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Review on
Automated Pantry Order System using ZIGBEE

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Abstract

Indian railway (IR) is one of the world's best transporting system. It is mainly used for mass transportation. Also it is an affordable and effective all the way. 23 million passengers are travelling by the train per day and 7.2 billion passengers every year. The most important thing is that, attention has been paid time to time to the public comforts and their needs by introducing new things without increasing the fare since last few years.
The aim is to build Automated Pantry Order System using ZIGBEE. A more advantageous system with it's advantages and disadvantages, over current food ordering system in IR which is totally manual system. The popularity of Indian railway and scope of our proposed system along with other ICT improvement is mentioned in the paper. Also the block schematic, hardware description and software description of Automated Pantry Order System using ZIGBEE is explained.

1. Literature Review

1.1. Current Scenario

Discussing about the Indian railway's pantry order systems, which is totally and totally manual system. Suppose a customer wants to order any food or breakfast, he can't access it immediately. Instead of that he will have to wait for waiter or service provider. Unless and until waiter comes to take order, your order can't be posted. And after posting the order the passenger or customer will have to wait for delivery and billing purpose.

But, these problems can be solved by using the AUTOMATED PANTRY ORDER SYSTEMS. This will provide the total automation technology. So that customer can order at any moment of time. And the problems because of the fast delivery and billing can be solved.

1.2. Advantages

1. Increase in income
2. Less expenditure
3. Low labour cost
4. More customer oriented service
5. Easy to handle
6. Easy to manage
7. Secure transactions all the way
8. Customer Satisfaction-key factor

1.3. Disadvantages

1. Proper Installation is required
2. Cost of Repair

1.4. Approximate use of travelling sources in India

The following pie chart in the figure 1 is representing the approximate use of travelling sources which are used by the passengers normally in India. Out of these probably one to two percent of people are using seaways, four to five percent people are making their journey by the airways, twenty-three to twenty-eight percent people are travelling by the bus.

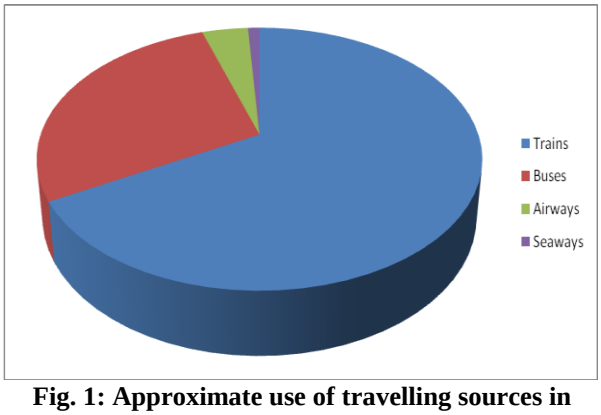

Fig. 1: Approximate use of travelling sources in India

And finally the most wide area of the pie chart is showing the population of India or the people using the train as the source of travelling.

So, conclusion is that the train is the most important source of travelling used by the people, for long as well as short journey trains. So, it is most probable that our proposed Automated Pantry Order System can be implemented in the long destinations trains or non-suburban trains. The diagramatic representation is shown in the figure 1 above. [4]

1.5. Passenger services

The diagramatic representation of the trains, kilometres in millions of kilometres per day as well as per year is represented in the following graphs as figure 2 and figure 3 below.

Basically passenger services are measured in terms of trains kilometres per day or per year. That is nothing but the density of trains running on the tracks to and fro. [4]

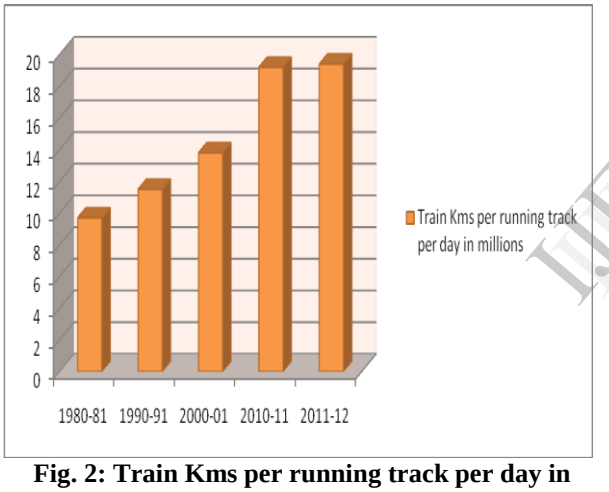

Fig. 2: Train Kms per running track per day in millions

The above figure 2 is representing the train kilometers per day in millions of kilometers. That's nothing but the density of train kilometers per day. And figure 3 below is representing the train kilometers per year in millions of kilometers or the density of trains per year in the category of non-suburban trains. Non-suburban trains are nothing but the trains travelling for long distances from one destination to another.

