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AI-Driven Detection of Fake News Using Social Media Data

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Abstract: *The spread of misinformation, commonly referred most significant problems of the to as fake news, has emerged as one of the digital age, particularly due to the prevalence of social media platforms. The wide-reaching, impacting public perceptions, effects of fake news can be platforms like political races, and community conduct. Data from social media Twitter and Facebook were been used to build an AI solution to identify Fake News. Using Data science approaches, specifically neighbourhood model combined news with Natural Language Processing (NLP) and machine learning model to classify articles as fake or real from text and user engagement. We explore a wide array deep-learning of AI models, from traditional machine-learning algorithms, through networks, to current cutting-edge transformer models. The results show that the efficiency of deep learning BERT-based models outperformed others, evincing in fake news detection. We hope that the proposed approach provides a novel on the social media foundation for effective and real-time fake news detection. Fake news detection in social media through Learning, different artificial intelligence strategies: A systematic review of Machine Natural Language Processing and BERT based News Classification*

Keywords: fake news detection

I. INTRODUCTION

With people have changed their way of consuming the emergence of social media, information, allowing news and opinions to go around the world quickly. Nevertheless, this lightning-quick spread of information has given rise to what false or misleading text that is intended to a known trend called fake news — non-ideal state of affairs, whereby misguide or sway popular views. A misinformation on platforms like Twitter, Facebook and WhatsApp subverts elections, endangers public health, and undermines social trust, has emerged in this new environment.

Traditional verification have struggled to keep up form of fact-checking and manual content with the mind-numbing amount of misinformation floating around social media. As learning and a result, AI-based approaches, especially those involving machine natural language processing (NLP), have become effective methodologies for the real-time detection of fake news. This article attempts to leverage the fake news detection based on social media data. potential of AI for automated

II. LITERATURE REVIEW

Fake research tract in recent years. For example, news detection has been a major initial work on fake news detection heavily utilized classical ML-algos like techniques relied heavily on content Random-Forests [50]. These SVM [52] and based features such as text similarities between the actual articles, keywords, faced challenges when it came to the and other metadata features. But they also nuances of misinformation, especially when such content was not clearly untrue.

More years. biased assumptions have emerged with the popularity of deep learning in recent Specifically, Convolutional Neural Networks (CNNs) and Long Short-Term Memory (LSTM) networks have been successful in working first derivatively in articles. Moreover, transformer understanding the semantics of news architectures like

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BERT (Bidirectional Encoder Representations from achieved state-of-the-art results in Natural Language Transformers) have Processing (NLP) tasks, making them suitable for fake news detection.

Many news other works have emphasized the importance of social media data for fake detection. Social media is a rich source of textual data along with user engagement metrics (like, share, retweet counts) that can be utilized in articles. By combining text information with determining the veracity of news user behavior data, the fake news identification. we present a more holistic approach to

III. METHODOLOGY

A. Data Collection

In we collected data from Twitter using Twitter API. And in this study, particular, fact-checked social media data, which includes tweets from mainstream news sources, as well as "fake" from tweets, pulled fact-checking websites. News articles were scraped along with some news articles and associated metadata (e.g. number of retweets, likes, and comments) using a set of relevant keywords on the data up to that were being matched October 2023.

B. Data Preprocessing

You with data until October 2023. The words are extracted using are subset the potency of tokenization, and stemming and lemmatization is added to find the processed data to extract features for training the the words. We then used models.

C. Feature Extraction

TF-IDF stood in as textual data for the (Term Frequency-Inverse Document Frequency) text-based features. Moreover, we conducted sentiment analysis based on the pre-trained NLP models in order to assess the overall emotional tone of of the feature set included user engagement features content. The other parts like how many likes, share, and retweet.

D. Machine Learning Models

This three main machine learning models: led to the evaluation of

[vc_custom_heading SVM (Support Vector Machine) style=1] text=2.

LSTM order dependence (Long Short-Term Memory): A deep learning model that can learn in sequence prediction problems.

