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Object Collision Avoidance with Train Using Android System

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Abstract: ***Railways are providing Eco-Friendly transport system for the mankind. Train accidents can happen very often due to safety violations which results from human errors or limitations in the operation of the existing system and also due to equipment failures'. Our project is fully concentrating on avoiding train collisions and ensures passengers safety through android system integrated with ultrasonic and MEMS sensor based control system inbuilt in the train. Emergency alerts can be sent through traditional tele-communication systems such as Walkie-Talkies or other communication devices. However, Collision avoidance systems using IR sensor and anti collision device are being used by the Railway sector is still facing some problems due to the consideration of some factors such as cost-effectiveness, despite it is increasing the amount spent on implementation of the devices. Currently, to some extent the Konkan Railways has put efforts to provide train safety through Zigbee and Infrared based sensor concepts. Even though it has the disadvantages such as limited range of signal covered and difficulty in their implementation in the real world it is still being used. Hence these drawbacks can be overcome in our project by using android based electronic component for the fast communication with latest technology (RASPBERY PI 3) to avoid collision and it gets operated through the GPS /GSM concepts. . Our work will be accepted worldwide because of its effectiveness and its robust communication features.***

Keywords: ***Global Positioning Satellite, Global System for Mobile, Micro Electro Mechanical System, Raspberry pi 3.etc…***

I. INTRODUCTION

With the accrued demand for railway services, the overall railway infrastructure has been apace developing within the past 20 years, together with its communication systems Walkie-Talkies or different communication devices. Collision dodging systems on same track exploitation Infrared Sensors (IR) and opposed Collision Device (ACD) by Konkan Railway. The ACD system was statically mounted. Therefore it's found to be ineffective and later it had been intuitive. After geographical sensors have also been used, this makes use of satellites for communication. But the system is more costly and complicated too. The major goal of this project is to avoid the communication delays and provide an efficient way to avoid the collision among the trains. The key feature of this system based on Android, Linux based operating system is to overcome the short range communication. Android was developed by Google and members of Open phone Alliance. Due to Android's open supply nature, straightforward and powerful fast application development tool for developing native mechanical man applications while not long. Its Performance is comparable to applications written with Java, Object bound programming language. The humanoid Open supply Project is an initiative created to guide development of the humanoid mobile platform. The humanoid platform consists of the OS (OS), middleware and integral mobile applications among GPS communication for establish the location of the train so as to avoid the collision and alert the motive force through mobile communication.

II. HARDWARE SYSTEM

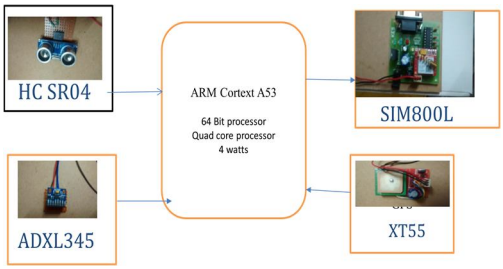

Fig 1: Proposed Block diagram

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The Rasp pi 3(ARM CortexA53) is getting connected with GSM which is operate under the power supply of 4watts because it have the boosting variable capacitors for regulate the current as it needs. When the objects in the track are monitored by the ultrasonic sensor which uses the sound waves travel to sense the object. The waves send by the emitter to bounce off an object and come back to the receiver. Then the RF Module is used to transmit and receive signals from one section to another. If any objects on the track is detects by an ultrasonic sensor.GSM is used to send SMS to authorized persons as guard, controller station and driver. In this prototype based system, the Rasp pi 3 along with the sensor which is used to sense the object.When the sensor detects that object, it having the sensational threshold of manageable and unmanageable objects. If the object is a manageable object then it will not pass the information to anywhere else. Otherwise if it is an unmanageable object, while it gets detected it will send the information through alert system and also forward the message to the mobile in order to indicate the driver, guard, controller station and also to the driver to know the particular status of the track.

III. PROJECT DESCRIPTION

A. Raspberypi3

This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

1) Ultrasonic Sensor Module

The module mechanically sends the wave and mechanically sight whether or not receives the returning pulse signal. If the signals returning, through outputting high level and therefore the time of high level continued is that the time of that from the unbearable transmission to receiving. iii.2 The Algorithm for Sensing the Collision When the collision is detect by using ultrasonic sensor which having the capacity to emit the waves immediately for transmitting and receiving in order to detect the obstacles in the track. The arm controller gets connect with the sensing module to sense the objects in the track.

2) GSM Module

When the collision is detected through the collision algorithm, the GSM module sends the message to the driver in order to prevent the collisions in the track.

