An Approach towards a Sensor Based Model for Avoiding Train Accidents

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Abstract: *Train accidents can happen often due to safety violations which finish from human errors or limitations simultaneously in the existing system in addition to due to complete equipment failures. The recommended system the Train Identification Chip (TIC) built-along with GSM (Global System for Mobile Communication) module may be used to speak involving the train as well as the Train Traffic Control Station. The Train Tracking Chip (TTC) modules and Train Identification Chip (TIC) modules are employing to sense the presence of trains on one track. The signals within the moving train are sent using the GSM network for the stationary trains on one track also to the TTCS. Using this process you can decide if the trains were vulnerable to Rear-finish collision or Mind on collision.*

Keywords: Train Identification Chip, Train Tracking Chip, Global System for Mobile Communication, Train Accidents.

1. Introduction

The Railway network could be the world's finest transport system. The Indian Railways is probably the greatest railway systems in the world. There's been many accidents happens inside the railway network system [1]. Train accidents can happen often due to safety violations which finish from human errors or limitations simultaneously in the existing system in addition to due to equipment failures'. As with the project is fully concentrating on remaining from train collisions and ensures traveller's safety through android system integrated with ultrasound and MEMS sensor based control system built-in inside the train. Presently, to some extent the Konkan Railways has put efforts to provide train safety through ZigBee and Infrared based sensor concepts. Although it has disadvantages for instance limited choice of signal covered and difficulty inside their implementation inside the real existence will still be used. Here RTOS is ported with ARM7 which cope that has a lot more difficult tasks. The Anti-Collision Device (ACD) can be a self-acting Micro-processor-based data communication device designed and created by Kankan Railway. The device includes Loco ACD getting a console (message display) for that motive pressure (in each and every Loco Engine), Guard ACD with remote (built-in Guard Van), Station ACD with console (built-in Station Masters' Cabin), Manned and Unmanned Gates ACD with hooters and flashers (in each and every location) and Repeater ACDs (fitted at locations getting obstructions in radio communication for instance hilly areas) which be employed in concert to prevent the following kinds of collisions and accidents like Mind on collisions ,Rear finish collisions ,Collisions due to derailment, Collisions within the level crossing gates. The recommended method is familiar with predict that kind of collision between trains and prevents them from occurring. By preventing these kinds of accidents more volume of lives might be saved. Just like the recommended model, collision happened with the above stages might be predicted and controlled. People mind on collision and rear finish collision are happening due to a person's negligence therefore these the elements is much more inside our country Inside the recommended system the Train Identification Chip (TIC) built-along with GSM

(Global System for Mobile Communication) module may be used to speak involving the train as well as the Train Traffic Control Station. The TIC inside the train and TTC on course at certain distances might make the reassurance of train safety every single check point crossings. Inside the TTC [Train Tracking Chip] we have fixed the scratch pad. This scratch pad could be the sensor which will give necessary signals to monitoring in the train.
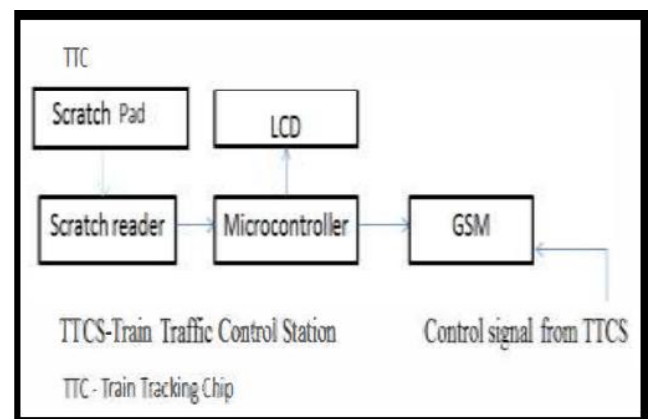

Figure: An overview of TIC and TTC

2. Methodology

A lot of the accidents happened due to the collision involving the trains and detrains. Inside the railways we considered collisions will be the most dreaded accidents. It's very difficult to stop this kind of collision, because of speed in the train, which need a lead distance to avoid. Collision happened by two ways due to human error. The 2 kinds of Collisions are, Mind - on collisions and Rear- finish-collisions The Rail Safety Act regulates the safety of all rail transport including heavy and light-weight rail systems, therefore most public and private sidings, each tramways and tourist and heritage rail methods [2]. The main railways controlled with the Act are the Melbourne heavy rail system, the Melbourne tram and light-weight rail network, Victoria's regional standard and broad gauge rail systems and regional tourist and heritage railways. Thus the Railways excluded

