PEDESTRAIN SAFETY DEVICE IN TRAFFIC SIGNALS

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ABSTRACT

In the era of Cenozoic era we live in, Transportation plays a vital role in daily lives of people. We have travelled so far, back from where we had just wheels to bullock cart till these days EV's (electric cars). Yet still the one thing that does not change in these many years is accidents. How does accidents happen? it happens when the machine malfunctions, or when unavoidable collision happens that's called accident. But these unavoidable accident cases tend to show few. what really shows major case in accidents are People breaking the rules, there results the true aspect of accident. The tremendous potential of the Pedestrian Safety Device to lower pedestrian accidents and improve general safety in metropolitan environments is evident. In terms of accident prevention and the safety of pedestrians, preliminary testing and simulations have produced encouraging results. Additionally, the device's ability to capture real-time data gives city planners and traffic engineers a chance to learn more about pedestrian behaviors and safety issues, enabling data-driven decision-making for urban development and traffic management. The need of combining cutting-edge technology into pedestrian safety measures is emphasized in this abstract, which also offers the Pedestrian Safety Device as a potentially effective remedy. To confirm the usefulness of the gadget and investigate potential improvements, more investigation and extensive trials are required.

Keyword: - *Pedestrian safety device, Collects accidents survey, Fusion 360 designing, Tinkercad circuits, Matlab simulation.*

1. INTRODUCTION

Traffic signals are essential for controlling the passage of cars, trucks, and pedestrians at junctions, guaranteeing an orderly flow of traffic, and improving road safety. In recent years, there has been an increased focus on pedestrian safety, leading to the incorporation of various safety devices to safeguard pedestrians into traffic signal systems. The importance and advantages of pedestrian safety devices at traffic signals are covered in this introduction.

Integrating pedestrian safety devices into traffic signal systems is an efficient solution to handle this issue because pedestrian safety is a major concern in urban areas with significant traffic. These tools are designed to increase pedestrian and crosswalk safety by ensuring their safety and wellbeing in the busy urban setting. We shall

discuss the significance of pedestrian safety devices in traffic signals and their possible advantages in this introduction. Urban infrastructure has traditionally included traffic signals, which are primarily used to control the flow of motorized traffic. The needs of pedestrians, who frequently occupy the same area as vehicles on the road, have occasionally been disregarded. Integrating safety features into traffic signals is a proactive way to address the major problem of pedestrian accidents.

We introduce the "Pedestrian Safety Device in Traffic Signal Project" to address this issue. With the help of technology and creative design, this effort aims to introduce novel safety measures at crossings that will increase pedestrian safety, boost traffic flow, and lower accident rates. The creation, use, and effects of pedestrian safety devices built into current traffic signal systems will all be investigated in this research. Our project aims to promote a safer and more sustainable urban landscape by making it safer for pedestrians and increasing traffic efficiency generally. This introduction lays the groundwork for a thorough investigation of the project's goals, procedures, and results.

In order to create a safer, more pedestrian-friendly urban environment, this initiative aims to integrate sophisticated safety features at traffic lights. This project aims to increase visibility, encourage adherence to traffic regulations, and lower accident risk in order to make our streets safer for everyone, especially pedestrians, who are the most vulnerable road users. This introduction lays the groundwork for examining the numerous elements and results of this trailblazing project, highlighting its potential to have a beneficial impact on the safety and standard of living in our community.

1.1 Benefits of our device

The law is supported by a study that demonstrates how a combination of passive and active measures that provide a better level of protection than the pre-existing regulations can greatly increase pedestrian protection. In particular, the analysis demonstrates that the addition of the "brake assist" active safety system and modifications to the passive safety regulations will greatly improve pedestrian protection.

When the existence of a traffic crash is brought to the knowledge of a police station (by anybody involved in the crash, by someone who knows about the crash, or by a police officer who learns about the crash), the information reported is documented in a First Information Report (FIR). What the person who reported the crash witnessed is reflected in the material in the FIR. As a result, the "criminal justice" process is initiated, and the police begin investigating the incident. Absent a ruling from the High Court or the Supreme Court of India, a FIR's contents cannot be changed after it has been filled.

The purpose of this introduction is to set the stage for a deeper investigation of the significant influence pedestrian safety devices have on contemporary traffic management. We will illuminate how these gadgets are reshaping urban landscapes and promoting a safer, more welcoming, and peaceful coexistence between people and vehicles by exploring their design, functionality, and advantages. We will examine the technology underlying these devices, their contribution to lowering accidents and fatalities, as well as the wider implications for urban planning and the future of mobility, in the pages that follow.

2. LITERATURE SURVEY

There are several issues with the possibilities for pedestrian signalization, according to recent studies in the field of pedestrian safety. In some instances, mounted signals haven't been able to get pedestrians' attention in a way that's effective. They have occasionally failed to send a clear message, and occasionally the signal's intention has been completely misunderstood. As a result, the efficiency of signals in enhancing the intersection's operational and safety qualities has been questioned by traffic experts. General instructions for the installation of pedestrian signals are provided in the most recent edition of the Manual of Uniform Traffic Control Devices (MUTCD). Pedestrian signals may be implemented in the following situations, per MUTCD:

1. The pedestrian cannot see the traffic light,

2. The crossing is at a recognized school crossing,

3. At one or more crossings, an exclusive pedestrian crossing interval or phase is offered.

4. In order to reduce pedestrian-vehicle collisions and let pedestrians cross safely, pedestrian clearing indications must be used wherever there is a high volume of foot traffic.

5. Multiphase intersections make people confused, and

6. During a break, pedestrians cross a portion of a street to an island, but they are unable to cross the remaining portion in time.

