**Capstone Project Proposal**

**Title:** Workforce Attrition Prediction and Insights through HR Analytics

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**Due Date for Proposal:** September 25, 2025

**Project Description:**

Employee attrition is one of the most pressing challenges faced by organizations. High turnover contributes not only to direct costs such as recruitment and training but also to operational disruptions and knowledge loss. Industry studies estimate that replacing an employee can cost 30–200% of their annual salary depending on role complexity. The ability to proactively identify at-risk employees and address retention issues is therefore of significant strategic importance.

This capstone project will develop a predictive analytics framework to estimate the likelihood of employee attrition and generate insights into its key drivers. Using the Opendatabay Employee Attrition dataset (~19,000 employees) and supplementary simulated HRIS data (demographics, job details, compensation, tenure, and satisfaction ratings), I will explore patterns of workforce attrition and build interpretable models. The methodology will include exploratory data analysis, feature engineering, logistic regression, and advanced ensemble models such as Random Forest and XGBoost. Model performance will be assessed with accuracy, AUC, and precision–recall metrics. To ensure interpretability, SHAP values and feature importance analysis will be used to identify the most influential factors behind attrition risk.

The results will be presented through an interactive dashboard (Power BI or Tableau) that visualizes attrition risks across departments and employee segments. The dashboard will allow HR managers to drill down into high-risk categories and explore actionable recommendations, such as compensation adjustments, workload balancing, and promotion planning.

**Expected Outcomes:**

* A predictive model that identifies employees with a high likelihood of attrition.
* An explanation of the key drivers influencing workforce turnover.
* A dashboard that HR managers can use to monitor attrition risk at multiple organizational levels.
* Strategic recommendations for improving employee retention.

**Scope and Feasibility:**

The project will focus on voluntary attrition (resignations) and will not cover involuntary exits such as layoffs or terminations. External labor market influences will be excluded due to dataset constraints. The project scope is appropriately constrained to ensure completion within the semester timeframe.

By combining HR domain knowledge with advanced analytics, this project meets the requirements of the MS in Business Analytics capstone and provides clear relevance to both industry and academic objectives.