Impact Factor (SJIF): 5.301

International Journal of Advance Research in Engineering, Science & Technology

e-ISSN: 2393-9877, p-ISSN: 2394-2444

Volume 5, Issue 3, March-2018

Implementation on effective ticket booking for the visually impaired people using IOT

Dr.S.Hemalatha[*1], R.Meera[2], L.Nandhini[3], B.Vishnu Priya[4]

[1]*Professor, Department of Computer Science and Engineering, Panimalar Institute of Technology, Chennai - Tamilnadu, pithemalatha@gmail.com*

[2]*Final Year, Department of Computer Science and Engineering, Panimalar Institute of Technology, Chennai - Tamilnadu, ravichandranmeera@gmail.com*

[3]*Final Year, Department of Computer Science and Engineering, Panimalar Institute of Technology, Chennai - Tamilnadu, nandylogu118@gmail.com*

[4]*Final Year, Department of Computer Science and Engineering, Panimalar Institute of Technology, Chennai - Tamilnadu, vishnupriya531997@gmail.com*

Abstract-Internet of Things(IOT) involves connecting physical objects to the internet to provide opportunities to build smart systems or applications. IOT paradigm assumes many devices connected over conventional intent network. These devices usually have restricted resources, so moving part of the service implementation to a cloud infrastructure is a prominent solution. We propose in this project human voice as a potential interface for one or more devices in IOT ecosystem enabling issuing commands and receiving information. Furthermore the system is enhanced through web crawling by incorporating trending data. As a proof of concept an automated ticketing system will be implemented. Concept of a proposed system is designed as an Android application where the user issues commands using voice. Voice is recorded and immediately sent to STT cloud service using HTTP POST method. As a response it receives JSON object with multiple alternative transcript of analyzed voice sequence. Transcript alternatives are then matched against set of supported commands using the Google STT service as automatic speech recognition (ASR) for issuing voice commands. When the ticketing process is completed the ticket verification process is initiated by the cloud to the IOT board installed on the Vehicle.

Keywords: Visually impaired people, Mobile platforms, Automatic Speech Recognition(ASR),Cloud platforms,Internet of Things.

I.INTRODUCTION

Visually impaired people face several problems for doing their regular daily activities such as reading, driving, walking etc., There are several problems of vision they are, **i)**Loss of visual acuity **ii)**Loss of visual field- inability of a person to as wide as the normal person **iii)**Photophobia-inability of the person to look at light **iv)**Diplobia-double vision v)Visual distortion vi)Visual perceptual difficulties. Visual acuity means the clarity of vision.Visual acuity depends on optical and neural factors such as, i)the sharpness of the retinal focus within the eye, ii)the health and functioning of the retina, iii)sensitivity of the interpretative faculty of the brain.

Visual impairment is due to damage in eyes or the failure of brain to receive and read the visual cues sent by the eyes.The common cause of visual impairment is diabetic retinopathy, age related macular degeneration,formation of cataracts and increased pressure within the eyes which causes glaucoma.Visual impairment has many forms and varying degrees.

The blind peoples face the problem of self navigating even in the known environment. Important problem faced by the blind people is that they cannot use the technology such as reading or searching any information from the web. To overcome this problem we can use screen readers but it takes more time to read the information.

Screen reader transmits the text displayed on the computer into a form that a visually impaired people can understand such as a tactile or auditory. Most of the screen readers does not help the blind people to navigate between different web pages but if some additional features is added then the user can work independently on a computer. Some screen readers has the synthetic voice that reads the text in the screen loudly and the others has the braile display. Such screen readers uses crystals that can expand when exposed to a certain particular voltage levels which helps the blind people to read the text using their fingers. Screen reading hardwares are much expensive.

In this paper we are using speech recognition for booking tickets. Speech recognition is the method of developing the technologies for converting speech into text. Speech recognition was dominated by the approaches such as Hidden Markov model along with artificial neural networks. Today, many aspects of speech recognition have been taken over by a deep learning method called Long short-term memory (LSTM). LSTM can store the values for both long and short periods which is

achieved by using identity activation function for the memory cell. LSTM is used to identify the time series or time lag and duration of an important event.The overall limitation of the existing system is with the that intensive voice recognition and synthesis in Mobile Device Environment due to low memory footprint and energy consumption.

