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SMART AUTOMOBILE SPEED CONTROL AND HORN ALTERNATOR FOR RESTRICTED AREAS USING GEO-LOCATION

Ragavendiran.S S [1], Ragul.A [2], Karthiga.M [3] , Nilesh .P. Raghavan[4]

[1,2,4]UG Scholar - Electronics and communication Engineering, Bannari Amman Institute Of Technology, Sathyamangalam, Erode, Tamil Nadu

[3]Associate Professor, Electronics And Communication Engineering, Bannari Amman Institute of Technology, Sathyamangalam, Erode, Tamil Nadu.

Abstract: Nowadays, noise pollution plays a significant role in health issues of ordinary people. To overcome this, we got a solution for that problem. "ECO-FRIENDLY ADAPTOID" is an advanced type of Horn system that controls noise pollution by alternating the sound produced by the horn, according to the environment.

- Noise pollution affects both humans and animals.
- Cardiovascular diseases, Sleeping sickness, Hypertension.
- Vehicles are the source of noises.
- Loud horn irritates the public.

The present disclosure relates to electronic automobile equipment that fits inside any automobile or vehicle and can help reduce noise pollution using smart alternating decibel values of horn corresponding to the reception of the surrounding sound from outside.
This invention, "Smart automobile Speed control and horn alternator for restricted areas using Geo-location", aims to solve the issue of noise pollution by the use of Smart Electronic Horn Systems. It responds to stimulus noise from the outside environment and generates a particular decibel level of horn sound corresponding to the level of surrounding noise received, and To reduce the speed of the vehicle by intimating the driver.

1. INTRODUCTION

Nowadays, noise pollution plays a significant role in creating health issues for ordinary people, and lots of accidents occur in the schools, colleges, hospitals areas etc., These accidents occur mainly because of the over-speed and the carelessness of the driver. We take this problem as the base problem of our project. We invented a device which produces the sound according to the environment condition, and alerts the driver regarding the zone (such as schools, colleges, hospitals) which the vehicle entered. Alert the driver to reduce the speed. In which major accidents in these areas can be avoided.
According to a recent report, 75 percent of all traffic accidents are caused by the driver's negligence. In the vicinity of the schools and hospitals it becomes more risky. Speed breakers are provided in school zones to slow down vehicles,but drivers must do it manually. Many times, due to the fault of the driver, speed is not managed. We have proposed a "Electronic speed controller" as a solution to this problem. When the car reaches the restricted region, the driver must slow down. We developed this theory to solve this problem. When the car reaches the restricted region, the driver must manually reduce the vehicle's speed. If the driver does not slow down the car, the electronic controller will take over and control and reduce the vehicle's speed based on the signal received from the transmitter in that zone.

2. MARKET ANALYSIS

- **Addressing Customers Liabilities:-**

Actual Automobile Buyers & Customers, Medium Automobile Manufacturing Businesses & Industries > 500 employees. Small Automobile Manufacturing Businesses & Industries < 500 employees (NOT targeting Large companies.

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- **Definition of the beneficiary segment**:-

Better present The Automobile Manufacturers a smart- horn system built-in for reducing noise pollution. Lead users to the right car or vehicle purchase through better understanding of the Smart Horn System & Creating a sense of duty & responsibility for preventing noise pollution especially by unnecessary honking. All the devices in the prior art are available as separate devices for each feature that is not too efficient as the proposed one. In the disclosure, the devices are integrated with a single PCB which does not need any additions. All the parameters are monitored and controlled using a single program. It is also compact and easily portable.

3. PROPOSED SOLUTION & WORKING (ALGORITHM AND IMPLEMENTATION)

- Create a Smart-Horn system for automobile manufacturers for reducing noise pollution, through the use of Internet-of-Things (IoT) technology.
- Creating an alert system for automobiles while entering restricted areas to reduce the speed of the vehicle. To avoid accidents in the restricted areas.
- To provide a seamless working condition model for future purposes and future improvements.

4. EXPLANATION OF EACH SEGMENT'S NECESSITY THROUGH FUNCTIONS

According to government regulation, horn decibel level should be within 80db to 120db. Due to increased noise pollution, there is a change in government regulation. Currently, the horn decibel level is decreased to 75db to 100db. Our design complies with the same. By alternating the horn's sounds, unwanted noise can be avoided, thereby leading to a refined horn signal output. It is fully automated, so it is user friendly.