- Broughton, J. and Knowles, J., 2011. Traffic Safety Basic Facts 2010 Pedestrians, Deliverable of the EC FP7 project DaCoTA, The European Commission Directorate General for Mobility and Transport.
  A review of pedestrian safety research in the United States and in other countries was compiled by Campbell et al. (2004)
  New intelligent signal solutions aimed at increasing safety of pedestrians are reviewed and recommended by Carsten et al.
- Campbell, B. J., Zegeer, C. V., Huang, H. H., Cynecki, M. J., 2004. A review of pedestrian safety research in the United States and abroad (No. FHWA-RD-03- 042). Carsten, O. M. J., Sherborne, D. J., Rothengatter, J. A., 1998.
  Intelligent traffic signals for pedestrians: evaluation of trials in three countries. Transportation Research Part C: Emerging Technologies, 6(4), 213-229.
  Understanding high risk of vulnerable road users and importance of technical standards for the protection of this group of people, the European Parliament adopted Regulation No 78/2009 (European Parliament 2009).
  Importance of technical standards for the protection of this group of people.

Authors	Location of Study	Use of Accident Data	Use of Compliance Data	General Conclusion
Abrams and Smith	Sioux City, Iowa	No	Yes	Improve compliance observed since installation of pedestrian signals
Mortimer	Eastern Michigan University	No	Yes	Decrease in conflict, illegal starts, and hazard-index values since the installation of pedestrian signals
Fleig and Duffy	New York	Yes, limited	Yes	A small reduction in pedestrian accidents at 11 intersections does not provide statistically reliable conclusions; no significant reduction in unsafe acts noticed
Inwood and Grayson	England	Yes	No	No significant difference in pedestrian accidents between zebra and pelican intersections
Skelton and Trenchard	England	No	No	Opinion survey indicated a lack of understanding of operating characteristic of pelican crossings
Williams	England and Australia	Yes	No	General reduction in pedestrian accidents observed with installation of pelican signals; however, presence of other countermeasures make it difficult to isolate the effect of pelican signals

Fig 1.1: Accident and compliance data

The scope of your literature review should be clearly stated and should cover any particular aspects of pedestrian safety equipment at traffic signals that you wish to investigate. If they are accessible, start with review articles or systematic reviews as they give an overview of the current state of the field's research. To learn more about pedestrian safety devices, their effectiveness, and their effects on traffic signals, look for original research papers, conference papers, and scholarly publications. Point out any new developments in pedestrian safety

technology and note any gaps in the body of knowledge. Put a summary of the current state of the field's understanding at the end of your literature review, along with any suggestions for additional study or practical applications.

Xu-Feng Cheng et al (2019) A novel zero voltage switching (ZVS) non-inverting buck-boost converter concept was suggested after research and exploration into soft-switching techniques for NIBBCs. All transistors function under ZVS circumstances thanks to the new NIBBC's use of a triple linked inductor device, two resonance inductors, and two supplementary diodes. Because the primary inductor receives constant current, the output current has less harmonics and ripples. The experimental findings demonstrated ZVS circumstances for all transistors and better efficiency compared to conventional constant conduction mode and triangle current mode NIBBCs, confirming the usefulness of the innovative NIBBC. Their suggested design is advantageous for energy conversion applications because to its simplicity, less switching losses, and improved efficiency.

3. OBJECTIVE AND METHADOLOGY

3.1 Objective

The main goal is to make sure that pedestrians are safe by reducing the possibility of collisions with moving vehicles. The purpose of pedestrian safety equipment is to make it safe for people to cross streets. By regulating traffic flow at intersections, these devices help to ensure that pedestrians have enough time to cross the street without running into turning automobiles.

Pedestrian safety equipment frequently has elements like pedestrian signals (walk/don't walk indicators) and crossing markings that increase pedestrian visibility to automobiles and assist walkers in determining when it is safe to cross.

Everybody should be able to cross the road safely, regardless of their physical capabilities, hence pedestrian safety devices should be made to assist people with disabilities.

Pedestrian safety devices help make traffic flow predictable by supplying clear signals and specified crossing zones, lowering the possibility of miscommunications or collisions between pedestrians and automobiles.

3.2 Methodology

Determine the areas that require pedestrian safety equipment. Take into account elements including traffic flow, pedestrian activity, accident history, and closeness to public spaces like schools or homes. Assure adherence to local, state, and federal regulations and standards for the installation of traffic signals and pedestrian safety devices. Include all necessary parties in the decision-making process, such as the public, local government officials, pedestrian advocacy organizations, traffic engineers, and urban planners.

Examine how pedestrian safety equipment affects traffic flow and congestion. Signal timing should be improved to allow for pedestrian crossings without placing an undue burden on automobiles. Establish the financial requirements for putting pedestrian safety equipment in place. Investigate potential financing sources, such as local government budgets, grants, or collaborations with pertinent organizations.

Define the pedestrian safety device's purpose, goals, and specifications. Determine the precise places and intersections where the gadget will be installed. Create a project team with members who have the necessary knowledge, such as engineers, designers, and safety specialists. To gather knowledge about the best practices and prospective solutions, conduct a thorough analysis of the current research, studies, and pedestrian safety technologies.

Determine and involve the appropriate parties, such as neighborhood representatives, pedestrian advocacy organizations, and local traffic authorities. To make sure the device meets the requirements and expectations of the neighborhood, gather input and feedback. Observe the traffic patterns for cars and pedestrians at the chosen traffic light locations. To pinpoint problem locations, analyze accident statistics, pedestrian activity, and traffic flow.

Make sure the gadget has features like aural cues, tactile feedback, and visible signs so that people with disabilities can use it. Respect all applicable laws and requirements regarding accessibility. Ensure seamless connection with the current traffic signal infrastructure by working with the local traffic signal authorities.

Create the appropriate interfaces and communication protocols to synchronize the device with traffic signals. To evaluate the prototype's usability and security, conduct controlled testing in a controlled setting. To find usability problems, get feedback from a variety of users, including pedestrians and make the necessary design adjustments and changes based on user feedback and prototype testing. To enhance the functionality of the device, perform numerous iterations. Choose a pilot location or a small number of places for the safety device's initial deployment.

3.3 Causes of recent pedestrian deaths

Numerous factors and situations can contribute to pedestrian deaths. It's crucial to remember that many accidents involve a combination of circumstances, and that the precise causes of pedestrian deaths can vary depending on the area. Typical reasons for pedestrian deaths include; The most frequent reason for pedestrian fatalities is being hit by a motor vehicle, such as a car, truck, or motorcycle. Numerous variables, such as speeding, distracted driving, intoxicated driving (caused by drugs or alcohol), and failure to give the right of way, can contribute to these accidents.