I.LITERATURE SURVEY

[1] Karl Pichotta and Raymond J. Mooney illustrates an approach to Learning Statistical Scripts with LSTM Recurrent Neural Networks. In this paper, Scripts encode knowledge of prototypical sequences of events. It describes a Recurrent Neural Network model for statistical script learning using Long Short-Term Memory, an architecture which has been demonstrated to work well on a range of Artificial Intelligence tasks. They evaluated the system on two tasks, inferring held-out events from text and inferring novel events from text, substantially out performing prior approaches on both tasks. They compared to a number of baselines, including the previous best-published system, on the tasks of inferring both held-out and novel events, demonstrating substantial improvements.

[2] Santosh K.Gaikwad, Bharti W.Gawali and Pravin Yannawar presented a review on speech recognition. They stated that Speech is most prominent & primary mode of Communication among of human being. Speech has potential of being important mode of interaction with computer .This paper gives an overview of major technological perspective and appreciation of the fundamental progress of speech recognition and also gives overview technique developed in each stage of speech recognition. This paper helps in choosing the technique along with their relative merits & demerits. A comparative study of different technique is done as per stages. This paper is concludes with the decision on feature direction for developing technique in human computer interface system. Through this review it is found that MFCC is used widely for feature extraction of speech and GHM and HMM is best among all modeling technique.

[3] Anu Arora, Anjali Shetty explained the Common Problems Faced by the Visually Impaired People. Visual Impairment has long been treated as a deterrent to normal functioning in human beings especially in the participation & economic productivity domains. The visually impaired faced difficulties in ambulation on pavement because of uneven surfaces, open manholes, parked car, vendors etc. Approach the government to improve infrastructure in terms of quality of roads.Footpaths or pavement should be wide enough. Provide railings in between the roads and pavements. .Awareness can be achieved by showing short films of problems faced by blinds, posters ,etc so that more and more people are aware especially in rural areas where they hold religious myths against blindness.

[4] Preeti Saini and Parneet Kaur states about Automatic Speech Recognition. In this paper, they describes about the accuracy of automatic speech recognition (ASR) remains one of the most important research challenges e.g. speaker and language variability, vocabulary size and domain, noise. The design of speech recognition system require careful attentions to the challenges or issue such as various types of speech classes, speech representation, feature extraction techniques, database and performance evaluation. This paper presents a study of basic approaches to speech recognition and their results shows better accuracy. This paper also presents what research has been done around for dealing with the problem of ASR.

[5] Nidhi Srivastava presented a paper **Speech Recognition using Artificial Neural Network**. This paper uses Neural Network (NN) and Mel Frequency Cepstrum Coefficients (MFCC) for speech recognition. Mel Frequency Cepstrum Coefficients (MFCC) is used for the feature extraction of speech as it generates the training vectors by transforming speech signal into frequency domain. Artificial Neural Network (ANN) solves problem by self learning and is a computational model for information processing which combines artificial neurons in order to process information. The weights of an artificial neuron are adjusted for getting a particular output from the particular input. 120 samples were recorded in MATLAB with the sampling frequency 44100 Hz where 60 samples were used for training sets and 60 for testing sets. For training the data train algorithm is used.The function melcepst from VOICEBOX speech processing toolbox is used for calculating the MFCC coefficients. Finally, Neural Network toolbox of MATLAB was used to create, train and simulate the networks and mean square error was used to evaluate its performance.

[6] Mrs. Omprakash Yadav, Ryan Fernandes, Rohit Tiwari, Sheenam Kaul presented a paper **Online Reservation System Using QR Code based Android Application System**. This paper presents the new Seat Allocation system using QR code image that contains information about ticket and passenger in the form of 2d image which reduces the time of scanning. The main idea of this research paper is to make journey of waiting list passengers more convenient in Indian Railway. Wireless standards is used for connectivity between HHT and DSA server by which authentication is provided to every ticket.The automatic up gradation procedure of DSA server makes it is possible to make the reservation when the train is running and also provides transparency in berth or seat booking either through online or from the counter. QR code is scanned by HHT devices which encode the URL by Check-in process and redirects to PRS server and fetches the stored data to verify the passenger.Check-in process updates the information of all passengers and lets the DSA server to make the seat reserve or vacant.DSA server allot the seats of absent passengers to waitlisted.Check-out process provides the passenger to break his journey.Booking interface provides the capability to book the ticket for passengers on board.

