E-RICKSHAW MANAGEMENT SYSTEM

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Abstract: Electric Rickshaws provide eco-friendly, cheap, convenient, time-effective means of transportation in place of conventional rickshaws. The e-rickshaws operating in the country observed a significant increase in numbers from 1000 in year 2010 to more than a lakh in year 2014. As these rickshaws are not operated manually, they provide longer rides to the users. The e- rickshaws lack regularization and management, due to which they increased the burden on public transportation system. Many issues related to the e-rickshaws like regularization, safety and management need to be addressed for their proper functioning. The regularization of e-rickshaws was addressed with the passing of Motor Vehicle Amendment Bill (2014) by the Lok Sabha. An efficient way for the management of e-rickshaws is discussed in the paper. The paper aims at developing a real-time e-rickshaw management system which focuses on providing safety and convenience to the users. The system will be working as an integrated function of Radio Frequency Identification (RFID) tags and Global Positioning System (GPS) to ensure the safety of the passengers. The RFID tags store detailed information about the passengers entering the vehicle and GPS is used to locate the location of the e-rickshaw at any given time. Furthermore, the management system is made more reliable by providing additional information like availability of e-rickshaws on a particular route at a given time. The goal of this system is to develop a pliable, reliable, user-friendly and cost-effective e-rickshaw management system that will not only be worthwhile for the users but e-rickshaw holders.

Keywords: RFID, GPS, management, safety, eco-friendly.

I. INTRODUCTION

Since time immemorial, rickshaws are used as the most widely accepted means of transportation.[4] Today many types of rickshaws like cycle rickshaws, auto rickshaws and electric rickshaws are used. [11] In many areas, auto rickshaws are ban because the roads are not well maintained. Hence, there is the requirement of e-rickshaw.[2] In the wake of sustainable development, electric rickshaws emerged as the popular eco-friendly means of transportation in some cities as an alternative to the traditional rickshaws. They provide convenient, cheap, pollution free mode of transportation and hence are becoming popular.[3]

A. Background

Initially, e-rickshaws lacked regularization and management. The issue of regularization was resolved by the government of India.[5] The government in the wake of regularization made it mandatory for every e-rickshaw to register itself with a nominal fee of Rs. 100.[12] After the registration, an identity card was issued to the driver of e-rickshaw. [10] The management of the e-rickshaws was still left unaddressed. No grounds for the safety of the passengers were put forth. Hence this gave rise to the need of a reliable, user-friendly and real time e-rickshaw management system.

B. Motivation

The paper aims to undertake management of the e-rickshaws operating in the country by taking into consideration two features of concern i.e. Convenience and safety of the users. RFID cards will be issued to each and every user. [6] The safety of the users will be addressed by recording their entry and exit points with the help of their RFID cards. The use of Global Positioning System (GPS) will further enhance the safety of the users by providing a way to track the user's journey. The project also aims at doing the analytics on the data generated by the operation of e-rickshaws to reduce the waiting time indulged by the passengers daily.

II. PROPOSED SYSTEM

The proposed system will provide the management of the existing e-rickshaws by addressing two features of concern viz. Safety and Convenience, with the help of Radio Frequency Identification and Global Positioning System.

A. RFID

Radio Frequency and Identification is used for the identification and tracking of the objects. It makes the use of electromagnetic fields and tags or labels.[9] Tags are attached to the objects that need to be tracked or identified. Information is stored electronically in the tags.[1] Integrated circuit which is used for storing and processing data, a means of collecting power and an antenna which is used for transmission of signals constitute an RFID tag. RFID card reader is used to read RFID tags. [8]

B. Global Positioning System

Global Positioning System uses a network of satellites to furnish information about location and time. It is most commonly used for locating, navigating and mapping. It contains a receiver which processes microwave signals transmitted by the device.[7] Many tracking stations are

distributed across the globe. These monitoring stations track the signals received from GPS satellites to estimate the real position of the object.