Accidents can also be caused by distracted walking on the part of pedestrians. Using a smartphone, putting on headphones, or participating in other activities that take their focus off the road can all be sources of distraction. Nighttime or unfavorable weather (such as rain, fog, or snow) can reduce visibility, making it more difficult for cars and pedestrians to see one another and increasing the risk of accidents.

Alcohol, drug, or substance-impaired pedestrians are more likely to be involved in collisions due to their poor judgement and coordination. Serious injuries or fatalities are more likely to occur in high-speed crashes with pedestrians. By slowing down traffic in areas with heavy pedestrian activity, these risks can be minimized. Texting or talking on the phone while driving can distract drivers from the road and make it difficult for them to see pedestrians in time to avoid collisions.

Increasing road safety, educating walkers and drivers, improving infrastructure, and enforcing traffic regulations are frequently the focal points of efforts to lower pedestrian fatalities. In order to provide safer surroundings for all road users, reducing the incidence of pedestrian accidents necessitates a combination of engineering, education, and enforcement approaches.

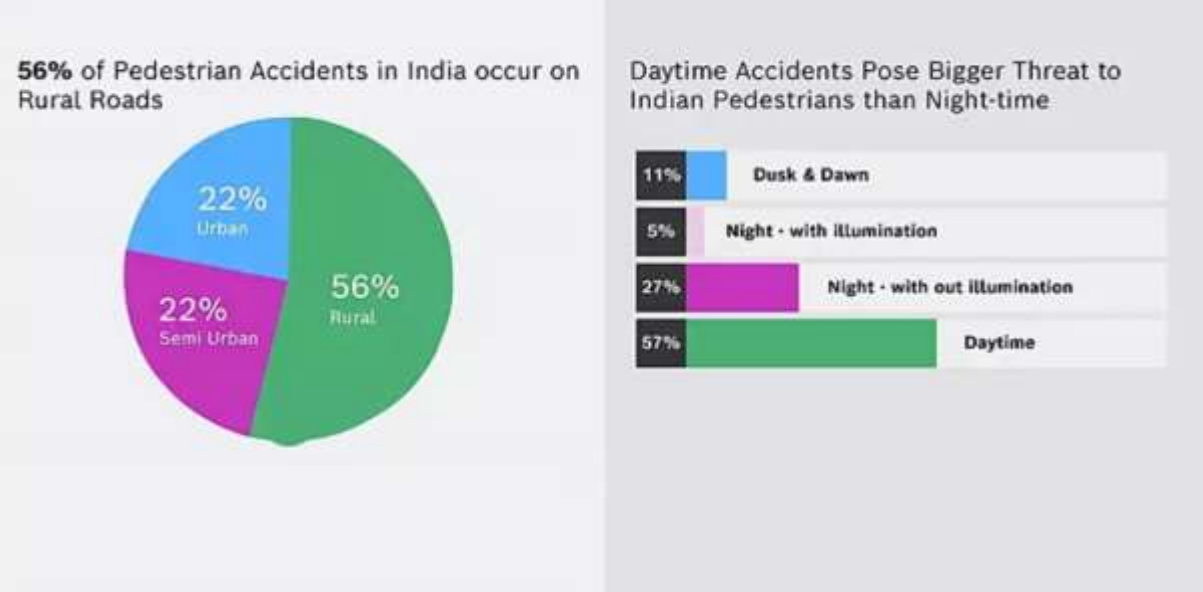

Fig 2.1: Statistics of pedestrian accidents

By ensuring that traffic stops, signalized pedestrian crossings are advantageous to users who are visually or physically challenged. To justify the delays to vehicle traffic that signalized pedestrian crossings cause, a significant amount of pedestrian activity is required. Additionally, signalized pedestrian crossings depend on motorists obeying traffic signals, which is not always the case. Midblock locations and intersections with existing traffic signals can both employ signalized crossings. At any signalized crossroads where pedestrians are expected to be present, pedestrian phasing should be taken into account. A raised element (raised crossing) may be included in signalized pedestrian crossings to reduce the speed of approaching vehicles.

3.4 Analysis of methodology

The attributes of a pedestrian facility, such as how it is used and the characteristics of the automobile and pedestrian traffic, determine how safe it is. Models found in the literature are based on data on pedestrian and traffic volumes as well as on pedestrian crossing characteristics, however traffic statistics are sometimes unavailable. The chosen strategy ignores the volume and composition of the current traffic in favor of the safety of a pedestrian crossing. Therefore, there is a risk in choosing not to intervene at pedestrian crossings that exhibit a high accident frequency because of increased traffic numbers. However, the methodology enables the identification of pedestrian crossings with the worst features for intervention.

There are several elements from the literature that either directly or indirectly affect the safety of pedestrian crossings. A panel of experts' opinions can be used to determine the relative importance of each aspect. Applying the Analytic Hierarchy Process (AHP), the difficulty of determining the precise contribution of each component to safety has been resolved. This approach is typically used to assess various options and determine which one is best to achieve a specific objective. AHP has been employed for the paper's purposes to combine the viewpoints of various specialists regarding the contributions of each safety-related aspect.

Potential aspects or features relevant to crossing safety have been included in a theoretical framework for safety. A panel of experts chose factors and features based on results from the literature as well as their relevance as evaluated by the panel. These two scenarios have been handled individually due to the major variations in traffic laws and road user conduct between signalized and unsignalized pedestrian crossings. The issue has been divided into three hierarchical layers for each scenario. The pedestrian crossing safety composite index is represented at the top level.

Day-time Nighttime and visibility Criteria for visibility assess how visible pedestrians are to drivers at crosswalks, how visible pedestrian crossings are to drivers, and how visible approaching cars are to pedestrians. The proper access for all road users, including those without disabilities, to approach the pedestrian crossing unhindered and potentially safe is ensured by accessibility standards. A particular indicator has been identified for each condition. Roadway width is an example of a quantitative indicator. A qualitative indicator would be the visibility of pavement markings.