[7] Ms.Vrinda, Mr.Chander Shekhar presented a paper **Speech recognition system for english language**. This paper presents an overview of speech recognition technology. It gives the description of how speech recognition systems work, and the level of accuracy that can be expected. The main idea behind this paper is to develop a speech recognition system for the physically challenged people who cannot operate the computer through keyboard and mouse. In this paper HMM (hidden Markov model) is used to recognize speech samples to give excellent results for isolated words. This paper provides the study of how to trap human voice in a digital computer and decode it into corresponding text, that is, converting speech to text. This project can be used at very large scale with very little modifications. During the experiment work medium size vocabulary system was implemented. The system can be extended to continuous word recognition with large vocabulary based on a phone acoustic model, using the HMM Technique or using other growing techniques like Artificial Neural Network.

[8] Subarnarekha Ghosal, Shalini Chaturvedi, Akshay Taywade and N. Jaisankar presented a paper **Android Application for Ticket Booking and Ticket Checking in Suburban Railways**.This paper deals with the development and implementation of smartphone application which is more effective than current ticketing system. The "Android Suburban Ticket (ASR)"can be bought easily anytime, anywhere and ticket will be present in the customer's phone in the form of "Quick Response Code". GPS facility is used for validation of the ticket at the source and deletion at the destination. The information for each user is stored in a CLOUD database for security purpose which is unavailable in the current suburban railway system. Also the ticket checker is provided with an application to search for the user's ticket with the ticket number in the cloud . The platform independent language java is used for the implementation.Along with that SQLite and Cloud Database are used as databases for user and ticket information respectively.PHP is also used as a development framework.

[9] Harpreet Singh,Ashok Kumar Bathla presented a paper **A Survey on Speech Recognition**. This paper gives an overview of the speech recognition system and its recent progress. The primary objective of this paper is to compare and summarize some of the well known methods used in various stages of speech recognition system. Speech is most common mode of communication among humans. The communication among human computer interaction is called human computer interface. Speech recognition is the process of the computer identifying human speech to generate a string of words or commands. The output of speech recognition systems can be applied in various fields. There are many artificial intelligent techniques available for Automatic Speech Recognition (ASR) development. The performance of the ASR system based on the adopted feature extraction technique and the speech recognition approach for the particular language is compared in this paper.

[10] M.A.Anusuya and S.K.Katti gave a brief description about Automatic Speech Recognition(ASR). After years of research and development the accuracy of automatic speech recognition remains one of the important research challenges. .The design of Speech Recognition system requires careful attentions to the following issues: Definition of various types of speech classes, speech representation and feature extraction. The problems that are existing in ASR and the various techniques to solve these problems constructed by various research workers have been presented in a chronological order. The objective of this paper is to summarize and compare some of the well known methods used in various stages of speech recognition system and identify research topic and applications which are at the forefront of this exciting and challenging field. Speech recognition has attracted scientists as an important discipline and has created a technological impact on society and is expected to flourish further in this area of human machine interaction.

III.PROPOSED MODEL

Continuous Integration of Live data in a Cloud-platform based Automatic Speech Recognition Engine and its Data retrieval is a multi-faceted problem. Improving the performance of a Language Model for Live data without affecting the overall performance is a challenge. We implement Android App Voice Data Processing with low memory footprint and energy consumption we are looking in to amount of data that needs to be stored and processed on a device. Also same amount of data has to be transmitted and send to the cloud server. We are not compressing recorded voice since Google STT service only supports FLAC format for compressed audio. The proposed system solves the limitation of the existing system by getting relevant information by crawling www and providing them proper weighting. Main idea of our solution is that intensive voice recognition and synthesis is done in cloud. The system can recognize the voice and perform the steps required to book tickets. The voice which is recognized is send to Google STT service and a matching is done with the voice. If the voice is matched then the required operation is performed. Using this device, the user(visually impaired people) can be independent and do all the necessary tasks. The ticket booking is done by using the Automatic Speech Recognition(ASR).