In this invention the IoT techniques are embedded to monitor every vehicle's noise level by an authorized person, as these are collected in a database. This database will be used for future research purposes. So that everyone should be aware of the maximum limit for honking. It will be beneficial to reduce
noise pollution.

- We first connect the microphone with the audio amplifier, to get the surrounding sound. By means of jumper wires. The audio amplifier's output is fed to the ESP8266 (Node-MCU), provided with other data from the SD card module, which contains the original default honking sound of the horn in the default decibel levels. NodeMCU converts the recorded input signal's analog value into decibel value, using built-in the formula given below.
- Mathematical equation used in the Audio amplifier and the NodeMCU, for Analog to Digital ADC = (11.003*dB) - 83.2073 dB = (ADC + 83.2073) / 11.003

The above figure (1) table describes the different decibel level sounds that the smart horn system will encounter from the surroundings i.e. from the external environment. If we infer from the above graph, we can see that our frequency values, whose unit is in decibels (dB), don't align with the ADC values in a linear fashion. This makes it extremely difficult to have a simple common multiplier corresponding to all ADC values to simultaneously procure the exact equivalent values of frequency in decibels or dB. In order to solve this problem, we will use the powerful "linear regression method", which in simple words, converts the curvy line graph into a straight line for simplifying mathematical calculations.

- We can easily derive a straight line equation, by which we can calculate the corresponding equivalent frequency value simultaneously for every taken value of ADC from the microcontroller.
- As It's Aforementioned In The Above Paragraph, The Straight Line Equation Which Is Derived From The Graph Is:-

$$ADC = (11.003 \times dB) - 83.2073$$

Hence, We Can Calculate It As

$$dB = (ADC + 83.2073)/11.003.$$

- The above equation is very reliable in calculating the frequency (dB) from the corresponding value of ADC.
- The NodeMCU compares the environment's decibel with the given three tuning conditions stored in the SD card and selects the right condition corresponding to the environment's decibel value and sends only that portion of the signal to the band pass filter.
- The Band pass filter contains the level between upper and lower cutoff decibel values and filters out the decibel value of the selected signal from the NodeMCU which are not present in the given level and sends it to the speaker.
- The speaker gives the respective output.

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All the devices in the prior art are available as separate devices for each feature that is not too efficient as the proposed one. In the disclosure, the devices are integrated with a single PCB which does not need any additions. All the parameters are monitored and controlled using a single program. It is also compact and easily portable

5. METHODOLOGY USED AND BLOCK FLOW DIAGRAM EXPLANATION

Brief Description of the Drawing
Figure 2 Block Flow diagram of the Eco friendly Adaptoids.

Figure (1) – Table Describing Different Ranges Of Decibel Levels With Examples

FREQUENCY IN DECIBELS	DAILY LIFE EXAMPLES
120 dB	Pain Limit, Sound Of Thunder
110 dB	Music Concerts, Wailing & Kids Shouting
100 dB	Hair Dryers At Home, Bikes And Two-Wheelers
90 dB	Trucks Running On Diesel, Powerfully Equipped Mowers
80 dB	Morning Alarm Clocks, Music Played At A Very High Volume
70 dB	Congested Busy Traffic Jams, Household Powerful Vacuum Cleaners
60 dB	Usual Conversations At A Height Of 3 Feet
50 dB	Silent Offices, Rainfalls At Mild Levels
40 dB	Silent Libraries, Chirping Of Birds
30 dB	Low Level Whispering, Hushed & Serene Rural Areas
20 dB	Rustling Leaves, Ticking Watch
10 dB	Nearly Complete Noiseless Circumstance, Normal Sound Of Breathing

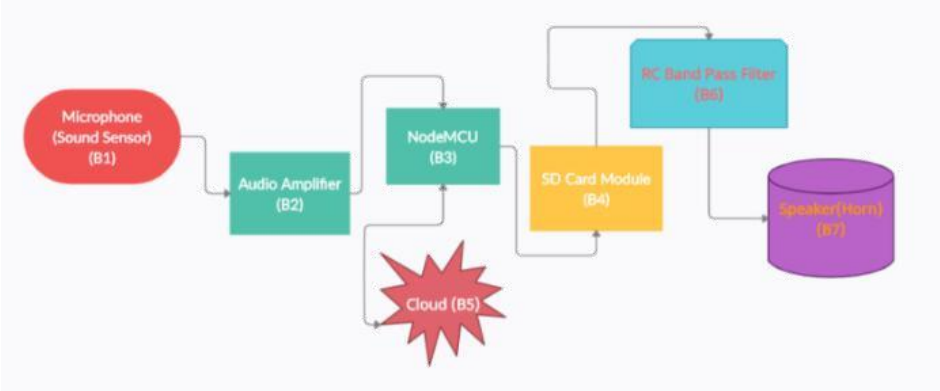

Figure (2) – Block Flow DiagramDetailed Description of the invention:

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- Microphone (Sound Sensor) (B1), the microphone converts sound energy into electrical energy, using this concept; we will connect the microphone to the audio amplifier (B2), to get the input sound.
- The audio amplifier (B2) is used to convert the low power noise signal to a high power signal through amplification, i.e., high enough for driving loudspeakers or headphones.
- NodeMCU (B3) uses this micro-controller unit called NodeMCU, which acts as the analog to digital converter and interacts with SD card module(B4) for comparison purposes.
- SD card module identifies the digital decibel value from the NodeMCU. It acts as the memory for pre-existing default horn decibel levels taken from the cloud and sent to the band pass filter (B6).
- A band pass filter (B6) eliminates the unnecessary noise that is not present within the stipulated decibel range and sends it to the speaker.
- Speaker (B7), which is used to produce a sound like a regular horn

COMPONENTS USED

The invention consists of seven main parts

1. **Microphone(Sound Sensor) .**
2. **Audio amplifier.**
3. **NodeMCU.**
4. **SD card module.**
5. **Cloud.**
6. **Band pass filter.**
7. **Speaker.**

6. ANALYZING VARIOUS NOISE POLLUTION CONTROLLING DEVICES, STUDYING THEIR MECHANISMS AND FEATURES

Description of Prior art

This project has drawn some valuable knowledge and technicalities from patents such as: -

WO2011041927A1: - A Very Powerful Noise Pollution Reduction And Controlling System Which Cooperates The Innovation Of A Karaoke System.

Abstract: - This System has powerful and efficient components such as wireless enabled Bluetooth earplugs or earphones, two units specially for signals, namely the Signal Processing Unit, A Control Unit and a Unit to provide the basic audio input signal to the SPU, known as the Signal Pickup Unit, respectively. A Control Unit is also provided following the SPU, which is fixed with the leaving terminal present in the audio signal on the signal processing unit. The output terminal of the control unit is connected with a Bluetooth emitting module or a left/right track power amplifier unit alternatively. The left/right track power amplifier unit is connected with a left loudspeaker and a right loudspeaker respectively. The Bluetooth earphones communicate with the Bluetooth emitting module via a Bluetooth receiving module. The present invention provides the advantage of controlling or reducing the noise pollution for the neighbors all around and the persons in the same karaoke environment, and making the persons capable of enjoying the present karaoke like the conventional karaoke.

US6271746B1: - A Powerful Automotive Horn Device Developed Equipped With A Manual Controller.

Abstract: - This Automotive Horn is built with many different motors, gyroscopes to enable it's manual controlling of the factors of acceleration, speed, direction of motion, propagator motion, which are actively live reading these feeds of information from the vehicle in which its present, on which this horn acts as a function to these values. The methods employed to control the switching on or disabling the horn, speed and direction control by the use of vibration, motion and acceleration sensors, with a combination of manual and electronic way of altering the tone or sound and time duration of active use. Volume modification is achieved by sensors of light or warning signals and also by the vehicle's braking system.

RESULTS AND INFERENCES DRAWN

In Fig 3 Simulation of GPS, GPRS using GSM module to locate the vehicle location and display the car speed using google maps, If the driver drives very fast, they will get an intimation through a phone call.

In Fig 3 Simulation of GPS, GPRS using GSM module to locate the vehicle location and display the car speed using google maps, If the driver drives very fast, they will get an intimation through a phone call. location and display the car speed using google maps, If the driver drives very fast, they will get an intimation through the phone call and SMS.

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Figure (3) Simulation of GPS, GPRS using GSM module to locate the vehicle

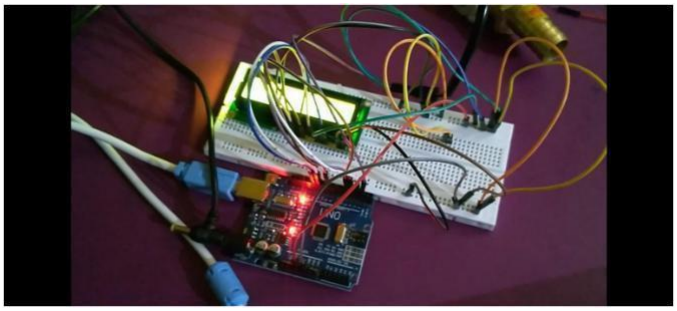

Figure (4) Surrounding noise decibel level checker using Arduino

In Fig 4 Surrounding noise decibel level checker using Arduino by using these decibel values, from theenvironment the electric horn volume level can be modified. The unwanted noise is filtered using the bandpass filter.

