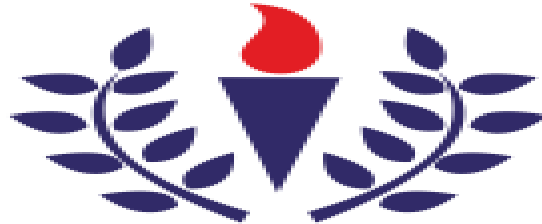# NEW HORIZON COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

TRAFFIC SIGNAL SWITCHER FOR EMERGENCY VEHICLES

A MINI PROJECT

REPORT

Submitted By:

Indrajith K R	1NH18EC041
Amith Sabu	1NH18EC005
Eric Joe	1NH18EC031
Dilip M	1NH18EC030

ABSTRACT

Normally we see that when there is an emergency vehicle in a lane in either side of a signal either a police officer switches the signal or the vehicles on the other lane gives way. This has a lot of room for human errors to take place leading to casualties. To prevent the human errors from taking place we are designing a circuit to automate the signal to switch to green whenever an emergency vehicle is detected in the lane. The traffic signal is made using a simple circuit consisting of an IC555 timer and an IC4017 A two way switch connected to a relay is used to bypass the signal coupled with a transmitter and receiver module.

IC555 is a timer IC that is used to provide time delays as an oscillator and as a flip flop element hence we have used it to create the time intervals of the traffic signal switching between lanes.

IC4017 is a counter that helps us to maintain the signal for the given count of pulses.

Combining these both a traffic signal is designed.

A two way switch connected to a relay further coupled with a transmitter-receiver module is engraved into the circuit. The ambulance will be carrying the transmitter. When the ambulance comes in range of the receiver the traffic light is automatically switched.

When an emergency vehicle comes in range of the receiver of the particular lane the signal of the corresponding lane turns green and the others turn red allowing the vehicle to pass freely and reducing any risk. Though our project is s prototype, it is quite simple and effective. For further real life applications we may apply more complex methodologies like image and sound processing and increase the logic for more than one lane.

CHAPTER 01

INTRODUCTION

In recent years the numbers of vehicles on the road have increased considerably and it has become a major challenge to commute from one location to another location. With the introduction of metro rail services and addition of new buses, there seems to be no solution to the traffic problem. Many times we see that when there is an emergency vehicle in a lane, either a police officer switches the signal or the vehicles on the other lane give way. Usually in urban cities due to traffic congestion the emergency vehicles are stuck in traffic jams and are unable to reach the hospital on time. It has become a huge task to take the deceased to the hospital and give them due treatment on time. There have been numerous incidents where in the patient has suffered complications due to delayed arrival at the hospital.

Also this has a lot of room for human errors leading to casualties. To prevent the human error from taking place we have designed a circuit to automate the signal to switch to green whenever an emergency vehicle is detected in the lane.

CHAPTER 02

LITERATURE SURVEY

In recent times, identifying vehicles in an unsupervised interstate highway from recorded videos has become an exceptionally challenging issue in computer vision. In scenarios such as activities at traffic crossing with heavy congestion we perform analysis and programming to ease the traffic congestion. To physically check the conditions is a huge task and not illogical.

Ishant Sharma and Dr. Pardeep K. Gupta proposed to sup-plant existed activity signals with a framework that checks the activity of stream of vehicles and consequently using activity flag and sensors that are placed. Here the time to nourish are made energetic and programmed by prepared the live location.

Chandrasekhar.M et.al recommended a framework that actually prepares the algorithm and does calculation in genuine time activity light control which can control the activity of light efficiently.

In the paper by Huajun Chai , the interaction between travellers' course choice and activity flag control is captured in a coherent system. The calculation and control technique were re-created in OmNet++ which is an organized communication test system and SUMO which is re-enactment of urban versatility which are implemented beneath a few scenarios. The re-enactment appeared that with the proposed energetic steering, the in general travel timing fetched altogether diminishes. These factors were considered in the implementation and it appeared that the proposed versatile flag control decreased the normal delay successfully, as well as diminished the vacillation of the normal speed.

Jianhua Guo et al introduced a modern methodology for area-wide activity flag timing optimization beneath client balance activity. The optimization demonstration had a multi-dimensional look issue that pointed to realize minimized the issue of overall travel time related with urban road arrange and the change of travel time for unit separate of travel. A hereditary calculation was created to infer the show arrangement. A re-enactment control convention was implanted in PARAMICS program instrument that was able able of conducting area-wide smaller scale recreation is received. This is used to plan the rationale outline and function module of the area-wide activity flag control framework. His results shown that portability changes are accomplished after applying the proposed show together with the hereditary calculation for area-wide flag timing optimization.

Some of the other literature surveys related to this topic are:

H.S. Mohana et.al., created a modern approach in recognizing and tallying vehicles in day environment by utilizing genuine time activity flux through differential procedures. Checking protest pixel and foundation pixel in a outline leads to the activity flux estimation. The essential idea utilized is variety within the traffic flux thickness due to nearness of vehicle within the scene. In this paper a basic differential calculation is outlined and tried with vehicle discovery and tallying application. Activity flux estimation will play imperative part in actualizing vehicle location and tallying conspire. Genuine time energetic s cene examination has ended up exceptionally imperative perspective as the increment in video investigation The method created is having basic measurable foundation. Energetic choice of pictures from the grouping is actualized effectively in arrange to diminish the computation time. The planned method are assessed such a 20 diverse video groupings and weighed altogether with basic certainty measures. To form the plan brightening invariant, a area of the background is taken as reference, which can not be influenced by the activity stream. Limit is fixed and utilized to separate the moo, medium and tall activity flux. There's a plot for activity flux thickness; it's fundamentally 1% flux thickness versus number of outlines. Basically vehicle discovery is carried out by utilizing this plot. Assume in the event that there's vehicle within the scene, at that point there's a flux change concurring to vehicle measure. Clearly on the off chance that there's huge vehicle (or question), there's greatest or in case there's little vehicle (or question), there's least sum of flux (white pixels).. For online learning, incremental calculation of the SVM was already proposed in and the approach was adjusted to other variations of part machines. When a single information point is included and/or expelled, these calculations can effectively overhaul the prepared show without re-training it from scratch. In spite of the fact that these calculations were created in numerous setting, they can be considered as occurrences of parametric programming or path-following.

