RESEARCH ARTICLE

Smartphone Based Controlling and Pit Detection System

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Abstract—In this work pits, obstacles and navigation of the module is developed for the effective driver control and safety navigation scheme is approached. The system consists of Bluetooth module, IR sensor, Ultrasonic sensor and microcontroller unit. Ultrasonic sensor is used to detect pits and uneven surfaces, IR sensors is used to detect obstacles on left and right sides of the system and using Bluetooth module the navigation path is controlled through Smartphone. At the event of the pit detection (using Ultrasonic Sensor) or obstacle detection (using IR Sensors) the display provided near will be displaying the information and the system has to reduce the speed to buy time for the driver to take decision. An android application is first to be installed in the Smartphone which consists of the facility to pair and with the navigational control keys. At the event of navigation control the application will pass the address and this address has to be matched with controlling of forward, reverse, right and left for navigation. Bluetooth module in the system is paired with Smartphone and further using of relay to have switching of controlling either using Smartphone or in vehicle guidance control. The available existing system is hand gesture navigation and obstacle detection. There is no detection of uneven approaches and navigational controlling of hand gestures use sensors in hands. Instead of using sensor the approach of Smartphone based navigation control and the detection of pits and obstacles are developed.

Keywords— Smartphone; Ultrasonic sensor; IR sensors; Bluetooth; Pit

1. INTRODUCTION

We plan to integrate the two detection systems to provide greater reliability, although this may be constrained by vehicle hardware limitations. Even vehicle in mobile there are certain problems that occurs such as pits, obstacles on sides, etc. Here we are going to use the ultrasonic sensors and IR sensors to deal with the pits and obstacles. Thus by giving the driver assistance in order to prevent the damages caused due to the pits and on heavy traffic conditions the driver assistance on preventing dash on side due to the obstacles.

While the existing method is on the indoor method of obstacle detection of the robot navigation, however while going on road the obstacle not the only problem. In the case of the pits the sensors cannot spot and even in vision sensor the pits are not effectively spotted. This paper also includes the controlling of the vehicle using the smart phone. As smart phone is one of the most needed thing as they are growing in an abrupt manner and so we here control the vehicle using the smart phone. The application developed using android will be installed in the phone which on navigation control passes the parameters for the navigational control. While there are currently many existing systems for controlling using the 3d image navigation, using remote control and so on. However the increase in the usage of the Smartphone by many people in their daily life the usage of such navigation control is approached. Thus there by having increased guidance for the driver assistance will cause the increased measurement in driver safety.

2. PROJECT TECHNIQUES

The schemes for the detection of the obstacles using the imaging sensors and the other sensors for the effective driver assistance have been developed only in highly designed cars. Recently the autonomous vehicle is the hot topic for the future generations. The first part of the planning is the detection of the obstacle detection and the navigation using simple schemes have to be done. The detection of the obstacle using IR will be of less reliable data as the detection range of IR can be used only at short distance and on high end it is not reliable. So this can be used on the sides for the driver assistance. The detection of the pits can be developed using Ultrasonic sensor which uses the sound waves for the detection. The sound waves passing at a certain frequency range will allow the detection of the pits if reception is not equal. The navigation control is done through the Smartphone by using the Bluetooth connection.

3. SYSTEM ANALYSIS

3.1 Introduction

In this section over view of Existing system and proposed system has explained. Various methods are used in existing system for obstacle detection and navigation control. The event when the pits and obstacles are detected the message or the caption is allowed to display nearby driver where he will look for many times will be placed and the navigational control using the Smartphone can also be done. As the Bluetooth covers very small area the approach of controlling using the Smartphone detection can be done only close to the system.

3.2 Overview of existing system

The obstacle detection using the IR and ultrasonic sensors have been an interactive method for the driver assistance. Moreover imaging sensors also used to have the tracking of the obstacles and even the navigational control of the system. Once the obstacle is detected using Ultrsonic or IR sensors then the data that has to be displayed is passed from the microcontroller to the display for the driver to have the traction of the obstacle and to avoid the accidents. The navigational control is done through the imaging sensors or by the help of another remote by passing the parameters for controlling the system has to be done.

