**FAKE NEWS DETECTION - A Machine Learning Project**

**Project Team**

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**Project Overview**

**1. Introduction:**

The widespread use of social media platforms has transformed the way information is disseminated and consumed, but it has also given rise to the proliferation of false information and fake news. Traditional methods of manual supervision are unable to cope with the sheer volume and speed of content on these platforms. To address this challenge, this project proposes the development of advanced deep learning models to automatically detect false short-text claims on social media.

**2. Objectives:**

* To develop a machine learning model capable of automatically detecting false information and fake news within short-text posts on social media.
* To create a dataset comprising a diverse range of false and true short-text claims from various social media platforms for training and evaluation purposes.
* To identify key features and factors influencing the classification of social media posts as fake or real.
* To design and implement a scalable and efficient system for real-time monitoring and flagging of false information on social media platforms.
* To evaluate the performance of the model through rigorous testing and comparison with existing methods, demonstrating their effectiveness in mitigating the spread of misinformation.

**3. Methodology:**

1. **Data Collection:** Gather data set from Kaggle.
2. **Preprocessing:** Exploring the data including, data cleaning, conversion, normalization, and feature extraction.
3. **Model Development:** Explore and experiment with various deep learning architectures such as Classification Random Forest, Regression, and Anova for false claim detection.
4. **Training and Optimization:** Train the models on the labeled dataset using appropriate optimization techniques and /hyperparameter tuning?/.
5. **Evaluation:** Assess the performance of the trained models using metrics such as precision, recall, F1-score, and accuracy. Conduct cross-validation and fine-tuning as necessary.

**4. Expected Outcomes:**

* Development of state-of-the-art deep learning models capable of accurately detecting false short-text claims on social media platforms.
* Creation of a benchmark dataset for evaluating false claim detection algorithms in the context of social media.
* Insights into the effectiveness and limitations of different deep learning architectures for this task.
* Demonstration of the potential for automated detection systems to assist in combating the spread of misinformation online.

**5. Impact and Significance:**

* The project aims to contribute to the ongoing efforts to combat the spread of false information and fake news on social media platforms.
* Automated detection systems developed through this project could assist social media platforms, fact-checking organizations, and users in identifying and flagging misleading content.
* Ultimately, the project seeks to foster a healthier online information ecosystem by empowering users with tools to discern credible information from false claims.

**7. Future Directions:**

* Exploration of multi-modal approaches combining text and other modalities (e.g., images, videos) for improved false claim detection.
* Integration of the developed models into existing social media platforms for real-time monitoring and moderation.
* Collaboration with stakeholders to deploy and refine the detection systems in practical settings and address emerging challenges in misinformation detection.

**Table of Contents**

**Loading Dataset**

After extensive research, our team explored numerous datasets on Google Dataset, Kaggle, Data.Gov, Datahub.io, UCI Machine Learning Repository, Earth Dara, and Global Health Observatory Data Repository. Eventually, we narrowed down our selection to [this](https://www.kaggle.com/datasets/arashnic/fake-claim-dataset) specific dataset from Kaggle.

**EDA**

Our dataset was subjected to an exploratory data procedure, which included the elimination of null values, narrowing down the data range, and pruning unnecessary columns.

This proactive step was implemented to guarantee that we had all the essential data required to produce insightful visualizations, effectively showcasing disparities within the dataset.

Our DataFrame shows the following columns

* **'ID':** Identifier for each entry.
* **'label':** Label indicating the truthfulness of the statement.
* **'statement':** The statement made.
* **'subject':** The subject of the statement.
* **'speaker':** The speaker who made the statement.
* **'speaker\_job':** The job or position of the speaker.
* **'state\_info':** Information about the state related to the statement.
* **'party\_affiliation':** The political party affiliation of the speaker.
* **'barely\_true\_counts':** Counts of barely true statements.
* **'false\_counts':** Counts of false statements.
* **'half\_true\_counts':** Counts of half true statements.
* **'mostly\_true\_counts':** Counts of mostly true statements.
* **'pants\_on\_fire\_counts':** Counts of pants on fire (outright false) statements.
* **'context':** Contextual information for the statement.
* **'sentiment':** Sentiment of the statement.
* **'sentiment\_score':** Sentiment score of the statement.
* **'sentiment\_magnitude':** Magnitude of the sentiment.
* **'anger':** Anger score related to the statement.
* **'fear':** Fear score related to the statement.
* **'joy':** Joy score related to the statement.
* **'disgust':** Disgust score related to the statement.
* **'sad':** Sadness score related to the statement.
* **'speaker\_id':** Identifier for the speaker.
* **'list':** Additional list information.
* **'sentiment\_code':** Code representing the sentiment of the statement.

**Data Cleaning**

**Outliers**

**Data Visualization**

**Data Modeling**

**Label Encoding**

**Data Preparation**

**Feature Selection**

**New Dataset**

**Deep Learning Model**

**Resampling the dataset**

**Data Evaluation**

**Heading**

**Technologies Used**

**Appendix**