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Helper Bot

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ABSTRACT

We are developing an intelligent Helper bot which is a computer program that simulates Human conversation, or chat, through AI. It will allow users to solve their queries about college. The aim of this project is to develop an assistance system that solves the queries about our college asked by the user. A knowledge base is maintained consisting of queries. It generates a response based on given input to emulate human conversations in text or voice mode.

Keywords— *ChatBot, NMT model, Sequence to sequence*

1. INTRODUCTION

Computers are used for retrieving so complex information into the easier form. In various fields, computers are helping humans in many ways to make their life easier. Helper bot is designed for the same purpose to counterfeit a smart communication on the text as well as on the spoken ground. This enquiry system recognizes the user input as well as access information to provide pre-defined acknowledgement. When the input is bringing into being in the database, a response from the same sequence is given to the user. They cannot respond to complex queries and are unable to perform complex activities. The Helper bot is implemented using Google's NMT in which for each sequence of queries or requests there is a sequence of responses. It uses relatively new technology. This paper covers the techniques used to design and implement a Helper Bot. Comparisons are drawn, findings are discussed and the conclusion is made at the end.

2. DESIGN AND OPERATION

One of the examples of Helper Bot is College Enquiry System. It is mainly divided into five steps. Each step performs some significant task.

Step 1: Gathering data: Collecting decent Dataset that contains millions of queries and conversations regarding college infrastructure and academics.

Step 2: Data preprocessing: Preprocessing of the data by extracting out the meaningful and relevant data out of the noisy and insufficient data.

Step 3: Neural Machine translation model: There are endless models that we could come up with and use. But here we work upon sequence to sequence models. Basically, every query and a reply can be reduced to sequences being mapped to sequences. For instance, a query is a sequence of some length where a reply will also be a sequence of possibly some different length. We'll be making use of Bidirectional Recurrent Neural Networks (BRNN) to train our model.

Step 4: Training dataset: For training, we need to create files that are basically "query" and "reply" text files, where each line is the sample. For instance, line 15 in the query file is the query, and then line 15 in the reply file is the response to line 15 in the query file.

Step 5: Evaluation: The evaluation of the model is done by testing it on different datasets which contains the general dataset and the dataset of college-related queries. We have used the Tensor Board as a tool.

3. MODELS USED

3.1 Sequence to Sequence (Seq2Seq)

Some of the states of the art techniques involve using Deep Neural Network and its architectural variations. Sequence to Sequence (Seq2Seq) model based on encoder-decoder architecture is such an architecture which is very popular for dialogue generation, language modeling and machine translation. Seq2Seq uses Recurrent Neural Network (RNN) which is a popular Deep Neural Network architecture specially for Natural Language Processing tasks. In Sequence to Sequence (Seq2Seq) model, many to many RNN architecture is used for the decoder. In this, encoder-decoder architecture, the input sequence is fed as a vector representation of text to the encoder. Then, the encoder produces some intermediate information representation or thought vectors. As a result, the thought vector generated by the encoder is sent to the decoder as input. Finally, the decoder processes the thought vector and converts the sequence one by one word and produces multiple outputs from the decoder in the form of the target sequence. Though, vanilla RNN is default in Seq2Seq and works well for many NLP problems yet, due to higher complexity of language modelling problem, vanilla recurrent neural network cells often fail, especially, where a long sequence of information needs to be remembered, as this information frequently becomes large for bigger datasets and turns to information bottleneck for the RNN network. Therefore, researchers use variations of a recurrent neural network to handle such a problem.

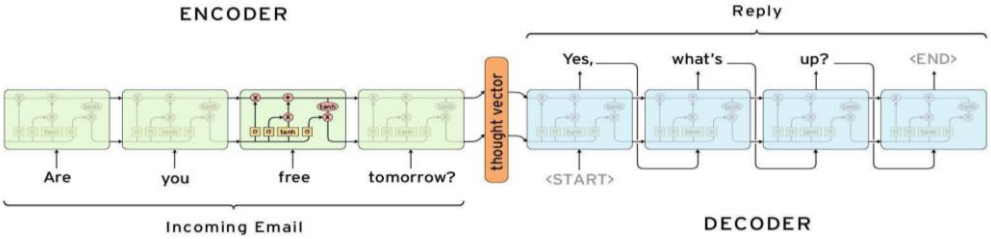

Fig. 1: Sequence to Sequence model

4. COMPARISON

This Helper Bot is very simple and user-friendly. It is not very complicated like other software. The working of the Helper bot is simple and can be easily understood by any person. In other devices, the working is very complicated. Many models are used which are complex to understand. In this program, only one model is used to make it simple and obtain the expected output. This Helper bot uses simple deep learning sequence to sequence model to represent the input and output whereas other software use input rules, keyword patterns and output rules to generate a response. If the input is not found in the database, a default response is generated. The input and output can be modified according to the user. Based on the user or the developer, the required queries and responses can be stored in the database. The database can be created and it allows the user to understand how the response is generated. This Helper bot can be used anytime. Whenever a person wants, he can chat with the Helper bot. It can also be used to provide information by modifying the program as needed by the user.

5. FUTURE SCOPE

Helper bot can also be referred to as virtual assistants. It is a rudimentary form of machine learning software that can mimic human conversation. Helper bot can be analyzed and improved. It can be used in different fields such as education, business, online enquiring etc. It can be used in the field of education as an information extractor. The information essential for education can be stored in the data base and can be retrieved any time by querying the bot. In the business field, it can be used to provide business solutions in an efficient way. When the solutions are efficient and accurate, the business can be improved and the growth of the organization will be increased. These bots can also be used to learn different kinds of language. The language that user wants to learn can be learnt by asking questions to the bot which are stored in the database. They can also be used in the medical field to solve health-related problems. Helper bots are going to explore and can be really dominating in future. Helper bots can provide an improved and flexible way to users. Helper bots result in smart communication and are advancing at an unpredictable rate with each new development. Since Helper bot predicts and provides an accurate response to a posed request, it is hard to imagine the future without a Helper bot.

6. CONCLUSION

The training produced a result which needs further improvement and more attention and speculation on training parameters. Adding more quality data will further improve performance. Also, the training model should be trained with other hyper-parameters and different dataset for further experimentation. This was an attempt to experiment with Deep Neural Network for dialogue generation in order to develop intelligent Helper bot. It can reach out to a large number of users. This Helper Bot developed using Google's Neural Machine Translation Model (GNMT) can be further improved. With more robust, high quality real-life conversational datasets which hyper-parameters of the GNMT model can be further tuned and optimized for performance enhancement.

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