3.5 Feasibility analysis

- There is no need for traffic inspector at the junctions for supervising the traffic to run smoothly and traffic rampage leading to terrible accidents.
- The intelligent work which is done by traffic inspector will be perfectly done by the microcontroller in the circuit with the help of sensors and the program which is coded to the microcontroller.

In analyzing the risks that can be brought on by improper implementation of pedestrian crossings, speed reducers, and pedestrian paths, road safety for roads becomes an important factor because citizens are the ones most likely to suffer its consequences, whether at the entrance to a site, the terminal sector, or the entire road in particular. The movement of different means of transport during key times of the day (leaving of kids from schools or people from employment), with the bicycle being the least used mode with an average of 4 bicycles being used during these hours, determines the average daily and weekly traffic.

Any mode of transportation, including various types of cars, bicycles, and motorcycles, which have a higher acceptance among the public and can be used to save money and avoid the tram but also to increase the indicators of accidents that happen, including morbidity and mortality of people because these happened on the street, is not immune to suffering an accident during mobilization.

Remember that the complexity and amount of information in the flowchart will vary depending on the complexity of the strategy and the specific goals. Try to keep it as simple as you can while yet effectively communicating your message. A project or organization may benefit from using flowcharts to improve communication, uniformity, and process explanation.

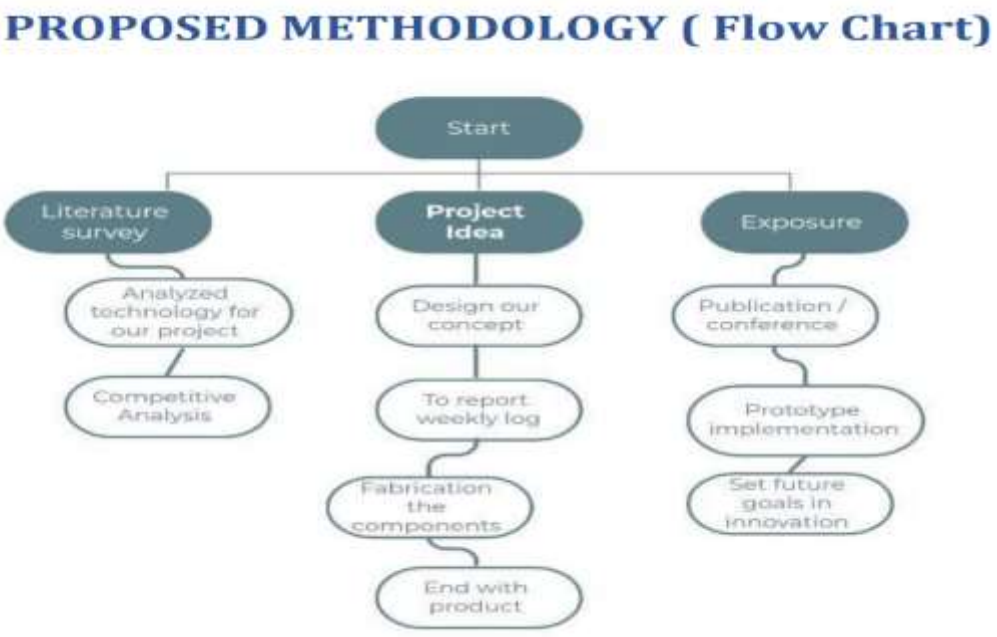

Fig 2.2: Flow Diagram of the Proposed Work

The steps and procedures associated with a project, task, or research study must be represented visually in a flowchart for a suggested methodology. The standard format for generating a flowchart of our project work plans is shown above figure2.2. The visual depiction of a project schedule provided by a Gantt chart facilitates the planning, coordinating, and time-tracking of tasks. Here is a suggested process for making a Gantt chart.

Keep in mind that the correctness of your Gantt chart and the regularity of your changes as the project develops are essential to its efficacy. It's an important tool for project management since it makes it possible to see the project timeline, assign resources effectively, and guarantee task completion on time.

The methodology for pedestrian safety devices in traffic signals should be tailored to the specific needs and traffic conditions of the area, with a focus on achieving the objectives of enhanced pedestrian safety and reduced accidents. By applying the approach to a set of pedestrian crossings, it is feasible to rank them according to the computed safety level and learn about areas that need to be improved as well as pedestrian crossings that need to be reconstructed.

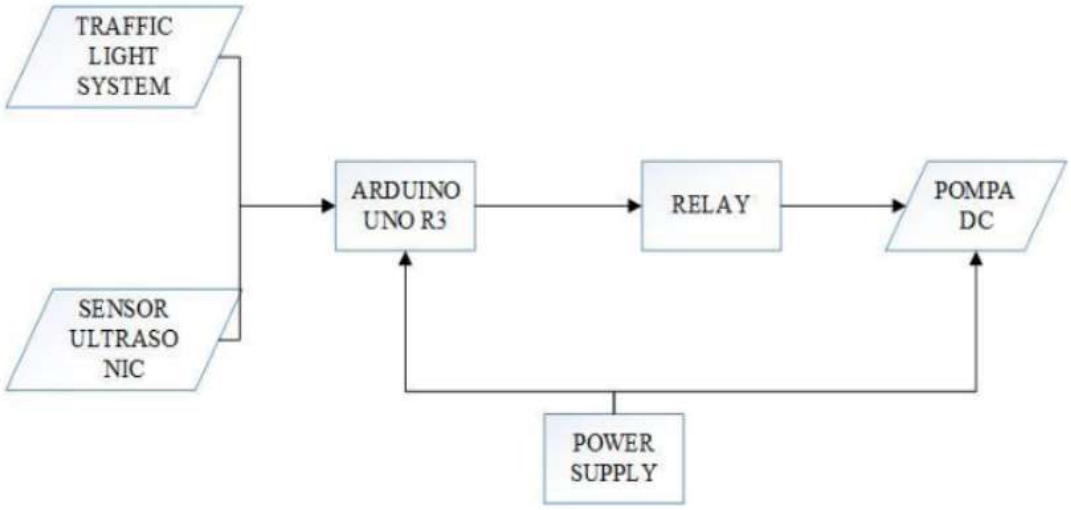

Fig. 1. Block Diagram of Pedestrian Security System.