Laura Munoz et.al.,proposed a framework to assess activity thickness with the cell transmission show. This employments cell densities as state factors rather than cell inhabitances, conjointly acknowledges non uniform cell lengths, and permits congested condition to be kept up at the downstream boundary of a modeled expressway segment. Utilizing cell densities rather than cell inhabitances licenses to incorporate uneven cell lengths, which leads to more prominent adaptability in apportioning the interstate.

Tomas Rodriguez et.al., proposed a framework on real-time activity checking; the framework is self-adaptive and is able to function independently for long periods of time, i.e. no covered up parameters to be balanced. It performs in all-weather condition and consequently chooses the suitable calculation for day, night and move periods. The framework is vigorous against quick and moderate brightening changes and is able to manage with long broken shadows, and shadows from parallel roadways. Conventional camera developments (i.e. wind vibrations) barely influence its execution since the framework is tolerant against worldly following blunders and strict limitations are utilized to recognize the vehicles. They too give an satisfactory treatment of

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occlusions and overwhelming vehicles, and gotten sensible comes about in thick activity. An thorough examination of the operational environment; an viable calibration and picture amendment strategy; an unique division approach, complemented with an inventive strategy for the programmed choice of the division parameters; a discovery and following approach uncommonly outlined for activity situations. In vigorous shadow evacuation strategy, particular arrangements for overwhelming vehicle discovery and the treatment of occlusions, and at last semantic testing and benchmarking technique is given. Here the framework sections the video by extricating the moving objects of the scene and performing a preparatory classification (i.e. it'll not endeavor to recognize shadows). Once the work picture has been made the picture is sectioned by extricating the moving objects utilizing an adaption of well-known back-ground concealment procedures.

P.F Alcantarillaet.al ,proposed an programmed street activity control and observing framework for day time grouping employing a dark and white camera. Critical street activity data such as cruel speed, measurement and vehicles tallying are gotten utilizing computer vision strategies. Firstly, moving objects are extricated from the scene by implies of a frame-differencing calculation and surface data based on dim scale concentrated. In any case, shadows of moving objects have a place moreover to the frontal area. Shadows are expelled from the closer view objects utilizing beat cap changes and morphological administrators. At last, objects are followed in a Kalman sifting handle, and parameters such as position, measurements, remove and speed of moving objects are measured. At that point, agreeing to these parameters moving objects are classified as vehicles (trucks or cars) or disturbance artifacts. For tallying vehicles, moving objects must be extricated from pictures.

Straight to the point Y. Shih et.al., proposed a framework for programmed seeded locale developing calculation for color picture division. To begin with, the input RGB color picture is changed into YCbCr color space. Moment, the beginning seeds are naturally chosen. Third, the color picture is sectioned into districts where each locale compares to a seed. At long last, region-merging is utilized to combine comparable or little districts.

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interactive media processor. Yi-Hsien Chiang et.al.,proposed a framework which devises a turnpike controller that's able of stabilizing activity stream when the traffic system is within the unsteady (congested) stage, in which a shock wave is likely to happen within the nearness of any in homogeneity and where the framework is on the skirt of a stick condition. Two sorts of activity controllers are created through the utilize of either a speed command approach that can be implemented in an brilliantly transportation framework (ITS) or slope metering that's a commonplace way of anticipating a expressway from over-burdening. By implies of the feedback linearization procedure, the discretized plainly visible activity stream demonstrate is reformulated, in which the required alter of volume in each area is treated as a virtual input. By investigating the casual relations among thickness, speed, and stream alter, the comparing speed commands can be decided. Recreations appear that the concocted controller can successfully stabilize the activity stream within the unsteady stage. The traffic state is within the unsteady stage when the activity thickness surpasses a basic limit esteem. In this stage, any in homogeneity is likely to result in a buildup of a stun wave that engenders upstream and may lead the framework to a clog condition. One strategy to keep activity from coming to the unsteady condition is to adjust activity request and supply. Then again, the marvels can be maintained a strategic distance from by legitimately planning all vehicles speed and remove progress. The last mentioned serves to constrict unforeseen stun wave propagation and to direct the state to the required balance condition concurring to the upstream and downstream circumstances. By the stun wave hypothesis, the activity reaction is influenced by the downstream condition, as well as the upstream condition. In this paper, they center on the plan of the activity stream control framework portrayed by a plainly visible discrete-time show.

By carefully selecting input features such as pixel color, intensity, texture, or a weighted combination of these data, the FCM algorithm can segment images to several regions in accordance with resulting clusters. Recently, the FCM and other clustering-based image-segmentation approaches are improved by including the local spatial information of pixels in classical clustering procedures. For example, an additional term about the difference between the local spatial information and the cluster centers is attached to the traditional objective functions of FCM algorithms. Long Chen, C. L. et.al.,proposed a framework for picture division utilizing fluffy c-means calculation. Picture division could be a central assignment in numerous inquire about areas counting computer vision and brilliantly picture and video examination. Its fundamental objective is to 70 part the pixels of an picture into a set of locales such that the pixels within the same region are homogeneous agreeing to a few properties and the pixels in numerous regions are not comparable. Clustering, especially fluffy C-means (FCM)-based clustering and its variations, have been broadly utilized within the assignment of picture division due to their effortlessness and quick joining. Since the inserted neighborhood spatial data, the modern FCM has illustrated vigor over clamors in pictures. In expansion to the joining of nearby spatial data, the kernelization of FCM has made an vital execution enhancement. The part FCM (KFCM) calculation is an expansion of FCM, which maps the initial inputs into a much higher dimensional Hilbert space by a few transform function. After this generation within the bit Hilbert space, the

information are more effortlessly to be isolated or clustered. Past inquire about on change to the part space has as of now been considered. As of late, advancements on kernel strategies and their applications have emphasized the ought to consider numerous bits or composite bits rather than a single settled bit. With different bits, the bit strategies pick up more adaptability on part determinations conjointly reflect the truth that viable learning issues frequently include information from numerous heterogeneous or homogeneous sources. Particularly, in imagesegmentation issues, the inputs are the properties of picture pixels, and they can be 71 inferred from distinctive sources. For illustration, the escalated of a pixel is straightforwardly gotten from the picture itself, but a few complicated surface data is maybe picked up from a few wavelet sifting of the picture. Multiple-kernel strategies give us a incredible apparatus to meld data from distinctive sources. It is fundamental to clarify that, in this paper, the creator have utilized the term "multiple kernel" in a wider sense than the one utilized in machine learning community. Within the machine learning community, "multiple-kernel learning" alludes to the learning.

