CS445- Milestone Presentation

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Introduction

- Overview:
    - Developing an intent detection mechanism with using the ATIS dataset.
- Importance of Intent Detection:
    - This mechanism shapes the current world of virtual assistants, with understanding the user needs and constantly improving the satisfaction of the user.

ATIS Dataset

- This dataset is quite a popular dataset used in intent detection which consists of data which is related to airline travel.
- Diverse intents and structured format which allows to efficiently perform the model training and evaluation.
- The dataset is split into three parts:
  - 70% for training
  - 15% for validation
  - 15% for testing

Approach Plan

- Implementation of the CNN-based feature extraction methods. (inspired by Kim (2014), which demonstrated the effectiveness of CNNs in text classification tasks.)
- Investigating and evaluating alternative methods for feature extraction such as embeddings and pre-trained models like BERT (Inspired by Xu et al. (2020), exploring self-attention mechanisms for intent detection tasks.)
- Developing and testing neural networks and LSTM-based classifiers (Inspired by Inspired by Sreelakshmi, Rafeeque, Sreetha, and Gayathri (2018), who showed the effectiveness of Deep Bi-Directional LSTM Networks in query intent detection)
- Hyperparameter optimization, overall performance evaluation

Workload Division

- While all members of the group will concentrate on all steps,
- One specific member for implementation of the CNN-based feature extraction methods
- One specific member for investigating and evaluating alternative methods for feature extraction such as embeddings and pre-trained models like BERT
- One specific member for developing and testing neural networks and LSTM-based classifiers
- One specific member for hyperparameter optimization, overall performance evaluation to ensure the integration of feature extraction and classification stages is optimized.

References

1.   Kim, Y. (2014). Convolutional neural networks for sentence classification. *arXiv preprint arXiv:1408.5882*. https://doi.org/10.48550/arXiv.1408.5882

2.   Zhang, Y., & Wallace, B. C. (2017). A sensitivity analysis of (and practitioners' guide to) convolutional neural networks for sentence classification. *Proceedings of the 8th International Joint Conference on Natural Language Processing (Volume 1: Long Papers),* 253–263. https://aclanthology.org/I17-1026/

3.   Xu, H., Wu, F., Wu, C., & Yuan, Y. (2020). Self-attention networks for intent detection. *arXiv preprint arXiv:2006.15585*. https://doi.org/10.48550/arXiv.2006.15585

4.   Sreelakshmi, K., Rafeeque, P. C., Sreetha, S., & Gayathri, E. S. (2018). Deep Bi-Directional LSTM Network for Query Intent Detection. *Procedia Computer Science, 143*, 939–946. https://doi.org/10.1016/j.procs.2018.10.394