Fig 2.3: Block diagram of pedestrian safety system

3.6 Boom barrier function

Boom gates, often referred to as boom barriers, are physical barriers that are frequently utilized in a variety of locations, such as parking lots, toll booths, commercial buildings and railway crossings. These barriers manage access and improve security in numerous ways. The following are the main purposes of boom barriers. At specific locations, boom barriers regulate the entrance and exit of vehicles, granting or denying access as necessary. They aid in controlling traffic flow and guarantee that only authorized vehicles can pass through. Boom barriers serve a variety of purposes, one of which is to increase security by prohibiting unauthorized vehicles from entering designated zones. This is crucial for safeguarding investments, people, and property. The maximum national impact that right-of-way fencing and/or median barriers on motorway crashes would have if these pedestrian barriers were used and were fully effective in reducing crashes identified as being related to this countermeasure was attempted as part of the analysis of pedestrian crashes on motorways. This countermeasure, according to the field investigators' calculations, may have stopped 14% of pedestrian crashes on highways. According to one analysis of the crash types and the associated causes, between 160 and 222 of these frequently significant nationwide incidents may be addressed each year.

Boom barriers can be combined with access control systems to track the time of entry and exit for both employees and visitors in specific office environments. At railway crossings, boom barriers and traffic lights are combined to make sure that vehicle traffic is stopped when a train is coming, averting accidents. Boom barriers may be used to control access to loading docks, service entrances, or other restricted areas in commercial or service-oriented buildings.

Boom barriers can be used as a barrier in industrial areas and building sites to keep unauthorized people and vehicles out of potentially dangerous locations. In some installations, boom barriers have elements to safeguard pedestrians, making sure they don't unintentionally enter traffic lanes when the barrier is down. Boom barriers are frequently used in parking lots to control access to authorized workers and pay lots for parking. This aids in revenue management and parking space management. Boom barriers may be used to inspect cars or regulate their passage at vehicle checkpoints, such as security checks at military facilities or border crossings. Boom barriers are used in residential and business complexes to stop unauthorized vehicles from entering the property, increasing security and privacy.

Boom barriers have a variety of uses, including traffic management, access control, and security. Depending on where they are located and the technology that has been built into them, they may carry out a variety of unique tasks. In conclusion, boom barriers are essential for controlling vehicle traffic, boosting security, and managing access in a range of environments. They are adaptable tools for regulating the movement of vehicles, guaranteeing safety, and safeguarding resources and people because of their multifunctionality. Boom barriers are useful tools that support the smooth running of transportation networks, commercial facilities, and security checkpoints. They can be used for toll collection on highways, limiting parking access, improving pedestrian safety, or preventing entry to restricted locations. They are vital in numerous fields and applications due to their capacity to act as a physical barrier and integrate with access control and traffic management systems.

3.7 Post application process

Every safety measure has its advantages and disadvantages. Some of the suggested methods performed better in a controlled lab setting but are not practical in everyday situations. We have noted the benefits and drawbacks of the available obstacle detecting technologies for this. The usability of these technologies and potential research directions should be identified. To educate the public and pedestrians on the proper usage of pedestrian safety equipment and the significance of pedestrian safety, launch public awareness campaigns and educational initiatives. To ensure the effective operation and visibility of pedestrian safety devices, regularly inspect and repair them. Enforce traffic regulations that pertain to pedestrian safety to deter reckless driving and make sure that motorists give pedestrians the right-of-way.

4. PROPOSED WORK MODULUS

Planning for and assessing the needs for pedestrian safety equipment should take into account variables such as the volume of pedestrian traffic, the frequency of accidents, and the flow of traffic. Create a well-thought-out strategy for installing safety equipment at particular crossroads or crosswalks. Engineering and design Make thorough designs for all pedestrian safety equipment, including crossing placement, signal placement, and any necessary infrastructure changes. Make sure that designs follow accessibility guidelines and local traffic laws.

The chapter that came before this one highlighted research findings related to pedestrian safety devices in traffic signals, such as the significant, positive correlation between faster vehicle speeds and the severity of pedestrian injuries, as well as a toolbox of potential solutions. However, research alone is not enough to help jurisdictions understand and deal with the problem of pedestrian safety in traffic; the work has not been going on long enough or in enough places to develop standardized methods for doing so or to provide reliable information about which methods are most effective in different situations.

4.1 Pedestrian safety methods;

1. Overview of initiatives to reduce traffic speed and increase pedestrian safety

2. The part that community and business partners play

3. Problems in putting efforts into action

4.Effort resistance and how it has been handled

5. Connections with state DOTs

6. Lessons discovered

SOFTWARE USED: SOLIDWORKS, FUSION 360, Matlab, Tinkercad

Using SolidWorks, you may build a structure that can shield pedestrians from approaching traffic as part of a pedestrian safety device in a traffic signal. Create the pedestrian protection structure using safety devices. It might be a rectangular frame or any shape that serves your needs. On the pole's top surface, use sketching tools to create the safety device's profile. Create the supports necessary to join the safety device to the traffic signal pole. These ought to be impact-resistant and sturdy. Create these support structures using the appropriate SolidWorks features, such as extrusion, loft, or sweep. Create the supports necessary to join the safety device to the traffic signal pole.

These ought to be impact-resistant and sturdy. Create these support structures using the appropriate SolidWorks features, such as extrusion, loft, or sweep. Review your design and get input from the necessary parties. Based on comments, alter and improve your design as appropriate. The real design process may differ depending on the particular requirements and safety norms in your area, so keep in mind that this is just a simplified overview. When constructing pedestrian safety devices for traffic signals, it's crucial to consult with traffic safety specialists and follow any applicable laws.

