

Automatic Tyre Killer

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Abstract—In India, people does not follow traffic rules and driving on the wrong side of the road and jump red signal is strictly prohibited and considered a significant traffic offense. The penalties for wrong-side driving include fines ranging from INR 500 to INR 1,000, and in severe cases, imprisonment of up to three months. Additionally, the offense is classified as non-compoundable, meaning that it cannot be resolved through payment of a fine without appearing before a court. The new Motor Vehicles Amendment Act has strengthened the penalties for various traffic violations, including not follow traffic signal and wrong-side driving, to encourage greater compliance with traffic rules. Break the traffic signal and Wrong side driving is very serious issue not India as well as in all over world. Fine is not the permanent solution to aware the people about the traffic management rules. So this project is most essential and helpful system in the traffic management system to drive safely and follow the traffic rules strictly. The aim of the project is to aware the people for the traffic rules. For that issues we developed such type of system is need to develop for good traffic management. Keywords: Traffic Management, Traffic Signal.

I. INTRODUCTION

Tyre Killer is an electro hydraulically operated heavy duty spike barrier which rises above the ground level on giving a valid input signal and thus prevents unauthorized intrusions at Traffic signal premises. The Traffic Flow Plate Spike Barrier is a high quality, heavy-duty steel constructed vehicle barrier designed to handle vehicles of all sizes and volumes. It can be fitted as a permanent or semi-permanent vehicle barrier offering the ability to control vehicle movements through a specific roadway area. According to WHO the traffic accident is about 1.25 million annually. The automatic tyre killer project helps in reducing the accident and making people follow the traffic rule.

Properly. In modern world, vehicle user increases largely. As the all-electric machines (vehicles) count increases the traffic is also increasing. By this effect, we can see a lot of road accidents. To rescue the victims, several problems must be faced by the ambulance because of traffic problems. The main objective of this system is to stop the vehicle at signal and restrict the vehicle which is trying to break the signal. This system can be used in the retractable spikes after the zebra crossing that comes out when the traffic signal is red and goes off when the traffic signal turns to green. This is an legit idea mainly to avoid congestion and rescue the ambulance. In the usual traffic system, the peoples were not following the traffic rules properly. To overcome this problem, we were implementing this system. The main aim of this system is to obey and follow the traffic rules properly if not there will be an opening of spikes. It will make all the people to obey the traffic rules correctly. The major objective of this system is to provide a safety secured system for our society this. On using the spikes module, the spikes system operates using DC motor. In case ambulance reaches signal the spikes will gets OFF and other signals gets ON with an emergency alert. This system provides a secured system for our society. No other way of breaking the traffic rule

II. BACKGROUND

In an effort to address reckless driving behaviors, Pune became the first city in India to deploy 'tyre-killers' on its roads to deflate the tires of vehicles driving on the wrong side. The spikes were initially installed in Amanora Park Town but were later removed following a notice from Pune traffic police. Citing concerns about the potential for serious injury or fatalities among commuters, the traffic police deemed the experiment too risky and stated they would not permit similar measures in the city, except at critical installations. They also highlighted the danger posed to ambulances.

III. LITERATURE SURVEY

[1]**K. Vishnusaravanabharathi**: proposes a system aimed at ensuring compliance with traffic rules by threatening to deploy spikes if rules are violated. The project aims to enhance safety on roads, reduce accidents, and ease the burden on traffic police.

[2] **Fred Wegman**: highlights the global scale of road traffic injuries and fatalities, emphasizing the disproportionate impact on low- and middle-income countries. He underscores the urgency of addressing this public health issue.

[3] **Sanket Bhansali**: discusses the role of industrialization and modernization in exacerbating traffic congestion worldwide. Their project introduces a Road Spike System to mitigate traffic problems in urban areas by puncturing the tires of vehicles attempting to bypass traffic signals.

[4] **Sanjeev Udenia:** describes the use of Guardian Traffic Systems' road blockers, traffic spikes, and access controls to manage access at airports, parking facilities, and other locations. These systems offer effective and economical solutions for controlling traffic flow and access to secure areas.

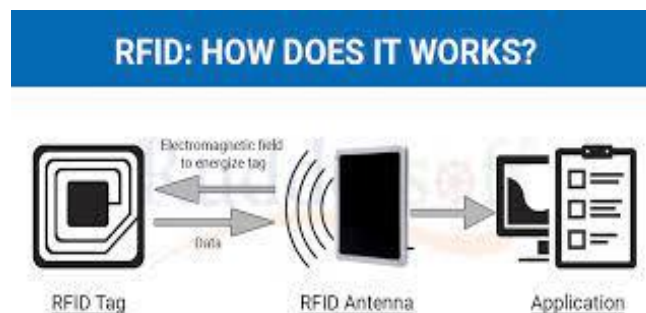
[5] **Ashwini Basavaraju:** proposed a framework for a dynamic and automatic traffic light control system to address traffic congestion in modern cities. Instead of assigning constant green signal times to traffic lights, the system dynamically adjusts green signal times based on traffic conditions. The approach involves gathering data from objects, subjects, or vehicles, processing it using computers and microcontrollers, and displaying it on traffic light signals to control the Closed Loop System.

