

Crowd Density Management in Local Trains Using Micro-Switches

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Abstract : This project describes how “Crowd density can be managed in local trains using micro-switches”. Local Trains are used by almost everyone in their day to day life. In this system all trains will have a sensor system to sense the crowd density in each train compartment and it will be displayed on a large indicator on the platform before the arrival of the train on the station via ZIGBEE based wireless communication. So People can take a decision in advance whether to travel in the particular train or leave it, then in which compartment that can be decided beforehand. Micro switches are used because of their low manufacturing costs and long service life. This project will help to divide the crowd evenly throughout the train.

Keywords : Zigbee, Micro-switch, Microcontroller 89S51, LCD Display

I. INTRODUCTION

Local trains are an important part of our day-to-day life. We are heavily dependent on them for regular travelling and journey. But the journey becomes very difficult for us when the trains are over-crowded and unfortunately crowded train is a very common thing in local trains. This experience can even become more difficult when we need to travel along with our family or hand full of baggage's. Technology has advanced rapidly in today's world. Hence we can make use of the technology to make information available to public beforehand, so that they can decide in advance for better journey. In the system, which we are proposing, all trains will have a sensor system to sense the crowd density in each train compartment and it will be shown on a large indicator on the platform before the train arrives on station via ZIGBEE based wireless communication. So People can take a decision in advance to travel in which particular train. If decided to travel, then in which compartment, that can be decided well in advance. Thus there will be even distribution of the crowd throughout the train. Even-though our local trains are of the British-era. Still the performance is quite comparable to world standard. But one part of the system is totally mechanical type and creates a lot of problems in operation, i.e. train chain pulling system. This system never works as intended to work because it has no logic associated with it and it is totally mechanical type in nature. In our system, we propose to digitize this mechanical system, so as to improve its performance and efficiency.

II. LITERATURE AURVEY

The system is based on quantitative measurement of the crowd density in the train using micro-switches [6] and transmitting the information to the station side. This paper provides description of the concept and features that makes Zigbee technology [1] more efficient for this project. All the aspects of Zigbee are described including IEEE 802.15.4 layers [2].

The micro-switches are placed below the metal sheets of the train compartment. At the train side microcontroller 89s51 [3] is used to transmit the information to the station side. This information is then displayed on the station side using LCD display[7].

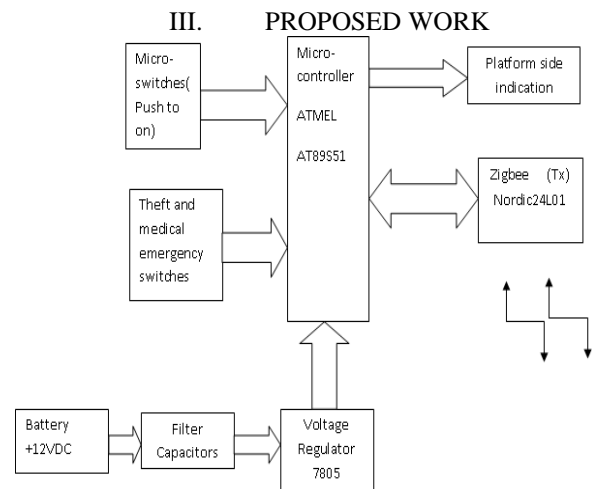


Fig No.1. Train Bogie Side – Block Diagram

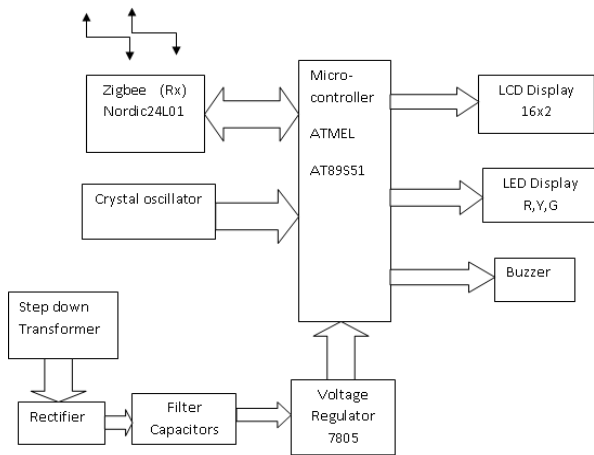


Fig No. 2. Platform side – Block Diagram

V. DISADVANTAGES

- Not helpful in over-crowded trains.
- Complexity in the system.

VI. APPLICATION

- It can be used in local trains, mail express trains and metro trains.
- With a bit of modifications it can be implemented on other public transport such as buses etc..

REFERANCE

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- [2] "Communication Systems" by Simon Hawkins.
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- [5] <https://www.scribd.com/document/197206603/Nrf24l01-2-4ghz-Wireless-Transceiver-Module-Manual>
- [6] http://stevenengineering.com/tech_support/PDFs/31PRSS.pdf
- [7] <http://www.microcontroller-project.com/16x2-lcd-working.html>

- Micro switches are used to measure the crowd density using short circuit concept with push to ON connection. The more the no of switches pressed more is the crowd density. Switches are connected as the inputs to the uC.
- ZigBee NRF 24L01[5] from nordic semiconductors is used to transmit the crowd density information to the station side module with proper addressing denoting the bogie no.
- Microcontroller 89s51 [4] with 4KB ROM and 128 bytes RAM, and support for ISP(In-system Programming) is used to control all platform side operations of the system.
- ZigBee NRF 24L01 from Nordic semiconductors is used to receive the crowd density information from the train side module with proper addressing denoting the bogie no.
- Signals are used to indicate the crowd density based on color codes i.e. Red for overcrowded, Yellow for moderate, Green for less crowded

IV. ADVANTAGES

- Advance information about occupancy in train compartment.
- Help commuter and train management to make quick and informed decision.
- Take judgment or decision in advance for better journey