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Paper Title:Unifying Vision and Language for Robust Fake News Detection Using Novel Deep Samples

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Outline

- Introduction (try to answer what it is, why it is, and what is (are) existing problems, why the problem is so important to discuss; may cite in the footer)
- Motivation & Contributions
- Proposed System Model
- Results and Discussion
- Conclusion
- Reference

Introduction

- It is about detecting fake news on social media by using smart computer models that look at both the words and the images in posts.
- Fake news can spreads quickly and can confuse or mislead people. Social media makes it easy for wrong information to reach many users in seconds.
- Most current tools only use text or only use images, so they miss important clues.
- Fake news can affect public opinion, lead to wrong beliefs, and even cause panic or harm. Having strong ways to find and stop fake news helps protect people and keeps online information true and reliable.
- Combining text and image helps improve detection. This research introduces new models for better accuracy.

Motivation & Core Contribution

- Most fake news tools only use text or only images.
- We built systems that use both, together.
- We combine new deep learning models for better results.
- Our models are more accurate than previous ones.
- Achieved top results with less computer power, so models can be used easily.
- There is a need to make detection both accurate and fast so it works well in real life.

Literature Review

- Earlier research used basic machine learning (SVM, Decision Trees) and deep learning (BERT, LSTM, CNN).
- Some tried mixing text and images, but it wasn’t perfect.
- Earlier work missed strong ways to join the information from both.
- Deep learning like LSTM, CNN, BERT helped with text, but images were handled separately.
- Multimodal fake news detection is the recent trend: combining both with models like BERT+ResNet and CLIP.
- This work tries new model mixes for better results.

Proposed System Model

- We designed three new systems.
- Each system takes both text and images.
- All together make better predictions.
- Data cleaned: only posts with both text and image, removed bad data.
- Models join (fuse) text and image features for decision.
- Models built and tested:
    1. Text: BERT, DistilBERT, CLIP
    2. Images: MobileNetV2, EfficientNet, CLIP
    3. Classifier: MLP (a type of neural network)

Simulation Setup

- Dataset: Fakeddit (has text and images).
- Images resized, text cleaned.
- Trained models on powerful GPUs.
- Main metrics: accuracy, precision, recall, F1 score.
- Data split: 80% train, 10% validate, 10% test.
- Models trained for 10 to 15 epochs with early stopping to avoid overfitting.

Result and Discussion

- BERT + MobileNetV2 model accuracy: 91.03% (best).
- CLIP + MLP accuracy: 88.2%.
- DistilBERT + EfficientNet + MLP: 82%
- Using both text and images is much better than using one.
- Precision, recall, and F1 scores shown in bar graphs.
- Confusion matrices used to check prediction strengths/weaknesses.

Conclusion & Future Work

- This work showed how using both text and images helps us catch fake news better than old methods.
- The three new models are strong, fast, and use less computer power.
- Tests proved our models are more accurate than others before.
- The BERT + MobileNetV2 system gave the best results. These methods can make social media safer and more trustworthy.
- Use new data types, like videos or audio, for even better detection.
- Explore how using extra features (like user behavior or location) can help.

References

- Choi et al. (2023): Image-text coherence networks for fake news detection.
- Dai et al. (2024): Light multimodal transformers for real-time fake news classification.
- Gao et al. (2025): Contrastive learning for robust fake news detection across modalities.
- Guo & Tang (2024): Multi-modal semantic alignment networks for misinformation detection.
- Gupta et al. (2024): Transformer-enhanced multimodal fake news classifier.
- Lakshminadh et al. (2025): Deep Learning for Pest Identification Using VGG Networks.

Reviewer Comments Addressed

- Added more details about the filtered Fakeddit dataset, including class balance and selection criteria, to help reproducibility.
- Upgraded equations and technical explanations based on reviewer feedback.
- Expanded datasets/fusion techniques in future work as suggested.
- Revised English writing, grammar, and formatting for clarity and IEEE compliance.
- Improved figure clarity (legends, labels, discussion in text).

Thank You