IV. COMPONENTS USED

Sr. no	Name of Component	Specifications	Quantity
1.	Microcontroller	Arduino UNO, AT mega 328P, 5V	01
2.	RFID Sensor	13.56 MHz	01
3.	Servo Motor	0-180 degree, 5V	02
4.	RGB LED	5V	01
5.	Battery	9V or 5V	01
6.	Spikes	-	As reqd.
7.	Car	For setup	01
8.	Box	For setup	01

IV.I. RFID: HOW DOES IT WORKS

Components used in the system include RFID technology and Arduino UNO. RFID, or Radio-frequency identification, uses electromagnetic fields to automatically identify and track tags attached to objects. These tags transmit digital data when triggered by an RFID reader device, allowing for tracking of inventory goods and other applications like automobile production, pharmaceutical tracking, and animal identification. In the traffic control system, RFID tags are used on government vehicles such as buses and ambulances. The RFID reader detects when a vehicle passes close by and sends a signal to the microcontroller, which controls the movement of a motor for up-and-down spike movement. Unlike barcodes, RFID tags do not need to be within the line of sight of the reader and can be embedded in the tracked object.



IV.II. USE OF AURDINO

Arduino UNO is utilized in the project to control the signal system and the RFID system.

- The system operates such that when the red signal is active, a servo motor is positioned upward at a 60-degree angle. A delay timer of 30 seconds is used for switching signal lights.

- When the signal turns green, the servo motor receives a signal from Arduino UNO and rotates downward. For emergency vehicles, an RFID sensor is used to allow their passage.
- When an emergency vehicle is detected by the RFID sensor, Arduino UNO receives a signal and positions the servo motor (spikes) downward, enabling the emergency vehicle to pass easily.

V. METHODOLOGY

Traffic controlling on road:

For controlling traffic on road & to obey traffic system road spike system is used. For automatic controlling RFID sensor used in this according to the presence of emergency vehicles on road the signal gets changes and system operated discuss below.

V.I. CONDITIONS OF SIGNALS

Case 1: When the signal changes to Red.

When the red signal is active Arduino UNO activates the servo motor, and spikes comes in upward direction which is 130 degrees. Red signal & servo motor are active till 10 seconds which is set in programming.

Case2: When the signal changes to Yellow.

When the yellow signal is active, there is no change in servo motor. Yellow signal & servo motor are active till 10 seconds which is set in programming. While yellow signal is active, servo motor follows the command from previous signal.

Case 3: When the signal changes to Green.

When the green signal is active Arduino UNO activates the servo motor, and spikes comes in downward direction which is 220 degrees. Green signal & servo motor are active till 10 seconds which is set in programming.

V.I.I. EMERGENCY VEHICALS

- For emergency vehicle, we provided RFID tag for them.
- RFID sensor will be installed before the spikes and tags will be installed on emergency vehicles.
- This tag can use to pass the road even if signal is red and spikes are in upward direction.
- While signal is red, sensor will check for authorized cards after every 25ms.
- When emergency vehicle comes, and signal is red then RFID sensor will sense the tag mounted on vehicle. It will give the command to Arduino to take spikes down.

Security system: For industries and offices this type of system is very useful and permitted to only those vehicles that the industries want.

VI. CONCLUSION

The automatic tire killer project is an innovative solution that can be used for effective traffic control. The system is designed to prevent vehicles from running red lights and causing accidents. By using RFID sensor tags, the system can identify emergency vehicles and turn down the spikes to allow them to pass through even when the traffic signal is red. This ensures that emergency services can reach their destination quickly and safely. Overall, the project has the potential to make our roads safer and more efficient, and it can serve as a model for future traffic management systems.

Tyre killer with traffic signals is an effective solution for controlling traffic flow in high security areas such as military bases, government buildings, and airports. The system ensures that only authorized vehicles are allowed to pass the red signal, while also preventing unwanted vehicles from gaining access. The added feature of traffic signals makes it easy to manage the flow of vehicles, improving safety and reducing congestion. This electronic based tyre killer system is a reliable and efficient way to enhance security measures in critical areas.

VII. FUTURE SCOPE

The Tyre Killer provides effective protection against unauthorized entry or exit of hostile motor vehicles. In the event of a vehicle attempting to breach the system, its tires and/or axles will sustain damage, depending on the specific model being used. Tyre Killers can be deployed either as standalone units or in conjunction with other security measures by using this project:

- People will start following traffic rules
- It will reduce the accidents
- Crime rate in respective area will get decrease
- Easy access to vehicle like Ambulance, Police van and Fire brigade

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