3) GPS Module

The sensing information can be transmitted via GPS interfaced with the ARM microcontroller to identify the particular location of the obstacle where it is located can be previously

4) MEMS Sensor

Mems is a technology, which is used to detect the tilt of the movable train and it makes a alarm to the driver. They can able to take precautionary measures to save the passenger's lives. The acceleration of a moving object can be determined by using the following formula: A=dv / dt = d2 r / dt2 wherever, dv is that the amendment of the velocity/speed over time dt that is capable the distinction between the initial speed and therefore the final speed of the thing, the dv can be defined as shown below: dV=v1-v0 where v0 is the initial velocity/speed while v1 is the final velocity/speed of the moving object

IV. REALISING

When a train reaches a lane, the obstacle present in the track is observed by the sensor. The function of the microcontroller in this application is to act as an interpreter between the hand gesture and the end application. According to the mobility of the Obstacle it can be classified into manageable and unmanageable category. If it's a manageable object (leaf, paper…) then it can be detected alone, but if it's an unmanageable object then the alert data is sent to the Driver, guard and control room .Here we use LPC 2148 which consume very low power for its operation purpose. The regulator will take 3V power supply for its operation, through GSM Module the detected information is sent to the Android Hand held devices. In case of emergency purpose through GPS module the control room persons can easily point out the geographical location of the train and rescue operation can be carried out in robust and effective manner. Abnormal train running can be identified by use of the MEMS technology with this micro kit and if this situation occurs then Buzzer get activated so that the abnormal driving can be overcome. The train can be activated in the traditional system

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itself While the passenger safety can be attained through the train obstacle collision warning system is implemented in a Micro kit oriented Android System and basically to check whether the vehicle is being driven to the destination in real time through the route deviation examination. The warning sign for abnormal running will be a buzzer sound.

V. LITERATURE SURVEY

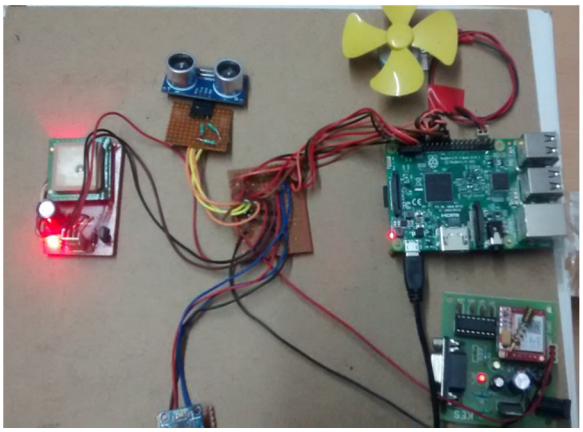
Zigbee based automation also provides only a shorter range of communication. It performs the communication based on gate level signals. If the signals are not get transmitted correctly, then it unable to sense the trains. Developing an embedded system with ARM & Inferno operating system is a radically simplified revolutionary approach. ARM offers the widest choice of embedded operating system development. Inferno comes with all that is needed to quickly develop advanced applications and with ideal for use in embedded devices. It runs on most popular processor architectures. Now a day's personal digital assistants are no more a luxury but a necessity we will make an attempt to build the essential PDA applications in inferno environment ported on ARM processor. Portability across environment: It runs as a native operating system on small devices, and also as a user application under windows Linux and Unix .In all these environments inferno application see an interface Distributed design: The identical environment is established on each device, and each may import the resources of the other platforms Dynamic adaptability: applications may depending on the hardware or other resources available.

Portable Applications: Inferno applications are written in the type safe language limbo whose complied representation is identical over all platforms.

The ability to track, trace and control anything by anyone from anywhere on the planet has been mankind's unfulfilled desire. The usefulness of GSM and GPS has made them popular in their own context .Integrating these technologies can prove to be a flamboyant solution for many unsolved problems. The idea of this paper is to integrate these two technologies into one system and provide an effective application for vehicle tracking as well as personal tracking. To implement a multi tracking system use of the following two technologies can be made firstly GSM(global system for mobile) which is a set of standards to describe technologies for second generation(2g) and GPS(global positioning system) which is a satellite based navigation system consisting several satellites revolving around the earth. The system will provide solution for tracking and tracing of multiple movable objects at an s sometimes the name multi tracking system. We can see the current location of the object and other add on features, for vehicles there will be live tracing via GPS, controlling its subsystem parts via GSM network using SMS or GPRS. The whole system will be implemented in Microsoft .net technology.