Mohamed Ben Salah et.al.,proposed framework for Multiregional Picture Division by Parametric Part Chart Cuts. Numerous thinks about have centered on variety definitions since they result within the most compelling calculations. Variety definition looks for an picture parcel which minimizes an objective useful containing terms that insert portrayals of its locales and their boundaries. The writing flourishes of both ceaseless and discrete details. Persistent definitions see pictures as ceaseless capacities over a nonstop space. The foremost viable minimizes dynamic bend utilitarian through level sets. The minimization depends on angle plummet. As a result, the calculations meet to a nearby least, can be influenced by the initialization and are famously moderate in show disdain toward of the different computational artifacts which can speed their execution. Combinatorial optimization strategies which utilize chart cut calculations have been the foremost effective. They have been of strongly intrigued as of late as a few ponders have illustrated that chart cut optimization can be valuable in picture investigation. Exceptionally quick strategies have been executed for picture division movement and stereo division following and rebuilding. Thanes Wassantachatet.al.,proposed a framework to discover the activity thickness Estimation with On-line SVM Classifier concurring to the framework. Activity blockage has noteworthy impacts on both the economy and environment. Diminishing activity blockage can move forward activity stream, diminish travel times and the natural impact. Programmed assurance of activity blockage status is hence presented to diminish the fetched of human asset and the activity blockage delay. This programmed assurance can too build up an compelling activity arrangement to the activity light controllers. In later investigate, the Covered up Markov show was utilized in classifying the activity blockage state naturally. Indeed in spite of the fact that the execution was impressively great, a few limitations still stay. One key issue was that the Well approach required fragmented video shots as inputs to both its preparing and testing forms, with outlines in each sectioned shot speaking to an indistinguishable activity thickness state. This conceivably makes it troublesome to perform an exact and down to earth shot division in a video grouping. Moreover, this presented a certain delay to the real-time handle, making a Well

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approach unreasonable for a real-time execution. Another approach is employing a inactive Bolster Vector Machine (SVM) approach to demonstrate the activity Compared with the Gee approach, the SVM approach disentangles both preparing and testing forms and offers a strict real-time handle. Tragically, comparable with a Gee approach, the inactive SVM might not work accurately on a video arrangement with irregularities in its foundation such as a inactive shadow. Moreover, the complete handle required certain gigantic number of preparing tests to attain great execution. On the other hand, a foundation modeling approach has been broadly utilized in shadow location and is able to complement a activity thickness estimation handle. In any case, it is tricky beneath distinctive climate conditions, fast changing brightening and activity blockage.

Guohui Zhang et.al, proposed a Video-based Vehicle Discovery and Classification (VVDC) framework for collecting vehicle number and classification information. The proposed approach can identify and classify vehicles utilizing un-calibrated video pictures. The capacity to utilize un-calibrated observation cameras for real-time activity information collection improves the value of this model VVDC framework.

RongrongTian, Xu Zhang recommended to utilize the TRANSYT activity modeling program to discover the ideal fixed-time flag arrange and VISSIM micro-simulation computer program to confirm and assess the TRANSYT show and to assist evaluate the ideal flag arrange.

Junchen Jin and Xiaoliang Ma proposed a group-based flag control approach able of making choices based on its understanding of activity conditions at the crossing point level. The control issue is defined employing a system of stochastic ideal control for multi-agent framework in which each flag bunch is modeled as an cleverly operator. The proposed framework is assigned to be congruous with the winning flag framework. The parameters were off-line optimized employing a hereditary calculation. Reenactment comes about appeared that the proposed versatile group-based control systemoutperforms the optimized GBVA control .

Nasser R. Sabar et al controlled the development of activity on urban lanes by decided the suitable flag timing settings. Proposed calculation was based on the so-called mimetic calculation that combines the qualities of the hereditary calculation and nearby look in an versatile way. In thatused two critical methods for progressing the execution of conventional mimetic calculations. To begin with, a orderly neighborhood based straightforward plummet calculation was utilized as a nearby look to successfully misuse the look space. Moment, an marker plot was proposed to control the nearby look application based on the quality and differences of the look prepare.The proposed calculation was coded within the commercial activity test system, AIMSUN, and tried on two distinction genuine world case thinks about in Brisbane, Australia, and Plock, Poland. The comes about illustrated that the proposed calculation wasbetter than hereditary calculations and fixed-time settings, demonstrated that the proposed calculation was an compelling arrangement strategy for activity flag optimization issues. Mohammad Aslani et al utilized RL (Support learning) calculations to plan versatile activity flag controllers called actor-critic versatile activity flag controllers (A-CATs controllers). Worked done rested on the integration of three strings: (a)

appears execution compared of both discrete and ceaseless A-CATs controllers in a activity organize with repeated clog (24-h activity request) within the upper downtown center of Tehran city, dissected the impacts of diverse activity disturbances included deft people on foot crossing,parking path, non-recurring blockage, and diverse levels of sensor commotion on the execution of A-CATS controllers, and compared the execution of distinctive work approximators (tile coding and outspread premise work) on the learning of A-CATs controllers. To begin with an agent-based activity reenactment of the ponder range was carried out.

At that point six distinctive scenarios are conducted to discover the most excellent A-CATs controller that was strong sufficient against distinctive activity disturbances. They watched that the A-CATs controller based on outspread premise work systems (RBF (5)) outflanks others. They said that RBF (5) was benchmarked against controllers of discrete state Qlearning, Bayesian Q-learning, settled time and activated controllers; and the comes about uncovered that (RBF (5)) reliably outflanks others.

EkinhanEriskin et al proposed unused strategy for planning activity flag timing at oversaturated convergences was communicated "the end blending system". An objectfunction with vehicle delay and stop-start numbers has been created. Add up to fetched esteem has been calculated concurring to the question work. Gotten comes about were compared with Webster as a conventional activity flag timing plan strategy and Transyt 14 flag timing program. Whereas Webster gives overstated comes about, Transyt 14 and Disposal Blending Frameworks given superior comes about.