3.3 Disadvantages of the existing system

1. The vision based using the vision sensor is less accurate and they couldn't possibly detect the pits. This makes it difficult in the driver assiting.
2. The combination of both obstacle detection and controlling the system is not present.
3. The IR sensor have very less range of catching the obstacles and this ranges from 20 to 150cm.
4. The hand gestures are stored in the inbuilt memory and the gestures that to be remembered by the user makes it difficult. Since giving gestures for certain functions can be done, user have to keep all the signalling functions in mind or it will lead to wrong navigation.

4. PROPOSED METHOD

The problem of some accidents is occurring with the high priority of the pits. Once the system passes through the pits either its base gets damaged or the driver will lose the control by haven't notifying the pits and this causing to the accidents in some cases. The

Ultrasonic sensor is used for the detection of the pits and IR sensors for the obstacle detection. The navigation using the Smartphone using the Bluetooth module and an android application is used. The serial ports and the serial interrupts are used for the pit and obstacle detection and the navigational controlling of the system using Smartphone. The application developed will be installed and the phone and system is first paired and on having the parameters for the navigational control is passed through the Bluetooth module which is then processed by the system to navigate.
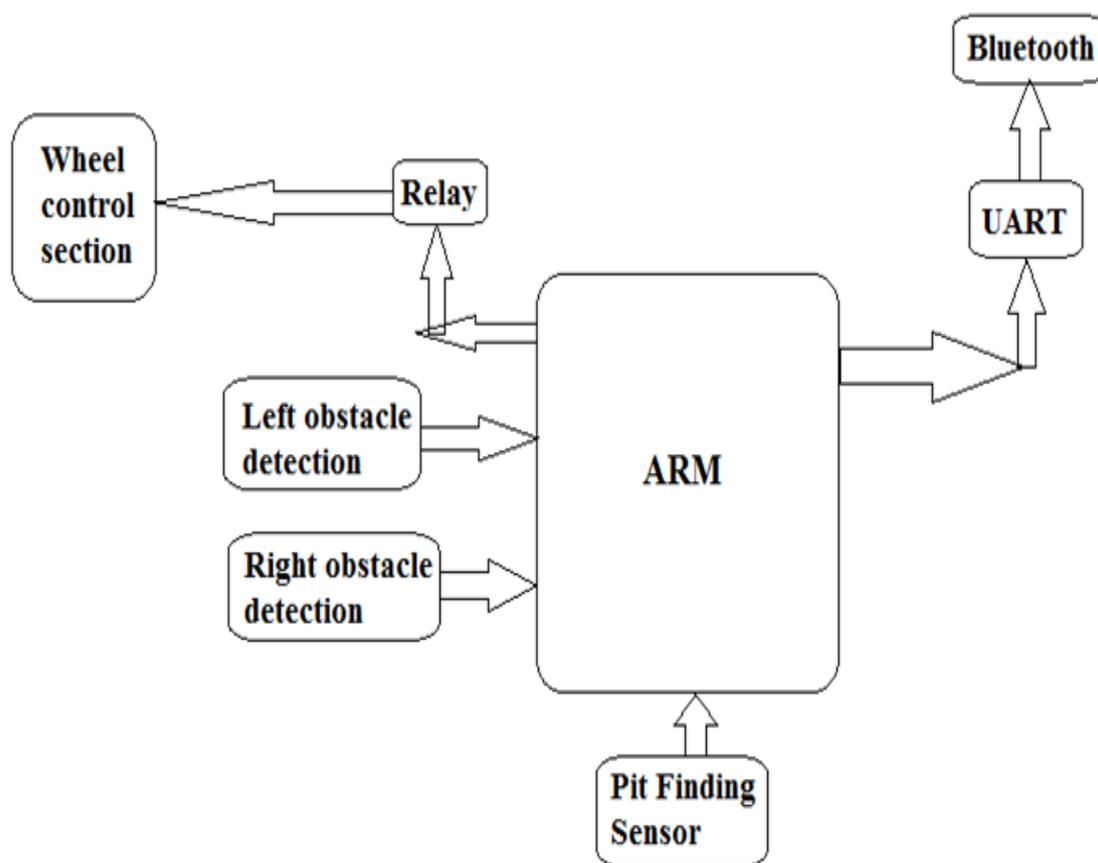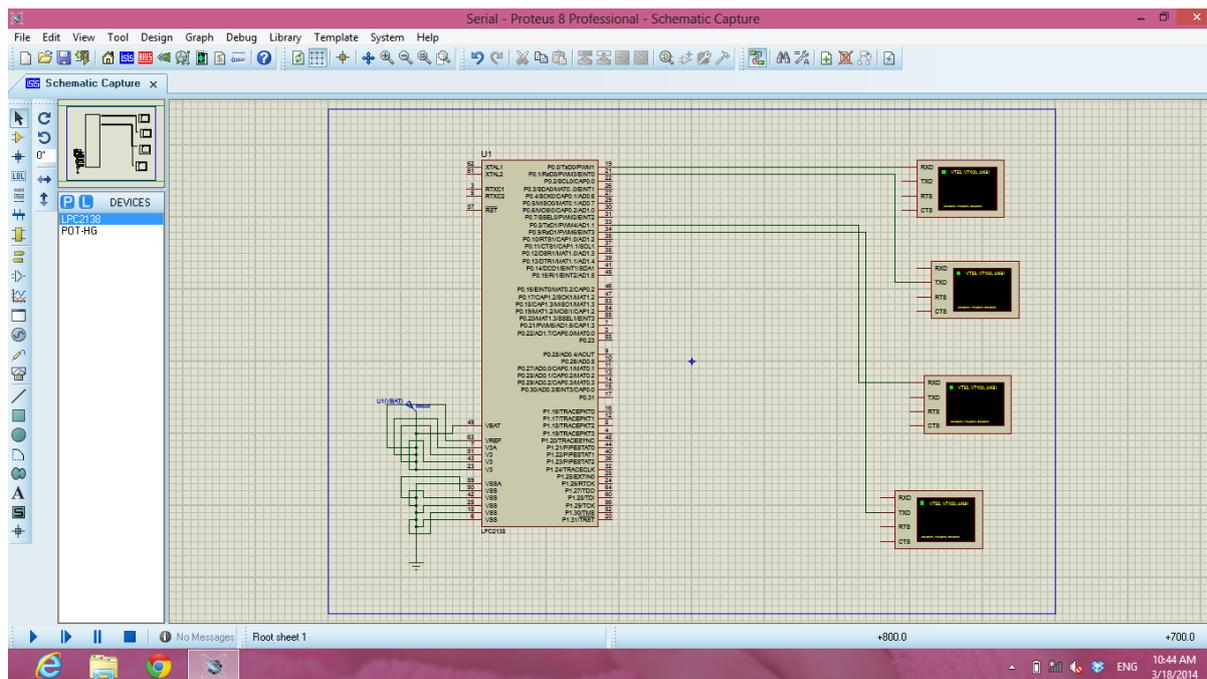
5. CONCLUSION AND FUTURE WORK

