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Traveller Usage Analysis Forindianrailways Using Cloud

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Abstract
The paper mainly focuses onsmart cities where travellers travel in train using smart cards which contain user data. These cards produce enormous measure of information which can be utilized for examination and expectation. Foreseeing the consumers count and behavior who utilizes the railroad administrations are explained through the utilization of big data strategy. From the smart card, traveller name, age, time, source and destination stations are been analyzed to improve railway infrastructure. The data are gathered and stored using public cloud storage. Additionally, for information investigation, we use grouping and classification. This encourages the railway department to improve their currentframework and can facilitate customized services for travellers.

KeywordsTraveller Usage Analysis, Railways, IoT, Smart City, R Programming, Cloud.

1 INTRODUCTION

The traveller reservation arrangement of Indian Railways is one among the biggest reservation models. The majority of the travellers travel in reserved space with Indian Railways. Numerous travellerstravel with open tickets. Right now, it is an intense assignment to effectively deal with the traveler information, which might be a key purpose of thought now-a-days. In [4], the authors called attention to variousissuesin implementing smart computing for railway frameworkstaking into account the reservation models.
Client generated datagivesthe least complex open doors for a couple of sorts of action choices, concerningcustomized traveller direction and service. In any case, these sorts of arrangements mostly have the hindrance of just giving incomplete data, implying that the information is only accessible for a piece of the explorers since some might be hesitant to give this data. Also, the datacould be off basebecause of malicious information provision [5]. Hence smart cards are used to get travellers details which help the railway department to analyse the info and also to enhance their infrastructure. It helps to provide personalized services for passengers and also to scale back manpower.

2Related Work

A unique mark biometric System for ticketing with a unified, well reasonable database was proposed[11] which assists with lessening the number of ticket counters as well as manpower.Toenhance the uptime of trains, the wired communication frameworkswhich uses links and connectors that experience the ill effects of mechanical vibrations during railway tasks are replaced by wireless systems to improve the efficiency and security of the railway framework [7].

In [8], anoutlineof existing communication frameworks in trains and new encouraging bearings for future wireless frameworks was proposed. The survey in [9] aims at providing a methodology where railroads could use better business IIoT capacities.
In [2], huge information systems over railroad/transport explorer information were deployed in keen urban communities to give a productive answer for rail line/transports department.In [1], the data from Arduino was collected by Java API, whichgives all the fundamentalusefulnessto appropriate sequential correspondences.
In [10], the author attempts to provide a good travel experience, which offersaccess to a total multimodal travel administration, for example, shopping, ticketing,and tracking and furthermore interfaces the first and keep going mile to significant distance ventures.
Robbery within the trains, overloading of the trains, black marketing of tickets are some problems which we all witness in our life. Subsequently by actualizing distributed computing in Indian railroads improves the traveler'sfacilities while going as well as expanded the rail routes incomes [6].
The Internet of Trains face numerous difficulties like interoperability, versatility, vitality proficiency and digital security, which may should be tended to by analysts that should manage the additional issues presented by railways [3].

3PROPOSED METHODOLOGY

A. System Architecture

The RFIDsmartcards are used to obtain user's details. The smart card consists of details such as passenger's name, age, source, destination as shown in Fig. 1. A reader is used to read the smart card details and these details are transmitted in digital format to Arduino microcontroller. This microcontroller transmits the data read to the system using RS232 cable. Cable is used to transform the data into analog format such that the system supports data. The collected data is stored in database using Java. At the same time the data is encrypted with the help of DES algorithm and it is uploaded to Cloud. R Programming is used for clustering and classification. The final result is obtained.

