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IoT based traffic and street light control management for smart cities

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ABSTRACT

All metropolis cities suffer from traffic obstruction issues particularly within the central downtown. traditional cities will be remodeled into good cities by exploiting data and communication technologies. The signal temporal arrangement changes with the density of the traffic and delay is given the assistance of a microcontroller. the web of Things (IoT) will play an important role within the accomplishment of good cities. The aim of this project is to style a density-based stoplight system interfaced with a barrier gate. This project proposes microcontroller for temporal arrangement modification of the signal and buzzer action. before of the barrier gate, a stop line is created and with the assistance of another IR device, the vehicle is caterpillar-tracked whenever it approaches the stop line If the vehicle crosses the stop line the hint is given to the close room. Node MCU microcontroller is employed for signal temporal arrangement modification supported the density of traffic.

Keywords: IoT, Road Traffic Management, Node MCU, Stoplight

1. INTRODUCTION

World's urban areas face many challenges due to associate degree baleful trend of growing populations. Such giant and racial gatherings of personalities lead to numerous varieties of issues in holdups. The thought of good cities has been introduced to moderate problems associated with growing urban population. it's one in every of the definitions of a sensible town is that the use of good Computing technologies to create the important infrastructure parts and services of a town. the internet of things (IoT) could be a recently surfaced model that aims to produce new opportunities within the field of communication and data technology. In IoT, duplicate nearly everything are going to be hooked up to the web. IoT will so play an important role in good cities. IoT wants cloud computing support to integrate devices. within the original IoT model, property to the web is enforced by device devices like RFID (Radio Frequency Identification) et al. However, embedded PCs like Raspberry Pi by Raspberry Pi foundation and stargazer by Intel or like Embedded computing units also can be used in IoT infrastructure. This paper suggests associate degree IoT-based resolution for Traffic management and management for good cities.

Traffic administration is changing into tougher in huge cities. the manufacturers square measure givens attentions on the thought of good cities that forces to deal with all {the issues the issues} concerning huge cities as well as traffic management problems. during this paper, traffic management resolution in good cities are investigated. generally, the traffic flowing towards a selected direction wants longer at sure timings. In some circumstances, the traffic law officer on duty might have to implement a selected traffic lights dominant pattern totally different from the routine pattern of lights. the stoplight timings will be adjusted to permit additional traffic moving towards the wedding program or special competition events. For this reason, lane directions will be switched to usually closed, streets or lanes could also be opened to unleash a sleek flow of traffic for the worshippers. during this paper, associate degree IoT-based resolution for the planning of a stoplight system has been conferred. The stoplight pattern could also be adjusted. during this paper, associate degree IoT-based resolution for the planning of a stoplight system has been conferred. The stoplight pattern could also be adjusted dynamically through the smartphones of associate degree onsite traffic law officer.

Arduino is associate degree ASCII text file platform used for building physical science comes. Arduino consists of every a physical programmable board (often noted as a microcontroller) and a piece of software package package, or IDE (Integrated Development Environment) that runs on your portable computer, used to communicate and transfer code .

The Arduino program has become quite fashionable folks simply beginning with physical science, and permanently reason t like most previous programmable circuit boards, the Arduino does not would love a separate piece of hardware (called a programmer) to load new code onto the board you will be able to use USB cable. to boot, the Arduino IDE uses a simplified version of C++, creating it easier to be told to program. Finally, Arduino provides a typical kind issue that flare the functions of the micro-controller into a additional usable package.

2. COMPONENTS/PARTS

Power (USB)

Every Arduino board wants a way to be connected to an influence supply. The Arduino UNO area unit hopped-up from a USB cable extending from your PC or a wall power supply that's terminated in Associate in Nursing very barrel jack.

Pins (5V, 3.3V, GND, Analog, Digital, PWM, AREF)

The pins on Arduino square measure the places wherever you connect wires to construct a circuit (probably in reference to a board and any wire. they typically have black plastic 'headers' that enable you to plug a wire right into the board. The Arduino has many totally different varieties of pins, that is labeled on the board and used for various functions.

GND (3): Short for 'Ground'. There square measure many GND pins on the Arduino, either of it will be ground your circuit 5V & three.3V.

Analog (6): There square measure vi pins underneath the 'Analog In' label (A0 through A5 on the UNO) square measure Analog In pins. These pins square measure want to scan the signal from associate degree analog device (like a temperature sensor) and convert it into a digital price that may scan by North American country.

Digital (7): from the analog pins their square measure digital pins (0 through thirteen on the UNO). These pins are used for every digital input (like telling if a button is pushed) associate degree digital output (like powering associate LED).

PWM (8): you'll have noticed the diacritical mark (~) next to a number of the digital pins (3, 5, 6, 9, 10, and eleven on the UNO). These pins act as traditional digital pins, however also can be used for one thing known as Pulse-Width Modulation (PWM). we've a tutorial on PWM, except for currently, consider these pins as having the ability to simulate associate associate degree log output (like weakening an diode in and out).