The authorShailendraTahilyani et.at.developed a modern path bypass calculation for course preoccupation given a result in smooth activity stream on the urban street arrange. Hereditary calculations are utilized for the parameter optimization. Ramteke Mahesh K. et.al.proposed FPGA (Field Programmable Entryway Cluster) controller based on Neuro-Fuzzy framework thought given successful arrangement for Activity Control. It can utilized to play down disadvantages of the routine activity controllers with the exactness of given variety in green cycle interims based on the overwhelming activity loads that changed at each path in a four leg crossing point.NarenAthmaraman and SrivathsanSoundararajan presented an versatile prescient flag control framework that performed genuine time line length estimation and utilized an proficient flag coordination calculation with APTTCA-based framework. Pavan Kumar and Dr. M. Kamala kumara examined versatile activity control frameworks with VANET, Centered on dependable activity expectation approaches and different sorts of versatile activity control calculations moreover proposed a versatile swarm detecting innovation to bolster energetic course choices for drivers to dodge clog. Proposed swarm sourcing can be one of the leading alternatives for Versatile activity control framework for India. Prof. JayeshJuremalani and Dr. Krupesh A. Chauhanauthor portrayed different delicate computing procedures to handle activity control framework. The forecast of traffic flows, traffic volumes and travel times may be a exceptionally important part of activity administration and data framework. The activity reenactment is correspondingly required to create these expectations by dependable way. The comes about of

the activity condition forecasts can be utilized for distinctive purposes such as to impact travel behavior, to diminish activity blockage and by and large to progress the execution of activity administration framework. Saab et.al.,have created a estimating framework for anticipating the number of travelers boarding for the another N planned flights on a specific course. The bit of the framework is Kalman channel. Inputs for the framework are the booking levels made for N takeoff days ahead of the information date for that flight leg. The solid relationship is expected between the numbers of travelers that boarded the plane on that flight and the number of bookings made for that flight fair some time recently flight. The framework can be utilized as choice 88 bolster framework to discover the ideal limits on the number of bookings which will be acknowledged in a particular passage lesson on long-term flight leg.

Senet.al., have investigated the results of utilizing connect travel time gauges with tall change to compute the least travel time course between an root and goal combine. They have taken note that changes of the travel times stay tall indeed when test sizes gotten to be expansive. So the increment in test measure of travel times does not ensure superior quality of data given by Cleverly Transportation Frameworks (ITS). The normal course travel times brought about by the guided drivers beneath various 'guidance strategies' were tried out. Reenactment comes about appeared that inactive travel time gauges advertised superior quality of direction than energetic travel time gauges. That was, since the fluctuation of energetic travel time gauges stay tall. The expectation and modeling of activity streams includes awesome challenges for sciences.

Related to some time recently said issue Wahleet.al.,have considered the quality of the replicated activity states with respect to vehicular densities and connect travel times. They have created a recreation apparatus for urban activity, which can moreover be effectively expanded to demonstrate activity stream on thruways. Both spatial and worldly scales of activity states can be extrapolate by recreation. The recreation apparatus can too be utilized for planning and assessing energetic activity administration framework taking under consideration diverse criteria. Routine factual models as a rule endure their strict scientific suspicions when depicting complex activity conditions. Correspondingly, cleverly versatile strategies are made for portraying wonder beneath non-ideal physical situations.

Huiskenet.al.for their portion have compared exhibitions of an ARMA time arrangement examination strategy and of a MFL neural organize strategy in blockage forecast. The volume, cruel speed, inhabitance and standard deviation of speed inside 89 1-minute time bin,which can be respected as an pointer of the chaos of the activity, were utilized as inputs of the demonstrate. Comes about appeared way better execution for MLF neural arrange strategy both the blockage expectation and the processor time productivity. Be that as it may, both strategies are not so strong within the case of the occurrence. Past investigate endeavors have claimed the common prevalence of the neural organize show in activity volume estimating. Be that as it may, the determining control of a single show is restricted to the normal cases to which the demonstrate fits best.

CHAPTER 03

PROPOSED METHODOLOGY

The sound record put away in a record within the computer shows the occurrence of the event of an crisis vehicle .The sound record is taken into the sound handling calculation which is utilized to find whether the sound may be a siren sound. Here as it were ON-OFF siren sound is used for this venture . In the event that the sound is siren at that point the ultimate control algorithm initiates which enacts the activity light to perform the essential activity .In the event that the sound isn't a ON-OFF siren then the activity light works in typical condition. Here the GSM is actuated as it were when the EV isn't passed the activity light.

Interfaces:

Software Interface:

Input Interface System: Both the sensors are to be interfaces to the EVRS such that all the signals will be totally digitalized conjointly for successful control with the input to our gadget. Within the current venture the input is taken from record put away within the computer from where crude information is taken and prepared. But to attain genuine time retaining of sound the Java media system can be actualized which bolsters media system where video is taken and prepared to get sound independently.

Yield Interface System: After the choices are taken the activity to be done are on the activity flag lights and other equipment as said over which are outside to the EVRS gadget. In this way for this activities to be conducted on the outside equipment and Yield Interface System is fundamental. Java system and java codes are composed for this reason and change apparatuses are too essential for it. The Yield Interface System interfacing the EVRS framework to the outside equipment gadgets such as the GSM transmitter, Flag lights controller and other equipment introduced within the traffic system for the advantage of the EV to cross the flag intersection.

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CHAPTER 04

PROJECT DESCRIPTION

Firstly, to make a simulation of a traffic signal we are going to make a four way traffic light sequence using an IC555 timer to generate clock pulses.

Secondly, we will be using a decade counter i.e., IC4017 to count the pulses generated by the timer. The timing of each signal is optimized for better traffic control. As per the circuit diagram we will obtain a traffic signal and simulate a junction. A bypass network is now incorporated in the circuit to switch the signal in the presence of an emergency vehicle. An RF transmitter is placed inside the emergency vehicle which transmits a simple high logic data when in range of the signal. The RF receiver is connected to the bypass network which when receives the data from the emergency vehicle resets the count sequence of the IC and makes the light green in the lane where the vehicle is present

 Hence when there is an emergency vehicle in a lane, the corresponding lane is given a green signal while the other lane turns red.

