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SMART VISION FOR TRANSPORTATION

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ABSTRACT

Inadequate information about the transportation, particularly for passengers who use public transport, specifically buses for commuting is causing lot of anxiety among the commuter. Passengers wait for long time at the bus terminus expecting the bus to arrive as per the schedule. At present there is no such system in place for the benefit of the passengers who take buses for commuting. Here in this project, we are using both IOT and Cloud technology together to overcome the above-mentioned issues. We propose a system which could track the current position of buses and the dynamic arrival and departure time and inform the passengers via web application. Both Bus Depo and passengers will also have information about the bus arrival, departure, route, Current location. Bus Depo management have different dashboard compare to passengers. It also has user friendlyapplication for user to track bus on their smart phones. In this project we are using Image processing Techniques to identify the bus number plate and Firebase as a cloud platform. This system helps end user to reach at their destination as shortly as attainable. The system provides a real-time data of location of local bus transport and tries to reduce the wait time at bus stop or at station and unnecessary crowding. This system also gives Complete information of the bus i.e. bus arrival and departure time, route. Bus depo management will also get to know about the bus information and also at a particular stop how many numbers of buses have been crossed and also yet to arrive at particular timings.[1]

KEYWORDS: IOT, Firebase, Raspberry -Pi, Pi camera.

INTRODUCTION

Lack of appropriate information system for transportation, particularly for passengers who use public transport, specifically buses for commuting is causing lot of anxiety among the commuter. Passengers wait for long time at the bus terminus expecting the bus to arrive as per the schedule. At present there is no such system in place for the benefit of the passengers who take buses for commuting. It would be good to have such a system like in railway stations which provide information about the arriving and departing trains. Here in this project we are using both IOT and Cloud technology together. The Internet of Things (IoT) is infiltrating many businesses. It provides simple means to collect and analyze technical system data to identify and optimize the performance of many things in our private and work lives. In this project we are using Image processing Techniques to identify the bus number plate and Firebase as a cloud platform. This system helps end user to reach at their destination as shortly as attainable. The system provides a real-time data of location of local bus transport and tries to reduce the wait time at bus stop or at station and unnecessary crowding. This system also gives Complete information of the bus i.e. bus arrival and departure time, route. Bus depo management will also get to know about the bus information and also at a particular stop how many numbers of buses have been crossed and also yet to arrive at particular timings.[3]

The structure of our paper which is as follows: Section II deals with Methodology, Section III deals with Block

Diagram and working, Section IV Flow chart and Results is shown, Section V Applications, Advantages and finally we conclude the paper.[4]

METHODOLOGY

Here we are using Image processing techniques to recognize the bus and its number plates by using raspberry pi camera. Bus and its number plates data will be stored in microcontroller (raspberry pi) and real time data by web application. Tesseract is a free software optical character recognition engine for various operating systems. Tesseract is considered as one of the most accurate free software OCR engines currently available. It is available for Linux, Windows and Mac OS. An image with the text is given as input to the Tesseract engine that is command-based tool. Then it is processed by Tesseract command. Tesseract command takes two arguments: First argument is image file name that contains text and second argument is output text file in which, extracted text is stored. The output file extension is given as.txt by Tesseract, so no need to specify the file extension while specifying the output file name as a

second argument in Tesseract command. After processing is completed, the content of the output is present in .txt file. Tesseract provides results with 100% accuracy. But in the case of some complex images Tesseract provides better accuracy results if the images are in the gray scale mode as compared to color images.[3] Although Tesseract is command-based tool but as it is open source and it is Optical character recognition, usually abbreviated to OCR, is the mechanical or electronic conversion of scanned images of handwritten, typewritten or printed text into machine encoded text. It is widely used as a form of data entry from some sort of original paper data source, whether documents, sales receipts, mail, or any number of printed records. Real time data displaying in dashboard form database. Firebase is the best tool for Web application and data analysis. Firebase is a relatively new technology for handling large amount of unstructured data. It is very fast as compared to RDBMS. Firebase came into existence for Android apps which uses JSON for storing data.[2]

Block Diagram and Its Working

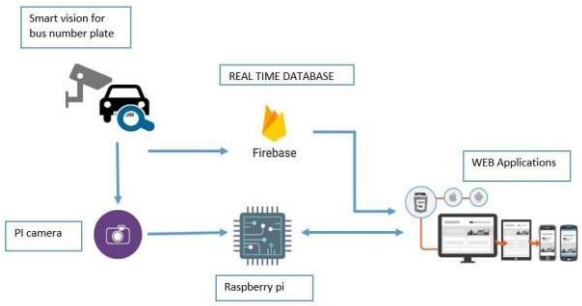

Figure 1: Block Diagram of Smart transportation System.

