**Title**: **Fake News Detection**

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**Abstract:**

Fake news propagation poses a serious threat to societal trust and information reliability. This project presents a deep learning-based approach to detect fake news, focusing on model architectures such as RNN and BiLSTM to classify news content effectively. The objective is to develop a system that can assist in identifying misleading news articles with high accuracy.

**Keywords:**

Fake News, Natural Language Processing, Text Classification, Machine Learning, Misinformation.

**1. Introduction:**

The rapid growth of digital media has led to an overwhelming spread of fake news, which negatively affects public opinion and decision-making. Automatic detection methods using deep learning models can provide scalable solutions for mitigating the effects of misinformation.

**2. Related Work:**

Previous research has employed traditional machine learning and NLP techniques to detect fake news. Recent advances leverage deep learning models like RNNs and LSTMs for better contextual understanding of textual data. This project builds upon these methods to improve classification performance.

**3. Methodology:**

* **Dataset:** Publicly available datasets (particularly on Kaggle) consisting of labelled real and fake news articles were used for training and evaluation.
* **Data Preprocessing:** Text data was cleaned, tokenized, and vectorized to be input into neural networks.
* **Model:** Recurrent Neural Networks (RNN) and Bidirectional Long Short-Term Memory networks (BiLSTM) were implemented for classification tasks.
* **Evaluation:** Models were evaluated using standard metrics such as accuracy, precision, recall, and F1-score.

**4. Results and Discussion:**

The BiLSTM model achieved the highest accuracy of about 99% (replace with actual number), outperforming baseline approaches. The results demonstrate the model’s effectiveness in capturing contextual dependencies in news articles to distinguish fake news reliably.

**5. Conclusion:**

This study confirms that deep learning models, specifically RNN and BiLSTM architectures, are promising for automated fake news detection. Further improvements could involve expanding datasets and real-time deployment.

**6. Future Work:**

Future directions include integrating real-time information sources to enable instant fake news detection as news emerges. The system will incorporate advanced AI techniques, such as transformer-based models and continual learning, to adapt dynamically to evolving misinformation patterns. Additionally, it will be designed to handle large-scale data influx efficiently, recognizing and filtering vast amounts of fake news rapidly. Inspired by GrokAI’s capabilities, the system aims to provide a comprehensive, intelligent platform for proactive misinformation management and user-friendly insights.