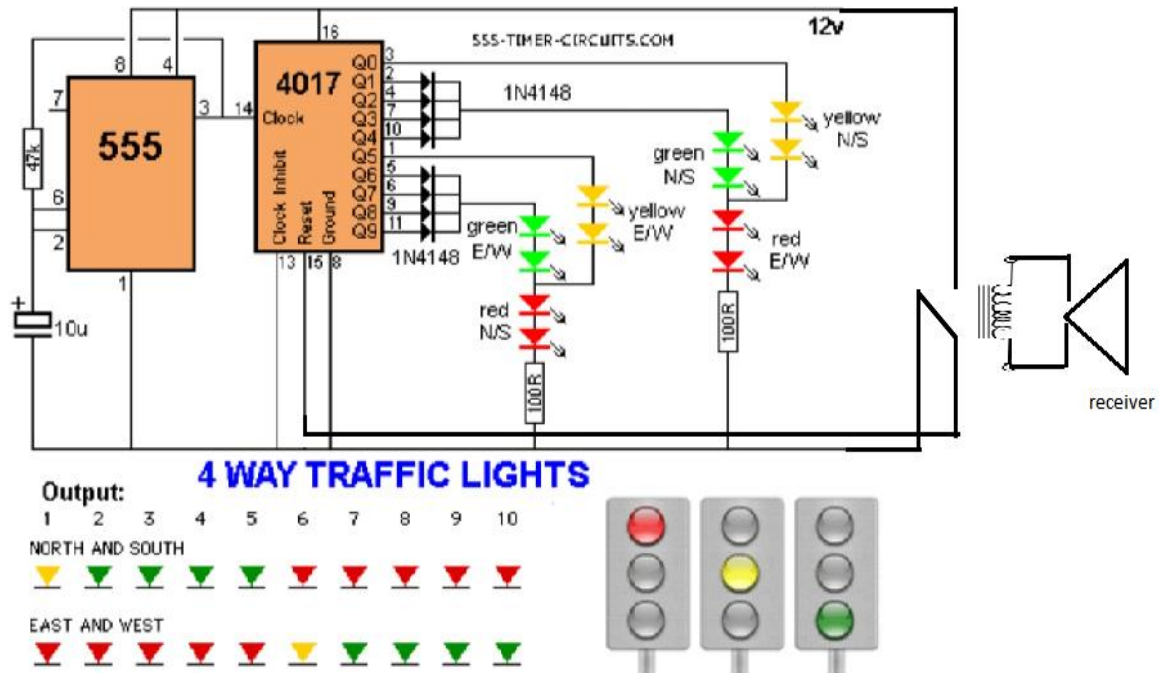Department of ECE, NHCE

CIRCUIT DIAGRAM:

Fig4.1

COMPONENTS USED AND SPECIFICATIONS:

555 TIMER IC:

The 555 timer IC is an integral part of electronics projects. Be it a simple project involving a single 8-bit micro-controller and some peripherals or a complex one involving system on chips (SoCs), 555 timers working is involved. These provide time delays, as an oscillator and as a flip-flop element among other applications.

Introduced in 1971 by the American company Signetics, the 555 is still in widespread use due to its low price, ease of use and stability. It is made by many companies in the original bipolar and low-power CMOS types. According to an estimate, a billion units were manufactured back in the year 2003 alone.

Depending on the manufacturer, the standard 555 timer package includes 25 transistors, 2 diodes and 15 resistors on a silicon chip installed in an 8-pin mini dual-in-line package (DIP-8). Variants consist of combining multiple chips on one board. However, 555 is still the most popular. Let us look at the pin diagram to have an idea about the timer IC before we talk about 555 timer working.
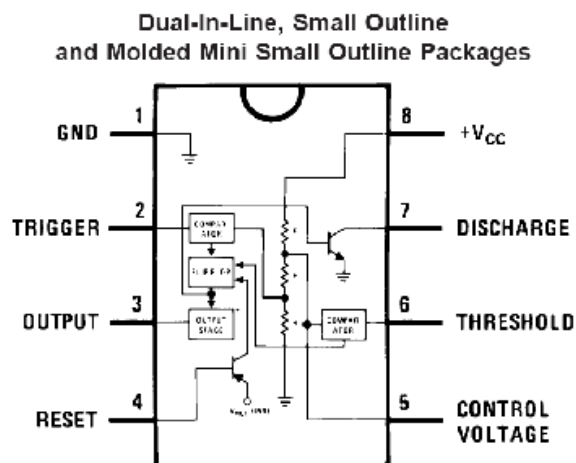
Fig4.2

Pin	Name	Purpose
1	GND	Ground reference voltage, low level (0 V)
2	TRIG	The OUT pin goes high and a timing interval starts when this input falls below 1/2 of CTRL voltage (which is typically 1/3 Vcc, CTRL being 2/3 Vcc by default if CTRL is left open). In other words, OUT is high as long as the trigger low. Output of the timer totally depends upon the amplitude of the external trigger voltage applied to this pin.
3	OUT	This output is driven to approximately 1.7 V below +Vcc, or to GND.
4	RESET	A timing interval may be reset by driving this input to GND, but the timing does not begin again until RESET rises above approximately 0.7 volts. Overrides TRIG which overrides threshold.
5	CTRL	Provides "control" access to the internal voltage divider (by default, 2/3 Vcc).

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6	THR	The timing (OUT high) interval ends when the voltage at threshold is greater than that at CTRL (2/3 Vcc if CTRL is open).
7	DIS	Open collector output which may discharge a capacitor between intervals. In phase with output.
8	Vcc	Positive supply voltage, which is usually between 3 and 15 V depending on the variation.

The 555 generally operates in 3 modes:

1. Astable
2. Monostable
3. Bistable modes.

Astable mode:

This means there will be no stable level at the output. So the output will be swinging between high and low. This character of unstable output is used as a clock or square wave output for many applications.

Mono-stable mode:

This configuration consists of one stable and one unstable state. The stable state can be chosen either high or low by the user. If the stable output is set at high (1), the output of the timer is high (1). At the application of an interrupt, the timer output turns low (0). Since the low state is unstable it goes to high (1) automatically after the interrupt passes. Similar is the case for a low stable monostable mode.

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Bi-stable mode

In bistable mode, both the output states are stable. At each interrupt, the output changes from low (0) to high (1) and vice versa, and stays there. For example, if we have a high (1) output, it will go low(0) once it receives an interrupt and stays low (0) till the next interrupt changes the status.
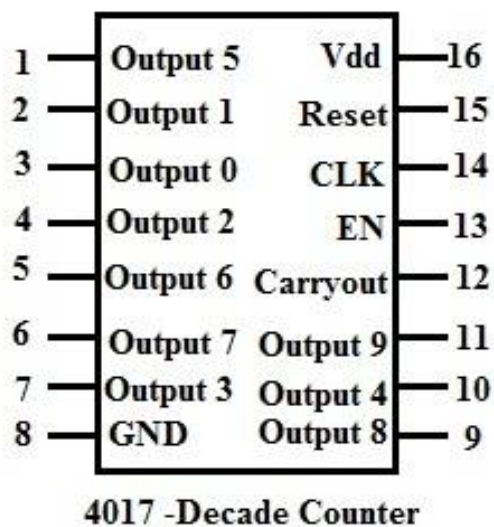
IC 4017:

4017 -Decade Counter

Fig4.3

Enable pin/Clock Inhibit(Pin 13)

- Enable pin enables the CD4017 IC.IC is enabled when the pin is active low.
- In order to disable or switch off the IC,this pin should be connected to active high input.When this pin is active high ,it ignores the clock signals.