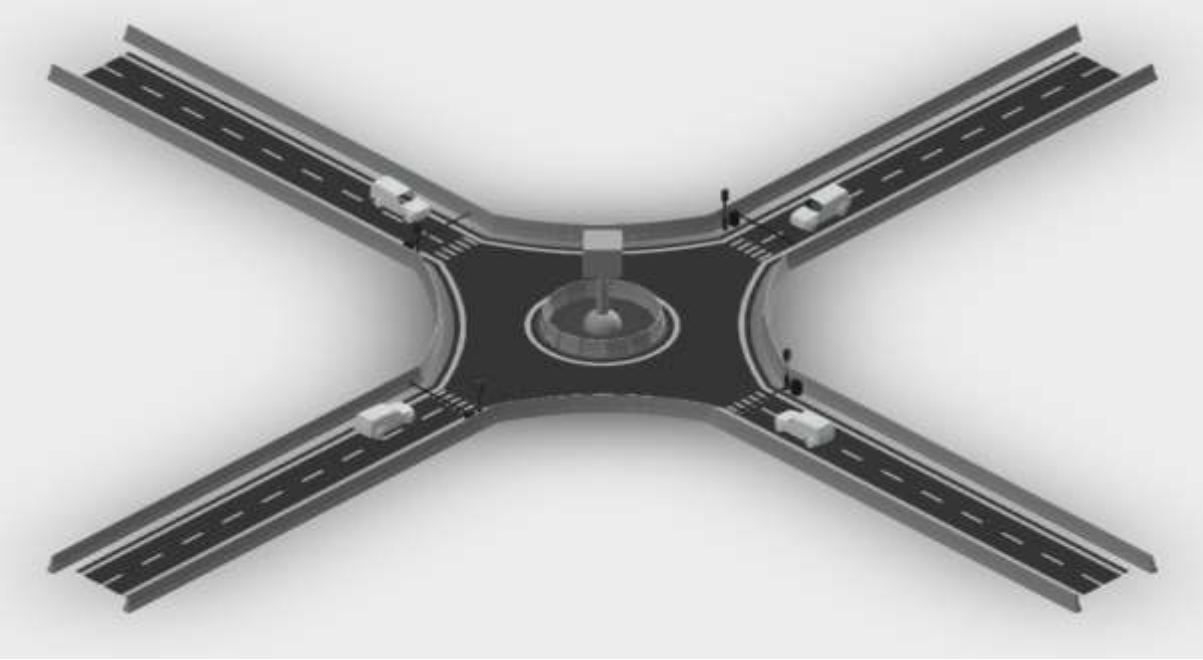

Fig 3.1: Fusion 360 simulation design

Fusion 360 offers powerful surface modeling tools that enable users to create complex and organic shapes. Surface modeling is particularly useful when designing products with sleek and curvaceous surfaces, such as cars, consumer products and industrial designs.

Simulink, a tool for simulating dynamic systems, ODE (Ordinary Differential Equations) solvers, and custom simulation functions are just a few of the simulation techniques available in Matlab. Writing Matlab code to put your model into practise. This code will compute the system's behaviour over time using the specified equations, beginning conditions, and parameters. This programme simulates a falling object's height over time and graphs the results. These procedures offer a fundamental framework for carrying out simulations in Matlab, while your particular simulation may require more sophisticated models and methods.

We set dimensions, relationships, and restrictions to create design features that are flexible and update automatically when changes are made in Fusion 360 because it supports parametric modelling. You can put together simple assemblies from separate components and study how they work together. Tools for motion studies, interference checking, and assembly animations are available in Fusion 360. It has simulation and analysis tools for testing how well your concepts work in various scenarios. This also involves heat analysis and stress analysis. Fusion 360 is a cloud-based platform, so you can access your designs from any location with an internet connection and work with team members in real-time. It has tools for data management and version control.

Examine the simulation and analysis tools if the application requires engineering or product design. If it supports heat analysis, stress analysis, and other engineering simulations, be sure it does. In order to produce realistic visuals and presentations of your concepts, evaluate the rendering and visualization technologies.

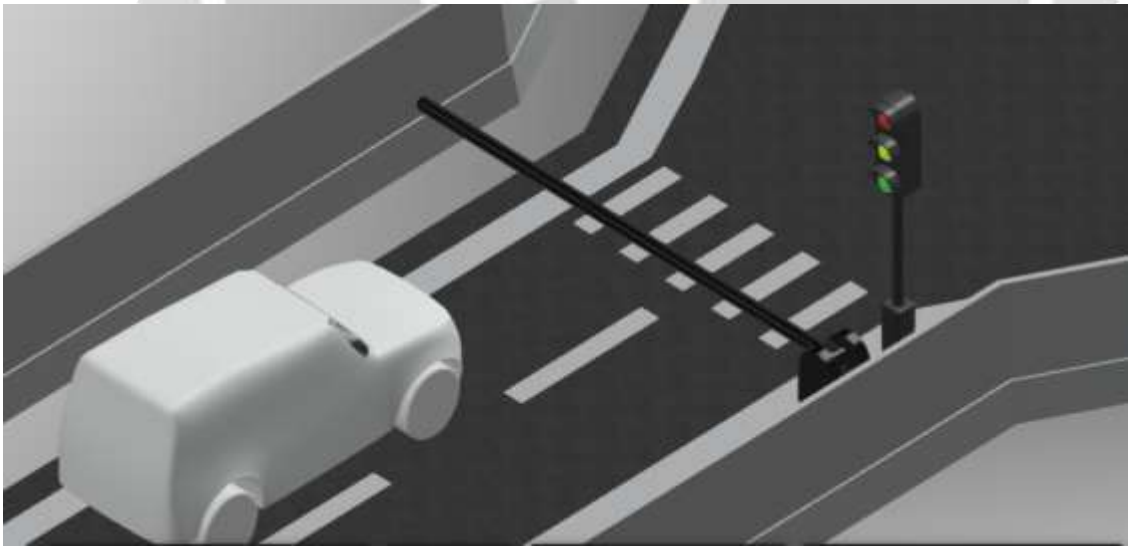

Fig 3.2: Fusion 360 safety device design

https://a360.co/3qzsmYn

In order to create a work plan for a Tinkercad simulation project, the project must be divided into manageable tasks and scheduled properly. making the basic simulation design in Tinkercad. Concentrate on developing the fundamental framework or elements of your project. Make a project report, user manual, and other necessary technical documents for your Tinkercad project. Keep in mind that the tasks and timescale can be changed

according to the demands of your particular project and the complexity of your Tinkercad simulation. To make sure expectations are met, it's also crucial to keep open lines of communication with stakeholders throughout the project. Each pedestrian's longitudinal journey was examined. This was the distance, measured parallel to the curb, between barrier openings used to enter and exit the roadway. The findings show that when the longitudinal distance between barrier openings on either side of the street is increased, the majority of pedestrians will cross the street away from the crosswalk.

