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Pir Based Smart Crossing System Using Iot

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ABSTRACT: *The main aim of this project is to construct a movable railway platform above the tracks with same platform height. This helps the passengers to easily move from one platform to another platform. The proposed system is capable of identifying train arrival and departure and there by intelligent controlling the movable platform. The system also uses PIR sensor and LDR sensor for presence of human being detection, day or night light detection and controls the devices like lights and fans. The system sends alerts through Wi-Fi module to passenger mobile phone when the platform gets operated.*

This project makes use of an onboard computer, which is commonly termed as microcontroller. It acts as heart of the project. This onboard computer can efficiently communicate with the sensors being used. The controller is provided with some internal memory to hold the code. This memory is used to dump some set of assembly instructions into the controller. And the functioning of the controller is dependent on these assembly instructions.
The main controlling device of the whole system is a microcontroller. IR sensors, DC motors, limit switches and buzzer are interfaced to the microcontroller. IR sensors input will help the microcontroller to assess the train arrival and departure conditions. When there is no train on the tracks, the microcontroller will move the dc motors to which movable platform setup is connected. The system sends alerts through Wi-Fi module to passenger mobile phone when the platform gets operated. So, a platform is made between two platforms for the passengers. When there is train arrival, the microcontroller alerts through buzzer and clears off the movable platform. Limit switches helps the microcontroller to assess the platform movement. The system detects any presence of human beings and controls the devices like lights. The system uses LDR sensor for day or night sunlight sensing and also controls the electrical devices like lights, fans etc using relay switches.

1. INTRODUCTION

Since people and vehicle are sharing the road, crosswalk increases efficiency of using the road in highly concentrated area. However, as the population increases, this brings more frequent accidents and more serious injuries and hence, nationals are trying to reduce these accidents by making promotions and legal sanctions. Such actions pull down the total number of fatal accidents but unfortunately, number of pedestrian fatalities does not decrease for a decade [1]. To be specific, this fatality does not have a similar characteristic compares to others. A research about 2014 in USA shows fatalities in 78% occurred in urban, 71% occurred at nonintersections and 72% occurred in the dark [1]. Through this research, pedestrian fatalities are implying heavily populated area causes more chance to make an accident and an inferior recognition makes less chance to detect a pedestrian or a vehicle.

In this paper, we propose a crosswalk system using sensors, a CCTV and illuminator to track pedestrian and highlight them to make vehicle driver easily avoid any dangerous situation and also shows how to treat an accident to save both pedestrian and vehicle driver.

II. LITERATURE REVIEW

Pedestrian fatalities seem to be affected by diverse reasons. However, amazingly, several features that may look like to affect, such as drunk driver or young driver, was not the major problems in accidents. It is more likely to influence by the density and number of the population and daylight. To reduce the number of pedestrian fatalities, there are several approaches, which lead driver to slow down, solve this problem. First approach is to enforce the recognition of crosswalk area using light emitting pavement marker, therefore vehicle driver can be easily informed where the actual crosswalk is on the road [2 - 4]. For all that, this neither prevents any sudden reactions from pedestrians nor drivers to notice pedestrian easily. Second approach is illuminating the crosswalk area that the driver notices a pedestrian from long distance. This is very adequate against a sudden emergence of pedestrian. On the contrary, this consumes too much energy tosustain all dark hours for sparse pedestrians moreover the coast of energy is not cheap if illuminators are installed more to lower the chance of accident [5]. For all that, if the accident happens, there is nothing more than trusting the vehicle driver to call emergency unless the pedestrian has its consciousness.

III. DESIGN OF HARDWARE

This chapter briefly explains about the Hardware implementation of authentication of helmet & alcohol sensing for riders safety. It discuss the circuit diagram of each module in detail.

3.1 LPC2148 (ARM7) MICROCONTROLLER:

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The LPC2148 microcontrollers are based on a 32 bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combines the microcontroller with embedded high speed flash memory of 512 kB. For critical code size applications, the alternative 16-bit Thumb mode reduces the code by more than 30 % with minimal performance penalty.

Due to their tiny size and low power consumption, LPC2148 microcontrollers are ideal for the applications where miniaturization is a key requirement, such as access control and point-of-sale. A blend of serial communications interfaces ranging from a USB 2.0 Full Speed device, multiple UARTS, SPI, SSP to I2Cs and on-chip SRAM of 8 kB up to 40 kB, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power. Various 32-bit timers, single or dual 10-bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers particularly suitable for industrial control and medical systems.

3.1.1. FEATURES OF LPC2148 MICROCONTROLLER:

¢ 16/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package.

