Railway Support: A Railway Chatbot

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Abstract

As the chatbots are very high in demand in today's industry world. It presents a new way of interaction of user with a computer system. It allows a user to simply ask questions in the same manner that they would address a human. This paper successfully explained and implemented a chatbot using Deep Neural Network(DNN) which can be used to get some basic information related to Indian Railway such as PNR, train status and Seat Availability, etc. Because interacting with a single window or chatbot is more convenient then visiting sites or mobile application again and again. It will save the user's time as well as enhance the user's experience.

Keyword: Railway Chatbot, DNN, TensorFlow, TFLearn.

I. INTRODUCTION

Indian Railway is the fourth largest railway in the world, transporting millions of passengers across the different corners of country every day. A platform like IRCTC and many others provide a facility of booking tickets and resolving different issues of passengers. On an average 13 lakhs of people book a ticket per day. Over and around 1 million of people visit site to check their ticket status. Besides booking ticket, some of the most commonly performed actions by passengers are Check the Passenger Name Record (PNR) status also known as ticket status, check if a waitlisted ticket has been confirmed, check running status of train, In India trains run late, passengers just want to know by how much and check the train schedule, which waste time of the passengers. Even to get the above-mentioned information from an application using platforms like Android and iOS, the user has to download an application which consumes internet bandwidth as well as waste time.

II. LITERATURE SURVEY

In this section we discuss the different methodologies review or literature review and motivation outcomes from it.

A.Android Based Educational Chatbot for Visually Impaired People The purpose of the mentioned android application is to provide educational based Chatbot for visually impaired people. It will give an answer to the educational based queries asked by the visually impaired people. They can easily launch the application with the help of google voice search. Once the application is open, it will give a voice instruction to use an application. Output will be provided in voice form as well as in text form. So normal people can also use this application.

B. Artificial Intelligence Applied to Challenges in the Fields of Operations and Customer Support Traditionally, Mastercard has been seen as simply a payment processor, and while that remains a large part of the business Mastercard also offers hundreds of products to financial institutions and others in its ecosystem around the world. Consequently, there is a need for large operations and customer support teams. Their systems accumulate data and, in this paper, they present four different examples of applying Artificial Intelligence to this data to solve business problems.

C. Climebot: An Argumentative Agent For Climate Change While climate experts have agreed that global warming is real, this consensus has not reached all the society levels. Our aim is to develop a conversational agent able to explain issues related to global warming. The developed chatbot relies on textual entailment to identify the best answer for a statement conveyed by a human agent. To enhance the conversational capabilities, they employed the technical instrumentation provided by the API.AI framework. To exploit domain knowledge, the agent uses climate change ontologies converted into an adequate format for the API.AI model. Hence, we developed a Climebot, which is an argumentative agent for climate change based on ontologies and textual entailment.

D. Executable Semantics of Recursively Nestable Dialog Flow Specifications for Web Application Information systems for the support of complex business process are often equipped with web-based front-ends to allow Research Article Volume 8 Issue No.4 International Journal of Engineering Science and Computing, April 2018 16724 http://ijesc.org/ convenient user access. To produce executable specifications of the users' interactions with such web-based applications, we use a visual language that enables developers to model their complex dialog structures. In this paper, we introduce the formal semantics of the core constructs of this. Dialog Flow Notation: its syntax in terms of invariants about the permitted elements and their relations and show how any words of the language (i.e. any syntactically correct dialog bowspeciscations) can be mapped to a deterministic pushdown automaton whose behavior dense the notation's semantics. This gives us and other tool developers a formal basis for the design and implementation of tools and frameworks that mirror the precise meaning of all DFN constructs.

E.. Study on the Public Information Service Systems of Railway Industry As we enter the 21st century, we experience one of the most important changes in our lives—information technology has been the important resource in the modern scientific and technology competition. So, the tide of Railway Informatization is increasingly rising. Railway information service system is the strategic resource element in the course of informatization. But railway information service in our country is not perfect yet, especially the information Service for the public. This paper first focus on the current situation of public information service in China, then proposed an information service system for railway industry to enhance the efficiency and transparency of information transmission. and then give some advices on how to operate the information service system to facilitate the information transmission in railway industry. F. Home Automation using IoT and a Chatbot using Natural Language Processing Home automation - controlling the fans, lights and other electrical appliances in a house using Internet of things is widely preferred in recent days. In this paper, we propose web application using which the fans, lights and other electrical appliances can be controlled over the Internet. The important features

of the web application is that firstly, we have a chatbot algorithm such that the user can text information to control the functioning of the electrical appliances at home. The messages sent using the chatbot is processed using Natural Language processing techniques. Secondly, any device connected to the local area network of the house can control the devices and other appliances in the house. Thirdly, the web application used to enable home automation also has a security feature that enables certain users to access the application. And finally, it also has a functionality of sending an email alert when intruder is detected using motion sensors.

III.   SCOPE

1. Resolve general FAQ of a passenger.
2. Resolve query regarding a tatkal or any other charges.
3. Tracking of PNR status.
4. Tracking train status.
4. Help in cancellation of ticket.

IV.   OUT OF SCOPE

1. Include speech-to-text functionalities.
2. Spell checker(Easilyunderstandmisspelled word too).
3. Will redirect the issue to technical support team.

