

# SOLUTION FOR NOISE POLLUTION AND POTHOLE DETECTION

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**Abstract:** This paper has an aim to control the horn of vehicle in restricted areas (such as schools, parks, hospitals, old age homes, college, government offices) automatically using current location of vehicle. Nowadays during a fast paced world all the peoples aren't have self-control. Such peoples are driving vehicles amp; have large sound horns which affects on people's life. We can't stop the noise pollution completely but we can control it in restricted areas. In this project we are using GPS for getting current location of vehicle amp; software panel checks that whether it is in no honking zone or not, if it is no honking zone then software panel informs arduino (microcontroller) to control the horn. If user is out of honking zone then horn will reset to it's original value. In this system we also provide additional feature like Pothole Detection using ultrasonic sensor for minimizing accidents happened due to pothole.

**Keywords:** No Honking Zone, Arduino, PizzoBuzzed, GPS, Ultrasonic, Geofence.

## I. INTRODUCTION

Now a day's accidents are mostly happens due to fast driving and over speed on roads. People do not bother about human lives. Because of more vehicles on the ground the accidents rates are increasing year by year. The government has taken to many steps to prevent this kind of Things but it not enough. Firstly we had decided to use laser diodes but it was costly so we go for IR module but again there is a draw back in using this it works under line of sight so finally we had decided to use RF. RF transmitter is on the road zone areas and receivers are placed in the vehicle. Then it transfers the information to the controller. Current speed are going to be monitored by the separate module or by the utilization of ultrasonic sensor that also sends information to controller. Then controller compares both speed and if the driver does not decreases the speed the control transfers automatically but the driver again operate it manually and exceeds the limited speed then the information transferred to the nearest police station. The data contains the current speed and registration number of the vehicle. The information transfer using controller with the help of GSM module. Then whatever the penalty amount will be paid by the owner. In this system we also provide additional feature like automatic send SMS to police admin using SMS gateway when user's vehicle can pass from honking zone and he can't control his speed after listening the alert buzzer the SMS can send to police admin with vehicle location detail. Using Ultrasonic Sensor the system can also detect pothole on roads and get buzzed. There is always considerable effort to reduce speed in the honking zones and avoid annoyance amongst the residents. The annoyance level of traffic speed may be personal but the community as a whole is quite sensitive to traffic noise especially honking by vehicles. L10 is a measure of daily exposure to traffic speed and provides an indication of how much the prevailing traffic noise will affect the exposed residents. It is calculated by averaging L10 of each of the eighteen hours between 6 am and midnight. The speed level should be less than 40 km/h on average. The traffic speed involves not only the speed generated by the movement of vehicles but primarily by honking of the vehicles. Honking by vehicles has become a major cause of accident pollution in contemporary society further leading to health hazards, irritation. Vehicular Traffic adds up to 55% of total urban speed. We observed the behavior of honking horn and surveyed overall vehicles. As per the International Program of (WHO 1994), an adverse effect of speed is dined as a change in the morphology and physiology, that results in impairment of functional capacity. WHO has documented seven categories of adverse health effects of noise pollution which is having only because of speedy driving on humans that includes hearing impairment, Interference with Spoken Communication, Sleep Disturbances, Cardiovascular Disturbances, Disturbances in Mental Health, Impaired Task Performance and Negative Social Behavior and Annoyance Reactions. Temporary speed exposure results in physiologic changes those are readily reversible. However, noise exposure of sufficient intensity, duration provokes changes that may not be so readily reversible. Noise pollution which having only because of speedy vehicle driven is not believed to be a cause of mental illness, but it is assumed to accelerate and intensify the development of latent mental effects on human health because of noise. How that bad effect was reduce.