¢ 8 to 40 kB of on-chip static RAM and 32 to 512 kB of on-chip flash program memory.

¢ 128 bit wide interface/accelerator enables high speed 60 MHz operation.

¢ In-System/In-Application Programming (ISP/IAP) via on-chip boot-loader software. Single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1 ms.

¢ Embedded ICERT and Embedded Trace interfaces offer real-time debugging with the on-chip Real Monitor software and high speed tracing of instruction execution.

¢ USB 2.0 Full Speed compliant Device Controller with 2 kB of endpoint RAM.

¢ In addition, the LPC2146/8 provide 8 kB of on-chip RAM accessible to USB by DMA.

¢ One or two (LPC2141/2 vs. LPC2144/6/8) 10-bit A/D converters provide a total of 6/14 analog inputs, with conversion times as low as 2.44 ?s per channel.

¢ Single 10-bit D/A converter provides variable analog output.

¢ Two 32-bit timers/external event counters (with four capture and four compare
channels each), PWM unit (six outputs) and watchdog.

¢ Low power real-time clock with independent power and dedicated 32 kHz clock input.

¢ Multiple serial interfaces including two UARTs (16C550), two Fast I2C-bus

¢ (400 kbit/s), SPI and SSP with buffering and variable data length capabilities.

¢ Vectored interrupt controller with configurable priorities and vector addresses.

¢ Up to 45 of 5 V tolerant fast general purpose I/O pins in a tiny LQFP64 package.

¢ Up to nine edge or level sensitive external interrupt pins available.

¢ 60 MHz maximum CPU clock available from programmable on-chip PLL with settling time of 100 ?s.

3.2. BLOCK DIAGRAM OF LPC2148 MICROCONTROLLER:

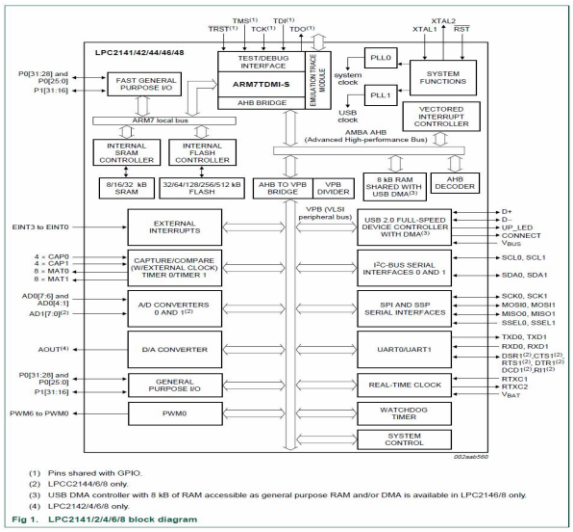


Fig: 1. Block Diagram Of Lpc2148 Microcontroller

3.2.1. DESCRIPTION ABOUT THE BLOCK DIAGRAM:

¢ On chip Flash Program Memory :

" LPC 2148 is having 512kB Flash memory. This memory may be used for both code and data storage. Programming of the flash memory may be accomplished in several ways(ISP/IAP).

¢ On chip Static RAM :

" On-chip static RAM may be used for code and/or data storage. The SRAM may be accessed as 8-bit, 16-bit, and 32-bit. An 8 kB SRAM block intended to be utilized mainly by the USB

¢ **Interrupt Controller :**

" The Vectored Interrupt Controller (VIC) accepts all of the interrupt request inputs and categorizes them as Fast Interrupt Request (FIQ), vectored Interrupt Request (IRQ), and non-vectored IRQ as defined by programmable settings.

¢ Analog to Digital Converter :

" LPC2148 contains two analog to digital converters(ADC0 & ADC1). Total number of available ADC inputs is 14. These two ADC's are 10 bit successive approximation analog to digital converters. Measurement range of 0 V to VREF. Global Start command for both converters.

¢ Digital to Analog Converter :

" The DAC enables to generate a variable analog output. The maximum DAC output voltage is the VREF voltage. 10-bit DAC. Buffered output. Power-down mode available.

¢ USB 2.0 Device Controller :

" The USB is a 4-wire serial bus that supports communication between a host and a number (127 max) of peripherals. Enables 12 Mbit/s data exchange with a USB host controller. A DMA controller (available only in LPC2146/48) can transfer data between an endpoint buffer and the USB RAM.

