

# Contextual Chatbot Application using NLP and Flask

Ravi Khevaria

*<sup>1</sup>Department of Information Technology, Maharaja Agrasen Institute of Technology, GGSIP University, Delhi, India*

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**Abstract:** The scope of Machine learning and Artificial Intelligence is increasing rapidly in almost every field. At the Global scale, various Industries and Tech Companies are implementing these techniques in order to increase their revenue and provide a seamless user experience. One of the main usages is the Virtual Assistants or Chatbots for handling various queries related to the business. These Chatbots provides a response to the user's query in the most realistic way as if handled by a real professional. Contextual Chatbots are a type of advanced Chatbots. Their basic aim is to try to find the intent of the user, in which sense the question is asked. Chatbot reply is according to the intent of the user and on the previous things, the user has already asked. Retaining a user sending a perfect message is where the contextual chatbot comes into play.

**Index Terms-** Chatbot, NLP, Tensorflow, tflearn, Flask.

## I. INTRODUCTION

Interaction between computers and humans can be made simple by using Chatbot or Virtual Assistants. By using Artificial Intelligence and Natural language processing, a chatbot can interact in a more realistic way like humans. Any realistic response generated by the Chatbot is using Natural Language Processing. Chatbots provides various services one of which is improving customer experience. In Chatbots various crucial role like training, optimizing and configuring the chatbot system is provided by human intervention. There are two different tasks that form the basis of a chatbot: 1. Analysis of User Request 2.Generation of the response of the User Request Analysis. The ability of the chatbot to identify the user intent in order to extract relevant entities and generating an adequate response to the User Request is the core function. If any failure occurs to correctly acknowledge the User Request, it will fail to provide the Desired Output. The Response to the User by the Chatbot can be predefined generic text, text obtained from a database having different Outputs, Data stored in various Systems.

## II. RESEARCH AND IDEA

This Chatbot is based on the Natural Language Processing technique of text modeling known as the Bag of Words model. Whenever any algorithm is applied in NLP, it works on numbers. We cannot directly feed our text by converting it into the bag of Words. There are various steps in building this model. The chatbot is using Tensorflow based machine learning model for taking the user inputs. Machine learning helps to identify user intent, the algorithm helps to set conversation context and return a response. Context used gives the basis and sequence for meaningful conversation. UI is implemented using Flask framework.

## III. METHODOLOGY

Intents are defined in the JSON structure. A list of intents is defined with patterns and tags. When a user types text, TensorFlow Machine learning helps to spot pattern and it returns probabilities for matching tags. Tag with the highest probability is chosen, or if the context was set — tag from context. Response for intent is returned randomly, supported provided list. The intent might be related to context, this helps to group multiple related intents. UI of the Chatbot is implemented using Flask.

