

Stabilization of the Mobility in Free Traffic

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Abstract

Objectives: Drunk driving is too dangerous and is continuing to harm many thousands of innocent lives. The main focus of this paper is to ensure safety and alertness of the drivers and people in the cars nearby the drunk driver by alerting them beforehand so as to avoid catastrophe. **Methods/Statistical Analysis:** An Infrared Sensor with an Electronic Nose i.e. smell sensor will be made use in either of the headlights of the car which will detect even the slightest smell of alcohol and send alerts to all the nearby cars within the range of 10 meters with the car number through app using Android Studio so that the nearby car drivers can be alert and make their own decisions to drive in the same path or change the route. **Findings/Application Improvements:** Keeping in mind that Nissan Motor Company has already implemented the technology which involves warning the fellow road user to stop the car and prevent the car to start if he/she is drunk, our intention is to overcome the drawback of this concept i.e. although the system will issue warnings to the drunk driver but it is his/her wish to drive or not and a person who in that state is understood to be not in full consciousness which means they can do anything. This paper is intended to ensure the safety of other cars which are being driven nearby or opposite to the drunk driver by sending those alerts. This system will make use of hardware equipment as well as software program.

Keywords: Electronic Nose, IR LED, IR Photo Diode, Pulse Decoder, Pulse Encoder

1. Introduction to STMFT

STMFT can be abbreviated as Stabilization of the Mobility in Free Traffic. This mechanism uses the idea of avoid and run method which means to avoid the traffic with reckless driving. The Idea emerges from the Latest Technology presently under consideration with Nissan Motor Company which uses the technology of Automatic Accident Avoidance System which prevents the automobile to go mobile. One can use this technology in the field of wireless communication as well as embedded systems¹. The scope of this technology can be broadened by using the high power Integrated Systems to predict the direction of motion of the automobile coming from the opposite direction.

The roots of this technology started a decade back when the accidents related to drink and drive shook the world. It happened so frequently that scientist were forced

to pull out a plan to control this incidents¹. Then came the Technology which used the Electronic nose which detects the smell of the Alcohol and prevent the driver from starting the engine. The Block diagram of the Existing system is as shown in the Figure 1 named Block diagram of Existing Network.

It can be inferred from the above that the system sends the signals from the electronic nose sensor and the decision to start or stop the engine is made in Automatic Power Cut off Circuit. When the signal is cleared, the Engine is allowed to run freely¹.

2. Proposed System Working

The idea which is being proposed is the improvement of the technology which starts or stops the engine of the vehicle whose driver is drunk. This is to put forward the fact the drunk human is not in full consciousness and can

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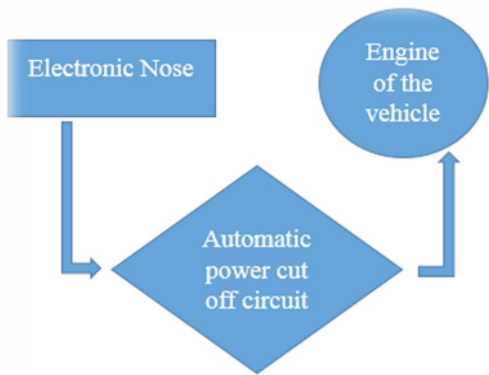


Figure 1. Block diagram of existing network.

disable the system which prevent the engine to start when the driver is drunk^{1,2}. Drunk person can find a way and start the engine which can prove fatal to the passengers and pedestrians walking on the road as the drunk driver can drive the car in any direction as they are not fully conscious. This proposed STMFT can be a life saver in for the people in Most of the Asian Countries like India.

The System uses the technology of wireless communication through Infrared sensors and a software application made from Android³.

The latest breakthrough of the system is to apply it in the vehicles using smart electronic circuitry. We place a circuit in the headlights of the vehicles and uses the infrared rays to communicate the signal produced in the circuit present in the automobile to the automobiles coming in the opposite direction. This helps to know the status of the driver and the behavior can be understood if the driver is drunk or not using the electronic nose installed in the automobile. This can be observed in the Proposed System with STMFT (Figure 2).