¢ UART :

" LPC2148 contains two UARTs(UART0 & UART1). In addition to standard transmit and receive data lines, the LPC2148 UART1 also provides a full modem control handshake interface. 16 byte Receive and Transmit FIFOs. It contains Built-in fractional baud rate generator covering wide range of baud rates without a need for external crystals of particular values.

¢ I2C-bus serial I/O controller :

" I2C is a bidirectional. It is a multi-master bus, it can be controlled by more than one bus master connected to it. It supports bit rates up to 400 kbit/s. Bidirectional data transfer between masters and slaves. Serial clock synchronization allows devices with different bit rates to communicate via one serial bus. Serial clock synchronization can be used as a handshake mechanism to suspend and resume serial transfer.

¢ SPI serial I/O control :

" It is s a full duplex serial interface, designed to handle multiple masters and slaves connected to a given bus. Synchronous, Serial, Full Duplex Communication.

¢ SSP serial I/O control :

" Supports full duplex transfers. Data frames of 4 bits to 16 bits of data flowing from the master to the slave and from the slave to the master. Synchronous serial communication. Master or slave operation. 8-frame FIFOs for both transmit and receive. Four bits to 16 bits per frame

¢ Timers :

" LPC 2148 has two 32-bit timer/counters with a programmable 32-bit prescaler. It also having external External event counter. Four 32-bit capture channels per timer/counter that can take a snapshot of the timer value when an input signal transitions. A capture event may also optionally generate an interrupt.

¢ Watchdog Timer :

" The purpose of the watchdog is to reset the microcontroller within a reasonable amount of time if it enters an erroneous state. When enabled, the watchdog will generate a system reset if the user program fails to 'feed' (or reload) the watchdog within a predetermined amount of time.

¢ Real Time Clock :

" The RTC is designed to provide a set of counters to measure time when normal or idle operating mode is selected. The RTC has been designed to use little power, making it suitable for battery powered systems where the CPU is not running continuously (Idle mode).

3.3 PIN DIAGRAM OF LPC 2148 MICRO CONTROLLER:

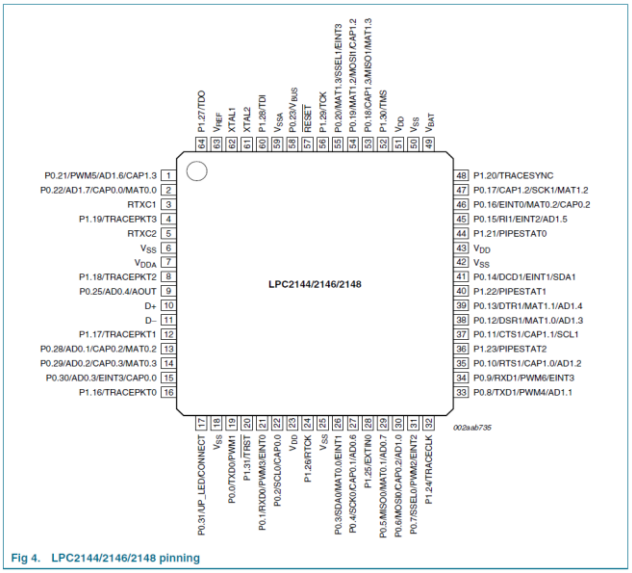


Fig:3. Pin Diagram Of Lpc2148 Microcontroller

3.4 RS232 CABLE:

To allow compatibility among data communication equipment, an interfacing standard called RS232 is used. Since the standard was set long before the advent of the TTL logic family, its input and output voltage levels are not TTL compatible. For this reason, to connect any RS232 to a microcontroller system, voltage converters such as MAX232 are used to convert the TTL logic levels to the RS232 voltage levels and vice versa.

3.5. MAX232 IC:

Max232 IC is a specialized circuit which makes standard voltages as required by RS232 standards. This IC provides best noise rejection and very reliable against discharges and short circuits. MAX232 IC chips are commonly referred to as line drivers.

To ensure data transfer between PC and microcontroller, the baud rate and voltage levels of Microcontroller and PC should be the same. The voltage levels of microcontroller are logic1 and logic 0 i.e., logic 1 is +5V and logic 0 is 0V. But for PC, RS232 voltage levels are considered and they are: logic 1 is taken as -3V to -25V and logic 0 as +3V to +25V. So, in order to equal these voltage levels, MAX232 IC is used. Thus this IC converts RS232 voltage levels to microcontroller voltage levels and vice versa.