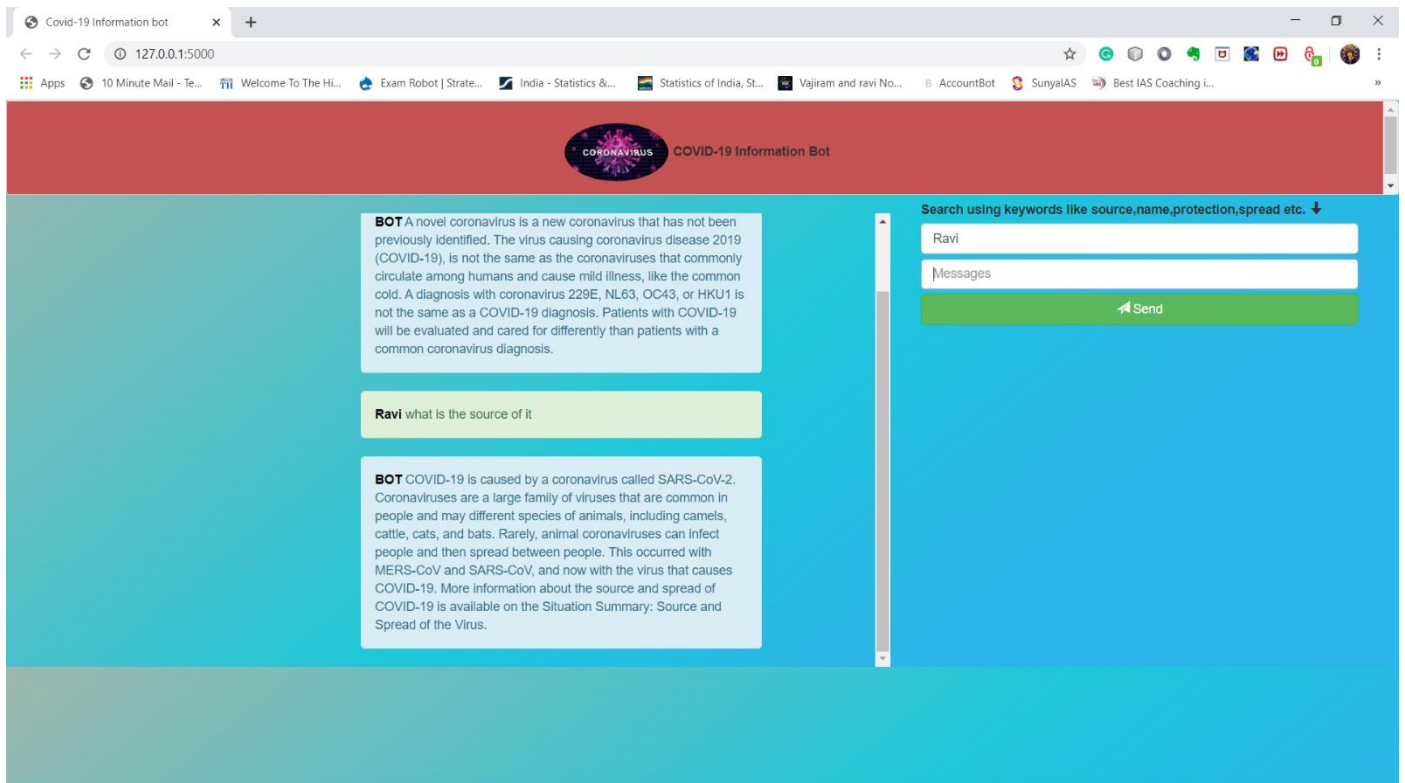
The model trains a neural network to recognize intent patterns. We load the JSON file with intents into TensorFlow. A list of intent patterns is prepared to be suitable to feed neural networks. Patterns are translated into stemmed words. The learning part is done with the TensorFlow deep learning library — Tflearn. It provide higher-level API and easy to use the platform to implement a machine learning algorithm. In particular, for our chatbot, we are using the Deep Neural Network model — DNN.

Once training is complete and the model is created, we can save it for future reuse. This allows us to stay model outside of chatbot response processing logic and makes it easier to re-train model on a replacement set of intents when required. Function response acts as an entry point to our chatbot. It gets user input and calls the classify function. Classification

function, based on the learned model, returns a list of suggested tags for identified intents. The algorithm locates intent by its tag and returns a random reply from the associated list of replies. If the context-based reply is returned, only if the context was set previously. Flask is used for b

#### IV. RESULT

After training the dataset now the chatbot is tested by launching the Chatbot Application. After training the model now the chatbot is prepared to be tested. The response generated by the chatbot is based on the Machine learning algorithm and the context based learning. The replies by the chatbot is quite meaningful and provide the necessary information asked in the query.



#### V. IMPROVEMENT

The performance of the chatbot can be optimized by having diverse dataset. Different ways for intents to impact and react to the different context settings can be formed. UI can be further improved and customized according to the user behaviour and comfort.

Various design and effects to the frontend can be deployed in order to make the user experience more lucrative. Having different settings and parameters for training the dataset can also positively effect the responses of the chatbot.

#### VI. CONCLUSION

The Chatbot is developed by using the Tensorflow and Bag of Words Model. To improve the efficiency of any Company or Organisation, they are using various Machine Learning Algorithms. These Chatbots can handle the user's query if they can understand the intent or sense in which it is asked. This can be implemented by using Contextual Chatbots, which can process the reply of the query on the basis of the context, by using various NLP algorithms. This is implemented as an Application by using Flask. By using context-based learning Chatbot can be able to retain the previous information and can reply meaningfully in a sequence, related to a particular topic. As the use of Machine Learning and Artificial Intelligence is increasing by leaps and bounds, the use of Virtual Assistants will increase rapidly in order to increase the revenue and improve the user experience.

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