## II. LITERATURE SURVEY

In developing countries one of the biggest issues is maintenance of roads. Well maintained roads provide a major portion to the country's economy. Identification of pavement distress like potholes and humps not only solely support drivers to stay far from accidents either vehicle damages, however additionally helps authorities to keep up roads. This paper discusses previous pothole .Detection ways in which that are established and a profitable result to spot the potholes and humps on roads and

supply timely alerts to drivers to avoid accidents or vehicle damages. Ultrasonic sensors are utilized to spot the potholes and humps and additionally to calculate their depth and height, severally. The recommended system captures the geographical locations of the potholes and humps using a global positioning system receiver. The sensed-data includes height of hump, pothole depth, and geographic location that is kept within the database (cloud). This is a valuable supply of data to the government authorities and vehicle drivers. An android application is used to aware drivers so that precautionary measures can be taken to evade accidents. Alerts will give in the form of flash messages with an audio beep. Pavement distress detection is associate intriguing topic of analysis and researchers are performing on pothole detection techniques. This section provides a quick description concerning the prevailing results for sleuthing potholes and humps on roads.[1]

Road accidents are one among the world's major public health and injury prevention issues. As per the World Health Organization (WHO), over 1,000,000 kids are killed in road accidents every year, everywhere the glob. The motivation on the far side this work is a trial to create an Arduino based embedded system that makes the passenger's journey even safer and safer. This paper handles the road discipline like speed management in several areas with horn management in horn prohibited zones. The features enclosed are Vehicle Speed management in school Zone and additionally controlling the speed of the vehicle in several zones like bridges, highways, cities and suburbs. It additionally includes Horn Control of Vehicle in No Honking Zone-management horn disturbances in horn prohibited zones like hospitals, public libraries, courts, colleges and Alcohol notice onto detect drunk driving. Road traffic crashes are one among the world's largest public health and injury prevention issues. Consistent with the World Health Organization (WHO), more people die on roads in India than anywhere else in the world a minimum of 13 people die every hour in road accidents in our country; the newest report of the National Crime Records Bureau reveals. In 2007, 1.14lakh folks in Asian country lost their lives in road accidents. inappropriate road infrastructure, failure to follow the speed limits, a rise in drinking and driving habits are among the major factors contributing to deaths from road crashes, WHO said in its details on 'Decade of Action for Road Safety 2011- 2010'. Currently Road safety systems are accessible in high end luxurycars such as Audi, Mercedes Benz etc. to name a few. [2]

Each year, there are thousands of highway deaths and decade of thousands of serious injuries due to "Run-Off-Road" accidents. Everything from easy driver inattentiveness, to fatigue, unfeelingness, to drunk driving, is accountable. Simple sensors can be fitted inside vehicles implant with various features like, automatic crash notification, vehicle security, speed control which can give motivation to an efficient road safety system. The features that are proposed during this work are: Automatic collision notification that gives alerting to the victim's relative, Red light control makes sure vehicle doesn't break signal, speed control alters speed in distinct zones, Horn control prohibit honking in horn prevented zone, Vehicle security is used to prevent theft.[3]

Due to the fast increasing vehicle population in the recent years has resulted in considerable increase in the traffic on roads, causing forbidding noise pollution and also making the task of vehicle monitoring cumbersome for the civil force. This paper suggest an idea to design an on board equipment SHARP which apply soundless horn, a mechanism for vehicles to reduce the traffic noise and a remote watcher to aid the civil force in observing the vehicles remotely with enhanced hit ratio of black listed vehicles. The proposed idea integrates the technologies of image processing and inters vehicular communication for its execution. The designed on board equipment is targeted for four wheelers and a typical SHARP system is formed of –a camera, processor, DSRC transceiver, GPS device and an LCD display. [4]

Automatic detection of potholes is a human security based project. This technique gives cost effective solution for detection of potholes on the road and indicate the road maintenance authority for maintenance. Microcontroller pick up the placement of that pothole by using GPS which GPS locations are send with help of GSM. The GSM at the server part grab that locations and show pothole or hump on the map of that area. We have taken keen interest in building this project to enhance the safety of human race and to fulfill low maintenance. This technique supply cost effective solution for detection of potholes and humps on the road and indicate the road financing authority for maintenance. The distance sensor senses the potholes as well as humps which is given to microcontroller. Microcontroller get the location of that pothole or hump by using GPS and that GPS locations are broad cast with help of GSM. The GSM at the server part takes that placement and indicate pothole or hump on the map of that area. [5]