from coverage beneath the Act include railways in mines, amusement and theme park railways and slipways. This railway has certain duties to guard also to prevent destruction inside their path. But nevertheless there's great deal of train collisions are occurring due to insufficient understanding. Emergency alerts might be sent through traditional telecommunication systems for instance Walkie-Talkies or other communication items. However, Collision avoidance systems using IR sensor and anti-collision device are utilized with the Railway sector remains facing some problems due to the idea on some factors for instance cost-effectiveness, despite its growing the amount allotted to implementation in the items. The Fig.l describes the part in the TIC and TTC module. Inside the Fig. 1, it offers two modules TTC and TIC this module is combined to teach monitoring module. The TTC module could be the module which consists of sensor referred to as "Scratch Pad". This really is really the Sensor that's put in the track. The TIC module can get the information in regards to the track as well as the checkpoint within the Scratch pad when the scratch visitors scratch the scratch pad. The recognized information is going to be collected also to be sent by micro controller with GSM module for the TTCS. The PIC microcontroller can be used as this function. This micro controller can get the control signals for the scratch visitors and transfers the data for the control station by GSM. The whole TIC module is placed inside the moving Train. Inside the TIC module, GSM may be used to deliver and receive information between TTCS and TIC. Inside the Scratch Pad the train track number, checkpoint number as well as the direction is fixed. The next module for the TTC could be the TIC module, which consists of sensor referred to as Scratch visitors. The TIC module also consist microcontroller, live view screen display and GSM module. In this particular project, train collision avoidance system remains designed, simulated and examined [3]. The simulation remains done while using the Lab VIEW and testing remains moved out while using the developed prototype. The communication involving the microcontroller and GSM Module is examined. The flow of Lab VIEW that is frequently used inside the TTCS may also be examined for individual's particular messages within the TIC. The TTCS module was built using GSM plus a Pc. Notebook system has software particularly produced to recognize the collision. We utilize the Lab VIEW software for your implementation in the control station. Lab VIEW gets together the introduction of user connects to the development cycle. Lab VIEW programs are classified as virtual instruments (VIs). Inside the Lab VIEW Controls are inputs, they enable someone to provide information for the Mire. The structures and procedures are situated around the Functions palette and are placed on the trunk panel. With one another controls, indicators, structures and procedures will probably be known in line with the block used [4]. An important feature of Lab VIEW could be the extensive support for interfacing to items for instance instruments, cameras, as well as other items. Clients typically interface to hardware by either writing direct bus instructions (USB, GPIB, Serial...) or using high-level, device-specific, motorists that provide native Lab VIEW function nodes for adjusting the unit.

3. An Overview of Proposed System

Inside the recommended system the Train Identification Chip (TIC) built-along with GSM (Global System for Mobile Communication) module may be used to speak involving the train as well as the Train Traffic Control Station. The TIC within the train and TTC on course at certain distances might make the reassurance of train safety every single check point crossings. Inside the TTC [Train Monitoring Nick] we have fixed the scratch pad. This scratch pad could be the sensor which will give necessary signals to monitoring in the train. The TIC module can be a module that's put in the moving trains featuring it's a scratch reader. This GSM gets the connection between the train as well as the control station and the other way round. This module inside the train when moving, the scratch visitors will scratch the scratch pad inside the track. This could keep each and every check points. In each and every checkpoint the particulars in the trains are communicated for the control station so the collision involving the trains might be prevented. The messaging involving the Train and TTCS is controlled having a PIC Microcontroller. The scratch pad is finished by figuring out 9 pins, this pins are spring type will connect with the moving train. The pin props up data in regards to the checkpoint, train track number and direction in the moving trains. The whole TTC module is placed inside the railway track. The TTC module is placed inside the track, where the sensor is placed to recognize within the train. Inside the TTC module, sensor named scratch pad may be used, were its familiar with identify train. The dynamic moving in the train could be very fast. The train recognition is finished through different sensors nevertheless it relates certain time variation. The scratch pad sensor consist data pins. This data pins are very useful for very good in the train, in order that it identifies it location, direction and track. Time variation may cause issues within the recognition in the train. Such situation we come across certain collision between trains. This problems might be avoided TTC which built using scratch pad sensor for your recognition in the train easily. The whole TTC module is placed inside the exterior atmosphere i.e. inside the railway track. The TIC module is placed inside the train. The monitoring in the train could be accomplished with the scratch visitors which are placed underneath the train. The TIC module can get the information in regards to the track as well as the checkpoint within the Scratch pad when the scratch visitors scratch the scratch pad. The recognized information is going to be collected also to be sent by micro controller with GSM module for the TTCS. The PIC microcontroller can be used as this function. This micro controller can get the control signals for the scratch visitors and transfers the data for the control station by GSM. 1) GSM [Global System for Mobile Communication: GSM can be a cellular and wireless network, meaning cell phones interact with it by looking for cells inside the immediate vicinity the insurance policy portion of each location varies in line with the implementation in the atmosphere. The underside station antenna is an element of the rooftop level. The GSM module produces outcomes of the trains as well as the control station A GSM modem can be a specialized type of modem which accepts a Sim, and utilizes a subscription with a mobile operator, like a mobile phone. Within the mobile perspective, a GSM modem looks like a mobile

phone without any display as well as the keyboard [5]. The Train Traffic Control Station could be the primary base station which predicts and controls the flow of traffics in the train. The Train Traffic Control Station is build using Lab VIEW. The TTCS is very essential to train collision avoidance. The control station includes GSM module and consists of the display to determine the information regarding trains. The TTCS can predict the two kinds of collisions (Rear finish collision and Mind on collision.

Figure: An Overview of TTCS by using Lab VIEW

4. Conclusion

The accidents between trains are increasing due to negligence of intelligent techniques implemented inside the trains and improper control signalling within the Train Traffic Control Station (TTCS) inside the recommended system the Train Identification Chip (TIC) built-along with GSM (Global System for Mobile Communication) module may be used to speak involving the train as well as the Train Traffic Control Station. The TIC inside the train and TTC on course at certain distances might make the reassurance of train safety every single check point crossings. Inside the TTC [Train Tracking Chip] we have fixed the scratch pad. This scratch pad could be the sensor which will give necessary signals to monitoring in the train. It has been believed once the machine is implemented inside the railway systems, train accidents might be prevented. This collision between trains is calculated and colliding trains were alerted. With this particular project train collision is stopped. Many human lives and a lot of characteristics might be saved when the method is implemented.

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