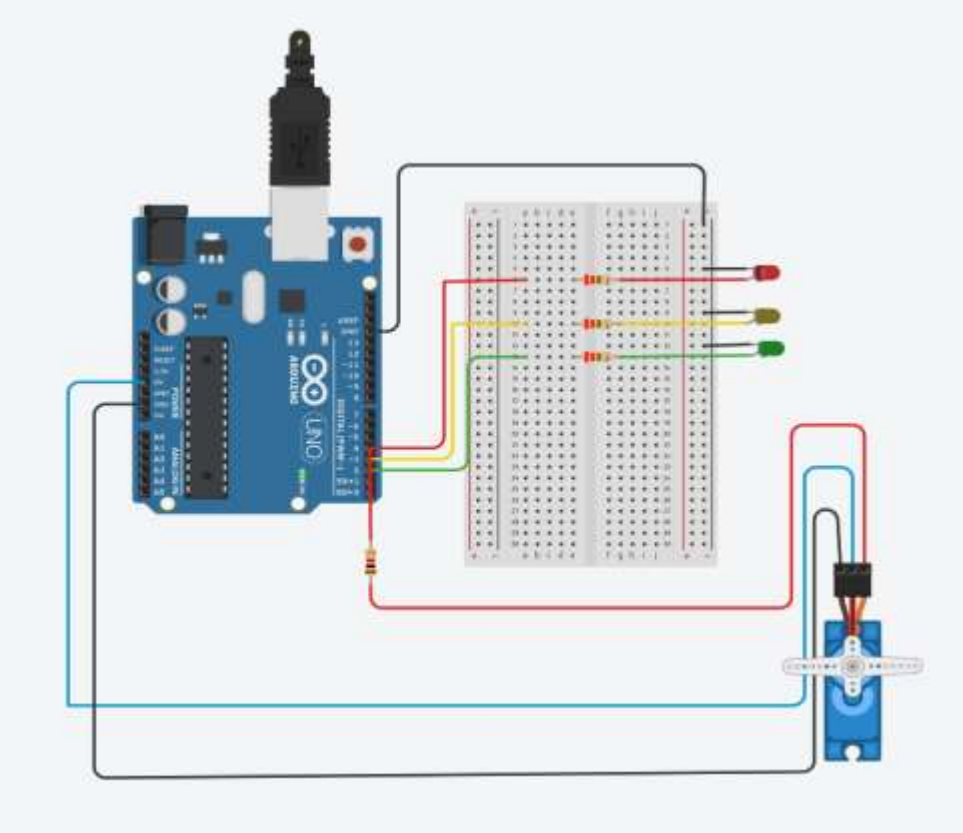

Fig 3.3: Circuit simulation in Tinkercad software

https://www.tinkercad.com/things/9BQKsODQFLV-swanky-fyyran-kieran/editel?sharecode=SAQXKCtVWGEPxo7lHvc3Ab8C8PDe5o07KR3CXeFc6JM

For installation permissions, work with the local government. Install safety equipment in the appropriate places. Teach device maintenance and troubleshooting to maintenance staff. Inform drivers and pedestrians of the enhanced safety features. The pedestrian safety device project in a traffic light system can be planned and managed using the foundation provided by our work breakdown structure. You might need to further divide these activities into sub-tasks, assign responsibilities to each, and set deadlines for each, depending on the project's complexity and particular requirements.

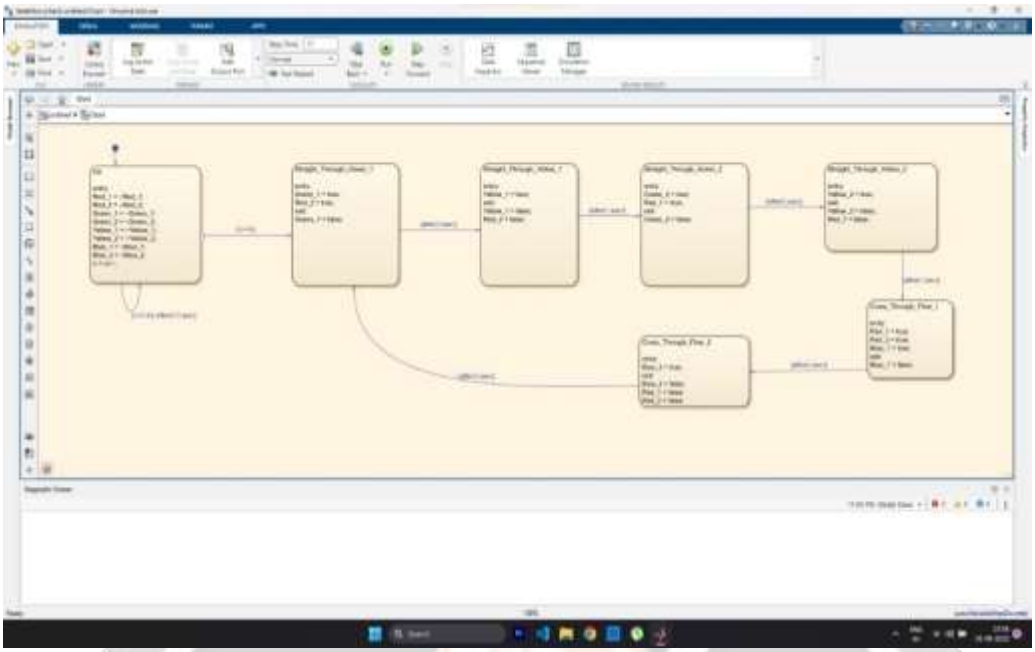

Fig 3.4: Matlab traffic simulation

Set a time step, then go over each vehicle iteratively to update its position and speed in accordance with the traffic regulations and the vehicle's present condition. For car behavior, you can use a straightforward model like the "Intelligent Driver Model (IDM)". Establish guidelines for following distance, speed restrictions, lane changes, intersection traffic signals, and other traffic-related norms.