And density is directly proportional to the number of passengers travelling per day and per year respectively. Whatever the density of running trains is represented is definitely along with passengers.

So, we understand the relation between the train kilometers with train density which is directly proportional to the number of passengers. Means, as the number of passengers are increasing day by day, our Automated Pantry Order System can be utilised more. And definitely the passengers travelling more than 300 to 400 kms requires food in the travel. If such a reliable and efficient service providing system is implemented in the trains, it will be the most usefull one, and one of the populler service, providing efficient system in the Indian railway department and other sectors also.

As shown in the graph below, if such a huge density of trains will be there with continuous growth in the graph, our pantry food ordering system is having a very wide scope. In the Indian railways we will have bright business potential also for the designers, manufacturers and suppliers. [4]

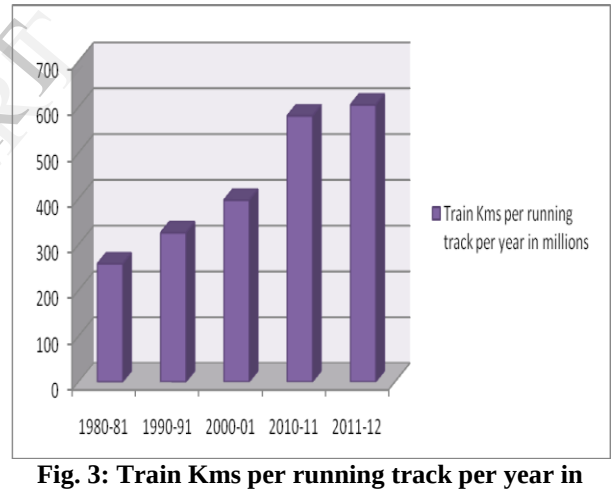

Fig. 3: Train Kms per running track per year in millions

1.6. ICT Improvements

Discussing about the ICT i.e information and communication technology process and progress in the Indian railway department, the following table 1 is describing in brief about various improvements in ICT sectors. [4]

Table 1. ICT Improvements in IR Department

Sr. No.	Item	Total Cost (Rs. In Crores)	Included in 12th Plan Estimates	Balance to be Funded (Crores)	Benefits
1.	Internet access at 58 'A1' class stations and 284 'A' class stations	65	Nil	65	Improved passenger experience
2.	Unified ICT platform for 6000 railway stations	500	Nil	500	Communication services – voice, data & video services for all administrative/ operational requirements
3. (a)	RTIS based on SIMRAN project	150	150	Nil	Tracking of trains, locomotives and cargo
3. (b)	RFID tracking system for wagons, coaches and locomotives	600	100	500	Tracking of wagons and cargo to improve wagon utilization and availability by 10%
4.	Mobile tracking (unreserved)	-	-	-	Reserved ticketing already launched
	Total	1,315	250	1,065	

Above table is giving an idea about various information and communication technologies implemented in the Indian railway department. Some of the technologies like internet access at 'A' class stations, unified ICT platform for 6000 railway platforms, RTIS based on SIMRAN projects, RFID tracking system for wagons and coaches, mobile tracking, etc. service facilities are being given by ICT improvement sector in IR department. And department or government had spent crores of rupees on this sector.

So, by considering the above improvements, government can also spend some sort of money on our proposed system in order to improve customer satisfaction along with fast, secure, and reliable transactions. That's what it can be one of the agenda under ICT improvements in Indian railways.