This prototype helps end user to reach at their destination as shortly as attainable. Smart vision will take a snap of bus number plate through raspberry pi camera and sent to microcontroller; microcontroller used here is raspberry pi. The control flow diagram tells us about how the raspberry pi camera captures the image of the number plate, that is stored in a firebase. The stored image is converted into a machine encoded text by optical character recognition real time data can be analysed by comparing with the reference number plate if they are matched bus arrival time and number of buses crossed at a particular station is known through real time data.[5] Tesseract engine that is command-based tool. Then it is processed by Tesseract command. Tesseract command takes two arguments: First argument is image file name that contains text and second argument is output text file in which, extracted text is stored. Real time data will be displayed in the dashboard web application. contains text and second argument is output text file in which, extracted text is stored. Real time data will be

displayed in the dashboard web application.

Figure 2: Raspberry Pi and Pi camera interfaced.

The working process is as follows first Setting the Raspberry pi and Interfacing of Raspberry pi with Raspberry pi camera Locate the Camera Module port, pull up on the edges of the port's plastic clip. Insert the Camera Module ribbon cable; make sure the cable is the right way round Push the plastic clip back into place Start up your Raspberry Pi.[4] Go to the main menu and open the Raspberry Pi Configuration tool. Select the Interfaces tab and ensure that the camera is enabled. Reboot Raspberry Pi. Now Camera Module is connected and the software is enabled, Number plate recognition is done using python. Here we use the OpenCV library to detect and recognize number plates, and the Tesseract library is used to read the characters. So before proceeding further, first install the OpenCV, Tesseract, and other required libraries.[6] OpenCV library is used to detect and recognize the bus images. Install OpenCV in Raspberry Pi 3. To see the data in real time we are using Firebase. To initialize Run firebase login to log in via the browser and authenticate the firebase tool. Go to your Firebase project directory. Folder has been created and to navigate functions folder inside the project folder and find index.js file edit this file to include cloud functions to be deployed into the server and then type the code to perform the required functions.[2]

FLOW CHART AND RESULTS

The flow chart tells us about how the raspberry pi camera captures the image of the number plate, that is stored in a firebase. The stored image is converted into an machine encoded text by optical character recognition real time data can be analysed by comparing with the reference number plate if they are matched bus arrival time and number of buses crossed at a particular station is known through real time data. Tesseract engine that is command-based tool.[7] Then it is processed by Tesseract command. Tesseract command takes two arguments: First argument is image file name that.

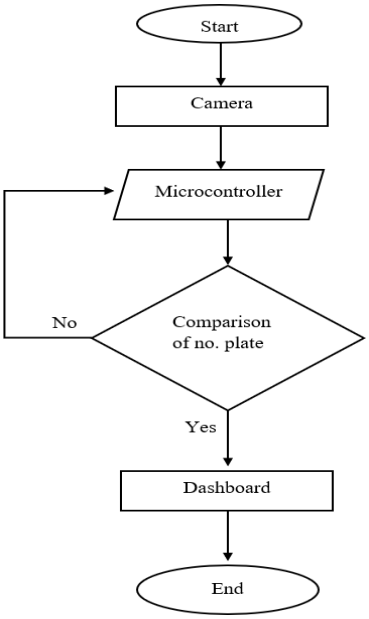

Figure 3: Flow Chart.

RESULTS PICTURES

Figure 5: Project Prototype

Figure 7: Working model.

