

# Chapter 18

## The Future of HR Analytics Using Machine Learning to Predict and Improve Employee Performance: Optimizing Workforce Strategy Through Advanced Data Analysis

**S. Shanmathi**

 <https://orcid.org/0009-0009-1530-7703>

*Christ University, India*

**Ajin Giny Kattampally**

 <https://orcid.org/0009-0006-6827-8721>

*Christ University, India*

**Sreedevi Narayana**

*CMR Institute of Technology, India*

**Vaishnavi Balaji**

 <https://orcid.org/0000-0001-5047-4333>

*Christ University, India*

### ABSTRACT

*In today's fast-paced business landscape, efficient project management is crucial for organizations to achieve optimal productivity and meet strategic objectives.*

DOI: 10.4018/979-8-3693-6215-0.ch018

*Our project management website offers a robust solution to streamline project management processes and enhance team collaboration. The platform provides comprehensive functionalities, including project and task assignments, real-time progress tracking, and performance evaluation. Key features of our platform include the ability to assign projects and tasks to employees, track the completion status of tasks, securely store project documents directly on the website, generate detailed reports, and evaluate employee performance based on task completion and project outcomes. By centralizing project-related activities within a single digital platform, our solution empowers organizations to optimize resource allocation, improve communication among team members, and monitor project milestones effectively.*

## **INTRODUCTION**

The main exploration of the research work is utilizing AIML methodologies to check employee performance based on a set of features or parameters. The research leverages a comprehensive dataset with diverse features such as demographic information, job roles, and historical performance metrics. By harnessing this historical input parameter, the study aims to uncover underlying relationships that can aid in forecasting individual employee performance. The research methodology involves meticulous data preprocessing to guarantee the predictive models' quality and reliability. This includes handling missing values, encoding categorical variables, and standardizing the numerical features. Through exploratory data analysis, the study highlights the underlying structure of the dataset for effective predictive models. To achieve the research objectives, various machine learning algorithms are employed, including Random Forest (RF), Support Vector Machines (SVM), and Gradient Boosting(GB). These algorithms are evaluated using performance measures like accuracy, precision-recall, and F1-score curves to assess their effectiveness in predicting employee performance.

The outcomes of this study present promising results, with predictive models achieving accuracy rates surpassing 80%. This underscores the potential use of ML models in workforce management and its practical implications for organizational decision-making. By harnessing advanced analytics, organizations can optimize human resource strategies and foster a more productive and efficient workforce. The practical implications of this research are significant, as it provides a roadmap for organizations to leverage AIML methodologies in their workforce management, thereby enhancing their decision-making processes and overall efficiency.

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