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Course Name: AI Virtual Assistants

Project Definition

Project title: Intent detection using Deep Learning Techniques

The object of this course project is to apply Deep Learning Techniques to the intent detection problem. I have chosen this topic because I want to deepen my understanding of the intent detection step in the architecture of a Virtual Assistant (VA) and Chatbots as after the speech has been converted to text, it is an important step that determines what the user intends (wants) by initiating the request to the VA or Chatbot. Additionally, the course project will enhance my experience in Deep Learning, especially in Natural Language Processing as it is the main purpose for me choosing this course. The final deliverable will be in the form of a written project report of the accomplished work, the source code in a Jupyter Notebook (python) and the data sets used in the project (uploaded on Github: https://github.com/womega/CSI5180_Project). This project will be based on [1]. I will explore (train and test on) benchmark data sets detailed in [2]: chatbot, askUbuntu and webapps. The project will be written in python, and I will use Keras¹ and Tensorflow².

Activity	Why	Time Planned	Deliverable
Read [1]	Get understanding of the problem to be solved.	2~3h	-
Explore the three data sets	To get a better understanding of the contents of each data set.	1~2h	-
Preprocess and extract features from the data sets	Before applying DL, the data should be preprocessed, and a relevant set of features should be extracted from the data.	4~5h	The preprocessed data sets and extracted features will be uploaded to the repository in comma separated value format.
Develop baseline model	This model will be the one to improve and compare to.	2~3h	-
Fine tune algorithm	The baseline model will be tuned with	2~3h	-

¹ <https://keras.io/>

² <https://www.tensorflow.org/>

	different hyperparameters in order to make improvements.		
Perform feature selection from literature.	Some features might have more importance over the others and others can bias the system, therefore it is trivial to select only relevant features to retrain on, in addition, I will explore more features in the literature, incorporate them and evaluate their impact in the scores.	2~3h	-
Retrain with the new feature set and compare	In order to see how the new model with the new feature set will compare to the baseline	2~3h	-
Prepare a presentation to demonstrate the work and progress	To demonstrate the implementation and experiments carried out.	2~3h	Video (.mp4 or .mkv) accompanied by the PowerPoint file
Write a final report	To explain and give further details about the work briefly shown in the presentation.	4~5h	Will be uploaded on Brightspace and Github in the form of a research article in a portable document format.

- [1] J. Kapočiūtė-Dzikienė, K. Balodis, and R. Skadiņš, “Intent Detection Problem Solving via Automatic DNN Hyperparameter Optimization,” *Appl. Sci.*, vol. 10, no. 21, Art. no. 21, Jan. 2020, doi: 10.3390/app10217426.
- [2] D. Braun, A. Hernandez Mendez, F. Matthes, and M. Langen, “Evaluating Natural Language Understanding Services for Conversational Question Answering Systems,” in *Proceedings of the 18th Annual SIGdial Meeting on Discourse and Dialogue*, Saarbrücken, Germany, Aug. 2017, pp. 174–185, doi: 10.18653/v1/W17-5522.