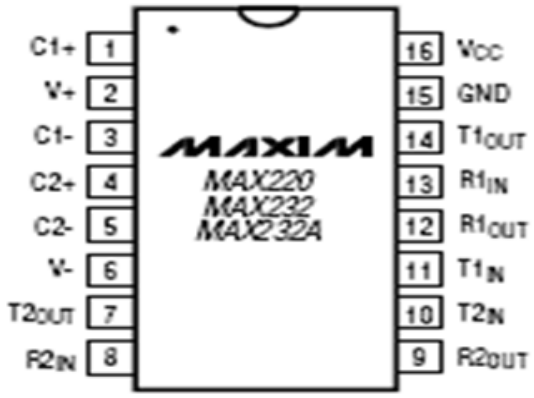
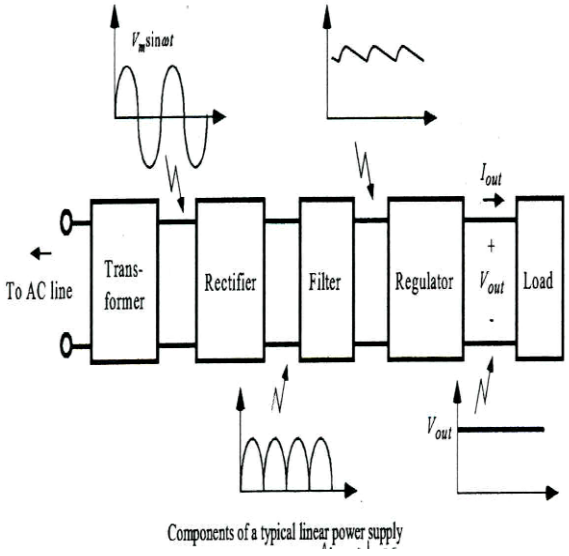


Fig:4. Pin diagram of MAX232 IC

3.6. POWER SUPPLY:

The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage constant irrespective of a.c mains fluctuations or load variations is known as "Regulated D.C Power Supply".



Components of a typical linear power supply

Fig:5 Block Diagram of Power Supply

3.7. IR SENSOR:

Infrared is a energy radiation with a frequency below our eyes sensitivity, so we cannot see it Even that we can not "see" sound frequencies, we know that it exist, we can listen them.

Even that we can not see or hear infrared, we can feel it at our skin temperature sensors.

When you approach your hand to fire or warm element, you will "feel" the heat, but you can't see it. You can see the fire because it emits other types of radiation, visible to your eyes, but it also emits lots of infrared that you can only feel in your skin.

Infra-Red is interesting, because it is easily generated and doesn't suffer electromagnetic interference, so it is nicely used to communication and control, but it is not perfect, some other light emissions could contains infrared as well, and that can interfere in this communication. The sun is an example, since it emits a wide spectrum or radiation.

The adventure of using lots of infra-red in TV/VCR remote controls and other applications, brought infra-red diodes (emitter and receivers) at very low cost at the market.

From now on you should think as infrared as just a "red" light. This light can means something to the receiver, the "on or off" radiation can transmit different meanings.Lots of things can generate infrared, anything that radiate heat do it, including out body, lamps, stove, oven, friction your hands together, even the hot water at the faucet.

To allow a good communication using infra-red, and avoid those "fake" signals, it is imperative to use a "key" that can tell the receiver what is the real data transmitted and what is fake. As an analogy, looking eye naked to the night sky you can see hundreds of stars, but you can spot easily a far away airplane just by its flashing strobe light. That strobe light is the "key", the "coding" element that alerts us.

Similar to the airplane at the night sky, our TV room may have hundreds of tinny IR sources, our body, the lamps around, even the hot cup of tea. A way to avoid all those other sources, is generating a key, like the flashing airplane. So, remote controls use to pulsate its infrared in a certain frequency. The IR receiver module at the TV, VCR or stereo "tunes" to this certain frequency and ignores all other IR received. The best frequency for the job is between 30 and 60kHz, the most used is around 36kHz

4.12.1. IR GENERATION

To generate a 36kHz pulsating infrared is quite easy, more difficult is to receive and identify this frequency. This is why some companies produce infrared receives, that

contains the filters, decoding circuits and the output shaper, that delivers a square wave, meaning the existence or not of the 36kHz incoming pulsating infrared.
It means that those 3 dollars small units, have an output pin that goes high (+5V) when there is a pulsating 36kHz infrared in front of it, and zero volts when there is not this radiation.