AREF (9): Stands for Analog Reference. Most of the time you'll be able to leave this pin alone. it's generally went to set associate degree external reference voltage (between zero and five Volts) because the higher limit for the analog input pins.

Reset Button

Just like the initial Nintendo, the Arduino encompasses a push (10). Pushing it'll quickly connect the reset pin to the bottom and restart any code that's loaded on the Arduino. this may be helpful if your code doesn't work, however you wish to check it multiple times. not like the initial Nintendo but, processing on the Arduino does not sometimes fix any issues.

Power diode Indicator

Just below and to the correct of the word "UNO" on your board, there's a little diode next to the 'ON' (11). This diode ought to activate whenever you plug your Arduino into an influence supply. If this light-weight doesn't activate, there might probability of one thing is wrong.

TX/RX LEDs

TX is that the abbreviation for sending, RX is that the abbreviation for receive. These pins square measure accountable for serial communication. In our case, there square measure 2 places on the Arduino UNO wherever TX and RX seem -- once by digital pins zero and one, and a second time next to the TX and RX indicator LEDs. These LEDs can provide North American country some admirable visual indications whenever our Arduino is receiving or sending knowledge.

IR Sensor

IR light-weight is like actinic ray however it's invisible to our eyes, due to that they're appropriate within the application of wireless communication. The band for IR (Infrared) within the spectrum is 300GHz to 430 THz and a wavelength vary of around 700nm to 1mm. Along with the IR diode another sources just like the sun, light-weight bulbs, human and animal bodies, etc. conjointly emit infrared energy. IR communication is for brief and medium-distance applications.

Blynk For Street Light And Barrier

Blynk could be a new platform that enables you to quickly build interfaces for dominant and observance any reasonably physical science hardware comes from our android and IOS device. As you transfer the Blynk app, you'll be able to produce a project dashboard and organize buttons, sliders, graphs, and alternative widgets onto the screen. by sung these widgets, you'll be able to flip pins on and off or gift knowledge from sensors. There square measure potential many tutorials that create the hardware half pretty simple, however building the software package interface continues to be tough. With Blynk, the software package aspect is even easier than the hardware. we have a tendency to square measure used blynk to regulate street light-weight and barrier.

3. MOTIVATION

In our day-after-day life, all face an easy downside on road i.e., traffic jam. This traffic downside happens because of a rise in vehicle density. due to these several criminal activities occur sort of a violation of the traffic rules, inflicting hassle to folks crossing the road, etc. because of huge growth in urbanization and traffic violation, associate degree automatic based mostly stoplight system is developed.

4. METHODOLOGY

The projected system consists of a NODEMCU microcontroller that will all the functions consistent with program interfaced. an influence provide is given to the microcontroller and therefore the IR device on each the aspect of the common sense the density of traffic and offers the data to NODEMCU microcontroller. The controller provides associate degree output to the stoplight, barrier gate, and buzzer. If the density is additional, then the red signal is created and therefore the motor activates the barrier to shut and once the inexperienced signal is given the barrier is created to receptive enable traffic to flow. The buzzer is provided to alert the folks concerning the signal and therefore the closing of the barrier gate. to boot, associate degree IR is provided to stop folks to cross the stop line. If they cross the stop line, IR detects the vehicle and offers a warning to the driving force. Also, the data are going to be sent to a close-by room. First, the facility provide is given to the microcontroller that activates the IR device. With the assistance of associate degree IR device, the vehicle crosses and substitute the lane thus once density is high the vehicle can block the IR transmitter and IR receiver, the corresponding stop signal is given to the microcontroller, that allots the signal to the actual lane and it activates the barrier gate and buzzer to the assigned lane. when the barrier is closed, associate degree IR can sense the vehicle that crosses the stop line. The projected system, fig. consists of a NODEMCU microcontroller that will all the functions consistent with program interfaced. this kind of system can facilitate to enhance traffic violation and promotes a much better means of following traffic rules and regulation. With the event of the BARRIER module, it's currently simple to prevent the unwanted components or vehicle. Also, we have a tendency to square measure in operation the road lights with NODEMCU, because the vehicle passes the close street light-weight pole, can ON and when the passage of the vehicle it's mechanically close up. this may result in save energy and conjointly the value of a government corporation.

5. CONCLUSION

Critical problems like hold up, accidents, simplex flow of caravans as well as an outsized range of cars and emergency vehicle movement square measure difficult problems in metropolitan cities. The thought of good cities provides solutions to such problems exposed in huge cities. gift stoplight dominant systems aren't absolutely ready to handle the assorted traffic things that may emerge in an exceedingly day. relying upon the matter, traffic flow ought to be managerial associate degree managed as per the present scenario underneath the control and supervising of an on-field traffic officer. By victimization the barrier technique, we are able to require the vehicles from beak the traffic rules.

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