CONSTRUCTION OF "ONE BELT AND ONE ROAD" INTELLIGENT ANALYSIS SYSTEM

Jackulin Sam Gini.A[1], Logeshwari.K[2], Nivedha.J[3], Juniya Pinky.M[4]

[1]*Assitant Professor, Dept. of Information Technology, Jeppiaar SRR Engineering College, Tamil Nadu, India*
[2,3,4] UG *Student , Dept. of Information Technology, Jeppiaar SRR Engineering College, Tamil Nadu, India*

---***---

Abstract - *Road accidents are one of the biggest public health and accident prevention problems in the world. The World Health Organization (WHO) says that one million people die from road accidents worldwide in a year. At least 13 people die in the country from road accidents, the latest report from the National Bureau of Criminal Documents Collection reveals. In 2007, 1.14 lakh people in India died in traffic accidents. There are thousands of road fatalities every year and tens of thousands of serious injuries from off-road accidents. Everything from simple driver inattention to fatigue, callousness and drunk driving is responsible. Simple sensors can be installed inside integrated vehicles with various functions, such as horn control, speed control which can drive an efficient road safety system. The features proposed in this work are: galvanic skin response sensor (GSR) which verifies the driver's heart function, traffic control with a green light ensures that the vehicle does not interrupt the signal, speed control alters the speed In different zones, the control of the horn avoids honking the horn in the forbidden zone of the horn and No Parking prevents the parking of the vehicle in any parking zone, helping to obey the road disciplines. The vector support machine algorithm is used in NodeMCU for the basic operation.*

Key Words: GSR Sensor, Speed Control, Horn Control, SVM algorithm, Node MCU etc….

1. INTRODUCTION

Currently, road safety systems are available in luxury cars such as Audi, Mercedes Benz, etc. The existing system uses an accelerometer sensor capable of detecting irregularities in the car and vibrations in the event of an accident. This sends a symbol to the microcontroller. The vehicle accident detection system with GSM and GPS modem is complete. Message notifications are sent to the prescribed mobile number. The main objective of this project is to control the discipline of the road, such as controlling the speed in many areas and controlling the horns in the areas and monitoring with the prohibited horns. The health of drivers through the galvanic skin response sensor (GSR). The motivation behind the project is to make a positive difference in the field of road safety and road discipline. It also includes a primary objective of exercising discipline on the road, such as controlling speed in numerous areas and controlling the horn in areas prohibited by the horn. There is no space to park cars where the vehicle will not visit the off state until it is moved to a different location. The main objective of this project is to address some of the main causes of road accidents, such as the breakdown of traffic signs and the control of road disciplines, such as speed control in different areas and control of horns in areas prohibited by the horn that controls the health of drivers using the Galvanic Skin Response Sensor (GSR), which is used to test the intestinal function of the driving force. If an abnormal event is detected, the machine stops automatically.

2. RELATED WORKS

Zhenghe Chen, Xizhi Hu, Yan Li and Zhaoyuan Zhang [1] Design of the automatic parking speed control system based on the Fuzzy-PID control. A general structure of the engine brake pedal is presented to solve the problem of the automatic parking system for intelligent driving in traditional fuel vehicles. At the same time, since the wide jitter of conventional PID control and PID parameters cannot be changed in real time, the generalized PID control method is used to control the rotation angle of the pedal.

R.D. Thombare, P.M. Sawant, P.P. Sawant, P.A. Sawant and V.P. Naik [2] Automatic vehicle speed control by video processing. This project proposed automatic vehicle speed control through video processing with a slight modification to the existing system. Gradually reduces vehicle speed when restricted areas are detected. To this end, video recording is performed through a camera for small scenes and the detection and identification of the traffic signal is carried out using the Speed-ed Robust Features (SURF) algorithm in the MAT LAB Simulink software. To reduce the vehicle speed, the PID controller is gradually used. The simulink model is developed in the Mat-lab environment and results are obtained.

Abdullah Arıkan, Abdulsamed Kayaduman, Suat Polat, Yasin Şimşek, İsmail Can Dikmen, Hıncal G�han Bakır, Teoman Karadağ and Teymuraz Abbasov [3] Simulation of control and application methods for autonomous vehicles. This project focuses on autonomous land vehicles. In the simplest example , the vehicle speed and position can be controlled by position sensor in the front wheel section and speed sensors in the rear wheel section. Autonomy is achieved by generating signals for the control system by interpreting the data of various sensors in the vehicle with the help of an algorithm. Vehicle control will be provided with the PID (integral proportional derivative) control method, in order to form a basis for vehicle autonomous technology.