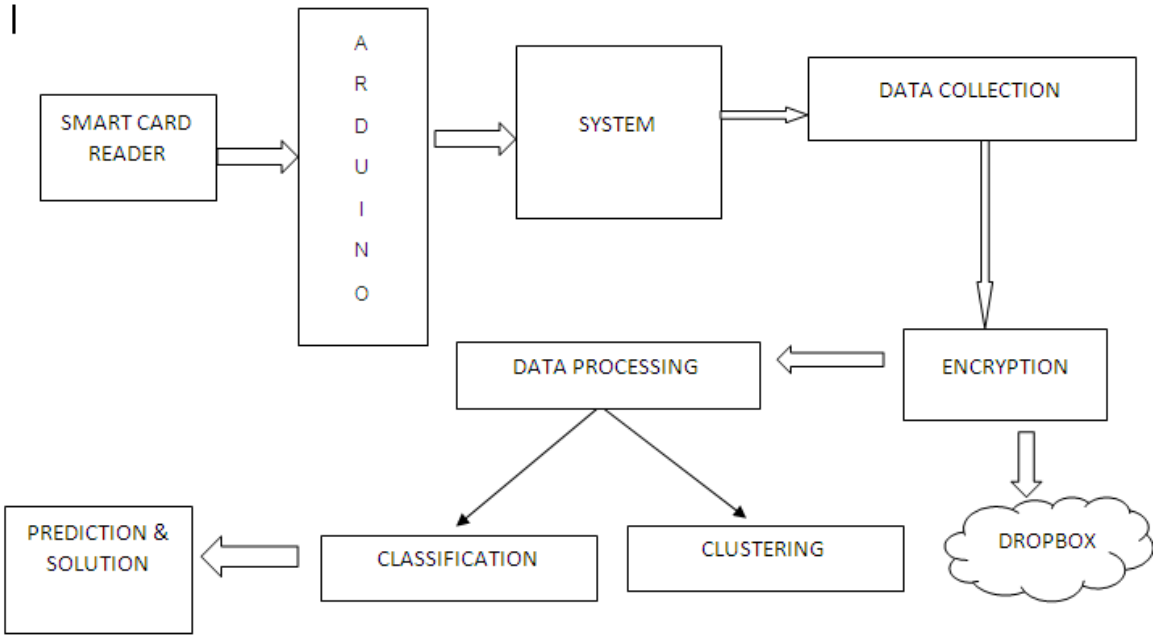

Fig.1. Railway infrastructure and traveler usage prediction

B. Modules

- **Implementing and interfacing smart card**

Fig. 2 shows the process of implementing and interfacing smart card with the Arduino Uno micro controller.

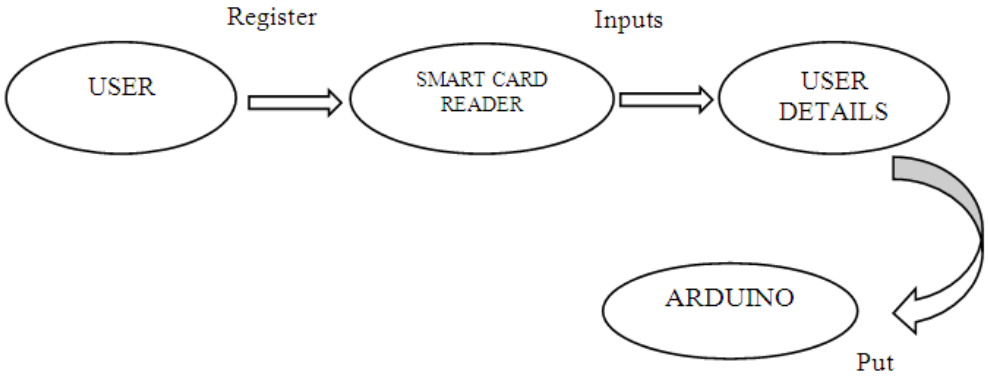

Fig. 2. Implementing and interfacing smart card

The RFID frameworkempowers information to be transmitted from a tag that will beused by a RFID reader and prepared dependent on the necessities of a specific application. Here the information transmitted by the tag give information about name and age of the traveller, source and destination of the train.

Fig. 3. RFIDSensor

In Fig. 3, the radio signs produced by the reception apparatus is utilized to enact the tag and read information from it.The reader emanates radio waves and when a RFID tag crosses the electromagnetic zone, it finds the activation signal.The reader interprets the information encoded in the tag's silicon chip and the information is passed to the host PC for preparing which is represented in Fig.4.

The subtleties, for example,name, age, source and destination are moved from the reader to the Arduino Uno microcontroller board which is shown in Fig. 4.