This application is for detecting defects on the road, such as potholes as well as speed bumps, and it automatically extracts the video section and the image of the parallel road segment containing the defect. Upon such critical hazard detection, the applying instantly informs nearby users about the deed. A good detection rate of speed bumps is achieved in the performed tests, while the asset of automatic image extraction based on the multimodal approach is also demonstrated. [6]

In this paper, a stereo vision build pothole detection system is proposed. Using the disparity map produced from an efficient disparity calculation algorithm, potholes is also recognized by their distance from the fitted quadratic paved surface. The system generates the size, volume and position of the potholes which allows the pothole restore to be prioritized according to its severity. For urban roads, Mednis et al. proposed a system that utilizes mobile phone accelerometer to detect and locate potholes. It records the vibration of vehicles when hitting a pothole. Severity may be approximated by the strength of the vibration. However, the vehicle has to be driven into the pothole, which could cause damage. Machine vision based techniques for automatic pothole detection have also been proposed, which only need a camera as input. However, existing view pointedly on the texture of the road surface, resulting in low accuracy. Mis-detections are mainly due to variation of lighting conditions.[7]

Nowadays we all use Google maps and its uses for negotiate during travelling, but these applications are not so friendly to tell you any roads condition or its complexity. This paper narrates the ghat complexity and pothole detection of roads. It has been considered

that the mobile sensors play an significant role in studying the road condition with the company of GPS system. Using Android smart phones and its sensors, 90% of real time data is collected and processed information is provided to the user. This paper also introduces the capability of smart phones to solve real time problems Road Quality and Ghats complexity analysis using android phone suggest to utilize the GPS system of phone and different sensors like accelerometer, gauss-meter, etc. of android phone, so we could analyze the road and might upload this information of that road on central server so every application, user can use this information during traveling. This information can be helpful to user at the time if there are multiple routes and for destination and he can choose one of the finest and shortest routes. [8]

In this paper, they proposed a heterogeneous online/offline sign encryption scheme. It allows the sensor node in the IBC to send a message to an Internet host in the PKI. This scheme adopted both online/offline technique and IBC technique to greatly reduce the computational cost of sensor nodes. The scheme setups a secure channel between a sensor node and an online host that supports end-to-end confidentiality, integrity, authentication and non-repudiation services. This method provides a new security solution for integrating WSNs into the Internet as part of the IOT. [9]

This paper describes an ultrasonic sensor that's ready to measure the distance from the bottom of selected points of an automobile. The sensor is predicated on the measurement of the time of flight of an ultrasonic pulse, which is reflected by the bottom. A constrained optimization technique is used to get reflected pulses that are easily detectable by means of a threshold comparator. Such a way, which takes the frequency response of the ultrasonic transducers under consideration, allows a sub-wavelength detection to be obtained. The sensor consists of only low cost components, thus being apt for first car equipment in many cases, and is in a position to self-adapt to different conditions so as to offer the simplest results. [10]

This paper discusses the mapping of Potholes and humps which assists the motive force in avoiding potholes on the roads, by giving him prior warnings. If the motive force is approaching a pothole or hump or driver is also warned in advanced regarding what road has how many potholes. The ultrasonic sensors are wont to identify the potholes and humps and also to live their depth and height, respectively. The proposed system captures the geographical location coordinates of the potholes and humps employing a global positioning system receiver. However, it doesn't consider the very fact that potholes or humps get repaired by concerned authorities periodically. The system will be further improved to contemplate the above fact and update server database accordingly. [11]

This method makes use of an accelerometer, a gyro and a GPS sensor mounted in a car. After the vehicle cruise through several streets, data is retrieved from the sensors. Then a genetic algorithm is used to find a logistic model that accurately detects road abnormalities using a cross-validation strategy. This methodology can be used to construct a real-time surface monitoring system, and has the potential to detect speed bumps in quasi real-time conditions. [12]