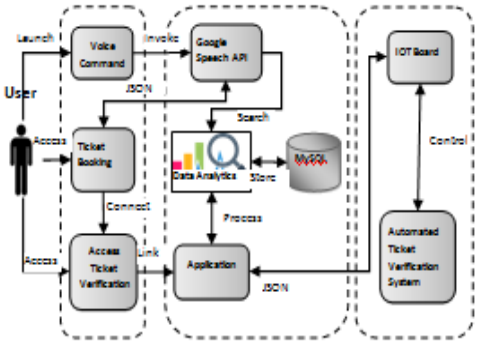


Figure 1.Architecture diagram

IV.ALGORITHM USED

4.1.LSTM:

Recurrent neural network is a type of densely connected neural network. In recurrent neural network the output of the hidden layer is fed back to itself. Recurrent neural networks are flexible. Recurrent neural networks can be implemented by one to many and many to many models.

Recurrent neural networks are not used frequently because of the vanishing gradient problem. Recurrent neural networks need long memories to connect data relationships at significant distances in time. This kind of network helps us in understanding how language and narrative works, how stock market events are correlated and so on. However, the more time steps we have, the more chance we have of back-propagation gradients either accumulating and exploding or vanishing down to nothing.

LSTM is used for reducing the vanishing gradient problem by reducing the multiplication of gradients which are less than zero and makes the recurrent neural network useful for long term memory tasks. An internal memory state is created which is simply added to the processed input, which reduces the multiplicative effect of small gradients. The time dependence and effects of previous inputs are controlled by forget gate,which determines what state is to be remembered and forgotten.

4.2. TensorFlow graphs

TensorFlow is based on graph based computation.It's an alternative way of conceptualising mathematical calculations. Consider the following expression a=(b+c)∗(c+2)a=(b+c)∗(c+2). We can break this function down into the following components: dea=b+c=c+2=d∗e. Now we can represent these operations graphically as:

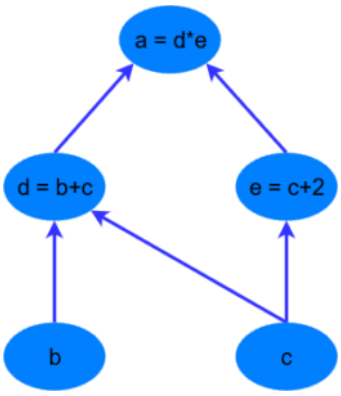


Figure 2.Tensor flow graph

This may seem like a silly example – but notice a powerful idea in expressing the equation this way: two of the computations (d=b+cd=b+c and e=c+2e=c+2) can be performed in parallel. By splitting up these calculations across CPUs or GPUs, this can give us significant gains in computational times. These gains are a *must* for big data applications and deep learning – especially for complicated neural network architectures such as Convolutional Neural Networks. To run the operations between the variables, we need to start a TensorFlow session – *tf.Session*. The TensorFlow session is an object where all operations are run.

V.MODULES USED

1.Android Based Voice Enabled Ticketing System using Google Speech API

2.Data Analytics through LSTM using Python and Tensorflow

3.PHP based Cloud Communication to Interface IOT Board

VI.MODULE DESCRIPTION

6.1 Android based voice enabled ticketing system using Google Speech API

Google Cloud Speech API enables developers to convert audio to text by applying powerful neural network models in an easy to use API. The API recognizes over 110 languages and variants, to support global user. You can transcribe the text of users dictating to an application's microphone, enable command-and-control through voice, or transcribe audio files, among many other use cases. Recognize audio uploaded in the request, and integrate with your audio storage on Google Cloud Storage, by using the same technology Google uses to power its own products. speech API can stream text results, returning partial recognition results as they become available, with the recognized text appearing immediately while speaking. Alternatively, Speech API can return recognized text from audio stored in a file. Automatic Speech Recognition(ASR) powered by deep learning neural networking to power your applications like voice search or speech transcription. In our project this module performs following functions.When user sends the voice I/O request (speaks) to the developed android application, the application sends the request to the speech recognition process to recognize the particular voice. The recognized voice is send to the cloud communication as the training logs which sends back the predicted logs to the speech recognition. After successful recognition it sends the response back to the android application. The android application sends the available menu to the screen reader to perform text to speech operation which reads the contents on the screen. The android app sends the voice I/O response to the user. The screen readers also communicates with the cloud. After successful ticket booking the generated ticket is stored in the device data store. User can access the ticket from the device data store