A square wave of approximately 27uS (microseconds) injected at the base of a transistor, can drive an infrared LED to transmit this pulsating light wave. Upon its presence, the commercial receiver will switch its output to high level (+5V).If you can turn on and off this frequency at the transmitter, your receiver's output will indicate when the transmitter is on or off.
Those IR demodulators have inverted logic at its output, when a burst of IR is sensed it drives its output to low level, meaning logic level = 1.
The TV, VCR, and Audio equipment manufacturers for long use infra-red at their remote controls. To avoid a Philips remote control to change channels in a Panasonic TV, they use different codification at the infrared, even that all of them use basically the same transmitted frequency, from 36 to 50kHz. So, all of them use a different combination of bits or how to code the transmitted data to avoid interference.

3.8 PIR SENSOR

A PIR-based motion detector is used to sense movement of people, animals, or other objects. They are commonly used in burglar alarms and automatically-activated lighting systems. They are commonly called simply "PIR", or sometimes "PID", for "passive infrared detector".

Operation:

An individual PIR sensor detects changes in the amount of infrared radiation impinging upon it, which varies depending on the temperature and surface characteristics of the objects in front of the sensor.[2] When an object, such as a human, passes in front of the background, such as a wall, the temperature at that point in the sensor's field of view will rise from room temperature to body temperature, and then back again. The sensor converts the resulting change in the incoming infrared radiation into a change in the output voltage, and this triggers the detection. Objects of similar temperature but different surface characteristics may also have a different infrared emission pattern, and thus moving them with respect to the background may trigger the detector as well.[4]

PIRs come in many configurations for a wide variety of applications. The most common models have numerous Fresnel lenses or mirror segments, an effective range of about ten meters (thirty feet), and a field of view less than 180 degrees. Models with wider fields of view, including 360 degrees, are available—typically designed to mount on a ceiling. Some larger PIRs are made with single segment mirrors and can sense changes in infrared energy over thirty meters (one hundred feet) away from the PIR. There are also PIRs designed with reversible orientation mirrors which allow either broad coverage (110° wide) or very narrow "curtain" coverage, or with individually selectable segments to "shape" the coverage.

Differential detection:

Pairs of sensor elements may be wired as opposite inputs to a differential amplifier. In such a configuration, the PIR measurements cancel each other so that the average temperature of the field of view is removed from the electrical signal; an increase of IR energy across the entire sensor is self-cancelling and will not trigger the device. This allows the device to resist false indications of change in the event of being exposed to brief flashes of light or field-wide illumination. (Continuous high energy exposure may still be able to saturate the sensor materials and render the sensor unable to register further information.) At the same time, this differential arrangement minimizes common-mode interference, allowing the device to resist triggering due to nearby electric fields. However, a differential pair of sensors cannot measure temperature in this configuration, and therefore is only useful for motion detection.

Product design:

The PIR sensor is typically mounted on a printed circuit board containing the necessary electronics required to interpret the signals from the sensor itself. The complete assembly is usually contained within a housing, mounted in a location where the sensor can cover area to be monitored.

Fig6:PIR sensor

PIR motion sensor design:

The housing will usually have a plastic "window" through which the infrared energy can enter. Despite often being

only translucent to visible light, infrared energy is able to reach the sensor through the window because the plastic used is transparent to infrared radiation. The plastic window reduces the chance of foreign objects (dust, insects, etc.) from obscuring the sensor's field of view, damaging the mechanism, and/or causing false alarms. The window may be used as a filter, to limit the wavelengths to 8-14 micrometres, which is closest to the infrared radiation emitted by humans. It may also serve as a focusing mechanism; see below.

3.9. LDR

The light sensor is a passive devices that convert this "light energy" whether visible or in the infra-red parts of the spectrum into an electrical signal output. Light sensors are more commonly known as "Photoelectric Devices" or "Photo Sensors" because the convert light energy (photons) into electricity (electrons).

Photoelectric devices can be grouped into two main categories, those which generate electricity when illuminated, such as Photo-voltaics or Photo-emissives etc, and those which change their electrical properties in some way such as Photo-resistors or Photo-conductors. This leads to the following classification of devices.

- • Photo-emissive Cells – These are photodevices which release free electrons from a light sensitive material such as caesium when struck by a photon of sufficient energy. The amount of energy the photons have depends on the frequency of the light and the higher the frequency, the more energy the photons have converting light energy into electrical energy.
- • Photo-conductive Cells – These photodevices vary their electrical resistance when subjected to light. Photoconductivity results from light hitting a semiconductor material which controls the current flow through it. Thus, more light increase the current for a given applied voltage. The most common photoconductive material is Cadmium Sulphide used in LDR photocells.
- • Photo-voltaic Cells – These photodevices generate an emf in proportion to the radiant light energy received and is similar in effect to photoconductivity. Light energy falls on to two semiconductor materials sandwiched together creating a voltage of approximately 0.5V. The most common photovoltaic material is Selenium used in solar cells.

