Literature Review on Sentiment Analysis with Deep Learning

I. Focus and Aim

The focus of this literature review is to provide a comprehensive overview of sentiment analysis using deep learning techniques. The aim is to explore the state-of-the-art approaches, identify key findings, and discuss the strengths, limitations, and discrepancies in the existing literature. This will help provide the context within which to plan and propose a research project. The primary audience for this review includes researchers, practitioners, and students interested in sentiment analysis with deep learning. The

II. Significance and Need

Sentiment analysis plays a crucial role in understanding and analysing textual data, especially in the era of social media and online reviews. Sentiment analysis has important applications in online monitoring such as detecting cases of bullying, depression, suicide, fraud and grooming; business intelligence such as customer, product and service sentiment monitoring; and stock/financial market prediction. Deep learning techniques have shown remarkable performance in sentiment analysis tasks. However, due to the rapid advancements in the field, it is essential to review and synthesise the existing literature to provide a holistic understanding of the topic and identify gaps within which research can be conducted. This review is significant as it will help researchers and practitioners gain insights into the latest developments, identify gaps, and explore future directions in sentiment analysis with deep learning.

III. Context and Perspective

The context of this review is within the field of natural language processing (NLP) and machine learning. It acknowledges the increasing availability of large-scale datasets and computational resources that have enabled the successful application of deep learning in sentiment analysis tasks. The review takes a comprehensive perspective, encompassing various deep learning architectures and techniques used for sentiment analysis. The synthesis of literature is based on analysing research papers, survey articles, and notable works in the field.

IV. Locating and Selecting Sources

To ensure a comprehensive coverage of the topic, searches are conducted on Google Scholar which is a freely-available platform which organises and provides access to academic papers from a range of reputable sources. Keywords such as "sentiment analysis," "deep learning," "neural networks," and related terms are used to identify relevant sources. Recent peer-reviewed papers, recent

conference proceedings, and papers in reputable journals will be prioritised. The selection of sources is based on the following factors in order: relevance, recency and impact on the field (as measured by the number of citations). The aim is to review a total of between 10 and 20 papers for this review.

V. Preliminary Structure of the Review

The literature review will be structured similar to literature reviews found in this specific domain of research. A preliminary outline of the proposed literature review is as follows:

1. Introduction:
   - Background, significance and applications of sentiment analysis
   - Overview of deep learning techniques for sentiment analysis
   - Research objectives and scope of the review

2. Brief Description of Deep Learning Techniques for Sentiment Analysis:
   - Introduction to deep learning and its applications
   - Brief description of prominent deep learning architectures for sentiment analysis

3. Review of Sentiment Analysis Using Deep Learning:
   - Public opinion monitoring
   - Financial market monitoring
   - Healthcare and medical monitoring
   - Political sentiment analysis

4. Challenges and Limitations in Sentiment Analysis with Deep Learning:
   - Handling sarcasm, irony, and negation
   - Data imbalance and bias issues
   - Ethical considerations and potential risks

5. Recent Advances and Future Directions:
   - Current trends and emerging techniques
   - Interpretability and explainability in deep learning models
   - Multimodal sentiment analysis

6. Conclusion:
   - Summary of key findings
   - Strengths and limitations of the literature
   - Discrepancies in the existing literature
   - Conclusions drawn from the review
   - Recommendations for future research and directions

VI. Main Findings and Strengths/Limitations:

The main findings in the literature on sentiment analysis with deep learning demonstrate the effectiveness of deep learning models in capturing context and semantic information, and the impact of different architectural choices on performance, including the effect of pretrained models and transfer learning. The strengths of the literature lie in the extensive exploration of deep learning techniques and their performance comparisons. However, limitations include the lack of standardised evaluation metrics, challenges in handling domain-specific sentiment analysis, and potential biases in the training data.

VII. Discrepancies in the Literature:

There are discrepancies in the literature regarding the optimal choice of deep learning models for sentiment analysis tasks. There is no consensus regarding an optimal technique or architecture with which to carry out sentiment analysis.

VIII. Conclusions and Outcomes:

Based on a preliminary review that is yet to be expanded, it can be concluded that deep learning techniques have significantly advanced sentiment analysis tasks. However, several challenges remain, such as addressing sarcasm and irony, handling domain-specific sentiment analysis, and ensuring ethical considerations. As an outcome of the review, it is argued that future research should focus on developing interpretable deep learning models, exploring multimodal sentiment analysis, addressing cross-lingual and multilingual challenges, and considering ethical implications in sentiment analysis applications.

In summary, this literature review aims to provide a comprehensive overview of sentiment analysis with deep learning, analyse key findings and discrepancies in the existing literature, and suggest future research directions to advance the field.