6.2 Data Analytics through LSTM using Python and Tensorflow

Data analytics (DA) is the process of examining data sets in order to draw conclusions about the information they contain, increasingly with the aid of specialized systems and software. Data analytics technologies and techniques are widely used in commercial industries to enable organizations to make more-informed business decisions and by scientists and researchers to verify or disprove scientific models, theories and hypotheses. TensorFlow is based on graph based computation .It's an alternative way of conceptualising mathematical calculations. The output of the hidden layer in a recurrent neural network are passed through a conceptual *delay* block and then is fed back into itself. Recurrent neural networks are very flexible but the main problem in recurrent neural network is the vanishing gradient problem. For recurrent neural networks, we need long memories, so the network can connect data relationships at significant distances in time. The most popular way of dealing with this issue is by using long-short term memory (LSTM) networks. The way it does so is by creating an internal memory state which is simply *added* to the processed input, which greatly reduces the multiplicative effect of small gradients. The time dependence and effects of previous inputs are controlled by an interesting concept called a *forget gate*, which determines which states are remembered or forgotten. Two other gates, the *input gate* and *output gate*, are also featured in LSTM cells. In this project this module performs the following functions. Testing and training the datasets is performed by the google speech recognition process by collecting the audio stream(voice) from the user and storing the collected text in the training data logs. LSTM takes the texts from training data logs and stores it in the results data base to which the google speech recognition process communicates directly. From the result database the text is sent to the word error rate calculator and the loss functions. The LSTM neural network sends the process input output operations to the tensor flow implementation process which provides the graphical visualization to the LSTM.

6.3 PHP based Cloud Communication to Interface IOT Board

Cloud communications are Internet-based voice and data communications where telecommunications applications, switching and storage are hosted by a third-party outside of the organization using them, and they are accessed over the public Internet. Cloud communications providers deliver voice and data communications applications and services, hosting them on servers that the providers own and maintain them. Now a days, voice are a great communication method. This is the concept used in our project which makes work easy and useful for visually challenged people. Few business mobile apps today are self-contained. Most communicate with back-end services, some of which run on legacy systems, but many of which run in cloud. We can discus how PHP can serve as a crucial building block for mobile apps and services, and how Right Scale can help manage and automate mobile development and application deployment in the cloud. According to Web Technology Surveys, 81 percent of websites. PHP was easier to use with the cloud than their next most-used language. Since we are working on cloud platforms PHP will be best for mobile application. In our application, after booking tickets our details will be updated in database as a logs. By saying verify ticket, we can verify our tickets. Later if we say open, the IOT board verifies the information and the motor in it start running and the door in the vehicle will be opened.

VII. IMPLEMENTATION

When user sends the voice I/O request to the android application, the android application sends the request to the google speech API to recognize the voice. When voice is recognized successfully then google speech API sends the response to the android application which in turn sends the request to automated ticket verification to access the ticket. Finally, after successful ticket verification the automated ticket verification sends the response to android application. Then the generated ticket is stored in the device data store. IOT board sends the speech API request to the LSTM process which communicates with the google speech API then provides the response to the IOT board. After receiving the response the IOT communicates with the Automated Ticket verification to verify the ticket. LSTM communicates with the python process for predicting and training the data sets. LSTM process stores the voice request logs in the cloud data logs.