The Photoconductive Cell:

A Photoconductive light sensor does not produce electricity but simply changes its physical properties when subjected to light energy. The most common type of photoconductive device is the Photoresistor which changes its electrical resistance in response to changes in the light intensity. Photoresistors are Semiconductor devices that use light energy to control the flow of electrons, and hence the current flowing through them. The commonly used Photoconductive Cell is called the Light Dependent Resistor or LDR.

The Light Dependent Resistor

Fig7:LDR

As its name implies, the Light Dependent Resistor (LDR) is made from a piece of exposed semiconductor material such as cadmium sulphide that changes its electrical resistance from several thousand Ohms in the dark to only a few hundred Ohms when light falls upon it by creating hole-electron pairs in the material.

The net effect is an improvement in its conductivity with a decrease in resistance for an increase in illumination. Also, photoresistive cells have a long response time requiring many seconds to respond to a change in the light intensity.

Materials used as the semiconductor substrate include, lead sulphide (PbS), lead selenide (PbSe), indium antimonide (InSb) which detect light in the infra-red range with the most commonly used of all photoresistive light sensors being Cadmium Sulphide (Cds).

Cadmium sulphide is used in the manufacture of photoconductive cells because its spectral response curve closely matches that of the human eye and can even be controlled using a simple torch as a light source. Typically then, it has a peak sensitivity wavelength (λp) of about 560nm to 600nm in the visible spectral range.

3.10.RELAY WITH DRIVER:

A Relay driver IC is an electro-magnetic switch that will be used whenever we want to use a low voltage circuit to

switch a light bulb ON and OFF which is connected to 220V mains supply. The required current to run the relay coil is more than can be supplied by various integrated circuits like Op-Amp, etc.Relays have unique properties and are replaced with solid state switches that are strong than solid-state devices. High current capacities, capability to stand ESD and drive circuit isolation are the unique properties of Relays. There are various ways to drive relays.Some of the Relay Driver ICs are as below.

Fig8:Relay with Driver

- High side toggle switch driver
- Low side toggle switch driver
- Bipolar NPN transistor driver
- N-Channel MOSFET driver and
- Darlington transistor driver
- ULN2003 driver

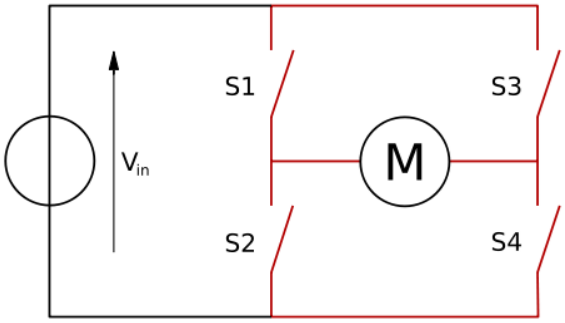
3.11. BUZZER WITH DRIVER:

A buzzer or beeper is an audio signalling device,[1] which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

Fig9:Buzzer

3.12.DC Motor with Driver:

A motor driver IC is an integrated circuit chip which is usually used to control motors in autonomous robots. Motor driver ICs act as an interface between microprocessors in robots and the motors in the robot. The most commonly used motor driver IC's are from the L293 series such as L293D, L293NE, etc. These ICs are designed to control 2 DC motors simultaneously. L293D consist of two H-bridge. H-bridge is the simplest circuit for controlling a low current rated motor. For this tutorial we will be referring the motor driver IC as L293D only. L293D has 16 pins,



The basic diagram of H-bridge is given below :

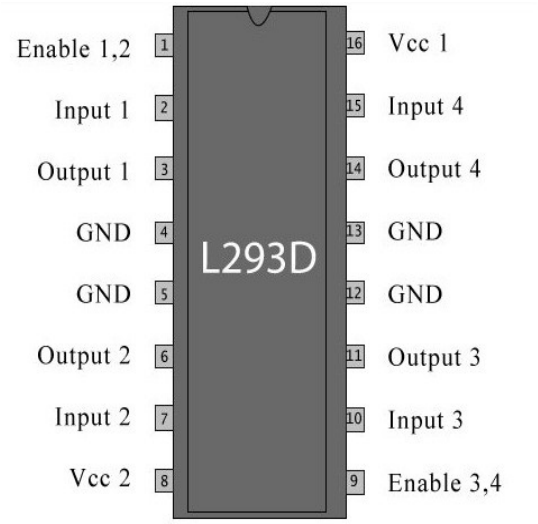
In the given diagram, the arrow on the left points to the higher potential side of the input voltage of the circuit. Now if the switches S1 & S4 are kept in a closed position while the switches S2 & S3 are kept in a open position meaning that the circuit gets shorted across the switches S1 & S4. This creates a path for the current to flow, starting from the V input to switch S1 to the motor, then to switch S4 and then the exiting from the circuit. This flow of the current would make the motor turn in one direction. The direction of motion of the motor can be clockwise or anti-clockwise, this is because the rotation of the motor depends

For simplicity, lets assume that in this condition the motor rotates in a clockwise direction.