The above Proposed system with STMFT shows the working principal of STMFT

3. Features of the Proposed System

The features in STMFT

- Flexible and open architecture
- Multiple medium interface
- Alarm Handling and Trending
- Access Control
- Automation
- Simple integration in automobile

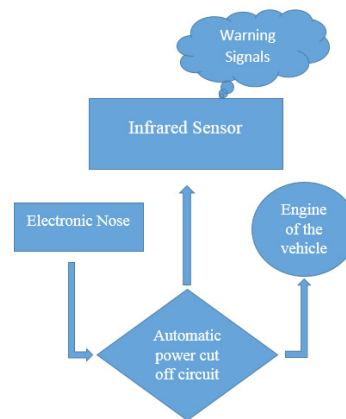


Figure 2. Proposed system with STMFT.

STMFT System is very sophisticated, human friendly device which predicts the direction of motion of the automobile and it is crucial as we see many papers with headlines stating that a person lost his or her life due to some hit and run accident.

This Infrared Sensors are versatile and are cost effective. The prototype of this model is very cost efficient and it can be integrated into any device. It is fitted with Infrared LED on the sender side and Infrared Photo Diode on the receiver side which sends and receives the signal from the sender and connects to the receiver.

4. Hardware

4.1 IR LED

The source from which the signal arrives consists of Infrared Light Emitting Diode which is connected to the circuit of the system. This acts as a transmitter which sends the information in the form of IR rays in the wavelength of 760 nanometer wavelength. The IR LED is as shown in the Figure 3 named as The IR LED.

The IR LED is just as that of a normal LED but the light source is in the range of wavelength which is not in the visible region of the light. The information send in this IR LED is received by the IR photodiode on the receiver end and is connected to the application which displays the information sent from is shown as in the above Figure.3 named as the sender side.

4.2 IR Photo Diode

The receiver side of this system contains an IR Photo Diode. It receives the signal from the IR LED and it

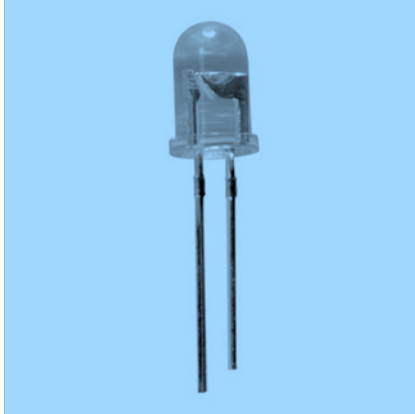


Figure 3. The IR LED.

connects the signal to the application installed on the receiver side which will the automobile coming for the opposite direction. Both IR LED and Photo diode has a cathode and an anode which can be interfaced with any of the systems. So the main advantage of this devices is that it will be reliable and very accurate when they are used as the medium of communication between the source and the destination devices. A typical IR Photo diode is as shown in the Figure 4 with the name The IR Photo Diode

5. Electronic Nose

The electronic nose sensor is a device which detects the smell of a particular type. We can use this sensor to detect the smell of an alcohol and uses the IR LED to transmit the signal across the medium and alert the receiver. These devices are made to program according to the required functionality either to warn the driver if the level of smell detected is very high. These can be seen in the below Figure 5 named Electronic Nose Sensors

6. Pulse Encoder and Decoder

This device is connected to the IR LED on the sender side and the IR Photo Diode on the receiver side. When the Electronic nose detects the smell of the drunken driver, it firsts warns the driver not to start the engine and also sends the information to the Pulse encoder, which sends information to the Receiver in the form of pulses¹⁻³.

These pulses are sent across the medium in the form of Manchester coding form as that is very reliable and has

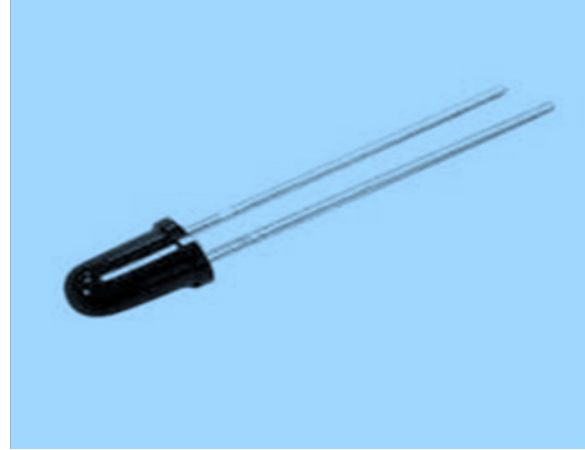


Figure 4. The IR photo diode.