This paper they describe a sensor network work which is used to detect the traffic density and use RFID reader and tags. They use ARM7 system-on-chip to read the RFID tags attached to the vehicles. It counts the number of vehicles that passes on a particular path during a specified duration. If the RFID tag read belongs to the stolen vehicles then message send to the police control room using GSM SIM 300. When an ambulance is near to the junction, it will communicate the traffic controller in the junction to turn on the green light. This module uses Zigbee modules on CC2500. [13]

### III. ALGORITHM

The additional standard and wide adopted even encoding rule seemingly to be encountered today is that the Advanced Encryption Standard (AES). It's found a minimum of six times faster than triple DES. A replacement for DES was needed as its key size was too small. With increasing computing power, it had been considered vulnerable against exhaustive key search attack. Triple DES was designed to beat this drawback but it had been found slow.

The features of AES are as follows –

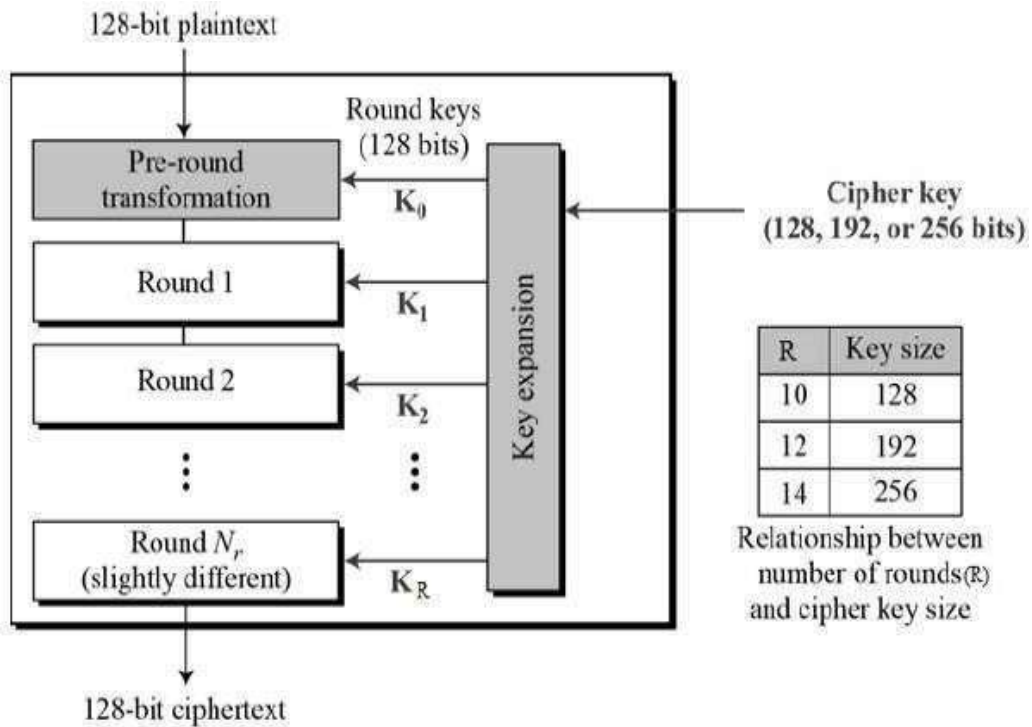
- Symmetric key symmetric block cipher
- 128-bit data, 128/192/256-bit keys
- Stronger and quicker than Triple-DES
- Provide full specification and elegance details
- Software implementable in C and Java

AES is degree repetitive rather than Feistel cipher. It's supported 'substitution–permutation network'. It contains of a series of connected operations, a number of that involve replacement inputs by specific outputs (substitutions) and others involve shuffling bits around (permutations).

Interestingly, AES performs all its operations on bytes rather than bits. Therefore, AES treats the 128 bits of a plaintext block as sixteen bytes. These sixteen bytes area unit organized in 4 columns and 4 rows for process as a matrix.