Clock pin(pin 14)

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- Clock signal provided to pin 14 is responsible for sequential output.
- When the first clock pulse is detected pin 3 goes high . For next clock pulse pin2 goes high,like this sequence is formed.
- The important thing to remember is, if we don't connect any clock signal to this input pin, it must be connected to either positive or negative voltage supply.
- It is not left unconnected as per the CMOS input standard rules.
- The clock input pin (pin number 14) responds only to the positive voltage signal or positive clock

Reset pin(Pin 15)

- Reset pin resets the output of the sequence.That is the current state of the output sequence is set to initial state.
- Reset pin should be connected to ground in order to reset the circuit.

Ground pin & supply pin(Pin 8 & Pin 16)

Pin number 8 acts as ground and it must be connected to negative supply voltage & pin number 16 is the supply pin for CD4017 and it is connected to positive voltage supply.

Carry out pin(pin12)

The pin 12 is supplied with the CARRY OUT signal. It completes one full cycle for every 10 clock cycles. This is used to 'ripple' the IC, which means to delay in counting operations.
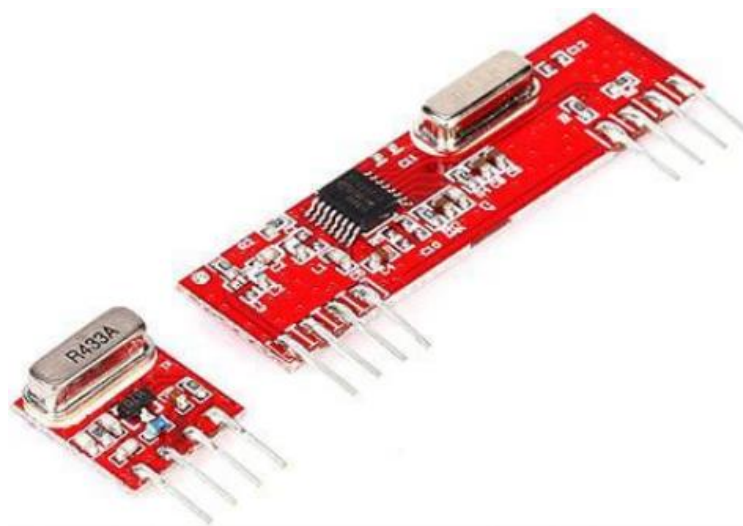
RF transmitter and receiver

Fig4.4

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In generally, the wireless systems designer has two overriding constraints: it must operate over a certain distance and transfer a certain amount of information within a data rate. The RF modules are very small in dimension and have a wide operating voltage range i.e. 3V to 12V.

Fundamentally the RF modules are 433 MHz RF transmitter and recipient modules. The transmitter draws no control when transmitting rationale zero whereas completely stifling the carrier recurrence hence expend altogether moo control in battery operation. When rationale one is sent carrier is completely on to almost 4.5mA with a 3volts control supply. The information is sent serially from the transmitter which is gotten by the tuned recipient. Transmitter and the collector are appropriately interfaces to two microcontrollers for information exchange.
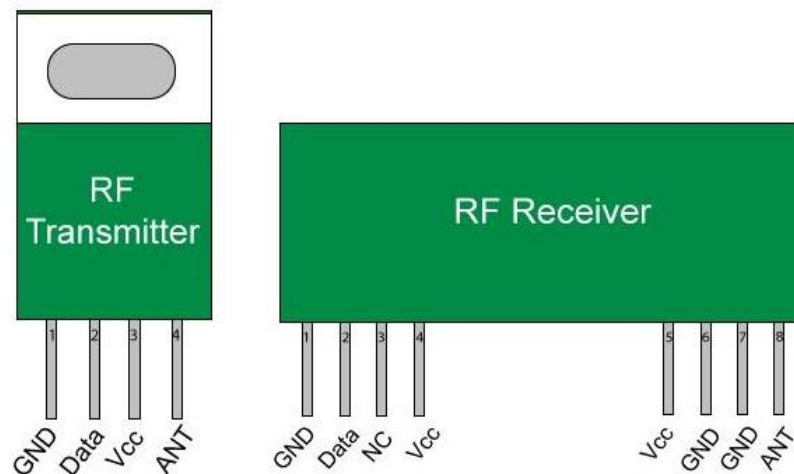

Fig4.5

Features of RF Module:

- Receiver frequency 433MHz
- Receiver typical frequency 105Dbm
- Receiver supply current 3.5mA
- Low power consumption
- Receiver operating voltage 5v
- Transmitter frequency range 433.92MHz
- Transmitter supply voltage 3v~6v
- Transmitter output power 4v~12v

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Main Factors Affecting RF Module's Performance:

 As compared to the other radio-frequency gadgets, the execution of an RF module will depend on a few variables like by expanding the transmitter's control a expansive communication separate will be assembled. In any case, which can result in tall electrical control deplete on the transmitter gadget, which causes shorter working life of the battery fueled gadgets. Moreover by utilizing this gadgets at higher transmitted control will make impedances with other RF gadgets.