In conclusion the obstacle and pits are detected using Ultrasonic and IR sensors and also the navigation control is done through the handy Smartphone which takes place in everyday part of life. The system has been tested in real world applications using bicycles. The automation industry is enhancing with the use of the electronics in it. The navigation of the car with the avoidance of the accidents and the death caused by those accidents can be reduced by combining automation with the electronics as it provides better assistance. The obstacle and pit avoidance in the vehicle will provides the first step for the development of the automated car. Also the wide use of the smart phones provides us support for the controlling of the vehicle there by having the increased driver assistance.

Limitation/Constraints of the System

1. Multi ultrasonic sensors can't be used as the sound waves will overlap if both the sensors use the same frequency so using of other sensors will help in both obstacle and pit detection.
2. The use of the Bluetooth in the controlling the vehicle is limited.
3. This system gives only the distance of the obstacle and the pits.

Future Enhancement

The automatic navigation can be added by just giving the source and destination. This includes the path planning and the detection of obstacles and the pits and entire navigation of the vehicle involves many algorithms and many sensors have be used for the further exact detection in order to have the absolute path planning of the vehicle regarding the traffic conditions. Then the usage of the Bluetooth module can be neglected and the usage of GPS and GSM is included for the path planning. This can be done by passing the GPS values to the system and there by the parameters passed are then to be searched on using the internet connection for the path planning thereby having the vision of the route how the system have to go. Even for obstacle and pit detection there are many sensors to be used for the faster and the reliable data to have clear picture of how exact the obstacle and pits are and if they are detected they have to be displayed in the glass view.

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