Manne Held, Oscar Fl�dh and Jonas M�tensson [4] Optimal control of the speed of a heavy vehicle in urban driving In this document, the mission of driving a heavy vehicle in urban driving is formulated as optimal control problem. The optimal control problem is solved first off-line using the maximum Pontryagin principle. A sensitivity analysis is performed to study how changes in the conduction corridor affect the energy consumption of the optimal solution. The same problem is also solved by using a predictive controller model with a backward horizon approach. The simulations are performed to study how the control horizon length affects potential energy savings.

3. PROPOSED SYSTEM

In this module, we develop the car that can be controlled by the Blynk app. We can move the car left, right, forward and backward through IOT. The car engine can be driven by the L293D driver. The RF transmitter includes four buttons like no horn, speed control, green signal and no parking. This RF transmitter is placed on signal panels that transmit the signal to the RF receiver. The RF receiver is connected to NodeMCU which receives the signal from the transmitter. The LCD screen displays the messages by pressing the buttons required by the transmitter. In this module, the GSR sensor is used to monitor the driver's health conditions. In general, the designer of wireless systems has two main restrictions: he has to operate at a certain distance and transfer a certain amount of information within a data transmission speed. The RF modules are very small and have a wide operating voltage range, that is, from 3 V to 12 V. Basically, the RF modules are 433 MHz RF transmission and reception modules. The transmitter does not consume energy when transmitting logical zero while completely suppressing carrier frequency, thus consuming significantly less energy in battery operation. When logic is sent, the courier is fully connected to about 4.5 mA with a 3 volt power supply. The data is sent in series by the transmitter that receives the tuned receiver. The transmitter and receiver are correctly connected to two microcontrollers for data transfer. From the circuit, the + 5V power supply is connected to the 40 pins of the microcontroller and the earth is connected to 20 pins. Here, we have two switches that are properly connected to the microcontroller with a maximum of 5 V and these two switches form the input command to the microcontroller. We also got an LCD screen to show the data to be transmitted. We also have a provision for connecting a computer keyboard to the positive and negative sides of the clock and to the data pin which is connected as input to the microcontroller from the keyboard output and which data is finally displayed on the LCD screen. The GSR is attached to the driver's belt, which constantly monitors the driver's health when the car is in motion. Detect driver fatigue or any other unusual events while driving. When it detects anomalous events, it automatically stops the machine. For the galvanic response of the skin, it is a method for measuring the electrical conductance of the skin. Strong emotions can stimulate the sympathetic nervous system, causing more sweat to secrete the sweat glands. Grove - GSR allows you to experience such strong emotions by simply connecting two two-finger electrodes in one hand. It is interesting to create projects related to emotions, such as the sleep quality monitor.

4. METHODOLOGY

The system architecture is designed with two modules, such as the vehicle control unit and the driver status monitoring unit. A power supply and motor controller are used to run the hardware. The RF transmitter transmits the signal from the signal board to the RF receiver. The receiver receives the signal and manages the conditions of the transmitter.

4.1 Working of RF transmitter

The RF transmitter includes four buttons such as no horn, speed control, green signal and no parking. This RF tramsmitter is placed in signal boards which transmits signal to the RF receiver

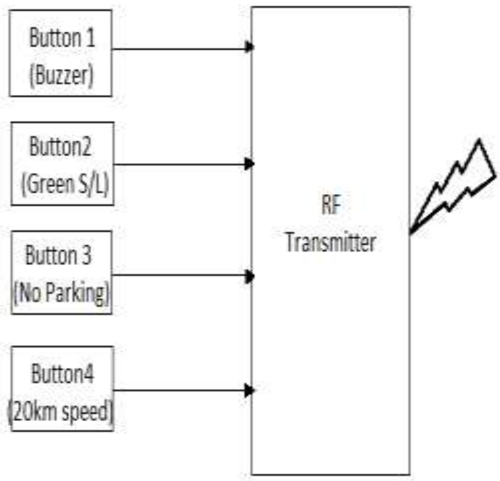

Fig-1: System architecture of transmitter section

The system architecture is designed with two modules, such as the vehicle control unit and the driver status monitoring unit. A power supply and motor controller are used to run the hardware. The RF transmitter transmits the signal from the signal plate to the RF receiver. The receiver receives the signal and manages the conditions of the transmitter. The architecture of the RF transmitter system is shown in figure 1. Here each press advances according to the code from 0 to 9 and finally when we press one of the buttons to send it it will go to the microcontroller and then to the RF transmitter module through a 433 MHz frequency transmitted by the 'antenna. The RF module has an antenna that is sent into space. The RF transmitter is a module capable of transmitting radio waves in space. It works together with the microcontroller. Here, the microcontroller supplies the data to the module to be sent. The transmitter takes the data in serial form and transmits it wirelessly through its antenna. The transmitted power output can be reduced by three physical environmental changes such as distortion, noise and other signal disturbances. Therefore, some measures must be taken to overcome these problems to increase or maintain the quality of the transmitter.

