

Image and Text Based Carbot

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ABSTRACT

Chatbots have now become an integral part of every website. They are conversational programs, that help interact with people, thus, solving their queries. Chatbots occupy a very important space in software development. With the development of Artificial Intelligence, the deployment and usage of chatbots has increased at a tremendous rate in the recent years. Chatbots are typically used in dialog systems for various practical purposes including customer service or information acquisition. Some chatbots use sophisticated natural language processing systems.

Chatbots can be classified into usage categories that include conversational commerce (e-commerce via chat), education, entertainment, finance, health, news, and productivity. In this paper, we present a “Carbot” i.e A chatbot specialized to cars. This is a unique combination of text and image processing. It is capable to retrieve information in the form on text about cars using NLP. And also, when fed with an image of an unknown car, this model is able to predict the model name using CNN processing.

Keywords — Convolution Neural Network (CNN), Deep Learning, Dataset, Natural Language Processing (NLP), Machine learning algorithms.

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I. INTRODUCTION

The model presented in the paper, is a merger of two main aspects: Natural Language Processing and Image Classification. Natural Language Processing is at the base of the implementation of a chatbot. NLP is a sub-field of computer science, artificial intelligence and linguistics which aims at understanding of natural language using computers. Chatbots having to deal with mainly human interaction use the various steps in NLP processing i.e. Tokenization, Filtering, Lemmatization, Stemming, etc. Once a query is fired to the bot, the standard feed forward neural network deployed at the backend will help identify and process the different “classes” of words present and locate the appropriate fitting answer for it and present it in a human understandable format. Image Classification is currently one of the most explored domains. Image classification plays an important role in computer vision, it has a very important significance in our study, work and life. It includes image pre-processing, image segmentation, key feature extraction and matching identification. With the help of neural networks and suitable datasets, an unknown image can be predicted with utmost accuracy. In

this paper, the project demonstrated is that of a model when fed with an image on an unknown car, it predicts the car model and provides an output accordingly.

II. LITERATURE SURVEY

Elabe Paikari and Andre van der oek *et al.* [1] proposed a system which gives review about how software tools that are used in development process, nature of chatbots as compared to chatbot tools, chatbot framework and comparison between different chatbots.

Giovanni Pilato, Agnese Augello and Salvatore Gaglio *et al.* [2] proposed an architecture which is capable to generate complex behaviors of the agent, through the real time activation of specific modules.

Chloe Clavel and Zoraida Callejas *et al.* [3] proposed a paper which reviews about sentiment analysis on the perspective of opinion mining and conversational agents communities and to determine the reaction ECA should have according to user detected sentiments.

Mehdi Allahyari *et al.* [4] proposed a paper which elaborates about many different text mining

techniques and used it in biomedical and healthcare domain.

Tianmei Guo and Jiwen Dong *et al.* [5] proposed methodology where for the feature extraction Convolutional neural networks use convolutional layers. Due to the limited feature extraction capabilities of traditional convolutional layers, the performance of convolutional neural network models is constrained.

Shalini K,Aravind, Vineetha R C, Aravinda Reddy D, Anand Kumar M and Soman K.P *et al.* [6] proposed a paper about sentiment analysis to identify the polarity of sentences in code-mixed labelled data using CNN which uses ReLU activation function

Amber Nigam *et al.* [7] proposed a model which explained a two-way relationship between the intent detection and slots prompts on fuzzy data.

Carlene Lebeuf,Margaret-Anne Storey and Alexey Zagalsky *et al.* [8] proposed a paper which gives review about integrating bots with softwares, creating and hosting bots, integration model of bots, platforms used for creation and distribution of bots, incites of creating and using bots..

Rajkumar Jagdale, Vishal Shirsat,Sachin Deshmukh *et al.* [9] proposed a paper which involves computational study of reviews of electronic devices. After preprocessing machine learning algorithms (Naïve Bayes,SVM) were applied to classify the reviews.

Saad ALBAWI and Tareq Abed MOHAMMED *et al.* [10] gives the deep understanding of Convolutional neural network. They explained and defined all the elements and important issues related to CNN, and how these elements work and state the parameters that affect CNN efficiency.