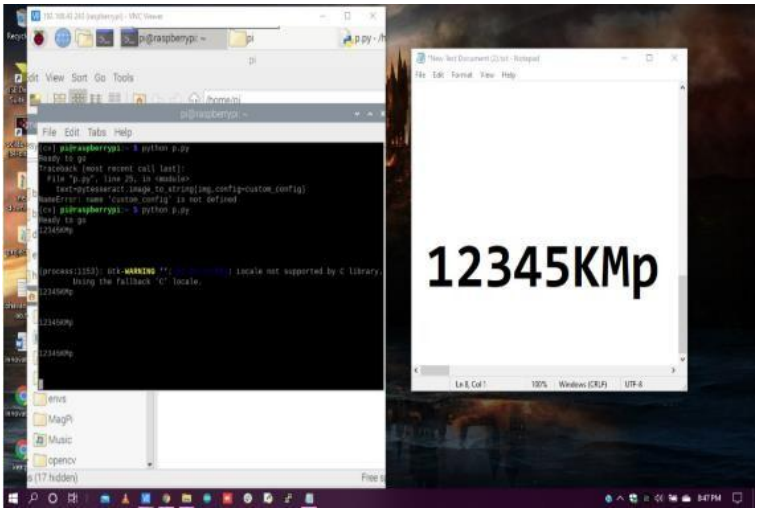

Figure 8: Code for number plate recognition.

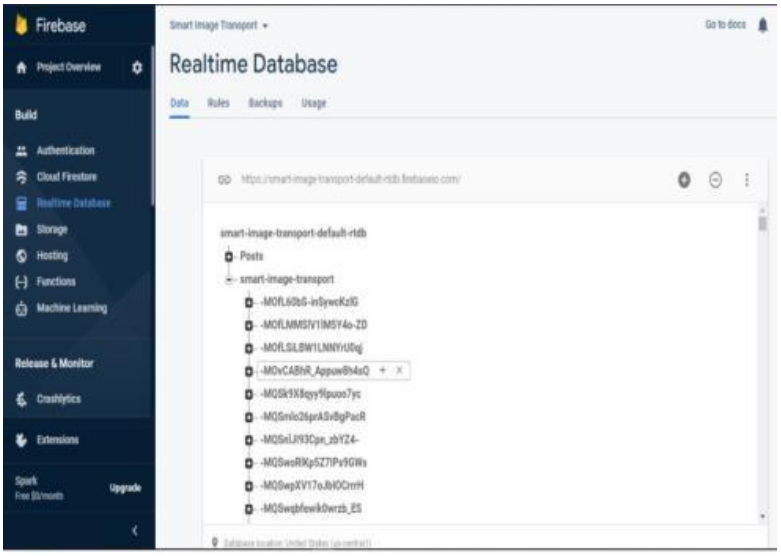

Figure 9: Data in Firebase.

Figure 10: Data of the particular bus for bus depo.

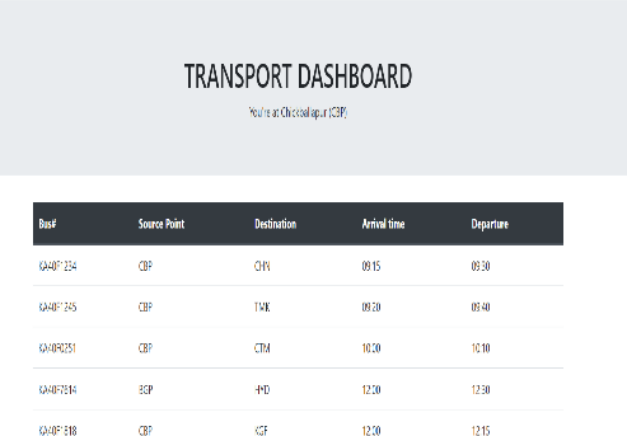

Figure 11: User website.

The prototype developed so far gives the information route of the bus and also covered route of the to the depo management. Monitors the bus arrival time at respective bus stations. Output data is shown in the dashboard.

ADVANTAGES AND APPLICATIONS

The Smart Vision for Transportation Provides many advantages they are It Reduces Dependability. Time efficient. User friendly mobile application and can plan their travel effectively. Helps end user to reach at their destination as shortly as attainable. Reduce the wait time at bus stop or at station and unnecessary crowding. Also, can be used in Public Transport. Tourist Places. Large Scale Industries

CONCLUSION

This proposed system helps end user to reach at their destination as shortly as attainable and also helps to plan their journey as smooth as possible. The system provides a real- time data of location of local bus transport and tries to reduce the wait time at bus stop or at station and unnecessary crowding. Both Bus Depo and passengers will also have information about the bus arrival, departure, route, Current location We propose a system which could track the current position of buses and the dynamic arrival and departure time and inform the passengers via web application.[13] Bus Depo management have different dashboard compare to passengers. It also has user friendly application for user to track bus on their smart phones.

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