4.2 Working of RF receiver

The RF receiver is connected to NodeMCU which receives the signal from the transmitter. The LCD screen displays the messages by pressing the necessary buttons on the transmitter. The architecture of the RF receiver system is shown in figure 2.

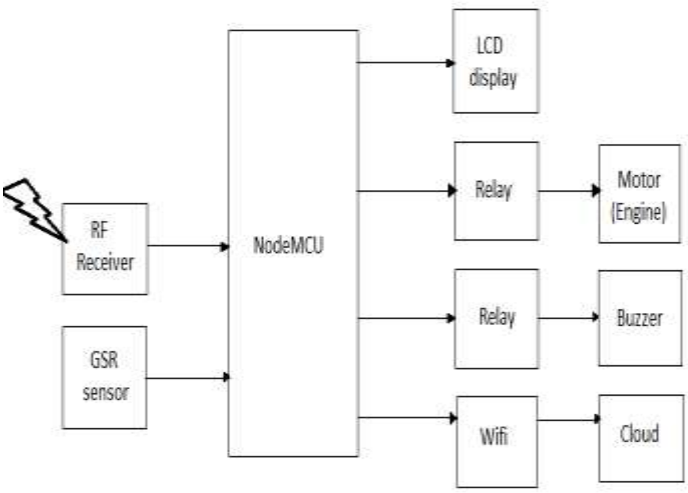

Fig-2: System architecture of receiver section

At the end of the receiver we have similar connections for the power supply, since the microcontroller needs + 5V. Similar to the transmitter, you also feel that we are using two buttons with 10k pull-up resistors via a 5 V power supply for the RF module. We are using pin 3.0 to connect the RF module data pin and 1 and 2 pins of the RF module are used for GND and VCC. We also have two buttons for selecting the code and for receiving data. Once the receiver module receives the data, this data is demodulated and goes to pin 10 of the microcontroller receiver according to the program. Then display the message on the LCD screen. The modulated RF signal was received by the RF receiver and demodulates the received data.

4.3 ESP8266 Node MCU 12E

NodeMCU is an open source Internet of Things platform that includes firmware running on ESP8266 hardware and Wi-Fi SoC systems based on the ESP-12 module. The term "NodeMCU" refers to firmware rather than development kits. The firmware uses the Lua scripting language. It is based on the eLua project and the Espress if SDK which is not OS for ESP8266. I use many open source projects like Lua-cjson and spiffs. LUA-based interactive firmware for SoC ExpressC Wi-Fi ESP8622 module as well as an open source hardware card which, unlike the $ 3 ESP8266 Wi-Fi modules, includes a CP2102 TTL-USB chip for programming and debugging It is compatible with the card and can be powered simply by its micro USB port.

4.4 SVM Algorithm

Support Vector Machine is a supervised machine learning algorithm it can be used to solve classification or regression problems. In a nutshell, it does some extremely complex data transformations, then determines how to separate your compatible data from the labels or outputs you have defined. Well, SVM is capable of classification and regression. In this post I will focus on using SVM for the ranking. In particular, I will focus on nonlinear SVM or SVM using a nonlinear core. Non-linear SVM means that the limit calculated by the algorithm does not have to be a straight line. The advantage is that you can acquire much more complex relationships between your data points without having to perform difficult transformations on your own. The downside is that the training time is much longer as it requires a lot more processing. The vector support machine algorithm is used in NodeMCU for basic operations. When multiple functions are used in the system, the data collapses. In this situation, the process causes the system to crash, interrupting the correct functioning of the functions. This SVM algorithm is used in the system so that functionality works in a suitable structure without collapsing.

5. RESULT AND DISCUSSION

The result of the proposed project is shown in Fig. 4 and Fig. 5. Vehicle speed control in a variable area: in this function, the vehicle speed is controlled in different areas, such as overpasses, bridges, roads, schools, cities and internal areas. Vehicle horn control in the non-horn zone - Check for unwanted noise in horn-prohibited areas, such as hospitals, public libraries, courts, schools, etc. The conditions are displayed on an LCD screen connected to the car.No parking prevents parking the vehicle in no parking zone which helps in obeying road disciplines. Galvanic Skin Response sensor which checks the heart function of the driver. The conditions are displayed in an LCD display which is fixed in the car. In this project we have developed the car which is controlled by Blynk application. The car is controlled by the blynk app were we can move the car like left, right, forward and backward via IoT. The hardware prototype of smart car one belt and one road vehicle control unit is shown in Fig 3. The prototype has two seperate modules that are RF transmitter and RF receiver. The RF receiver is placed at vehicle and liquid crystal display(LCD) is added to receiver to configure. The light emitting diodes are placed to each module to check condition respectively. This project is produced a hardware prototype and is given high performance than existing methods.

