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SMART PEDESTRIAN CROSSING AND TRAFFIC MANAGEMENT SYSTEM

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ABSTRACT This paper presents a smart wireless control system for pedestrian crossing areas that can effectively manage traffic and ensure the safety of pedestrians, particularly school children. The system uses smart sensing technology to detect the presence of pedestrians and control the traffic lights accordingly. The system is portable, LED-based, and cost-effective, making it easy to install and maintain. The system was successfully tested and validated on a university campus, meeting all design criteria. In addition, the Intelligent Traffic Signal Management and Control System is a software-based solution that uses a scheduling algorithm to manage traffic on four-way junctions. The system allocates time to each signal based on the number of vehicles waiting on that side, thereby reducing traffic jams and improving traffic flow. To further enhance road safety and reduce noise pollution, the two systems have been merged in this model. Stage 1 uses the smart traffic control system to allow pedestrians to cross safely, while stage 2 employs smart sound sensing technology to change the traffic lights from red to green when noise levels decrease, reducing noise pollution and creating a safer environment. This project aims to raise awareness about reducing pollution, following traffic rules, and promoting a better society. At junctions, the system will operate in a loop, such as A-B-C-D.

Keywords—Servo motor, Gear motor, L293D motor driver

INTRODUCTION

Frequently, people violate traffic rules at signal points causing disturbance, traffic congestion, and accidents. To address this issue, we have implemented a road blocker that stops vehicles on respective paths based on the traffic signal, preventing violations of traffic rules. Additionally, we have installed speed breakers to control the speed of vehicles, and the energy generated by the speed breakers can be utilized to operate the road blocker. We have also incorporated a voice-activated sensor for emergency vehicles like ambulances and government class one vehicles. India has seen significant growth in the number of motor vehicles on the road, with a growth rate of almost 20% over the past decade. To manage the increasing traffic and number of speed breakers, we have developed an innovative device to channelize the energy wasted by vehicles on speed breakers to some useful work. Traffic lights at intersecting streets require sophisticated control and coordination to ensure smooth and safe traffic flow.

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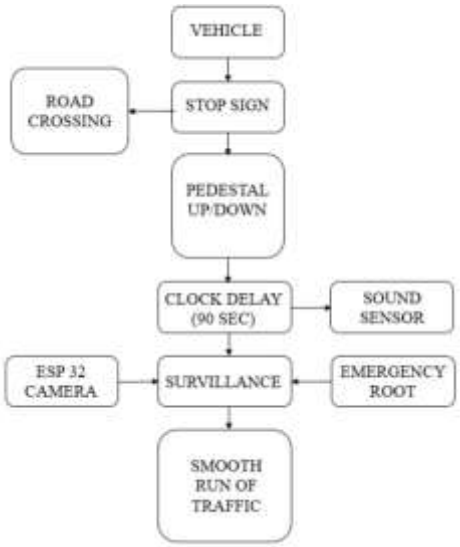
For safety purposes, we have introduced a mechanism in which the signal turns red to block the path through the signal and a series of rods with varying heights are used in place of speed breakers. When the signal turns green, the rods are lowered, and the path is opened. The battery is used as a source and is charged through the mechanism provided. The movement of vehicles up and down the speed breaker rotates the shaft of the alternator, and the battery gets charged, making it available as a source for the system. Electronic circuits have replaced electromechanical controllers in recent times, and they offer high accuracy and fault tolerance. We have also provided emergency call functionality for ambulance and fire brigade vehicles using a sensor. During an emergency, the traffic is blocked based on the priority call levels. The project is developed to meet the requirements of a solid-state traffic light controller using a microcontroller as the main controlling element and LEDs as the indication of light. The microcontroller is programmed to adjust the timing and phasing to meet changing traffic conditions, and the circuit is reliable, compact, and cost-effective.