VI. EXPERIMENTAL RESULTS

The scenarios of accident in Train are due to object collision. Our device detects the manageable and unmanageable objects in train track and sent the message to mobiles. The following Figure: 4 show the implementation of our proposed work.



VII. CONCLUSION

In this Object based Collision avoidance for Train System, which is paved the way to detect both the static and dynamic objects and also ensures passengers safety. This system is having the dynamic nature to detect the objects in the track. It offers a robust, secure and efficient mode of communication to prevent the collision. If it is a manual maintenance and monitoring of the track is very

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difficult and also it's not feasible one nowadays. This paper ensures the recent technology with cost effective.

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BIOGRAPHIES

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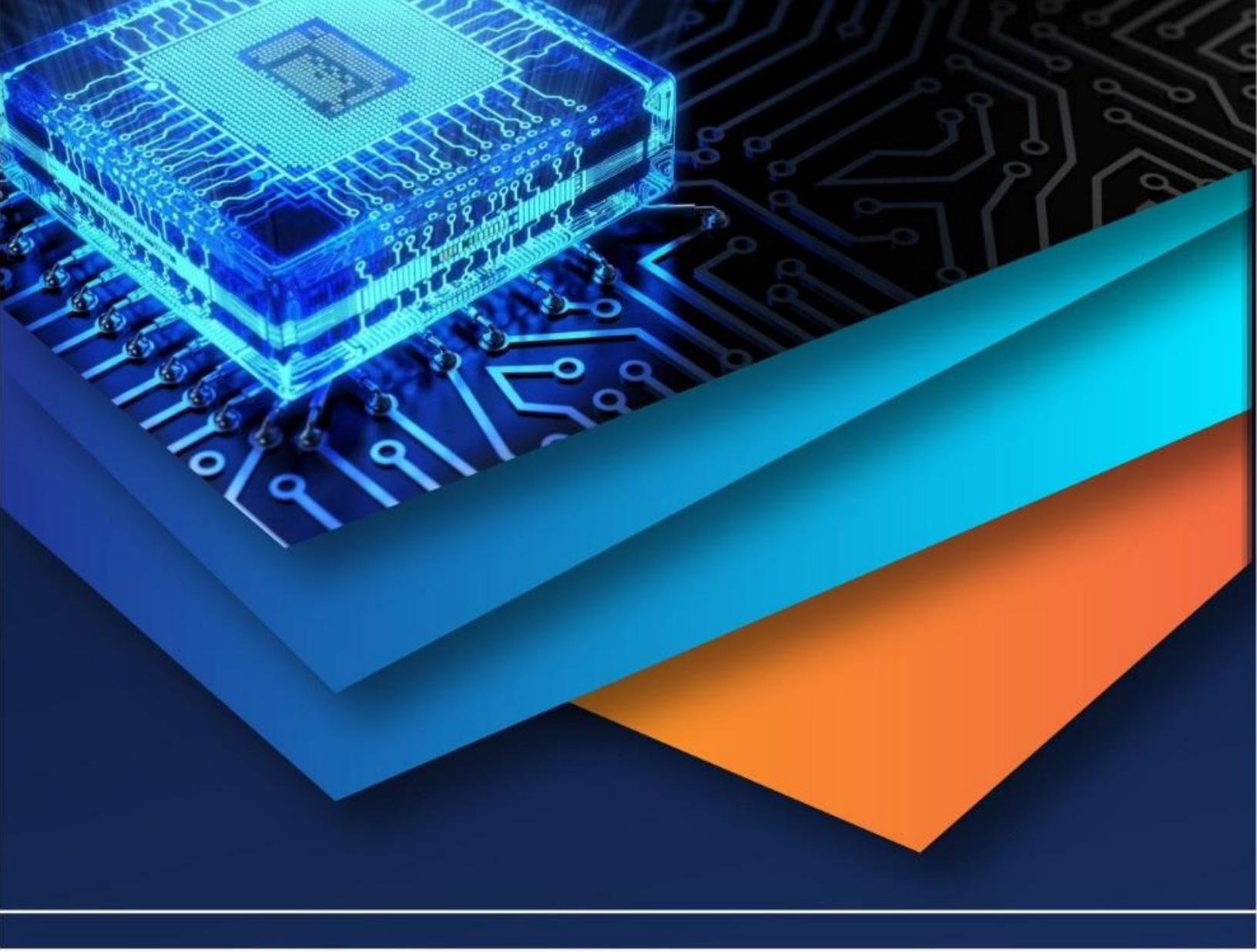

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