CONCLUSION:

Detailed Description of the Disclosed Embodiment

- The government allotted decibel level 80db to 120db-expected noise level 75db to 100db
- Unwanted noise totally removed-ECO friendly
- Uses IoT- fully automated - monitors noise level - collected in the database - becomes Smart cities reduced noise pollution.
- Fully Automated horn - smart cities.
- Driverless car - uses this technology.
- GPS accessing enabled.
- User had an idea of noise pollution - reduced pollution level

.AI and Machine Learning - filter noise.

Surround sound range (dB)	Tuning mode type(dB)	Horn functioningmode
Below 80	80	Fine
Between 80 to 95	90	Medium tuning
Above 95	100	High tuning

The Adaptoid's design decibel level must follow the government's guidelines & regulations. Existing Horn Systems should be updated and modified to match the default circuit used in the project. Future Models of similar devices might also include appropriate silencers and install them on street light poles and other road side buildings. Mitigation: Reduce Installation Costs in Automobiles. We are unable to decide the response system during emergencies where massive decibels are needed. Mitigation: Update and include those designs during the test sessions as well.

With the help of our project noise pollution is reduced in the areas like schools, hospitals, colleges etc., and accidents

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also reduced in those areas. The miniature size and cost effectiveness helps in affordability, reliability, accuracy and space consumption efficiency. We are planning to extend our project with IoT. The total number of times a driver honked is also recorded in the database. So every citizen will be aware about the noise pollution, and the noise pollution will be reduced.

REFERENCES:

[1] Abbaspour, M., Karimi, E., Nassiri, P., Monazzam, M. R., & Taghavi, L. (2015). Hierarchal assessment of noise pollution in urban areas–A case study. Transportation Research Part D: Transport and Environment, 34, 95-103.

[2] Alario, P., Gamallo, A., Beato, M. J., & Trancho, G. (1987). Body weight gain, food intake and adrenal development in chronic noise stressed rats. Physiology & behavior, 40(1), 29-32.

[3] Anderson, P. A., Berzins, I. K., Fogarty, F., Hamlin, H. J., & Guillette Jr, L. J. (2011). Sound, stress, and seahorses: the consequences of a noisy environment to animal health. Aquaculture, 311(1-4), 129-138.

[4] Angus, J., & Howard, D. (2013). Acoustics and psychoacoustics. Focal press.

[5] Banner, A., & Hyatt, M. (1973). Effects of noise on eggs and larvae of two estuarine fishes. Transactions of the American Fisheries Society, 102(1), 134-136 Beranek, L. L. (1971). Noise and vibration control. Edited by Leo L. Beranek. New York, etc: McGraw-Hill Book Co.

[6] Berg, R. E., & Stork, D. G. (2005). The physics of sound. San Francisco: Pearson-Addison Wesley. Committeeon Environmental Health. (1997). Noise: a hazard for the fetus and newborn. Pediatrics, 100(4), 724-727.

[7] Davis, D., Patronis, E., & Brown, P. (2013). Sound System Engineering 4e. Focal press. Department for Health Regulation, Ministry for Health, Malta (2013). Environmental Health Inequalities in Malta. Retrieved February 20, 2018 from:

[8] Directive, E. U. (2002). Directive 2002/49/EC of the European parliament and the Council of 25 June 2002 relating to the assessment and management of environmental noise. Official Journal of the European Communities, L, 189(18.07), 2002.

[9] Ratva, J., Zemp, E., Dietrich, D., Bridevaux, P., Rochat, T., Schindler, C., & Gerbase, M. (2010). Impact of road traffic noise annoyance on health- related quality of life: Results from a population-based study. Quality of Life Research, 19(1), 37-46. doi:10.1007/s11136-009-9571-2

[10] Fahy, F., and Gardonio, P. (2007). Sound and structural vibration: Radiation, transmission and response. Amsterdam: Elsevier/Academic.

[11] Fowler, G. S. (1999). Behavioral and hormonal responses of Magellanic penguins (Spheniscus magellanicus) to tourism and nest site visitation. Biological Conservation, 90(2), 143-149.

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