Predicting the election results using

the Historical IEC Election results

and an API for real-time data.

Using the machine learning algorithm, Random Forest

Additional Visualisations

Classifier to predict the South African electoral results.

INTRO

- In an age of ever-changing political landscapes, the need for accurate and predictive electoral modelling has become increasingly important. The primary objective of the project is to addresses this by developing an initial predictive model framework using historical IEC electoral data and API technologies.
- This model aims to predict election results, analyse voter behaviour, identify potential trends, and understand the drivers of voter preferences and party performance.
- This initial framework may be used to aid political analysts, campaign managers, and policymakers in making informed decisions. Furthermore, it is designed to serve as a foundation for future developers and analysts, to facilitate the development and enhancement of subsequent iterations.

RESULTS



HRISTIAN DEMOCRATIC PARTY FRICAN CONTENT MOVEMEN FRICAN NATIONAL CONGRES SANCE UNIT ANCE OF SOCIAL DEMOCRATS - C AGANG SOUTH AFRICA AL JAMA-AH R TRANSFORMATION FOR ALL LIANCE OF FREE DEMOCRAT R RESIDENTS ASSOCIATIO TIAN POLITICAL MOVEMENT PATRIOTS OF SOUTH AFRIC CONGRESS OF THE PEOPL NOMIC ERFEDOM FIGHTER ATION LIBERATION ALLIANC ONGRESS OF SOUTH AFRICA SATION OF SOUTH AFRICA INDEPENDENT DEMOCRATS IKATHA FREEDOM PAR MENT DEMOCRATIC PARTY I DEMOCRATIC CONVENTION NATIONAL FREEDOM PARTY -

- 0.2

Number	of appearances per party:	
2019	48	
2014	29	
2009	26	
Name:	Election Year, dtype: int64	



METHODS

- 1. Given the nature of the historical IEC electoral data, we identified three classifier models: Decision Tree, Random Forest and Gradient Boosting Machines (GBM).
- 2. We selected the best performing classifier model with respect to their predictive abilities.
- Model Performance comparison: 3.

Model	Model Accuracy
Decision Tree Classifier	13%
Random Forest Classifier	<mark>29%</mark>
Gradient Boosting Machines	19%

- Figure 1: Predictive accuracy of the three classifier models considered- Random Forest Selected
- Develop an Application Programming Interface 4. (API) to cater for real-time data input.

0 NIST CONGRESS OF AZANIA -PAN AFRICANIST MOVEMEN EMOCRATIC MOVEMEN - 0.0 Figure 3: The Random Forest Model Performance - Confusion Matrix Graph. DISCUSSION

- **Model accuracy**: 29% for predicting the winning party in the next election.
- **Key constraint**: Limitations of our dataset.
- **Performance impact**: Insufficient historical data and incomplete voter information/features (such as voter demographics)
- **Other factors**: External influences outside the dataset these include IEC data access limitations and incomplete data due to POPI regulations
- **Conclusion**: Although low, predictive value does exist, but accuracy is limited by the data quality and scope.

Figure 5: The number of registered voters from 2009 to 2019



Figure 6: The number of voters VS the party voted for over the period 2009 to 2019



Lance Fick and Thabo Masilo



YUNIBESITHI YA PRETORIA

Department of Computer Science

Faculty of Engineering, **Built Environment and** Information Technology Fakulteit Ingenieurswese, Bou-omgewing en Inligtingtegnologie / Lefapha la Boetšenere,

Tikologo ya Kago le Theknolotši ya Tshedimošo

Capstone Project - MIT 808

Course Coordinators: Dr. Vukosi Marivate (vukosi.marivate@cs.up.ac.za) Abiodun Modupe (abiodun.modupe@cs.up.ac.za)