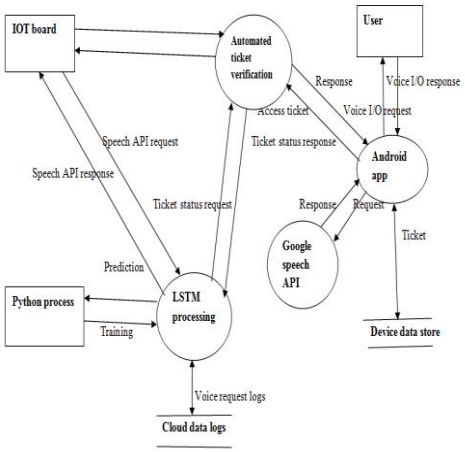
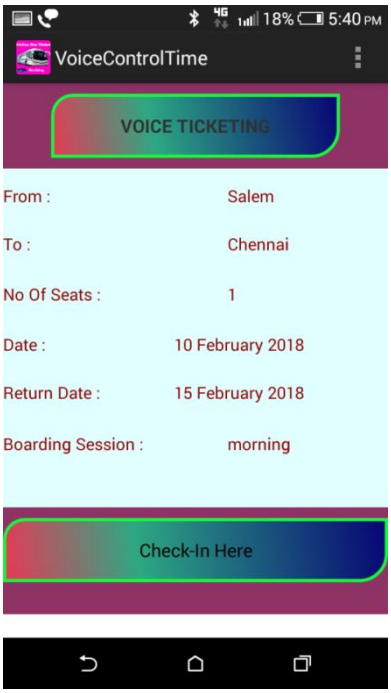
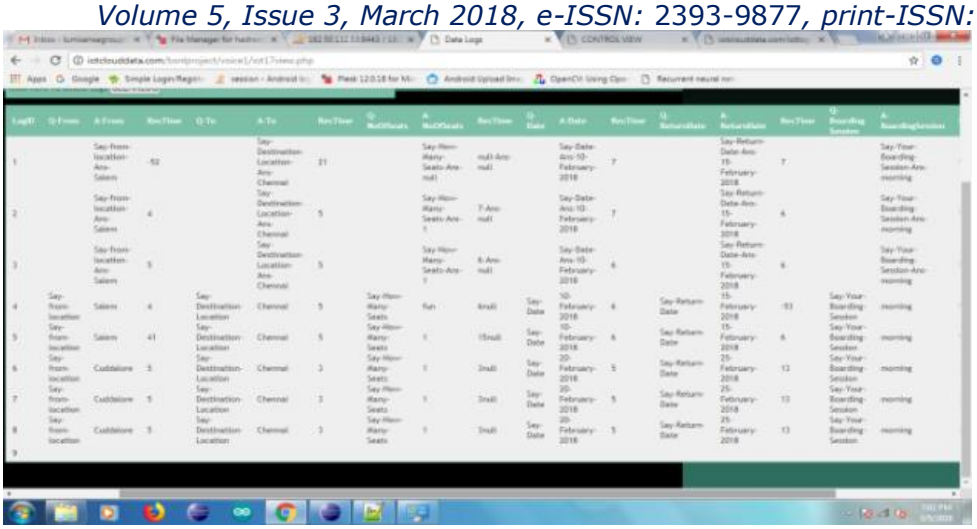


Figure 3. Flow chart

VIII. ANDROID APPLICATION DESCRIPTION

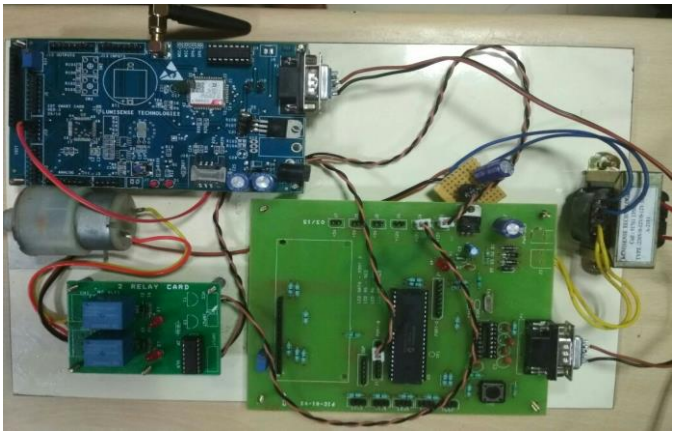




In this page the users can book a new ticket or verify their tickets which they have created already.It consists of some basic information like from location,to locations,no of seats,amount,travel date and the return date.The user has to fill all these basic details.After this is being processed,the information that the user has given is sent to the cloud. In this application, gesture algorithm is used..Hence,after completing each step user must shake the phone to move to the next screen.