Now, when S3 and S2 are closed then and S1 and S4 are kept open then the current flows from the other direction and the motor will now definitely rotates in counter-clockwise direction

When S1 and S3 are closed and S2 and S4 are open then the 'STALL' condition will occur.

L293D Pin Diagram :



3.13.LED INDICATOR:

A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated.[5] When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light is determined by the energy band gap of the semiconductor. LEDs are typically small (less than 1 mm^2) and integrated optical components may be used to shape the radiation pattern.

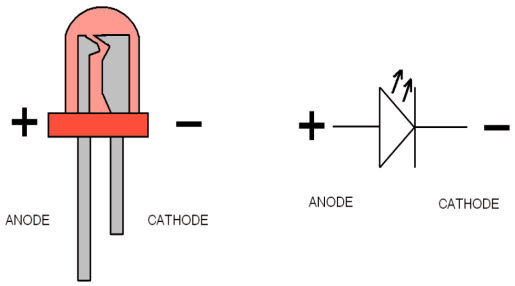


Fig10: LED INDICATOR

3.14.Wifi Module:

Wi-Fi or Wifi is a technology for wireless local area networking with devices based on the IEEE 802.11 standards. Wi-Fi is a trademark of the Wi-Fi Alliance, which restricts the use of the term Wi-Fi Certified to products that successfully complete interoperability certification testing.

Devices that can use Wi-Fi technology include personal computers, video-game consoles, phones and tablets, digital cameras, smart TVs, digital audio players and modern printers. Wi-Fi compatible devices can connect to the Internet via a WLAN and a wireless access point. Such an access point (or hotspot) has a range of about 20 meters (66 feet) indoors and a greater range outdoors. Hotspot coverage can be as small as a single room with walls that block radio waves, or as large as many square kilometres achieved by using multiple overlapping access points.

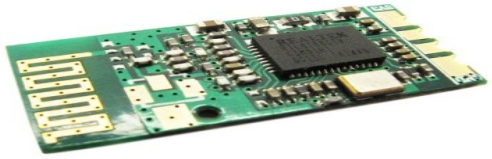


Fig11:Wifi Module
Depiction of a device sending information wirelessly to another device, both connected to the local network, in order to print a document

Wi-Fi most commonly uses the 2.4 gigahertz (12 cm) UHF and 5.8 gigahertz (5 cm) SHF ISM radio bands. Anyone within range with a wireless modem can attempt to access the network; because of this, Wi-Fi is more vulnerable to attack (called eavesdropping) than wired networks.

3.14.ANDROID MOBILE:

Android is a mobile operating system developed by Google, based on the Linux kernel and designed primarily for touchscreen mobile devices such as smartphones and tablets. Android's user interface is mainly based on direct manipulation, using touch gestures that loosely correspond to real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with a virtual keyboard for text input. In addition to touchscreen devices, Google has further developed Android TV for televisions, Android Auto for cars, and Android Wear for wrist watches, each with a specialized user interface. Variants of Android are also used on game consoles, digital cameras, PCs and other electronics.

Initially developed by Android Inc., which Google bought in 2005, Android was unveiled in 2007, along with the

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founding of the Open Handset Alliance – a consortium of hardware, software, and telecommunication companies devoted to advancing open standards for mobile devices. Beginning with the first commercial Android device in September 2008, the operating system has gone through multiple major releases, with the current version being 8.0 "Oreo", released in August 2017. Android applications ("apps") can be downloaded from the Google Play store, which features over 2.7 million apps as of February 2017. Android has been the best-selling OS on tablets since 2013, and runs on the vast majority[a] of smartphones. As of May 2017, Android has two billion monthly active users, and it has the largest installed baseof any operating system.

Fig12:Android Mobile

6. PROJECT DESCRIPTION

This project makes use of an onboard computer, which is commonly termed as microcontroller. It acts as heart of the project. This onboard computer can efficiently communicate with the sensors being used.

