SPOOKY AUTHOR IDENTIFICATION

NOVEMBER 11, 2021

PREPARED BY

TARFAH ALABBAD

MUNEERA ALSHUNAIFI

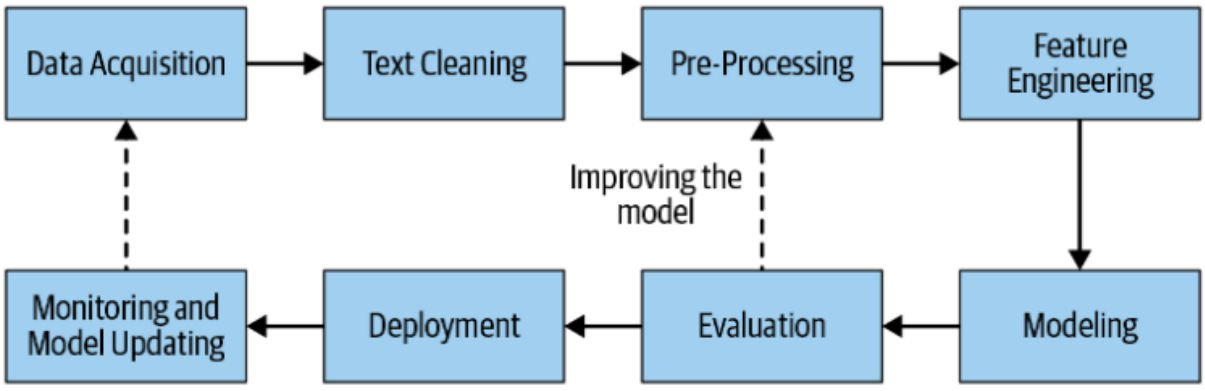
PROJECT REPORT

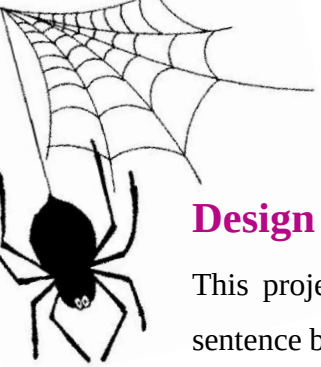
Abstract

In recent years, authorship analysis of anonymous texts in the Internets has received some attention in cyber forensic and data mining communities. Authorship analysis is the study of linguistic and computational characteristics of the documents written by known or unknown authors.

The problem is determining the true author of texts was a task of social interest from the moment it was possible to attribute the authorship of words. With the development of statistical techniques and due to the wide availability of data that can be accessed from the internet, authorship analysis has become a very practical option.

The aim of this project is to predict the author of given sentence, the key idea is to exploit the differences of the writing styles of the authors and use this information to build our models. We will try many experiments in our project using varies classification models and a pre-trained language model and we will focus on some performance measure metrics to evaluate the models such as: Precision, Recall, F1-score and we will see the accuracy confusion matrix. To accomplish the project we will follow the following Natural Language Processing pipeline:





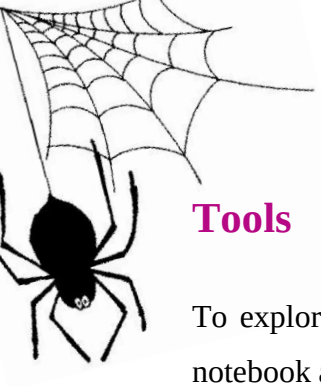
Design

This project originates from the Data Science Bootcamp (T5) to predict the author of given sentence by using multiple classification algorithms and a pretrained language model followed up by the Natural Language Processing Pipeline. The models developed will help reduce and avoid plagiarism and author's impersonation and some other crimes.

Data

The dataset obtained from Kaggle website: https://www.kaggle.com/c/spooky-author-identification/data, it contains text from works of fiction written by spooky authors of the public domain: Edgar Allan Poe, HP Lovecraft and Mary Shelley

Feature	Description	Data Type
ID	Unique identifier for each sentence	object
Text	Some text written by one of the authors	object
Author	Author of the sentence in a shortcut format (EAP: Edgar Allan Poe, HPL: HP Lovecraft, MWS: Mary Wollstonecraft Shelley)	object



Tools

To explore and analyze the data and do the prediction models in python, we will use Jupyter notebook and Python packages, such as: Pandas and NumPy Matplotlib, seaborn and SKLearn for modeling. NLTK and genism and spacy for text pre-processing and cleaning the text Also we will use extra libraries for visualization such as Plotly and wordcloud and we may use Flask framework for deployment.

Algorithms

We applied the preprocessing techniques for the text raw data, we removed punctuations, stop words and convert it to lower case, also we extracted the lemmatized text from the original text feature. Those techniques will help us in resulting a good performance measures for our models. However, We tried some experiments using some machine learning models and a pre-trained language model, the pre trained language model consider as feature engineering step and we used TF-IDF which is statistical measure used to evaluate how important a word is to a document in a collection of documents or corpus. This importance is directly proportional to the number of times a word appears in the document. However, the next step of feature engineering methods we used was Count Vectorize which is a feature extraction tool that select the words/features/terms which occur the most frequently. In addition, , we obtained two different types of machine learning models:

- Supervised: Classification (Multinomial Naïve bayes, SVM)
- Unsupervised: Topic modeling (Latent Dirichlet Allocation LDA), SVD for reducing dimensions

Communication

- Presentation.
- GitHub