RESULTS AND DISCUSSION

Comparative Analysis of Deep Learning Models and Preprocessing Techniques for Sentiment Analysis in Hotel Reviews between the project and previous research paper:

Both Word2Vec and Fasttext embeddings performed competitively across a range of deep learning architectures, including CNN and MCNN models. When combined with the MCNN model, Word2Vec obtained an impressive accuracy rate of 93.10%, demonstrating its potency in collecting semantic links. However, Fasttext fared better than earlier studies, with an outstanding 98.65% accuracy rate using the CNN model, indicating a noteworthy 5.55% improvement. These findings highlight the effectiveness of both embedding strategies in improving deep learning model performance in various architectural frameworks, with Fasttext showing a notable improvement in accuracy over earlier benchmarks when combined with the CNN model. In both cases, the least successful model is the Hierarchical Attention Network (HAN), whose maximum accuracy attained is just 55.42% when the Fasttext embedding preparation technique is used, and 54.85% when the GloVe preprocessing technique is applied. When HAN is examined against other models, it constantly performs worse even when using alternative embedding techniques. These results imply that, irrespective of the particular embedding technique used, there are limits to HAN's capacity to efficiently extract semantic information from text input.

The work also highlights how dynamic deep learning research is, with continuous improvements in model topologies and embedding methods transforming sentiment analysis's terrain. Future iterations of deep learning models might profit from including these cutting-edge embeddings as more recent embeddings, like BERT, become more well-known for their capacity to capture complex contextual relationships. Furthermore, investigating new model designs or hybrid strategies that integrate the advantages of many models may produce even greater gains in sentiment analysis precision. In the end, this comparison research highlights how the deep learning community must constantly innovate and adapt to meet changing difficulties and raise the bar for sentiment analysis performance.

In conclusion, the comparison study emphasizes how important model design and preprocessing methods are for deep learning-based sentiment analysis tasks. The results

highlight the significance of careful assessment and embedding selection that is suited to the job at hand by indicating that while some models may perform best with a given embedding, others may need to experiment with different embeddings to obtain optimal performance.

Table 1: Result of Accuracy in previous research paper and in the Project

Sl. No.	**Models used**	**Preprocessing Techniques**	**Accuracy (%) in the Previous Research Paper**	**Accuracy(%) in the Project**
1	CNN	Word2vec	93.01	92.09
		Fasttext	92.59	**98.65**
2	MCNN	Word2Vec	**93.10**	92.41
		Fasttext	91.04	97.14
		BERT	92.36	92.24
3	RNN	Word2Vec	91.95	91.18
		Fasttext	92.19	91.18
		BERT	51.43	52.49
4	HAN	Word2Vec	55.32	53.42
		Fasttext	55.42	51.51
		Glove	55.31	54.85
5	RMDL	BERT	91.22	90.74
		Fasttext	90.74	89.68
		Glove	91.05	95.29

According to Table 1, the best model for hotel review based Sentimental Analysis is Convolutional Neural Network using Fasttext having an Accuracy of 98.65 Percent in the project.