2. Proposed Design

2.1. Transmitter Section

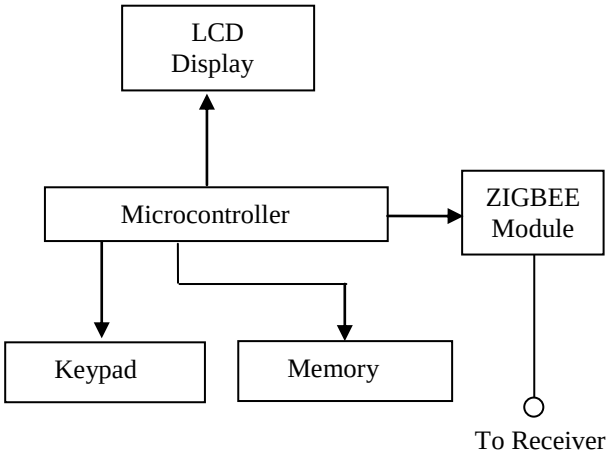

Fig.4(a). Transmitter section

2.2. Receiver Section

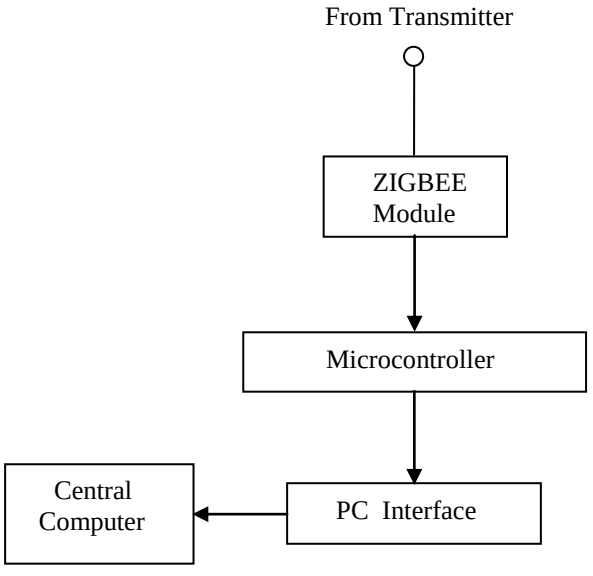

Fig.4(b). Receiver section

3. Hardware Description

The paper is all about transmitting and receiving zigbee units used in the automated pantry order system. In this, the transmitter module is present on both ends in each bogie. If passenger want to give any order then he must have to go to the device which is present in the bogie with his conform railway reservation ticket. And passenger will have to enter his PNR number, seat number and bogie number to the module through numerical keypad. After giving all this details to the device, the list of menus will be displayed, from which passenger will have to select his desired item whatever he want. Then device asks for quantity of food item to enter.

After giving all the required information to module the internal hardware starts working. The data which passenger entered from numerical keypad is fetched from microcontroller and fetched data will be sent via transmitter. In pantry car the receivers will be placed and transmitted data will be received by the receiver in pantry car. If two orders are given simultaneously from the same bogie then at that time one order is on hold as soon as the first order is cleared the second order will hit the receiver in pantry car.

After receiving the data in pantry car, the payment receipt is generated in the printer for respective order. Then waiter or service provider in pantry car serves the order and payment receipt to the passenger as early as possible. In this way automatic pantry car order system using zigbee module works.

4. Software Description

4.1. Transmitter Section

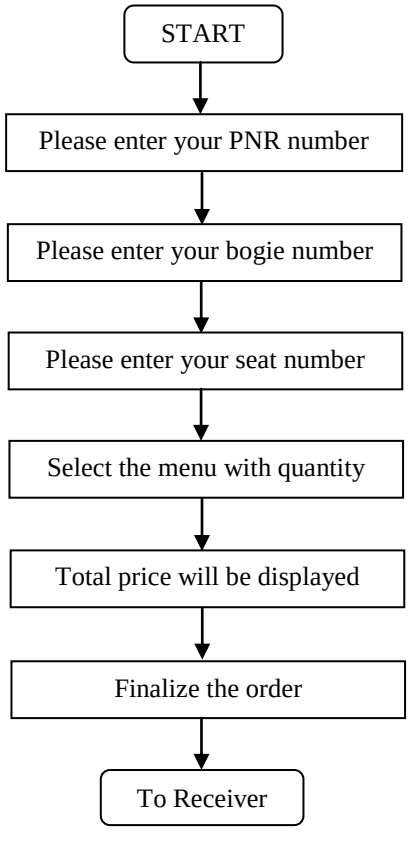

Fig.5. Flow chart for Transmitter section

The flow charts are giving the software description in brief for the automated pantry order system. The stepwise flow of execution is shown in the above flow chart for transmitter section and following flow chart is describing the flow of execution for the receiver section.

4.2. Receiver Section

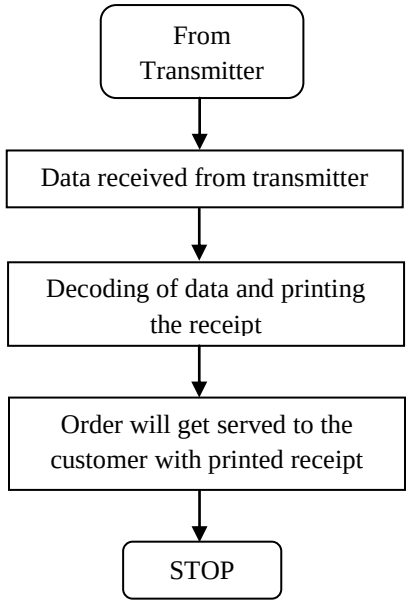

Fig.6. Flow chart for Receiver section

5. Conclusion

The current scenario of conventional food ordering system is done. Modified model of Pantry Order System is discussed to make it more convenient and efficient. Hardware description and software description is also given with the focus on ZIGBEE communication protocol.

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