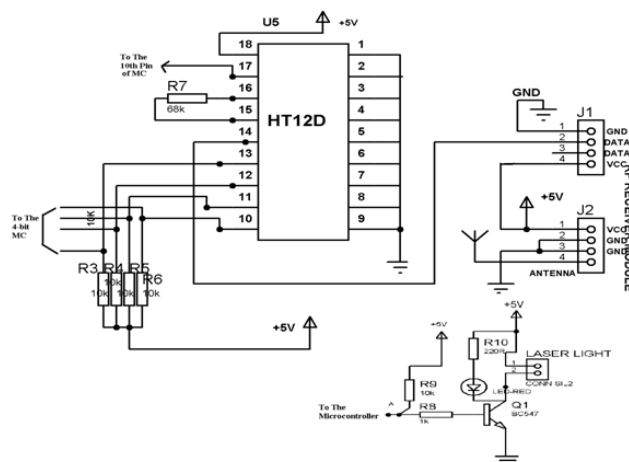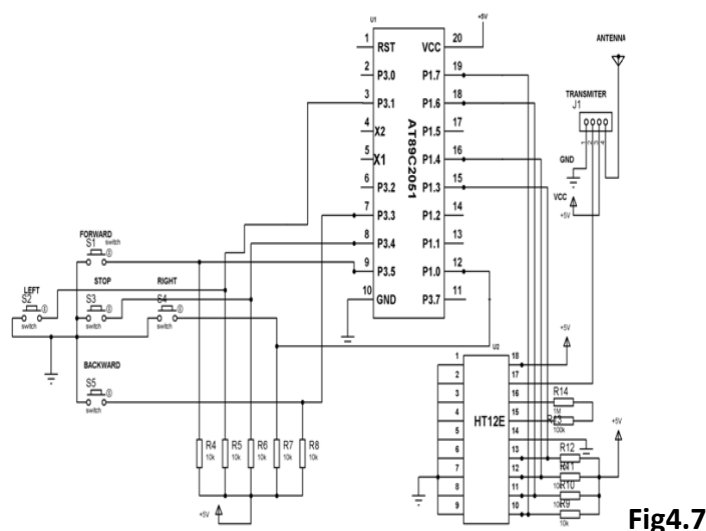RF transmitter and receiver circuit:

Fig4.6

Fig4.7

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An **RF module** (short for **radio-frequency module**) is usually a small electronic device used to transmit and/or receive radio signals between two devices. In an embedded system it is often desirable to communicate with another device wirelessly. This wireless communication may be accomplished through optical communication or through radio-frequency (RF) communication. For many applications the medium of choice is RF since it does not require line of sight. RF communications incorporate a transmitter and a receiver. They are of various types and ranges. Some can transmit up to 500 feet. RF modules are widely used in electronic design owing to the difficulty of designing radio circuitry. Good electronic radio design is notoriously complex because of the sensitivity of radio circuits and the accuracy of components and layouts required to achieveoperation on a specific frequency. In addition, reliable RF communication circuit requires careful monitoring of the manufacturing process to ensure that the RF performance is not adversely affected. Finally, radio circuits are usually subject to limits on radiated emissions, and require Conformance testing and certification by a standardization organization such as ETSI or the U.S. Federal Communications Commission (FCC). For these reasons, design engineers will often design a circuit for an application which requires radio communication and then "drop in" a pre-made radio module rather than attempt a discrete design, saving time and money on development.

RF modules are most often used in medium and low volume products for consumer applications such as garage door openers, wireless alarm or monitoring systems, industrial remote controls, smart sensor applications, and wireless home automation systems. They are sometimes used to replace older infrared communication designs as they have the advantage of not requiring line-of-sight operation.

Several carrier frequencies are commonly used in commercially available RF modules, including those in the industrial, scientific and medical (ISM) radio bands such as 433.92 MHz, 915 MHz, and 2400 MHz. These frequencies are used because of national and international regulations governing the use of radio for communication. Short Range Devices may also use frequencies available for unlicensed such as 315 MHz and 868 MHz.

RELAY:

An electrical relay is an electromagnetically operated electrical switch - an electromechanical switch. A relatively small current is used to create a magnetic field in a coil within a magnetic core and this is used to operate a switch that can control a much larger current.

In this way an electromechanical relay or electrical relay can use a small current to switch a much larger current and enable both circuits to be electrically isolated from each other.

Electrical relays come in a variety of different sizes and they can be of a variety of different types using slightly different technologies, although they all use the same basic concept.

Although electromechanical relays may be considered in some respects to use old technology, and solid state relays / solid state switches might be thought to be a more effective means of switching electrical current.

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In any case electromechanical transfers have a few one of a kind properties that make them perfect for numerous applications, where other sorts may not be as compelling. That said, strong state switches, strong state transfers or electronic switches are broadly utilized and have taken over in numerous zones where electromechanical transfers were already utilized as electrical switches.

The circuit images for electromechanical transfers can shift to some degree - like most circuit images. The foremost broadly utilized organize appears the hand-off coil as a box, and the contacts are set near by as appeared underneath.

Circuit symbol of a relay

Note that on this symbol, both normally open and normally closed contacts are shown. Where one or more sets of contacts is not used, it is often not shown.

Other circuits, especially new that may be a bit older may show the relay coil as an actual coil. Although this does not conform to the latest relay circuit symbol standards, it may nevertheless be seen in some instances and it describes the inside of the relay well. Circuit symbol of a relay
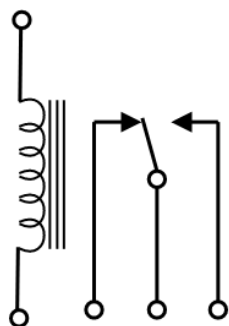

Fig4.8

It is possible for there to be further sets of electrical switch contacts. In the same way that it is possible to have multiple poles on a switch, the same can be done with relays. It is possible to have several sets of switch contacts to change over multiple circuits.

Relay switch basics

A relay is a form of electrical switch that is operated by electromagnet which changes over the switching when current is applied to the coil.

These relays may be operated by switch circuits where the switch cannot take the high current of the electrical relay, or they may be operated by electronic circuits, etc. In either circumstance they provide a very simple and attractive proposition for electrical switching.

Basic concept of an electrical relay switch operation

Relays have a number of basic parts that form the relay.

- **Frame:** A mechanical frame is required to hold the components in place. This frame is normally quite robust so that it can firmly support the additional elements of the electromechanical relay without relative movement.
- **Coil:** A coil wound round an iron core to increase the magnetic attraction is needed. The coil of wire causes an electromagnetic field to be created when the current is switched on an causes the armature to be attracted.
  - **Armature:** This is the moving part of the relay. This element of the relay opens and closes the contacts and it has a ferromagnetic metal to be attracted by the electromagnet. The assembly has an attached spring which returns the armature to its original position.
  - **Contacts:** The contacts are operated by the action of the armature movement. Some of the electrical switching contacts may close the circuit when the relay is activated where as others may open a circuit. These are known as normally open and normally closed.

CHAPTER 05

RESULT AND DISCUSSION

Emergency vehicle recognition system can be employed to all Indian roads. It is

platform independent and portable and hence can be used to detect Emergency vehicle and help Emergency vehicle to cross traffic safely without delay .

