarm module is to detect and report the system fault. Once the fault occurs, the module sends the fault information to the monitoring center to inform the management personnel to deal with it in a timely manner. In case of power failure and system power failure, emergency power supply shall be used to provide temporary power supply for system related emergencies to complete fault alarm.

4.3 Application and Development Market of Intelligent Traffic Light Setting Technology for Camera Device

The design of traffic light based on the intelligent setting of camera is mainly based on the intelligent camera technology. With the great development trend of the world economy, China is developing rapidly at a level superior to that of the world. In artificial intelligence, from scratch to reach the world's leading level, from the application in the country's high-tech development, now more committed to social livelihood issues, through intelligence to change the people's living standards and height. The original traffic lights to ensure the safety of pedestrians, traffic order began to appear in London, England, and later for a variety of reasons continue to improve. Chinese traffic lights first appeared in the British concession in Shanghai in 1928. After many years of consistent traffic lights, they stubbornly adhere to their responsibilities of maintaining pedestrian safety and the sequence of vehicle trips, but they also begin to change under the urging of big data artificial intelligence. Just like today's new smart traffic light design based on the camera. Development should always keep pace with The Times. With the rise of China's economy, China attaches great importance to the development of traffic links. Road congestion has become an increasingly serious problem. Therefore, the design of intelligent traffic light setting based on camera device has become an inevitable result, an essential development and the most effective way to solve the problem. As an intelligent camera system, we need to adopt information and image analysis technology. Information analysis systems are systems and tools for producing, processing, transmitting, storing and utilizing data. This alone can greatly reduce the waste of human resources time efficient grasp of information and road conditions for effective measures. In the system after the mature we can equipped with WIFI communication protocol, so that we can make the vehicle users know when did not reach to the intersection traffic conditions to make the best solution, communication protocol and terminal connected at the same time, can save the cost of communication lines, road traffic information collected in the digital detectors, to achieve reunification of the information collect and distribute the intelligent adjustment. With the

continuous development of artificial intelligence technology, more manpower, material and financial resources can be reduced, and unnecessary waste of resources can be reduced, so as to achieve more accurate and higher-level services and promote the development of the country from all aspects. Compared with the analysis at home and abroad, the design of traffic light based on intelligent setting of camera device has become a new and even inevitable trend. Although the development prospect is bright, the market competition is increasingly fierce. In 2015, Britain launched a fully upgraded SCOOT camera technology smart traffic light system to automatically calculate the number of people crossing the road to adjust the timing of the traffic lights. China is also in the micro simulation and simulation of traffic flow, intersection traffic control strategy optimization and so on. Therefore, for the promising and competitive market to be developed, we should be more ready to do a good job in the development of China's intelligent traffic light industry.

5 Conclusion

This paper is based on the camera device intelligent set traffic lights design. The main idea of the project is to combine the current situation of China's transportation development, to solve the traffic problems caused by the oppression of the huge number of vehicles and the inconvenience of people's life and work with the large-scale expansion of highways and the continuous growth of the number of cars driven by the economy. Base on the country's high-end development of artificial intelligence to use high-tech to solve the livelihood of the people, the country's problems, to a complete traffic lights system to play the largest role. Due to my theoretical level is not mature enough, ability still needs to be improved and the limited experimental conditions, the article is a little insufficient, please correct your criticism.

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