# Enhanced salary prediction in data science industry: Integrating economic indicators with XGBoost regression

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Precise salary prediction is essential for addressing job market uncertainties and promoting fair compensation policies across industries. This study uses XGBoost regression algorithm to examine if integrating macroeconomic information improves the accuracy of salary predictions in the data science sector. The study integrates demographic and professional experience data through four years of historical salary information from Kaggle.com which was scraped from Glassdoor and focuses specifically on US data science positions. The dataset underwent comprehensive feature engineering to optimize predictive capabilities. The enhanced XGBoost model integrates GDP growth rate, inflation rate, unemployment rate and interest rate as further predictive characteristics. According to the study, there is a significant increase in prediction accuracy; the improved model's Mean Absolute Error (MAE) of 5021 is 86.6% better than the baseline XGBoost model's MAE of 37554. The model provides forecasting capabilities for upcoming years by effectively capturing salary variances across different job titles, employment categories, and experience levels. The application of macroeconomic indicators demonstrates how economic circumstances have a significant effect on data science compensation systems. The model demonstrates that economic factors such as GDP growth rate, inflation rate, unemployment rate, and interest rate substantially impact salary determination, providing a more comprehensive understanding of compensation dynamics. A Flutter mobile application built around this machine learning model was developed for better practical applicability. It allows users to see income progression charts across several chosen parameters and forecast earnings for the coming years. This study helps job seekers make career decisions and offers HR professionals insightful information for strategic compensation planning. The research improves decision-making skills by providing a trustworthy instrument for assessing earning potential. The results demonstrate that salary prediction models are significantly improved by macroeconomic integration.

**Keywords:** *Machine learning, XGBoost, Salary prediction, GDP growth rate, Inflation rate*