

Electoral Trend Analysis and Seat Prediction in Bihar Assembly 2025 Using Machine Learning Algorithms

Dr. Shakti Pandey¹ and Dr. Savya Sachi²

Assistant Professor, Department of Computer Application, J D Women's College, Patna, Bihar¹

Assistant Professor, Department of Computer Application

L N Mishra Institute of Economic Development and Social Change, Patna, Bihar²

Abstract: Predicting electoral outcomes in complex, multi-party democracies like India is a challenging task, particularly in states like Bihar with its unique socio-political landscape. This study employs a machine learning (ML) framework to analyze historical electoral trends and predict the seat share for the 2025 Bihar Legislative Assembly election. Utilizing a dataset spanning from 2005 to 2020, which includes historical results, socio-economic indicators, and incumbency factors, we trained and evaluated multiple classification models. A key finding is the superior performance of the Random Forest classifier, which achieved an accuracy of 89.7% and an F1-score of 0.91 in predicting winning coalitions at the constituency level during cross-validation. The model forecasts a highly competitive election, with the National Democratic Alliance (NDA) projected to secure 125 ± 15 seats, the Mahagathbandhan (MGB) 110 ± 12 seats, and Others 5 ± 3 seats. Trend analysis, conducted via Python, reveals a strong negative correlation ($r = -0.89$) between the ruling coalition's seat share and anti-incumbency sentiment, proxied by inflation and unemployment rates. The results demonstrate that machine learning models, when trained on relevant socio-political data, can serve as powerful tools for political forecasting, providing data-driven insights that complement traditional psephological methods.

Keywords: Electoral Prediction, Machine Learning, Bihar Politics, Random Forest, Political Data Science, Indian Elections, Time-Series Analysis

