International Journal of Research in Engineering, Science and Management
Volume-1, Issue-10, October-2018
www.ijresm.com | ISSN (Online): 2581-5792

Road Bump Detection Using Gyro Sensors

P. Harinath[1], S. Sai Prakash[2]
[1,2]*Student, Department of ECE, SRMIST, Chennai, India*

***Abstract*—Road surface condition is one of the main concerns for people nowadays, and it may drastically affect fuel consumption and the safety of drivers and pedestrians. Abnormalities in the road such as manholes and potholes can cause accidents when not identified by the drivers. Furthermore, human induced abnormalities, such as speed bumps, could also cause accidents. While these obstacles ought to be signalized according to specific road regulation.**

***Index Terms*—GPS module, Gyro sensors, GPS Trackers**

I. Introduction

The GPS Module can send the location of the vehicle to the database, which can be used to pinpoint where to send the road laying machinery. The Gyro sensor senses when the vehicle isn't moving on an even plane and prompts the GPS Module to send the signal. The Arduino board acts as a base and holds the entire machinery together. The modules standard off position is at 180 degrees. If it gets into a pothole or if the road isn't proper, it will change the angle. This would trigger the GPS module to send a signal with the exact latitude and longitude values to a database. By keeping track of the database, we can see the exact location of the irregularity on the roads. Human-induced abnormalities, such as speed bumps, could also cause accidents. While these obstacles ought to be signalized according to specific road regulation. This project contains 3 main parts.

1. The Gyro sensor
2. The GPS module
3. The Arduino

II. Working

It uses the Gyro sensors to monitor the irregularities in the road and a GPS sensor to send the location of that particular place. The Gyro sensor communicates with the Arduino board after going through a rough or irregular road. The Arduino then activates the GPS module to send the location of that particular place, then all the locations are used as raw data and road mapping is done.

III. Applications

This can be applied mainly in road laying. As mentioned before, the current road laying system is very slow and completely automated. This will help in making it efficient.

- This can also be used for military applications, such as surveying the geography in sensitive areas.
- This can be used in tracking cars and making sure they and the people in them are safe.
- It can give us a host of other information about different roads. The modules standard off position is at 180 degrees. If it gets into a pothole or if the road isn't proper, it will change the angle.
- This would trigger the GPS module to send a signal with the exact latitude and longitude values to a database.
- By keeping track of the database, we can see the exact location of the irregularity on the roads.

IV. Gyro Sensors

Gyro sensors, also known as angular rate sensors or angular velocity sensors, are devices that sense angular velocity. Gyro sensors come in a variety of types. Here, different types are plotted by size and performance. In recent years vibration gyro sensors have found their way into camera shake detection systems for compact video and still cameras, motion sensing for video games, and vehicle electronic stability control (anti-skid) system. Gyro sensors come in a variety of types. Here, different types are plotted by size and performance gyros is expected to grow in areas such as vehicle driver safety and support systems, and in robot motion control. Bumps and humps are utilized as means of calming traffic and controlling vehicular speed. Needless to say, bumps and humps of large dimensions in length and width force drivers to significantly reduce their driving speeds so as to avoid significant vehicle vertical acceleration. It is thus that this experimental study was conducted with the aim of determining a speed bump design that performs optimally when leading drivers to reduce the speed of their vehicles to safe levels. The first step of the investigation starts off by considering the following question: "What is the optimal design of a speed bump that will − at the same time − reduce the velocity of an incoming vehicle significantly and to a speed that resulting vertical acceleration does not jeopardize road safety?

V. The GPS Module

This paper presents an expert system for detecting traffic congestion and incidents from real-time GPS data collected from GPS trackers or drivers‟ smartphones. First, GPS traces are pre-processed and placed in the road map. Then, the system assigns to each road segment of the map a traffic state based on the speeds of the vehicles. Finally, it sends to the users traffic alerts based on a spatiotemporal analysis of the classified

segments. Each traffic alert contains the affected area, a traffic state (e.g., incident, slowed traffic, blocked traffic), and the estimated velocity of vehicles in the area. The proposed system is intended to be a valuable support tool in traffic management for municipalities and citizens. The information produced by the system can be successfully employed to adopt actions for improving the city mobility, e.g., regulate vehicular traffic, or can be exploited by the users, who may spontaneously decide to modify their path in order to avoid the traffic jam. The elaboration performed by the expert system is independent of the context (urban o non-urban) and may be directly employed in several city road networks with almost no change of the system parameters, and without the need for a learning process or historical data. The experimental analysis was performed using a combination of simulated GPS data and real GPS data from the city of Pisa. The results on incidents show a detection rate of 91.6%, and an average detection time lower than 7 minutes. Regarding congestion, we show how the system is able to recognize different levels of congestion depending on different road use.

VI. Arduino

The rise of open hardware platforms such as Arduino, hardware and software prototyping were complex and expensive. Therefore, many universities and research centres began to develop cheaper and easier alternatives in the late twentieth century. But these solutions were not general and they were not popular outside the institution where they were used. This was true until Arduino was born in 2005 in the IVREA institute as a student project run by Massimo Bansi, who applied the concepts of free hardware and software, which meant a major change. The concept of free hardware relates to a design of a microprocessor-based electronic system which is available for free use. Nowadays, there are available a great variety of Arduino boards with different processors, sizes and connectivity features. The Arduino hardware has become cheap and easy to acquire, with prices ranging from about depending on models. Regarding the software to program Arduino, the same IDE (Integrated Development Environment) is used for all boards, and it is available for different OS (Arduino, 2015).

VII. Conclusion

This paper concludes that the hardware has become cheap and easy to acquire, with prices ranging from about depending on models. The experimental analysis was performed using a combination of simulated GPS data and real GPS data.

References

[1] MacIntyre, S. (2008, August). Participation in the classroom, productivity in the workforce: Unfulfilled expectations. Paper presented at the 13th Australian Council for Educational Research Conference, Brisbane Qld. Retrieved from research.acer.edu.au/research_conference_2008/8

[2] Preston, R. (2010). Observations in acute care: Evidence based approach to patient safety. British Journal of Nursing 19, 442-447. Retrieved from http://www.britishjournalofnursing.com

[3] Ramsey, J. K., & McGrew, W. C. (2005). Object play in great apes: Studies in nature and captivity. In A. D. Pellegrini & P. K. Smith (Eds.), The nature of play: Great apes and humans (pp. 89-112). New York, NY: Guilford Press.

[4] Sievers, W. (1966). Monash University [Photograph]. http://trove.nla.gov.au/work/15565401?q=monash&c=picture&versionId=18284000

[5] Tranquilli, A. L., Lorenzi, S., Buscicchio, G., Di Tommaso, M., Mazzanti, L. & Emanuelli, M. (2014). Female fetuses are more reactive when mother eats chocolate. The Journal of MaternalFetal & Neonatal Medicine, 27(1), 72-74.