V.   ASSUMPTION

A. General Assumption

1. User is familiar with android/iOS platform.
2. User know English language and can-do entire conversation in English.

B. Technical Assumption

1. Atechnical support is there who continuously add the data in database about train schedule.
2. Have access to database storing information of user corresponding to PNR.
3. Internet connectivity is required.

VI.   SOLUTION APPROACH
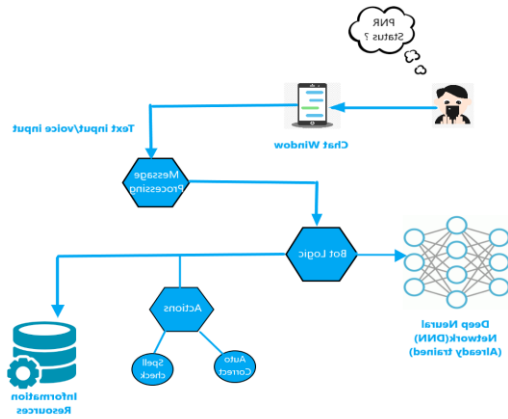
A. High Level Solution approach

fig 1: High Level Solution Approach

B. Model/Algorithm Proposed
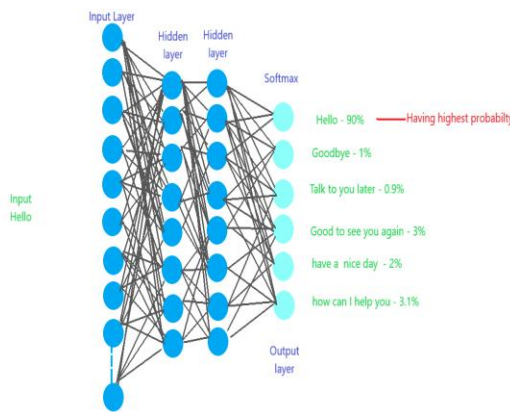Model: Deep Neural Network using Tensorflow

Fig 2: Deep Neural Network

Above fig 2 , deep neural network have input layer having neurons equal to the number of words input contain , and having two fully connected hidden layers having 8 neurons each and output layer having six neuron and activation function softmax.
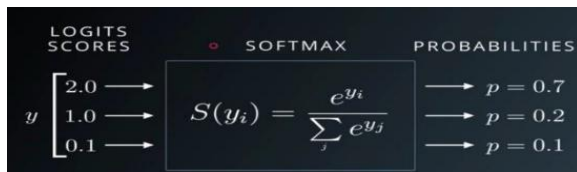

Fig 3 :Softmax function

The fig 3, shows that Softmax function turns logits [2.0, 1.0, 0.1] into probabilities [0.7, 0.2, 0.1], and the probabilities sum to 1.

A.How this model works ?

Since , we have n tags(that's why we have n neurons in output layer) , we get each tag with probability corresponding to it and the tag which have the highest probability will picked up and bot will print random statement corresponding to that tag .
Like in above fig. "**Hello**" tag have highest probability so bot will randomly print any statement corresponding to that tag.
B.Outcome: Two hidden layers are enough for this kind of model and this classification work very efficiently and accurately. Accuracy of this model is around 99%.

VII. IMPLEMENTATION
A DNN(Deep Neural Network) model is used which is trained by "**intents,json**" file containing data and label for classification. An interface is developed using a Java (runs on an android platform) which act as a kind of chatting window for the user. A bot takes the user's query and fetch the content from information repository and provide an informative output t user.
A.Software Support
Packages Used : TensorFlow , TFLearn, Numpy, json, pickle and random.
Model used : DNN
IDE :Jupyter notebook.
B.Hardware Support:
No special hardware support is required, an android platform and internet connectivity is required.

VIII. APPENDIX

A.Deep Neural Network:
A deep neural network is a neural network with a certain level of complexity, a neural network with more than two layers. Deep neural networks use sophisticated mathematical modeling to process data in complex ways.

B.Softmax activation function
Softmax function turns logits [2.0, 1.0, 0.1] into probabilities [0.7, 0.2, 0.1], and the probabilities sum to 1.In deep learning, the term **logits layer** is

popularly used for the last neuron layer of neuralnetwork for classification task which produces raw prediction values as real numbers ranging from [-infinity, +infinity]. — According to Wikipedia

Logits are the raw scores output by the last layer of a neural network. Before activation takes place.

IX.   SOLUTION SUBMISSION

GitHubLink: https://github.com/Hritik21/Railway-Support-Bot

This model might throw a deprecation warning but it will not affect its performance. And GUI development is yet to done.

Note: This is not a complete solution, it is only a Deep Neural Network(DNN) model which is trained by .json file. This model will convert into..tflite file and will hosted on firebase ml kit for further use.

This model will soon provide a PNR status too by fetching a data from real time database.

Fig 4: Dummy table holding user's information

Fig 5: Dummy table holding train status

X.   TESTING

Fig6: Small Talk with the Chatbot using voice input

XI.   CONCLUSION

This paper successfully explains and implemented chatbot which can be used to get the required information from Indian Railway. In the future, we will fix the bugs and include the railway complaints and booking information. The key to effective chatbot use is to make sure they enhance your customer's experience. This chatbot will benefit the passengers by saving time, memory space and internet usage.

XII.   REFERENCES

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