C. *Analytics on Data*

The availability of e-rickshaws for a specific time is uncertain thus most oftenly passengers are required to wait for long times. This problem can be easily resolved if the number of e-rickshaws available on a particular route is known. This can be achieved by doing analytics on the data generated by e-rickshaws operating in a particular place. Demand of e-rickshaws varies according to the routes. The number of e-rickshaws required at a particular route at a given time can be determined in advance and thus making the availability of e-rickshaws certain. This will reduce the waiting time and human fatigue.

III. SYSTEM MODULES

A. *Module 1*

The system contains e-rickshaws equipped with GPS tracking device. The GPS is used to determine the current location of the e-rickshaw. When a passenger requests for the current location, the request is sent to the central server. The data about the location is fetched from the database and the user is notified about the location with the help of a message. The actual position of the rickshaw is calculated with the help of signals being transmitted by a network of satellites that use microwave signals. This module accounts for the safety aspect of the system.
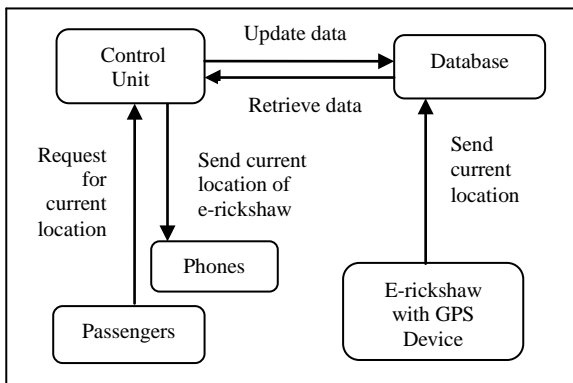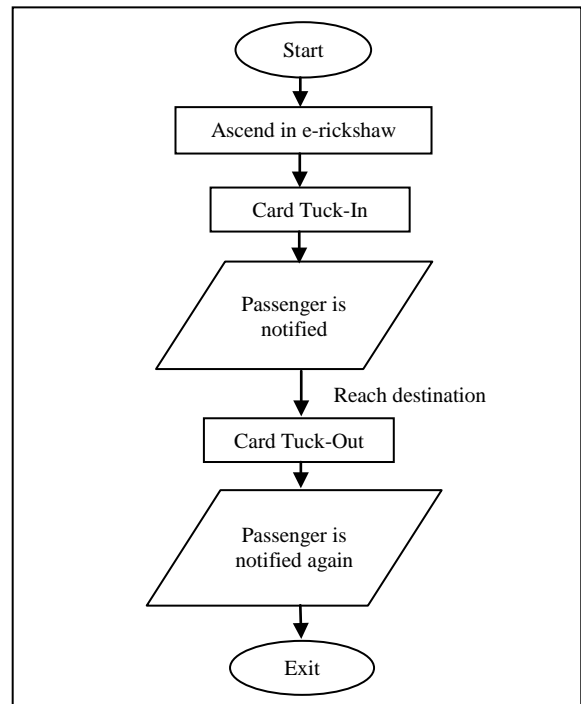

Figure 1. Working of GPS.

B. *Module 2*

Figure 2. Implementation of RFID Module.

The journey begins with the boarding of the passenger in the e-rickshaw. The user upon boarding tucks his RFID card in the RFID card reader and thus marks his entry point. The RFID reader, kept in the rickshaw reads the serial number of the tag containing the details of the passengers and accordingly fetches the concerned mobile number to send a message to the user. On reaching the destination, user tucks again his card in the reader and thereby marks his exit point following which a message is sent again to the user. The whole module depicts the journey of the passenger being carried out in an efficient manner.

IV. CONCLUSION

This management system endeavours secure and convenient transportation medium for regular passengers of e-rickshaws. The system with the help of RFID and GPS technologies addresses safety of the passenger by tracking their journey along with the recording of starting and ending points of their journey. Additional information like the availability of e-rickshaws on a particular route at a given time tends to reduce human fatigue and save their time thus provides convenience. The system provides a reliable and pliable management of E-rickshaws and thus making e-rickshaws to become as a potential mode of green transportation which is apt for sustainable development.

V. ACKNOWLEDGMENT

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