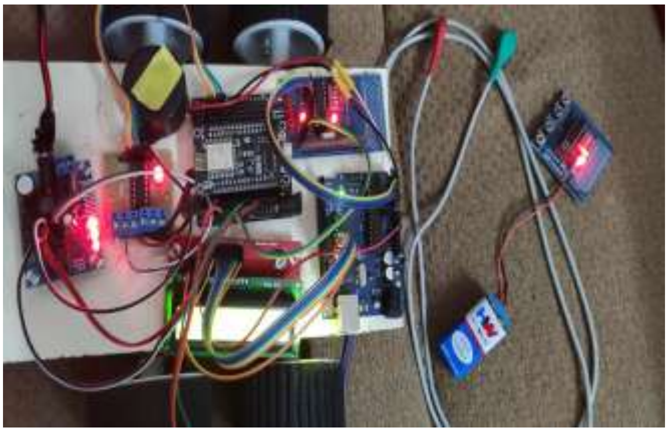

Fig 3: Hardware prototype of one belt and one road

Fig 4: Output of vehicle speed control

Fig 5: Output of horn control zone

6. CONCLUSION

In this project, we develop the car controlled by the Blynk app. Our proposed system is developed to control road disciplines and also helps to control major road accidents. Each module is implemented in hardware using Node MCU, Arduino and the motor controller to run the car. In addition, we use a car LCD display that shows the condition of the transmitter and the GSR sensor is attached to the car's seat belt to check the driver's heart function which helps control major road accidents.

7. REFERENCES

[1] Dimil Jose, Sanath Prasad, V. G. Sridhar-"Intelligent Vehicle Monitoring Using Global Positioning System and Cloud Computing"- 2nd International Symposium on Big Data and Cloud Computing (ISBCC'15).

[2] Duy Tran, Eyosiyas Tadesse and Weihua Sheng, Yuge Sun, Meiqin Liu and Senlin Zhang- "A Driver Assistance Framework based on Driver Drowsiness Detection"-The 6th Annual IEEE International Conference on Cyber Technology in Automation, Control and Intelligent Systems June 19-22, 2016, Chengdu, China

[3] Fan, Z., Zhang, R., Liu, X., & Pan, L. (2016). China's outward fdi efficiency along the belt and road: an application of stochastic frontier gravity model. China Agricultural Economic Review, 8(3), 455-479.

[4] Girma S. Tewolde, Member, IEEE- "Sensor and Network Technology for Intelligent Transportation Systems"-978-1-4673-0818-2/12 -2012 IEEE

[5] Han, L., Han, B., Shi, X., Su, B., Lv, X., & Lei, X. (2018). Energy efficiency convergence across countries in the context of china's belt and road initiative. Applied Energy, 213, 112-122.

[6] Jianqiu, Y. U., & Cao, Z. (2015). The analysis and forecast of rmb internationalization on one belt and one road. Applied Energy, 88(7), 2480-2489.

[7] K.U.G.S. Darshana, M.D.Y. Fernando, S.S. Jayawadena, S.K.K. Wickramanayake- "Intelligent Driver Monitoring System" 2013 International Conference on Advances in ICT for Emerging Regions (ICTer).

[8] N.Dheerthi, G.Kiruthikamani- "Real time data monitoring system with intelligent vehicle tracking using ARM7" -Global Conference on Communication Technologies, IEEE .

[9] Sawant Supriya C, Dr. Bombale U. L. Patil T.B – "An Intelligent Vehicle Control and Monitoring Using Arm" International Journal of Engineering and Innovative Technology (IJEIT) Volume 2, Issue 4, October 2012.

[10] Seele, P., & Helbing, D. (2018). Boost sustainability through social justice in china's belt and road initiative. Nature, 555(7696), 311-311.

[11] Yu, S., & Lu, H. (2018). Relationship between urbanisation and pollutant emissions in trans-boundary river basins under the strategy of the belt and road initiative. Chemo sphere, 203, 11-20.

[12] Zhang, Y., Zhang, J. H., Tian, Q., Liu, Z. H., & Zhang, H. L. (2018). Virtual water trade of agricultural products: a new perspective to explore the belt and road. Science of the Total Environment, s 622–623, 988-996.