Unlike DES, the amount of rounds in AES is different and depends on the length of the key. AES uses ten rounds for 128-bit keys, twelve rounds for 192-bit keys and 14 rounds for 256-bit keys. Every of those spherical use a distinct 128-bit round key, that is calculated from the first AES key.

The schematic of AES structure is given within the following illustration



**Encryption Process**

Here, we have a tendency to limit to description of a typical round of AES cryptography. Every round comprise of 4 sub- processes. The primary round method is delineate below-

**Byte Substitution (Sub Bytes)**

The sixteen input bytes are substituted by wanting up a hard and fast table (S-box) given in style. The result's in a very matrix of 4 rows and 4 columns.

**Addroundkey**

The 16 byte of the matrix is now considered as 128 bits and are XOR to the 128 bits of the round key. If this is the final round then the output is the cipher text. Otherwise, the resulting

128 bits are interpreted as sixteen byte and that we begin another same round.

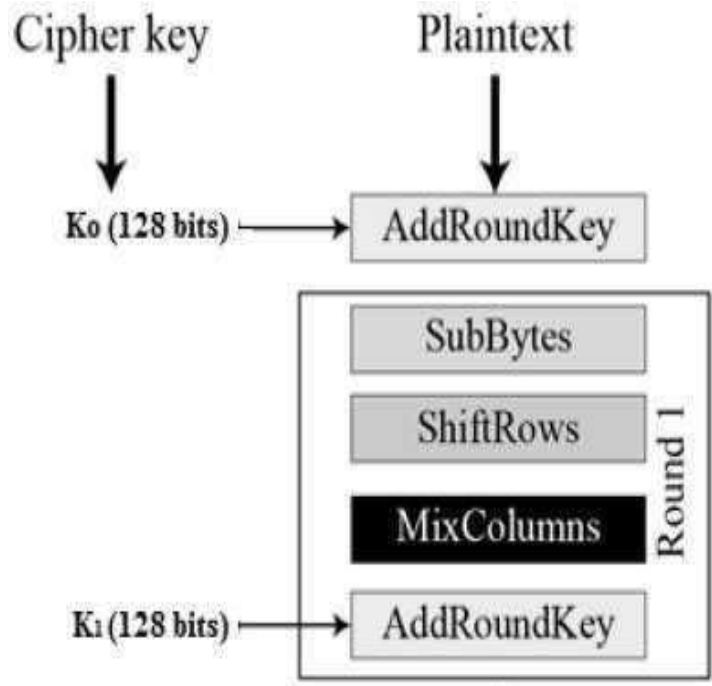
**Decryption Process**

The method of decryption of an AES cipher text is identical to the encryption process in the reverse order. Each round consists of the 4 steps conducted in the reverse order –

- Add round key
- Mix columns
- Shift rows
- Byte substitution

Since sub-process in every round is in reverse manner, in contrast to for a Feistel Cipher, the encoding and cryptography algorithms must be singly enforced, though they are terribly closely connected.





