Title: Improving Machine Translation Quality using Neural Network Architecture

Introduction:

Machine Translation is the process of translating a source language to a target language using computers. Despite significant advances in Machine Translation over the past few years, the quality of translation still remains a challenge. The primary goal of this project is to improve the quality of Machine Translation using Neural Network Architecture.

Objectives:

1. To develop a Neural Network-based Machine Translation model that can translate accurately and fluently between English and French languages.
2. To evaluate the performance of the developed model using standard evaluation metrics such as BLEU and METEOR.
3. To compare the performance of the developed model with existing Machine Translation models such as statistical machine translation and rule-based machine translation.

Methodology:

The proposed project will follow the following methodology:

1. Data Collection: A corpus of parallel English French sentences will be collected for training and testing purposes.
2. Pre-processing: The collected data will be pre-processed by removing irrelevant information such as numbers and punctuations and converting the text to lower case. The pre-processed text will be tokenized into sentences and words.
3. Model Development: A Neural Network-based Machine Translation model will be developed using Deep Learning techniques such as Convolutional Neural Networks (CNN) and Long Short-Term Memory (LSTM) Networks. The model will be trained on the pre-processed parallel corpus using Backpropagation algorithm and Adam optimization.
4. Model Evaluation: The developed model will be evaluated using standard evaluation metrics such as BLEU and METEOR. The performance of the model will be compared with existing Machine Translation models such as statistical machine translation and rule-based machine translation.

Expected Outcomes:

The expected outcomes of this project are:

1. Development of a Neural Network-based Machine Translation model that can translate accurately and fluently between English and French languages.
2. Improvement in the quality of Machine Translation compared to existing Machine Translation models such as statistical machine translation and rule-based machine translation.
3. Identification of the strengths and weaknesses of the developed model and recommendations for further improvement.

Conclusion:

The proposed project aims to improve the quality of Machine Translation using Neural Network Architecture. The successful completion of this project will contribute to the advancement of Machine Translation research and development.

1. Bahdanau, D., Cho, K., & Bengio, Y. (2014). Neural Machine Translation by Jointly Learning to Align and Translate. arXiv preprint arXiv:1409.0473. [Link: <https://arxiv.org/abs/1409.0473>]
2. Sutskever, I., Vinyals, O., & Le, Q. V. (2014). Sequence to sequence learning with neural networks. In Advances in neural information processing systems (pp. 3104-3112). [Link: <https://proceedings.neurips.cc/paper/2014/hash/a14ac55a4f27472c5d894ec1c3c743d2-Abstract.html>]
3. Luong, M. T., Pham, H., & Manning, C. D. (2015). Effective approaches to attention-based neural machine translation. arXiv preprint arXiv:1508.04025. [Link: <https://arxiv.org/abs/1508.04025>]
4. Papineni, K., Roukos, S., Ward, T., & Zhu, W. J. (2002). BLEU: a method for automatic evaluation of machine translation. In Proceedings of the 40th annual meeting on association for computational linguistics (pp. 311-318). [Link: <https://www.aclweb.org/anthology/P02-1040.pdf>]
5. Lavie, A., & Agarwal, A. (2007). METEOR: An Automatic Metric for MT Evaluation with Improved Correlation with Human Judgments. In Proceedings of the ACL workshop on intrinsic and extrinsic evaluation measures for machine translation and/or summarization (pp. 65-72). [Link: <https://www.aclweb.org/anthology/W07-0734.pdf>]
6. Koehn, P. (2009). Statistical machine translation. Cambridge University Press. [Link: <https://www.cambridge.org/core/books/statistical-machine-translation/57BC2E1F6B875D7F3E3F2F2B9258F60D>]
7. Knight, K., & Graehl, J. (1998). Machine transliteration. Computer Science Department, University of Southern California. [Link: <https://www.isi.edu/natural-language/mt/translit98.pdf>]
8. Chiang, D. (2005). A hierarchical phrase-based model for statistical machine translation. In Proceedings of the 43rd Annual Meeting on Association for Computational Linguistics (pp. 263-270). [Link: <https://www.aclweb.org/anthology/P05-1033.pdf>]
9. Bahdanau, D., Brakel, P., Xu, K., Goyal, A., Lowe, R., Pineau, J., ... & Bengio, Y. (2016). An actor-critic algorithm for sequence prediction. arXiv preprint arXiv:1607.07086. [Link: <https://arxiv.org/abs/1607.07086>]
10. Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., ... & Polosukhin, I. (2017). Attention is all you need. In Advances in Neural Information Processing Systems (pp. 5998-6008). [Link: <https://proceedings.neurips.cc/paper/2017/hash/3f5ee243547dee91fbd1669682ca3d12-Abstract.html>]