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Density Based Traffic Control using RFID in Labview

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Abstract: The traffic control is the major technique used to reduce time and also to reduce accidents. This paper represents strategy for controlling the traffic signal according to the live traffic density. The traffic density is taken through RFID. The number of vehicles in the lane is calculated using a reader and tags. A reader is placed on the road and the tags are attached to the cars. As the cars passes through the reader it starts to count. Based upon the count, traffic signal time reduces and rises. Generally, traffic signal opens for every 60 seconds. This system opens the signal according to the live traffic density.

Keywords: LabVIEW, myRIO, RFID, Traffic density

I. INTRODUCTION

With the uncontrolled population growth, travelling has turned out to be a really difficult task in today's world. The increase in travelling people has caused a heavy growth in traffic at every nook and corner of the city. This in turn, is contributing to the wastage of precious time which leads to impatience and frustration of the people. Traffic congestion is a common problem that has increase due to the increased number of vehicles on the road. To deal with this problem, researchers have proposed many solutions. One of the currently used models was timer model. Traffic can be controlled to a great extent by using timers at each phase of the traffic. The cause of traffic is dependent on many factors like peak time, special days, season, bad weather, or unexpected events like accidents, special events or constructional activities. Once we get stuck in traffic, we may have to wait for hours to get out of it. We can solve this problem to a great extent by implementing this density-based traffic control system using RFID which continuously manages the traffic lights based on density of traffic. In RFID, the reader will detect the RFID tag and it will count the number of tags based on that the traffic signal light is controlled. LabVIEWis the platform used to process the input, and output will give to the myRIO and in turn myRIO will control the traffic signal light. This idea can be represented using a LED's as traffic light.

II. LITRATURE REVIEW

[1][2] In this paper, they use Ultrasonic sensor to measure the density of the traffic, but it has more disadvantages likevery sensitive to variation in the temperature, also it has more difficulties in reading reflection from soft, curved, thin and small object and also it will sense any object such as humans, animals, etc..which comes in its range. In our paper, we use RFID to measure the traffic density, it will only sense the vehicle which has RFID tag, so that we can measure the traffic density accurately.

[3]In this paper, they propose the LabVIEW simulation for control the traffic light based on time. Timer doesn't concern about the traffic density, if traffic density is either high or low, it will run according to its allotted time. To represent this, they use only simulation. In our paper, we measure the traffic density using RFID, according to the traffic density, the signal timing will be adjusted and also to represent this, we use simulation in LabVIEW and hardware implementation using myRIO.

[4][5]Image processing technique involves RGB to grayscale conversion, Edge detection etc., So it is complicated when it is applied to real time but in our paper, we measure the density using RFID, it is an easy and accurate way when compared to image processing.

[6] in this paper they use Infrared Sensors to measure the traffic density but it has low operating range and sensitive to any object which cross the sensor and also the they use Arduino Uno AT Mega 328P its structure is very poor, in our paper we use RFID which high range and only detect the vehicle which has RFID tag and we use myRIO which good structure.

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[7] in this paper radial basis function neural network used to measure the density of traffic and simulating in MATLAB it is a very tedious process, but in our paper, we use RFID to measure traffic density it is easy process and we implement in hardware.

[9][8] In this paper, they use Raspberry Pi as a microcontroller. In that, complex multitasking can't be done and it doesn't compatible with windows but there are more than 1.3 billion windows users around the world. In our paper, we use myRIO as microcontroller which can do complex multitasking and it is compatible with windows.

[10] They use RFID technology to control the traffic signal especially for Emergency vehicles only by LabVIEW simulation. In our paper, we use RFID technology to detect all the vehicles by that we measure density of traffic and we implemented it in hardware.

III. SYSTEM IMPLMENTATION

In this paper we are using RFID EM-18 reader module which generates 125KHz radio frequency wave continuously. When RFID tag comes in that range of radio frequency wave, the coil strip in that particular tag will get excited and it will powers the tag's transponder, unique data of the particular tag would send the information to the reader by transponder, at the same time RFID reader will receives the transmitted data. This data will be transferred to the processor. The processor considers each unique data as individual vehicle. The number of data received will be equal to the number of vehicles in the road. According to the number of vehicles the traffic signal timing will be adjusted. Similarly, there are three roads in the junction. Thus, in each road, number of vehicles were detected, the process checks the road in anticlockwise continuously, based upon the number of vehicles in each road, the signal timing will be optimized. As a result, the traffic is regulated accordingly.