PROPOSED Our project integrates both traffic control and road safety systems. It consists of two stages. In stage 1, a smart traffic control system is used to regulate pedestrian traffic. In stage 2, a smart sound sensing setup is incorporated into the traffic lights. When noise levels decrease, the traffic lights switch from red to green, allowing people to cross. This approach not only reduces noise pollution but also improves safety by reducing accident rates. Our project aims to raise awareness of traffic rules, reduce pollution, and promote a safer and more secure environment. At junctions, traffic flow follows a loop pattern (A-B-C-D). When A is blocked, B is released, while C and D remain blocked. This loop ensures maximum traffic awareness and reduces accidents. In emergencies, physical traffic controllers will address the situation, as our project is an addition to the existing traffic system

FLOW CHART



Design and implementation The proposed traffic system includes an Arduino Mega connected to motor drivers, which control four gear motors. The Micro Controller is also connected to an output display and a four-way signal display. into the system to monitor incoming traffic at the signals. To accommodate the four-way servo motor setup, a second Arduino Uno is added

LITERATURE SURVEY By taking [1] R. Methorst, R. Eenink, J. Cardoso, K. Machata, and J. Malasek, ‘‘Single unprotected road user crashes: Europe we have a problem!,’’ Transp. Res. Procedia we get Unprotected Road Users (URU) are a subset of Vulnerable Road Users (VRU) who are not protected in their vehicles: pedestrians, cyclists and powered two-wheelers.[1] EU statistics for 2014 show that their share in road traffic fatalities was 22% for pedestrians, 8% for cyclists and 18% for Powered Two-Wheelers, in total 47% of the fatalities. From explorative studies regarding injured road traffic casualties, it is found that about two thirds of the transportation casualties are Unprotected Road Users, of which two thirds are single accidents, i.e., crashes

where no other road user is involved.[2] Most of these single crashes are not (yet) detected in the standard police reported accident statistics, but do represent costs to society that probably exceed crash costs of car related crashes. It can be expected that the shares of URU fatal and injury crashes will increase, particularly because of the ageing of the population, urbanization and despite ICT/ITS developments. Some of these crashes can be prevented by relatively simple measures, others need more investments e.g., infrastructure, legislation or enforcement. From a policy point of view, it will be wise to address this issue, not only for road safety reasons, but also because the elderly is getting more numerous and a serious economic and political factor.[3] Then E. A. Mueller, "Aspects of the history of traffic signals," IEEE Trans on Vehicular Technology it explains about Emerging trends in software development has been changed due to the huge amount of data, growth of internet, mobile, dynamic and smart applications. These applications consist of small, intelligent, flexible and distributed components known as agents. This research proposes agentbased autonomous controller (ABAC) architecture for managing road traffic. It uses time series of historical traffic intensity to estimate the appropriate time allocation for each signal at a given intersection.[4] Our approach takes care of the exceptional appearance of rescue vehicles (e.g., ambulance) in order to ensure a smooth flow of the traffic. The ABAC architecture counts on several AI techniques germane to assessing the intensity of the traffic using image recognition algorithms. It also counts on environment sensors (sound sensors) in order to detect the advent of emergency vehicles.[5] By talking all the measures we designed project to overcome accidents happing by traffic signals violations as In this model we have merged both traffic control system and road safety system together, as at stage 1 people will cross the traffic at pedestrian with smart traffic control system & at stage 2 ,for reduction of noise pollution we added smart sound sensing setup that are connected to traffic lights so whenever reduction of noise takes place then the Red indication in traffic lights will goes to Green and allows the people to go , by this 2 stages of work we can conclude a better noiseless save & secure environment and also reduce the accidents rate in a smart way. The ABCD traffic management architecture shows a high degree of adaptability leading to the least need for human intervention.

CONLUSION In conclusion, this paper proposes a smart wireless control system that effectively manages traffic and ensures pedestrian safety in crossing areas, especially for school children. The system uses smart sensing technology, is portable, cost-effective, and easy to install and maintain. Moreover, the Intelligent Traffic Signal Management and Control System optimizes traffic flow on four-way junctions using a scheduling algorithm that allocates time to each signal based on the number of waiting vehicles. By merging both systems, this model enhances road safety and reduces noise pollution, creating a safer environment. This project aims to promote awareness of reducing pollution and following traffic rules for a better society. The proposed system will operate in a loop at junctions, such as A-B-C-D, and meets all design criteria.

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