III. TIMELINE DIAGRAM

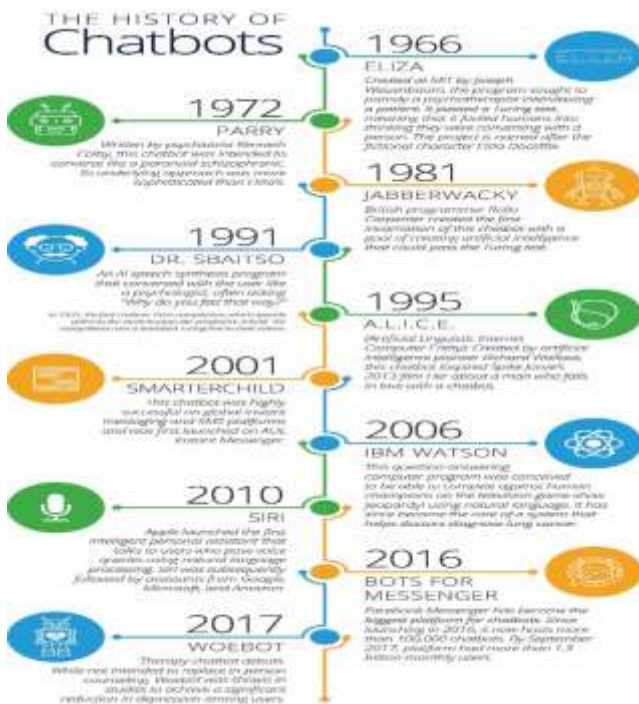


Fig 1. Timeline Diagram[11]

IV. METHODOLOGY

The following diagram shows the system architecture of the proposed system.

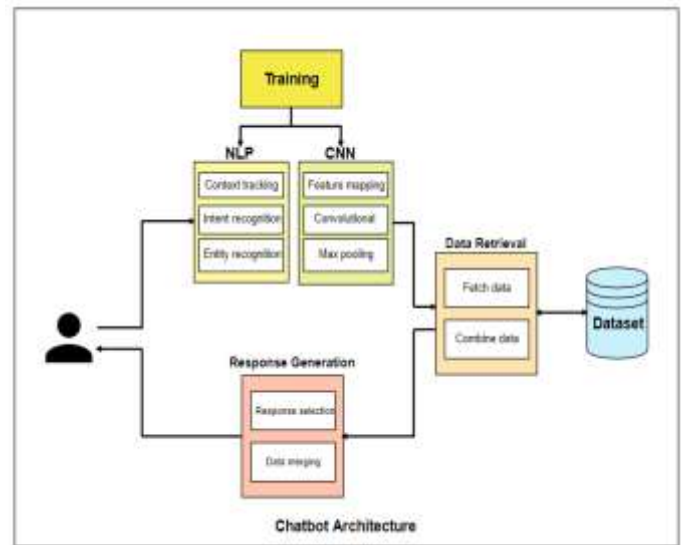


Fig 2. System Architecture

a) Working of Carbot

This Carbot is implemented using Convolutional Neural Network, Natural Language Processing and Feed Forward Neural Network. Carbot is given a text input and text output is displayed showing relevant information of car. Additionally image of car could be given as an input to the Carbot and the model and other specifications of the identified car model is displayed.

b) Training the Model

The text model built after preprocessing was trained using json file, which consists data in form of intents, tags, patterns, responses and context set. 200 epochs were required to train the model completely. The trained model is saved in chatbot_model.h5. The CNN model built was trained using around 5000 images of car dataset from which 1200 images of car were used for testing of the model.10 epochs were required to train the model completely. The trained model is saved in cnn_trained.h5.

c) Load Model

The .h5 files of both CNN and text saved in static folder are used to predict the output of chatbot and predict the name and relevant information about car. For prediction we need to first load the model(.h5) file which can be done as:

```
model = load_model(STATIC_FOLDER + '/' + 'cnn_trained.h5')
```

d) Class Prediction

There are 8 classes and tags of images i.e. Tata, Suzuki, Chevrolet, Hyundai, Ford, BMW, Audi, Tesla. The Model successfully predicts the tag or class of input (text or CNN). Responses of predicted tag is information of the car which is displayed on the screen and class and information of image is displayed if image is given as input.

V. RESULT

Training Phase of Convolutional Neural Network provided accuracy of 83.01% after training with 50 epochs and batch size 32. Natural Language Processing provided accuracy of 90.91% with loss of 27.69% after training with 200 epochs and batch size 5.

VI. CONCLUSION

The experiments documented in this paper are mainly to provide better insights to customers regarding car models. It serves an important role in easing the whole system of finding precisely the requirements they are looking for. The model will help businesses improve their customer satisfaction level, since it provides the flexibility of identifying the required car model just by simply uploading an image and also accessing only the required information regarding cars.

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