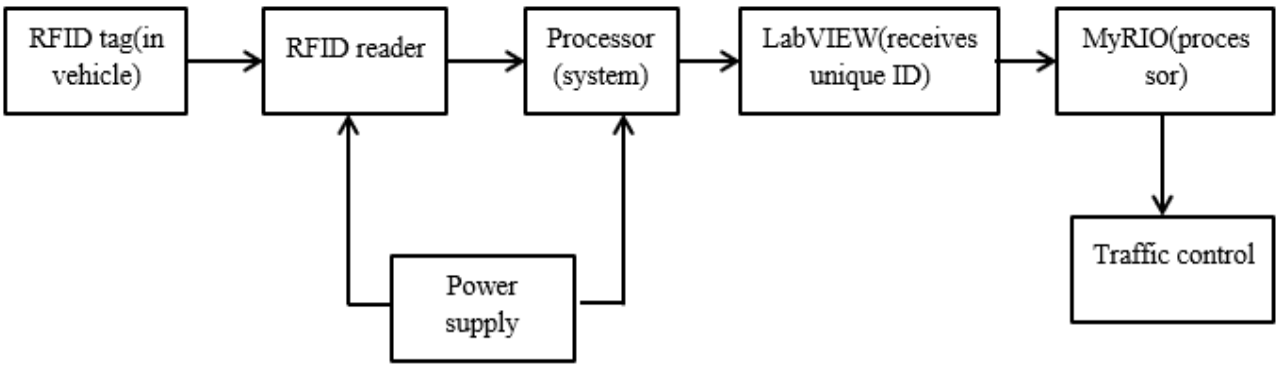

Fig.1 Block Diagram of the system.

IV. METHODOLOGY OF THE PROJECT

RFID reader module will emit the radio frequency wave and the RFID tag is fixed in the vehicle. When the tag detects frequency in the particular range of reader, it will transmit the unique Id to the reader. The reader receives the tag id and send it to the processor, then the processor will consider Id as a vehicle. Similarly, each Id is counted as an individual vehicle and then the number of vehicles is measured as a traffic density. Thereby, traffic signal timing is adjusted according to the vehicle count. The timing to hold the signal open is depend upon the vehicle present in the particular road. Correspondingly, other three roads work in the same way in anticlockwise direction.

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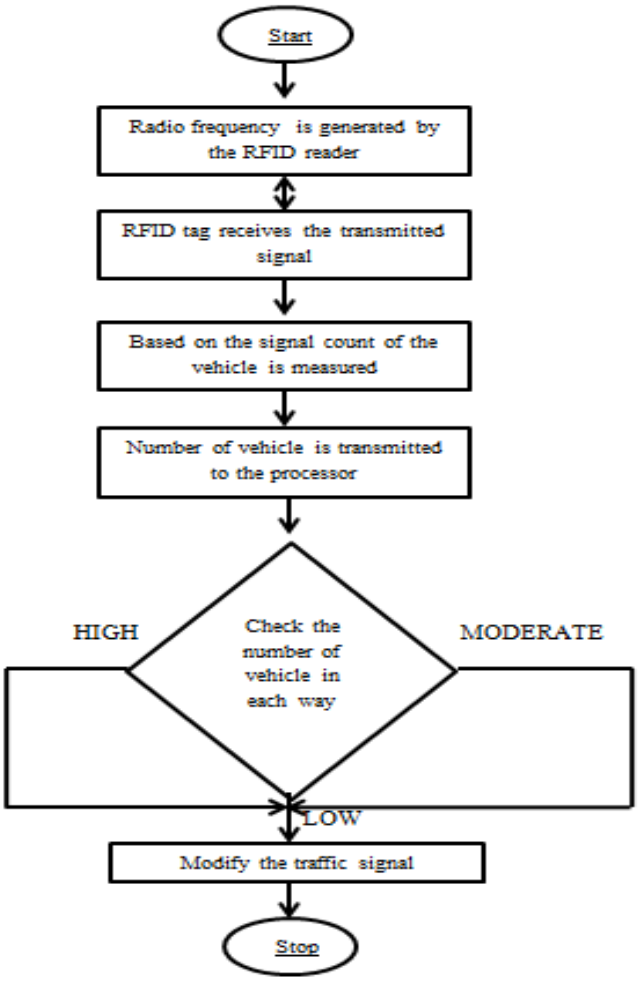

Fig. 2 Flow diagram of the project.