4.2 Real time detection

The human visual system processes real-time information from moving objects. It has the ability to autofocus on a range of items in its environment without suffering any biological alterations. However, using the camera to detect obstructions is challenging due to the absence of optical flow or motion parallax. It is imperative to be alert for additional objects, such as innocuous impediments and potential projectiles in the air. Despite recent advancements in camera technology, it is still challenging to trace and track multiple objects simultaneously in low-level devices. Because tasks regarded as simple by humans are surely difficult in computer vision, we humans can easily recognize a person regardless of the orientation of the vehicles in various areas or multiple vehicles are seen together from any viewpoint.

However, common problems with object identification algorithms include occlusion, changing viewpoints, poor lighting, etc. Occlusion, for instance, occurs when two or more objects approach too closely to one another and appear to mix or combine, a situation that frequently occurs on the street. The second crucial component is speed, therefore object detection algorithms need to be extremely quick during prediction to identify items in motion and accurately classify relevant things.

4.3 Specification and process

1. Microcontroller – 328p
2. Servo motor -5v
3. Traffic light sequence
4. Power supply -5v

ON/ Off Switch – it is used to start regular sequence of traffic light which has two signal red, Yellow , Green after sequence completed it has pedestrian crossing light Green will be on . at this time the servo motor rotates to 80degree angle to lift of the road to avoid the transport and allow the pedestrian. After some time the pedestrian Red light will glow, servo motor rotates to angle of 0 to allow the vehicle. Interrupt Switch is used to emergency crossing of pedestrians can be allowed for short duration.

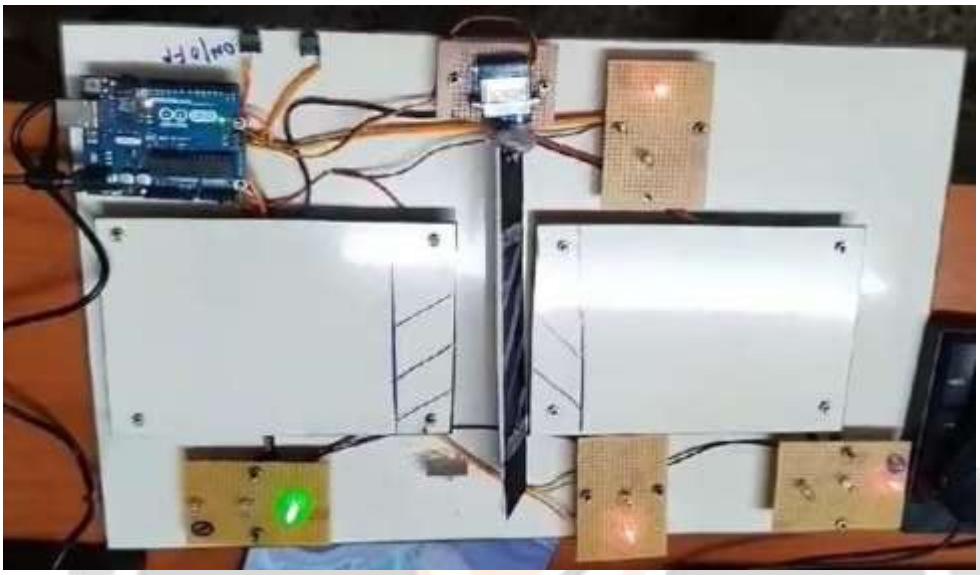

Fig 3.5: Arduino traffic simulation

We could drag & drop different parts from the components panel on the right-hand side into the circuit editor, including Arduino boards, sensors, LEDs, motors, and more. You can observe the actions of your code, create breakpoints, and look at variables while the simulation is running. A wonderful approach to debug your Arduino program is with this.

5. CONCLUSIONS

Conclusions

Concluding that the installation of pedestrian safety devices in traffic signals has greatly increased pedestrian safety at the chosen intersections or crosswalks is the improvement in pedestrian safety. Note any statistically significant decreases in pedestrian collisions or near-collisions. Conclude that without sacrificing pedestrian safety, the safety devices have been able to improve traffic flow and reduce congestion at the target crossings. Positive Changes in Pedestrian Behavior: Take note of the improvements in pedestrian conduct that have been noticed, such as more adherence to pedestrian signals and safer crossing procedures.

Stress the value of community involvement and feedback, which have been crucial in determining the project's success. Recognize that the safety equipment' overall reliability has been enhanced by the prescribed maintenance schedules and techniques. Conclusion of the project was cost-effective, and the improvements to safety and traffic flow more than paid for the amount that was allotted.

Suggestions for future works

Consider extending the use of pedestrian safety equipment to additional crossings or high-priority locations with high pedestrian traffic or accident rates. Continual Monitoring and Evaluation: Encourage gathering information on the movements of people and vehicles, accidents, and compliance while also recommending continual monitoring and evaluation of the effectiveness of safety equipment.

Investigate the incorporation of cutting-edge technologies to further improve signal timing and increase safety, such as smart sensors and real-time traffic data processing. Develop and implement continuing programs for pedestrian education to increase compliance, especially among vulnerable groups. Analyze the viability of adaptive signal timing systems that can dynamically alter pedestrian signal phases in response to current traffic conditions and pedestrian demand.

Include Accessibility elements: Make sure that future installations adhere to the universal design tenets by including accessible elements to support people with disabilities. Continue your public education efforts to inform locals and guests about the presence and significance of safety equipment and crosswalk regulations.

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