Lengthy judgement texts resulted in traditional sentiment models to be biased towards negative sentiment. Summarization of input text and cross validation resulted in improved performance on sentiment classification.

An empirical analysis of appellate copyright jurisprudence in South Africa

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1 Introduction

An empirical analysis of appellate copyright jurisprudence in South Africa is a type of analysis that involves looking at the actual outcomes of cases and the legal reasoning behind them, as opposed to theoretical or abstract discussions of copyright law. Copyright reform in South Africa has seen a dramatic and controversial debate, especially with respect to the appropriate limitations and exceptions to place on copyright protection. There has been no empirical investigation of judicial sentiment on copyright issues and questions in South Africa. Yet, there are claims that copyright law involves aspects of public policy that are determined by courts. The law comprises natural language and one important dimension of legal language is its sentiment which may be found amongst other places, in the identification and classification of judges' opinions and sentiments (as expressed in their court judgments) about issues/questions arising from legislative texts.

The objective of this project is to analyze appellate court decisions in copyright cases
- To identify judgement sentiments.
- To identify key insights into the legal principles, arguments, and outcomes that shape copyright jurisprudence in South Africa.
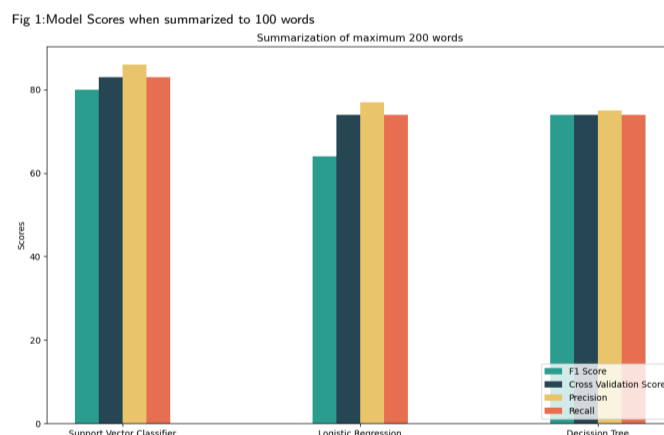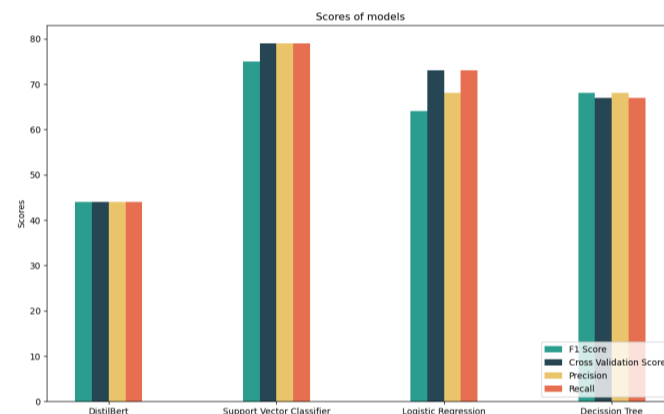
By employing data science techniques, the project seeks to identify patterns in court decisions, explore the judgements sentiments and factors influencing those decisions, and provide empirical evidence on the evolving landscape of copyright law at the appellate level.

2 Methodology

- Data was collected on 35 judgements on copyright decisions made by higher courts in South Africa regarding copyright disputes.
- Data cleansing & pre-processing involved removal of punctuation, lower-casing of text, removal of special characters, spacing and stop words. The text was tokenized in preparation for machine learning models.
- The data was split as follows: 70 percent (No of cases) of the data was used as Training data and 30 percent (No of cases) were reserved as Test data.
- A transformer model 'distilbert-base-uncased-finetuned-sst-2-english' was fine tuned for the classification of sentiment on the dataset.
- Traditional sentiment classifiers such as Support Vector Machine (SVM), Logistic Regression and Decision Trees were also trained on the data set.

3 Results

Fig 1:Model Scores when summarized to 100 words

Fig 2:Model Scores when summarized to 200 words

- In fig 1 & fig 2 Support Vector Machine (SVM) outperforms all the other models followed by Decision Tree when using the weighted F1 - score as a measure of performance between the different models.

4 Discussion

- SVM achieved the best results of an F1 - score of 0.75
- Cross validation was used in conjunction with text summarization using a transformer model (Facebook/BART-large-CNN) on the judgement text and this improved the performance as shown in fig 1 & fig 2.
- The SVM model still achieved the best results with an F1 - score of 0.80.
- The sentence text length has a big impact on the context and thus models are able to perform better when there is more context however, this also affects the performance.

Exploratory Data analysis of Judgement texts