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Assignment Report: Detecting Fake News Related to the Syrian Conflict on Social Media Using Machine Learning and Deep Learning Techniques

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Detecting Fake News Related to the Syrian Conflict on Social Media Using Machine Learning and Deep Learning Techniques

Problem Statement

With viral fake news on social media, it is framing the Syrian war. False information lies and manufactured plots do not only affect what people believe, they can also disrupt societies, shift how countries respond and intensify existing tensions.

Old-school machine learning methods such as SVM, RF, and NB notice some of these, but miss the nuances of Arabic dialects and the semantic context of posts on the conflict. More recently, deep learning models such as LSTM, BiLSTM and transformer-based models such as AraBERT have outperformed. But they are limited by small datasets and the ever-changing social media environment (Hussein et al., 2021).

This problem is urgent. Disinformation influences public opinion, humanitarian response, and policy.

Its objectives are to survey existing methods, assess their strengths and weaknesses, and design an effective fake news detection system for the Syrian conflict on social media using state-of-the-art machine learning and deep learning models.

Research Objectives

- 1. To comprehensively analyze existing methods for Arabic fake news detection**
 - To identify datasets, preprocessing techniques, and linguistic challenges specific to Arabic content.
- 2. To investigate the failure of current ML and deep learning models to detect conflict misinformation.**
 - To evaluate machine learning and deep learning models on Syrian conflict data

- To assess traditional ML methods (SVM, Random Forest, Naïve Bayes) for accuracy, precision, recall, and F1-score.
- To capture Arabic dialects, semantics, and time in Deep learning models (LSTM, BiLSTM, CNN-LSTM, transformers)

3. To identify out the critical hurdles and blind spots in Syrian conflict-specific fake news detection

- To highlight issues such as data scarcity, imbalance, dialectal diversity, temporal dynamics, and ethical considerations. These problems affect both schema model robustness and real-world utility.

4. To provide a more holistic model for fake news detection regarding the Syrian war

- To integrate insights from previous studies and best-performing models to develop a hybrid detection approach. including preprocessing, feature extraction, and model selection for the language and context of Syrian social media.
- To guide tips for data set generation, model evaluation, and ethical deployment in political contexts.

Literature Review

Arabic Fake News Detection

The detection of fake news in Arabic has attracted increasing attention due to **the language's morphological complexity, dialectal diversity, and script variations** (Al-Ayyoub et al., 2019). Social media platforms such as **Twitter** and **Facebook** have been primary channels for the rapid dissemination of misinformation. Traditional machine learning approaches have typically relied on lexical, syntactic, and semantic features. While these methods can capture basic patterns, they often struggle to interpret subtle contextual cues or address previously unseen topics (Salloum et al., 2019).

Deep Learning Approaches

Recent work has shown that deep learning models, including LSTM and CNN architectures, can effectively **capture temporal dependencies and semantic patterns** in Arabic text (Hussein et al., 2021). Transformer-based models, particularly AraBERT and multilingual BERT variants, have further improved detection capabilities by generating **contextual embeddings** that better represent nuanced misinformation. Nonetheless, these approaches demand substantial amounts of labeled data and are constrained by the **limited availability of Syrian conflict-specific datasets**.

Syrian Conflict-Specific Studies

Studies explicitly targeting fake news related to the Syrian conflict remain scarce. The datasets available are typically small, manually curated, and often reflect **political bias, propaganda, or sentiment manipulation**. Reported model performance varies **traditional machine learning** approaches achieve accuracy levels of 70–80%, while transformer-based models can **reach F1-scores of up to 90%** on these limited datasets (Darwish et al., 2020; Hussein et al., 2021).

Challenges and Limitations

1. **Data Scarcity:** Limited labeled data for the Syrian context reduces model generalizability.
2. **Dialectal Variation:** Syrian dialects and code-switching introduce linguistic complexity.
3. **Temporal Dynamics:** News narratives evolve rapidly, requiring adaptive models.
4. **Ethical Concerns:** Automated detection in politically sensitive areas must consider potential biases and unintended consequences.

Implications for Future Research

Future research should focus on:

- Developing **larger, balanced, and multi-dialect datasets** for the Syrian conflict.
- Exploring **hybrid ML-deep learning frameworks** to leverage the strengths of both approaches.

- Addressing **ethical considerations**, including transparency, fairness, and accountability in sensitive political contexts.

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