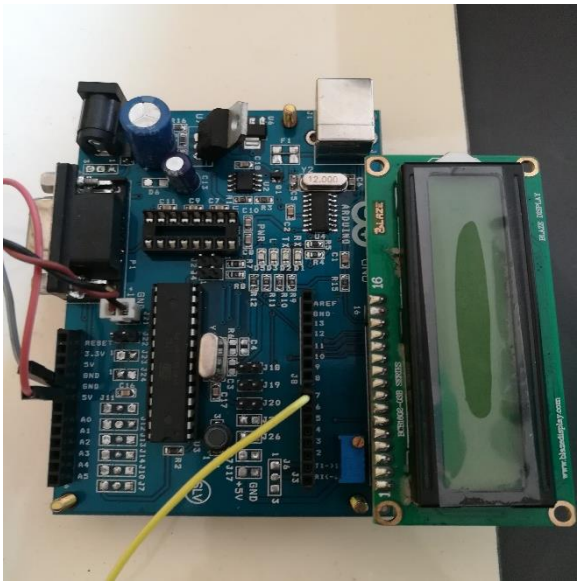

Fig. 4. Arduino Microcontroller

- **Data Collection and Cloud Storage**

The data from the Arduino Uno is collected using Java API. Then this data is encrypted and stored in cloud as shown in Fig. 5.

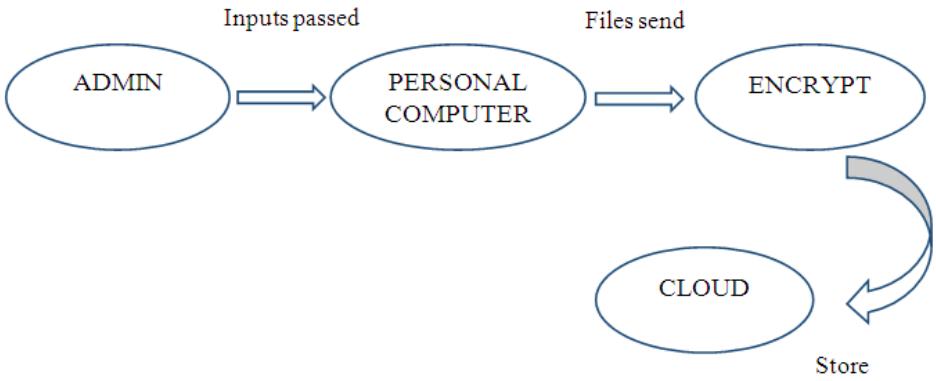

Fig.5. Data Collection and Cloud Storage

- **Data Processing**

For processing this huge data, R programming language is used. K-Means algorithm is used to cluster the data. The data is classified using Naïve Bayes algorithm.The clustering and classification process done is shown in Fig. 6. The interest on the number of customersventuring out from one station to a specific station, from source to destination directly are calculated. Also, the age group of the people who are travelling in a particular time is analysed.