IV. BLOCK DIAGRAM:

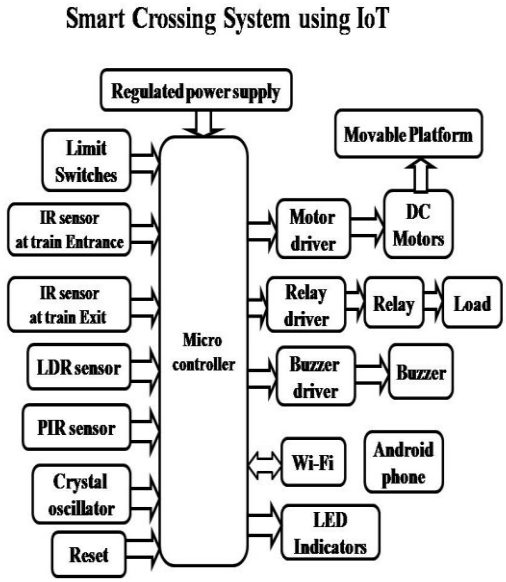

Fig13. block diagram

4.1. SOFTWARE REQUIREMENT

1. Embedded C programming.
2. Proteus for hardware simulation.
3. Keil version4 ide
4. FLASH Magic

4.2. HARDWARE REQUIREMENTS:

1. Regulated Power Supply.
2. Microcontroller.
3. Limit switches.
4. IR sensors.
5. PIR sensor
6. LDR sensor
7. Relay with driver.
8. Buzzer with driver.
9. DC motor with driver.
10. LED Indicators.
11. Crystal Oscillator.
12. Reset.
13. Load.
14. Wi-Fi module.
15. Android phone.

4.3. WORKING:

Smart Crossing suggests a new type of crosswalk system thataims the same goal with the puffin crossing system. Thesystem provides devices are formed with six major parts as Control Unit manages and controls every connected device,stores metadata about the devices and

itself, saves a video records from CCTV Analyzer, communicates with Control crosswalk area. The records will be fetched if the suspected events detected by the abnormal movement tracking algorithm.

Traffic Controller is mounted at the near the roadside to start the passing traffic. The controller the pedestrian to monitor passing traffic while waiting for the signal to cross. Control Center monitors the all control unit operations andaudits any suspecting events that may be a serious accident. The abnormal movement-tracking algorithm reports any kind of unexpected sensing records to control center including with false-negative detections. In the field, monitoring agents take a video record of clipped part from reported the control unit, and they check it is an accident happened. In control unit, it has two major algorithms, called abnormal movement tracking algorithm and pedestrian presence algorithm. Pedestrian presence algorithm is sustaining the single to cross using CCTV analyzer and boundary detector. It also treats any sudden enter without using controller. Abnormal movement tracking algorithm is to detect abnormal actions, as shown in Table I, which derives any chance of making fatalities. At the end of strong suspecting of fatalities, abnormal movement tracking algorithm sends distress signal to control center over the Internet. Therefore, control center checks out recorded video and takes an immediate action to Center to fetch updates and send a particular video records and operates algorithms about abnormal movement tracking and pedestrian presence. The records are fetched by Control Center to analyze if there has any serious accident happened. This record can be a major evidence to track the hit and run vehicle driver. Boundary Detector is to detect the pedestrian and vehicles enter particular area. In this system has two boundary detectors, which are installed at crosswalk and the other is at vehicle stop and yield line. Boundary detector utilizes CCTV and illuminator when it detects the presence of pedestrians waiting at the crossings, and as they are crossing the road. Illuminator is to light up the crosswalk and pedestrians to be recognized from great distance and provides light.

V.CONCLUSION

In this paper, we propose a new type of crossing system that can provide pedestrian safety as well as drivers to notice pedestrians earlier to avoid any dangerous situation. Using illuminator provides three times longer distance of noticing the pedestrian that earns enough time to slow down the speed of vehicle. If in case of accident happens, smart crossing provides automated circumstance reporting to the control center about the situation records and respond immediately whether the driver get panic or run away. This may save many lives, which brings more chances to get into the golden hour. Smart crossing also saves enormous energy in running the illuminator. Many other illuminator spends a lot of energy to illuminate the crosswalk whether the pedestrian exists or not. Meanwhile, smart crossing turns on the illuminator when the

pedestrian exists. A side effect of this system may affect to both pedestrians and vehicle drivers. Pedestrians can expect to be rescued even if they try to jaywalking. Drivers are more likely to abide the rules in crosswalk sections. The CCTV force them to drive carefully.

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