**IV. ARCHITECTURE**

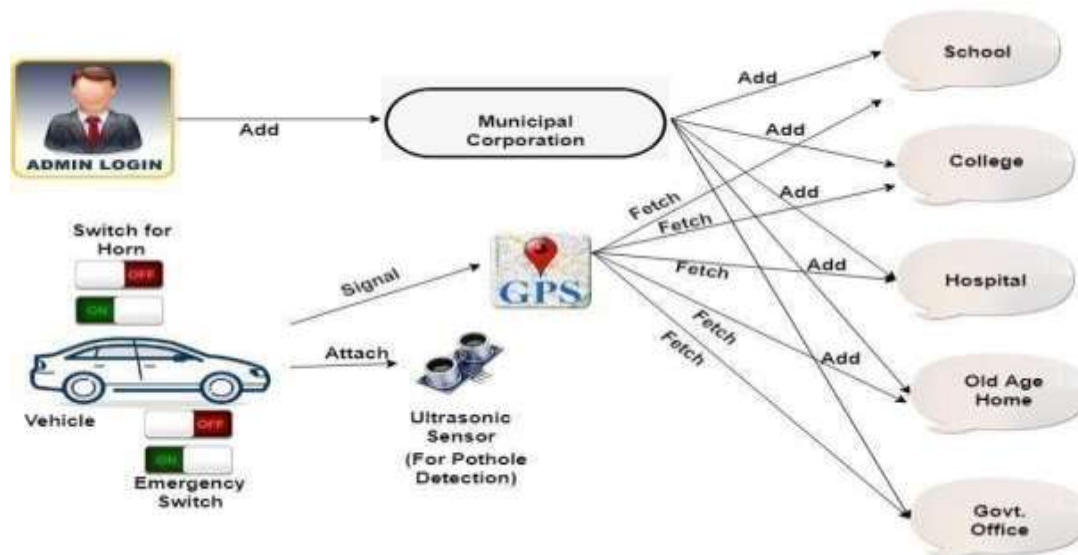
Smart honking zone for smart cities system the system architecture is define as follows:

- Admin:
 

Admin can add the municipal corporation with details like name, District, State, Country, Area, view al the honking zones which are included by the municipal corporation on GPS. He also and delete the municipal corporation and also view all details and data of others which is included by the municipal corporation.
- Municipal Corporation:
 

In our system the municipal corporation can add the honking zones like hospital, school, college, old-age home and government offices in cities as a honking zone with their longitude, latitude, Name, Type, location and other are located on map with description and decide the speed level of the vehicle which is travel from near the honking zone.
- System:
 

In this web application when any car or vehicle goes from any honking zone the horn or noise level of vehicle will be monitored. This monitoring system is built in vehicle when vehicle loud noise on honking zone then the second emergency switch can send automatic text MSG to police admin using SMS gateway with the location detail of vehicle. If the detected noise of vehicle is greater which is not allowed in honking area then the will buzz and get alert to driver to drive slowly in honking zone area. Built - in ultrasonic sensor can detect the pothole on road and buzz to alert the driver from potholes.



## V. CONCLUSIONS

The various effects associated with this problem including stress, depression and other physical and mental ailments which needs at the most attention from the society are directly tackled by uprooting their main cause like honking zone. Moreover, Priority Emergency Vehicle System features a humongous potential to save lots of many lives caused by the delay of those to succeed in their required destination. The output of this technique has end in embedded module which shall benefit the residents of societies located like hospitals, school, college, adulthood home, and Government offices, students studying in schools located within the vicinity of roads, patients admitted within the hospitals located on the roadsides and other people of varied professions/occupations. The necessity for costly noise absorbers is by this technique. The accidents that are caused thanks to loud music inside the vehicle, which inhibits the power of the driving force to concentrate are mitigate by this technique. During this paper we developed a replacement design to regulate the speed of the automobiles and detect the pothole on roads which is sensed by ultrasonic sensor. In normal driving mode, we will expect other vehicles interfering nearby and possibly blocking or attenuating RF signals. During this aspect, we will use GPS location for restricted areas. As soon because the vehicle enters into the traditional area it's speed doesn't decrease and it goes normally no action is performed and when the vehicle enters into the restricted areas. It enters the transmitter module just send an information which contains what proportion speed a vehicle can go inside the speed limited region. Then the signal or information is received by the receiver and therefore the signal acquired from the speed meter is additionally given to the controller. Basically the signal is analog in nature which will be converted into digital so only the micro controller ready to process the signal. The signals from the transmitter and therefore the Accelerator are compared by the controller. during this there are two cases first current speed is a smaller amount than the transmitted speed the vehicle goes normally no action is required and second information from the speed meter are and if is bigger than transmitted speed by the transmitter module the controller waits for whether the driving force the speed to the below value if the driving force reduce the speed means reduce the speed consistent with it. Speed denotes that at which era the vehicle cross that area. Then the fine or penalty amount is collected by the closest tollgate or the check post. That there's that contains stop information means the control releases by the controller to driver.

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