Spoken Language Understanding and Intent Classification

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1 Introduction

Spoken Language Understanding(SLU) system has been studied and developed extensively in the recent years. Many leading technology companies have developed their own SLU system based products, such as Siri, Cortana, and Google Assistant. A SLU system consists of domain identification, intent classification and slot filling three components, and they are usually being modeled separately. [3] Most current SLU systems can identify domain and intent of individual spoken sentences very well, however, it lacks of the ability to relate sentences with previous conversations.

2 Objective

Understanding a sentence based on previous conversations is a very important task in communication. In this project, we are going to explore part of the SLU system, specifically, we are targeting to achieve sentence intent classification using machine learning. And in addition, we are going to experiment different engineering structures which helps the algorithm to understand a sentence based on previous conversations.

3 Related work and proposed approach

There are many literature works that focused on the area of SLU, the specific tasks of domain identification and intent classification are being considered as basic classification problems. Linear classifications, such as Support Vector Machines are being widely used on the task of domain identification and intent classification. [1] Moreover, Neural Networks have also being applied to this tasks, which gives a more complex model and better performance comparing with single linear classification. [4] In this project, we propose to develop a spoken sentence intent classification algorithms using Neural Network approach. The algorithm will be trained and tested on on-line text

intent classification databases, and being demonstrated using Google speech recognition API. In addition, we are going to experiment with the task of classifying intent of a spoken sentences related to previous conversations. A model with Recurrent Neural Networks(RNN) will be used for this specific part of the project, [2] and by doing so to achieve a relatively positive result on understanding spoken language and intent classification.

4 Reading List

1. Contextual Spoken Language Understanding Using Recurrent Neural Networks [2]

2. Convolutional Neural Network Based Triangular CRF for Joint Intent Detection and Slot Filling [5]

3. Liblinear: A library for large linear classification [1]

4. Contextual domain classification in spoken language understanding systems using recurrent nerual network [4]

5. Understanding Spoken Language [3]

References

[1] Ran R., Chang K., Hsieh C., Wang X., Lin C. "Liblinear: A library for large linear classification". In: *Journal of MAchine Learning Research* (2008).

[2] Shi Y., Yao K., Chen H., Pan Y.C., Hwang M.Y., Peng B. "Contextual Spoken Language Understanding Using Recurrent Neural Networks". In: (2015).

[3] Tur G., Wang, Y., Hakkani-Tr D. "Understanding Spoken Language". In: *Chapman and HallCRC Press* (2013).

[4] Xu P., Sarikaya R. "Contextual domain classification in spoken language understanding systems using recurrent nerual network". In: *ICASSP* (2014).

[5] Xu P., Sarikaya R. "Convolutional Neural Network Based Triangular CRF for Joint Intent Detection and Slot Filling". In: (2013).