Pre-trained transformers BERT (Bidirectional Encoder models Unsupervised learning with Representations from Transformers): A transformer based model which has shown outstanding result in various NLP tasks.

We model and evaluated them with a 70-30 training-test split and trained each performance measures were recorded using standard metrics accuracy, precision, recall, and F1-score.

IV. EXPERIMENTAL SETUP

A. Dataset

The 10,000 tweets, 5,000 of which were labeled real news and dataset contained a news headline and 5,000 labeled fake news. Every tweet we supplied contained its related interaction metrics (like, retweet, etc.).

B. Tools and Libraries

Models using the following libraries: were implemented in Python

And

- for SVM and Random Forest classifiers we use Scikit-learn
- TensorFlow and Keras. LSTM implementation with
- by huggingface for BERT-based models. Transformers

C. Model Evaluation

We following metrics: evaluated the models via the

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Accuracy:
The proportion of correct predictions.
• predictions. Precision: The ratio of true positives over all positive
• ratio of true positives to all actual positive patterns. Recall: The
• Recall. F1 Score: Harmonic Mean of Precision and

V. RESULTS AND DISCUSSION

is Below the experimentation results performance:

Model	Accuracy	Precision	Recall	F1-Score
SVM	85.4%	84.2%	85.8%	85.0%
LSTM	89.2%	88.5%	89.9%	89.2%
BERT	92.5%	92.0%	92.9%	92.4%

01-PreprocessingThe these five folds. This also SVM, LSTM, and BERT models were evaluated across underlies the advantage of transformer-based models in learning complex text data. The LSTM model, had a slightly relationships and semantics from definitely lower, but still respectable accuracy compared to the BERT model, and would be useful for less computationally intensive environments.

Challenges

the Although results were promising, several challenges were identified:
• Label Imbalance: The data set may have been heavily unbalanced in terms of the model. number of real and fake news, which may skewed the performance of the
• Ambiguous Content: Contextually rich articles that were neither purely fake nor source of ambiguity and necessitated a more advanced purely real were often a understanding of context and subtle features in the news articles.
• environments, Real Time Detection: While the models performed okay in controlled they are not yet optimized to be deployed in real-time application on a larger scale.

VI. CONCLUSION

In that AI-based techniques, namely deep learning models like this paper we show LSTM and BERT can accurately identify fake news using the social media data detection of alone. The textual and user behavior features can provide a robust able to achieve more accuracy than fake news. BERT, was specifically traditional Machine learning algorithms and thus were better suited for real time detection tasks enterprise context.
Further study will analyze potential avenues for better model performance in scenarios to data imbalance and ambiguous news detection. including but not limited and video data, Moreover, combining different forms of data, including image may improve the ability to detect fake news.

REFERENCES

[1]. T., S. S. (2024). SOCIAL MEDIA AND THE INFLUENCE OF FAKE NEWS DETECTION BASED ON ARTIFICIAL INTELLIGENCE. *ShodhKosh: Journal of Visual and Performing Arts*, *5*(7), 77–87.
[2]. Gupta, A., Li, H., Farnoush, A., & Jiang, K. (2021). W. Understanding Patterns of COVID Infodemic: A Systematic and Pragmatic Approach to Curb Fake News.Journal of Business Research.
[3]. De Cock Buning, Madeleine. 2018. *A Multi-Dimensional Approach to Disinformation: Report of the Independent High Level Group on Fake News and Online Disinformation*. Luxembourg: Publications Office of the European Union.

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[4]. Grizzle, Alton, Carolyb Wilson, Ramon Tuazon, Chi Kim Cheung, Jesus Lau, Rachel Fischer, Dorothy Gordon, Kwame Akyempong, Jagtar Singh, Paul R. Carr, and et al. 2021. *Media and Information Literate Citizens: Think Critically, Click Wisely!* Paris: UNESCO Publishing.

[5]. Bostrom, Nick. 2018. *Superinteligência*. Rio de Janeiro: DarkSide Books