Voice Assistant based on Bengali Dialects

Debalina Barua
BRAC University
debalina.barua@g.bracu.ac.bd

Farhana Akter Badhon
BRAC University
farhana.akter.badhon@g.bracu.ac.bd

Mumtahina Ahsan
BRAC University
mumtahina.ahsan@g.bracu.ac.bd

Shadman Sakib Chowdhury
BRAC University
shadman.sakib.chowdhury@g.bracu.ac.bd

Rimi Reza
BRAC University
rimi.reza@g.bracu.ac.bd

Akib Noor
BRAC University
akib.an.noor@g.bracu.ac.bd

1 Introduction

Through language, people communicate, share meaning and experience their sense of individual and community identity. Natural Language Processing (NLP) is the key to link people all over the world breaking the language barriers.The ideal aim of the Machine Translation system in NLP is to give the possible correct output without any human assistance.People from different parts of Bangladesh speak in different dialects of Bengali and are limited to communicate among them with existing local Bengali dialects. Although Bengali as a lingua franca, facilitates communication between Bengali speaking people irrespective of localities, communication challenges still exist in people with limited standard Bengali language proficiency.This paper reports the concept of an automated local Bengali dialect to standard Bengali translator as a model to bridge the communication gap in Bangladesh.Our work will also be extended to translate from any Bengali dialect to English.

2 Background

Similar work has been done in Nigeria(Arikpo, 2018), where they developed a machine translator that translated English language to Yoruba sentences using classic syntactic and semantic analysing algorithms. The analysis of the result of their work showed that 70% respondents accepted its usability. In(Khalifa et al., 2021) the context of Arabic sequence labeling by using a language model fine-tuned on Modern Standard Arabic only to predict named entities and part-of-speech (POS) tags on several dialectal Arabic varieties.

3 Ideas/Plans

Voice assistant is based on the concept of transforming a voice command (speech) into the text(Sultana et al., 2012). In this implementation, the requirement is not only transforming the speech to text but also identifying the different dialects of Bengali Language. Python's speech recognition library can be used for the first part. As a pre-processing step, after the text is obtained, we start with text normalization and in the NLP part, we are going to use Recurrent Neural Network (RNN) as RNNs are a very important variant of neural networks heavily used in NLP. Unlike other neural networks, RNNs have a memory that remembers all information as it uses the same parameters for each input when performing the same task on all the inputs or hidden layers to produce the output. We will be using Long Short Term Memory (LSTM) architecture which is a special kind of RNN, capable of learning long-term dependencies. an LTSM is a small neural network consisting of four neural network layers. The LSTM architecture contains the recurring layer from the RNN with three networks acting as gates. There is an input gate, update gate and a forget gate and it trains the model by using back-propagation. Gated Recurrent Unit (GRU) is a modification in the basic recurrent unit which helps to capture long range dependencies and also helps a lot in fixing the vanishing gradient problems. It contains an update gate and a reset gate. Therefore, we are going to try both GRU and LSTM to see which can perform better.

4 Potential Challenges

The official language, Bengali, is spoken by the vast majority of people but there are many indigenous languages spoken in some regions of the country and several foreign and immigrant languages. This gives rise to the unavailability of resources of training data and benchmarks which are not available for the majority of the world's languages. Therefore, finding a dataset would be a challenge

here. Moreover, biases in the dataset also result in the model providing bad predictions as well. There are also certain problems and issues affecting NLP in general like finding references of anaphora and cataphora and understanding discourse and challenges in pragmatics.

5 Conclusion

As Bangladesh is a country of having so many dialects, we decided to develop a system by which we can translate all Bangla dialects into standard Bangla. In this paper, we are also thinking of translating any Bangla dialect to native English in the future and also identifying the different dialects of Bengali Language. If we can implement this project, it will be the first work on bengali local dialects. It will also help the uneducated people, who are not proficient in standard bangla, to communicate with people from different regions of Bangladesh.

References

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