IX. HARDWARE DESCRIPTION

It consists of the Iot board attached to a rotating motor. Rectifier is used to convert AC to DC power supply. The iot board consists of a sim card which acts both as a GSM and GPRS. The control to the Iot board is provided by the cloud. When it receives the signal the rotating motor runs. The hardware is shown below:



X. TENSOR FLOW GRAPH

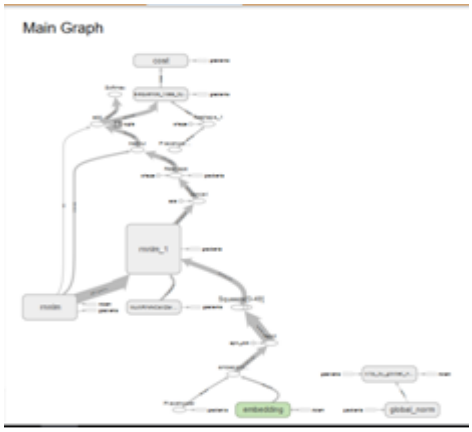


Figure 4.Flow graph

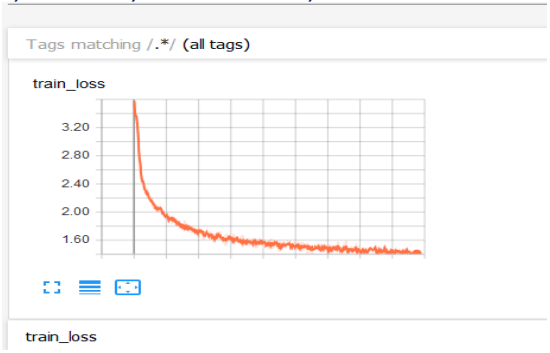


Figure 5.Training loss graph

The training loss is calculated and displayed for each and every record.

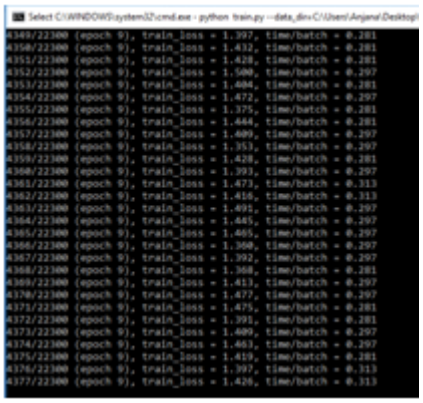


Figure 6.Training loss

XI.CONCLUSION

The main aim of this project is to develop a ticket booking application that performs all the operation by speech recognition. Hence, visually impaired people can make use of this application. There are several applications that help the visually impaired people. This application adds extra features to those available softwares. Using this, Visually impaired people can book the tickets without the help of personal assistants.

References

[1] Karl Pichotta and Raymond J. Mooney," Learning Statistical Scripts with LSTM Recurrent Neural Networks", In Proceedings of the 30th AAAI Conference on Artificial Intelligence
(AAAI-16), Phoenix, Arizona, February 2016.

[2] Santosh K.Gaikwad,Bharti W.Gawali,Pravin Yannawar," A Review on Speech Recognition Technique", International Journal of Computer Applications (0975 – 8887),Volume 10– No.3, November 2010

[3] Anu Arora, Anjali Shetty," Common Problems Faced By Visually Impaired People", International Journal of Science and Research (IJSR),Volume 3 Issue 10, October 2014

[4] Preeti Saini, Parneet Kaur," Automatic Speech Recognition: A Review",International Journal of Engineering Trends and Technology- Volume4Issue2- 2013

[5] Nidhi Srivastava,"Speech Recognition using Artificial Neural Network",International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 3, Issue 3, May 2014

[6] Mrs. Omprakash Yadav, Ryan Fernandes, Rohit Tiwari, Sheenam Kaul," Online Reservation System Using QR Code based Android Application System ", International Journal of Scientific and Research Publications, Volume 4, Issue 12, December 2014

[7] Ms. Vrinda1 ,Mr. Chander Shekhar," Speech recognition system for english language", International Journal of Advanced Research in Computer and Communication Engineering,Vol. 2, Issue 1, January 2013

[8] Subarnarekha Ghosal, Shalini Chaturvedi, Akshay Taywade and N. Jaisankar," Android Application for Ticket Booking and TicketChecking in Suburban Railways"Indian Journal of Science and Technology, Vol 8(S2), 171–178, January 2015

[9] Harpreet Singh,Ashok Kumar Bathla," A Survey on Speech Recognition",International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume No. 2, Issue No. 6, June 2013

[10] M.A.Anusuya,S.K.Katti," Speech Recognition by Machine: A Review", (IJCSIS) International Journal of Computer Science and Information Security,Vol. 6, No. 3, 2009