V. RESULTS AND SIMULATION

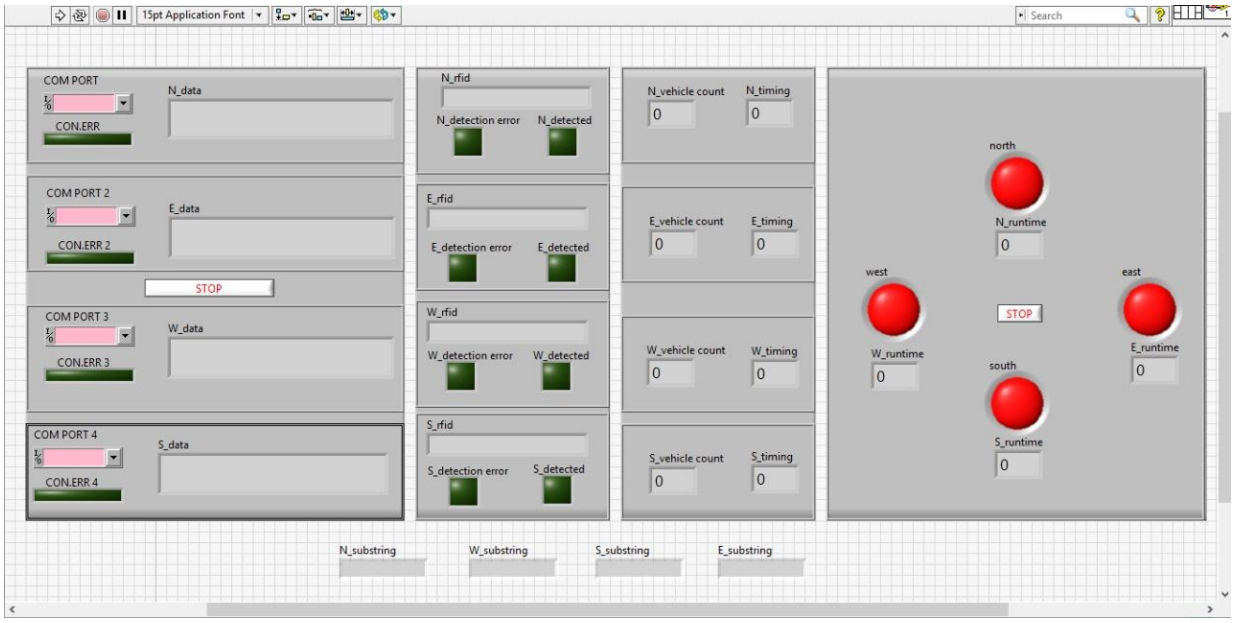

Fig.3 Front panel of the system in LabVIEW

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Once the unique Id is received by the processor, it will count each Id as one vehicle and it counted as vehicle count. If the count of the vehicle is in between the range of 0-5, the traffic signal will be opened for 10 seconds, if the vehicle count is in the range of 5-15, the traffic signal will be opened for 30 seconds, similarly if the range is 15 and above, the traffic signal will be opened for 60 seconds. All these traffic signals are indicated as Boolean indicator. And the signal from the RFID is received into the LabVIEW using VISA port in LabVIEW toolkit. The number of vehicles in each way is indicated by the numeric indicator. The traffic signal is regulated by implementing the counter in the program. The above-mentioned process is repeated in the anticlockwise direction. And the whole process is reinitialized for every iteration.

VI. CONCLUSION

The system which exists already works efficiently to manage the traffic but it is time consuming. The proposed system works uninterruptedly with accuracy in managing the traffic at every junction. By implementing this system, public can save their valuable time by avoiding waiting at the traffic. Also, it helps to reduce the overcrowding in high traffic ted areas which in turn it reduces the accidents by means of saving the public life. In addition, it also helps to reduce the human interruption in traffic signals.

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