Figure 5. Electronic nose sensors.

less bit error rate. Every automobile will be equipped with a Manchester decoder which reads the message sent by the sender. This is then connected to an application made by android which displays the message which I understandable by a common man on the screen whether or not there is a danger of reckless driving. The above hardware is shown in the Figure 6. Below as The Pulse Encoder and Decoder is as shown

7. Circuit Schematics

The Combination of all the devices mentioned above makes a perfect anti accident system which not only warns the drunken driver but also the drivers of the automobile near by the drunken driver's vehicle so that the people around him can take necessary action and prevent themselves running down by the reckless driver. The circuit connections are shown as in Figure 7.



Figure 6. Pulse encoder and decoder.

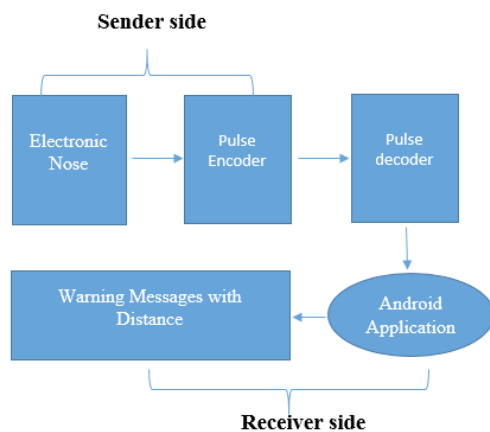


Figure 7. Circuit diagram of the proposed system.

8. Discussion

With the increase in traffic on the roads, accidents happen very frequently due to drink and drive especially in the countries like India where the traffic is in both the directions of the same lane. The idea is to alert the fellow traffic of the vehicle which is driven by the drunken driver so that they may prevent being pinned down by the vehicle. We clearly understand that the drunken driver is not under fully consciousness, he/she may disable the Security system which prevents the engine to start when the smell of the alcohol is detected in the car. This idea is the extension of the system by alerting the fellow road users by using simple and easily available equipment in the market³.

As a result of which we can understand the signals sent by the automatic system which detects the smell of

the alcohol and convert it into Manchester coding, which is then received by the fellow road user and take necessary precautions like parking the car till the danger of reckless driving is subsided or to detain the drunken driver

8.1 Advantages

- Prior Knowledge of the fellow road users
- Monitor the pattern of the reckless driver
- Safe and efficient electronics
- High security
- Easy to operate and user friendly

8.2 Disadvantages

- Distance constraints as it will be too late if there is a speeding car approaching
- Where there is safety, the cost goes high if the distance of transmission is increased.
- Complex design of the wireless card and network⁴.

9. Conclusion

The application and the use of STMFT provides a better and a safer use of electronic devices and this smart technology provides safer road way means of transportation. The future of this system is about to bring a revolutionary change in the use of electrical and electronics devices by drawing patterns of all the fellow road users from a really far distance and completely making it a controlled traffic flow.

10. Acknowledgement

The authors thank the SRM University's Electronics and Communication department and the department of Computer Science Engineering of Rajalakshmi College of Engineering for providing opportunity for this study.

11. References

1. Teng J, Bai DP, Shen Z, Xuan D. Mobile phone based drunk driving detection. 4th International Conference on Pervasive Computing Technologies for Healthcare, Munchen Germany; 2010. p. 1–8.
2. Dong W, Jinzhou J. Automatic Control systems of anti-drunk, Driving. International Conference on Electronics, Communications and Control (ICECC), Ningbo; 2011. p. 9–11.

3. Kumaran S, Rani BS. Application of synthetic aperture focusing technique for estimation of width using pulse echo ultrasonic testing. *Indian Journal of Science and Technology*. 2014 Jan; 7(4).DOI: 10.17485/ijst/2014/v7i4/48624.
4. Reddy YD, Sajin AP. An efficient traffic-aware partition and aggregation for big data applications using map-reduce. *Indian Journal of Science and Technology*. 2016 Mar; 9(10). DOI: 10.17485/ijst/2016/v9i10/88981.