ABSTRACT

The performance of a software development team is crucial to achieving optimal results. A team composed of highly skilled individuals does not always guarantee success if synergy and role distribution are not well-balanced. The main problem addressed in this study is how to optimally form a software development team based on individual competencies to enhance project success.

This study employs a data mining approach to analyze individual competency patterns and determine the optimal team composition. The dataset comprises four years of Software Engineering course records from Telkom University. Predictive models were developed using Decision Tree, Random Forest, and Gradient Boosting algorithms to evaluate the relationship between individual competencies and team performance. Additionally, SMOTE (Synthetic Minority Over-sampling Technique) was applied to address data imbalance issues.

The findings indicate that Random Forest achieves the highest accuracy in predicting team success, while the combination of soft skills and hard skills significantly influences team performance. This model enables the automated formation of competency-based teams using a best-path algorithm, enhancing efficiency and effectiveness in software development projects.

The proposed model can be implemented in both academic and industrial settings to support recruitment strategies and competency-based resource allocation, ultimately improving project success rates.

Keywords: Data Mining, Team Formation, Competency, Decision Trees, Random Forest, Gradient Boosting, Academic Performance Analysis.