It saves Emergency vehicles to cross the traffic where accidents or unclear able traffic jams which are occurred by warning the traffic warden to assist the free movement of traffic Because it is programmed using java hence it is portable to any systems which support JVM (java virtual machine).The picture below shows a EV stuck in traffic and using EVRS we can allow it pass freely through the traffic.
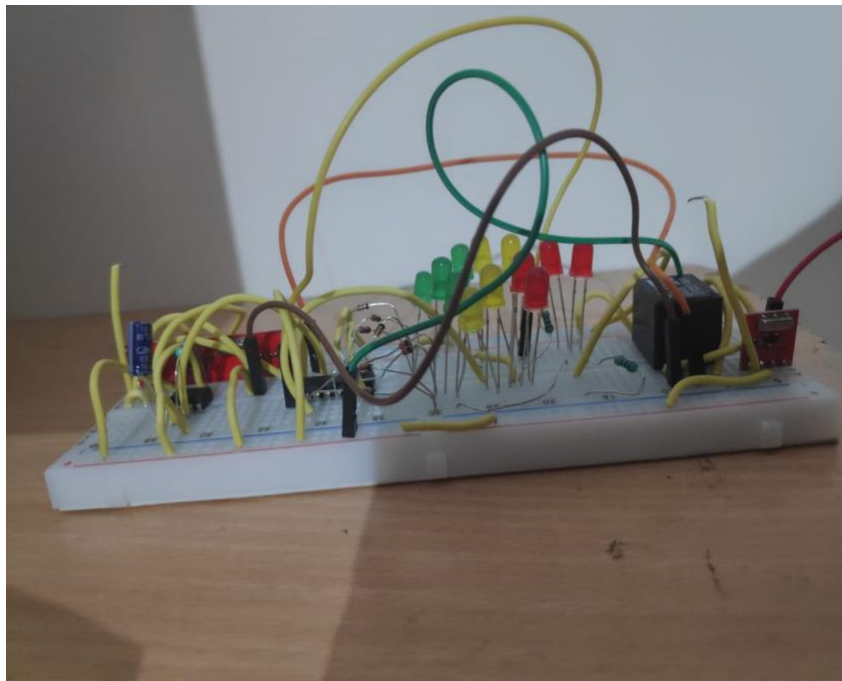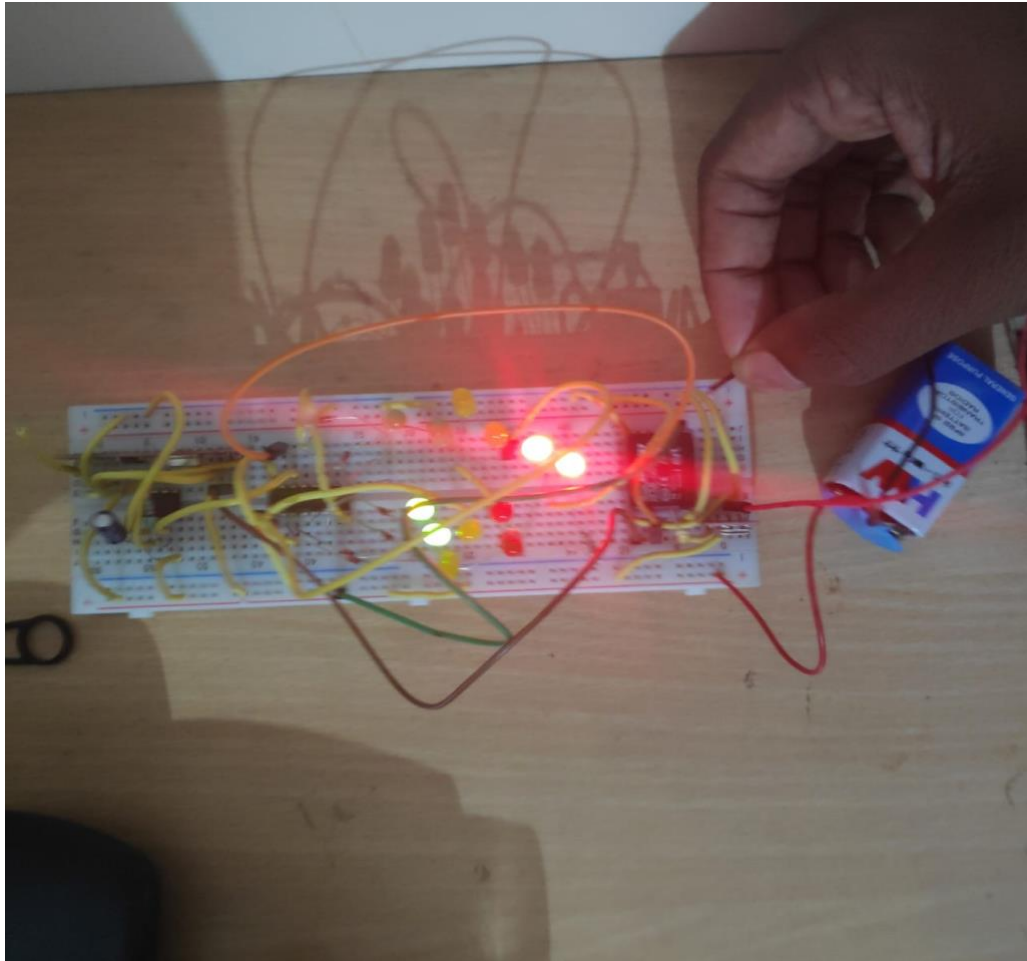

Fig 5.1

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Fig5.2

CHAPTER 06

CONCLUSION AND FUTURE SCOPE

Traffic signal switcher for emergency vehicles is a very user friendly and a emergency aiding system. It is completelyautomatic and no human intervention is needed in between. This system is extremelyuseful in the medical field as the patient can be commuted to anywhere by road-way moreswiftly than what it is at present, thus reduced risk of life.

This design is a prototype and for control over a single traffic lightonly also on the assumption that only a single EV is present at a time. The current EVRS system is designed to detect an EV based on sound processingwhich is efficient and accurate.

Future enhancement to this project can be done by introducing new functionalities that includes

1. Image processing

2. Java media framework (JMF)

By using image processing the system's ability to detect EV becomes even moreaccurate. It can detect EV much faster and accurately than the current system proposed. We can apply blob analysis which is much simpler and faster algorithms among imageprocessing.

JMF or Java Media Frameworks is to feed real time data to EVRS. JMFsupports media files to be taken in, hence video can be taken can be taken from cameraand analyzed to remove sound and image, and both data can be analyzed simultaneouslyto arrive at a conclusion .The current project is only designed to detect only one type of siren but it can bedesigned to detect all kinds of siren sound by improving the sound processing algorithm