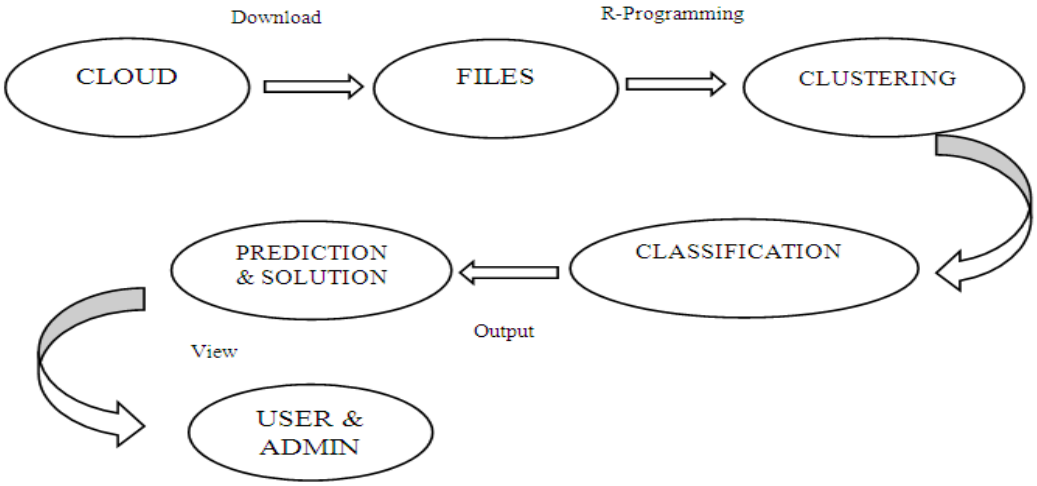

Fig.6. Clustering and classification

4 Evaluation

The evaluation is done by collecting the users details by using RFID cards. It consists of name, age, source and destination. The information is gathered with the help of RFID sensors, embedded using Arduino and then stored in database. Then the details are encrypted in order to avoid unauthorized access and stored in public cloud(Drop Box), that provides access to any users. The user's details are then grouped in the form of clusters by using k-means algorithm. Then they are classified by a classification technique known as naïve bayes. This helps in collecting and predicting the user behavior. Thus, real time data can be generated, which can be used for infrastructure maintenance and train services.

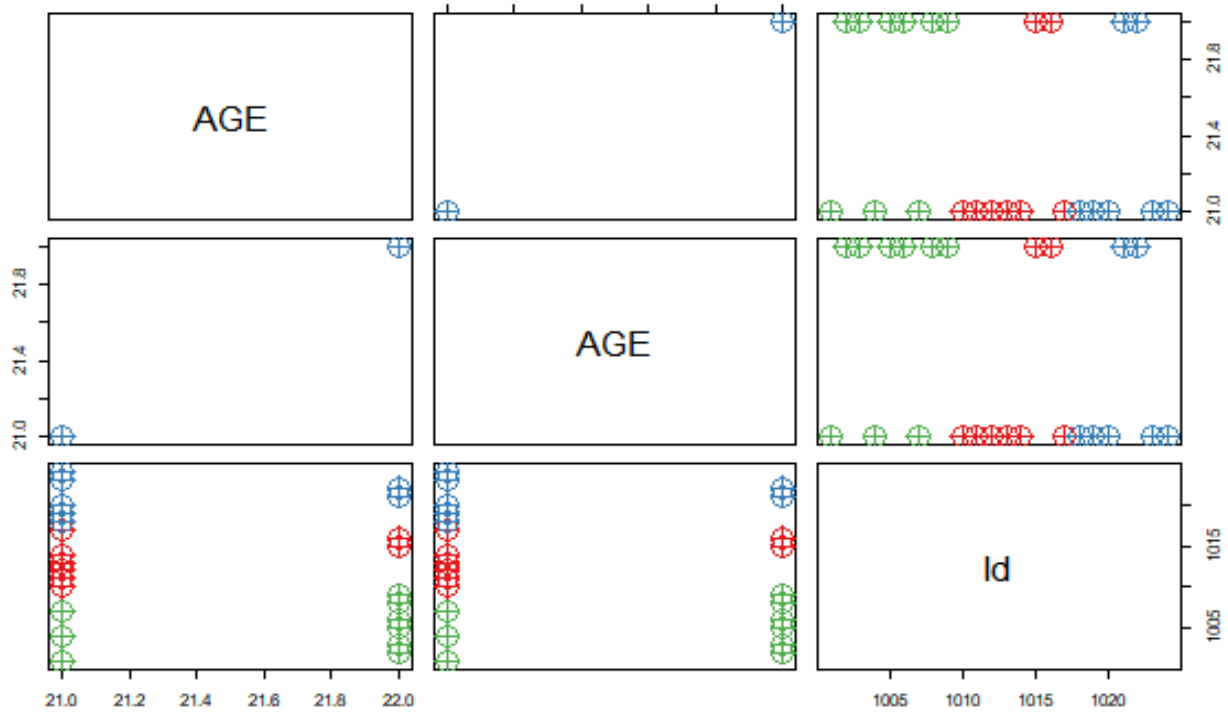

Fig.7. Relationship between the values obtained from various clusters

Fig.7. gives the relationship between the values obtained from various clusters. The entire data is collected and grouped into clusters based on age, source and destination. The clusters are used for classification and final result is obtained. The final result represents the total demand.

5 CONCLUSION

This paper shows the advantages of using big data techniques on data originated by IoT-based gadgets in savvy urban communities particularly for the public railway service of a city. Along these lines,railwaystravellerdata is collected and processed using big data techniques. The anticipated outcome would give a productive answer for railway division to ad lib the administration and framework. In future, the administrations of vitality effectiveness and solace the executives in the railwayadministration of a city can be done.

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