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A Web-Based Employee Attrition Prediction System using ML and Flask

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Abstract: *Organizations face serious difficulties as a result of employee attrition, which has a negative impact on finances and production. A predictive employee attrition system is created using machine learning methods, notably Random Forest and Gradient Descent, in conjunction with the Flask web development framework to address this problem. Numerous aspects, including number of projects, job satisfaction, time spend in company, and more are examined using the Random Forest algorithm. The program can forecast which employees are most likely to depart the company by training it on past data. Strong predictions are produced by Random Forest, which makes use of a group of decision trees to capture complicated correlations between variables. Additionally, the efficiency of the model is optimized, and the attrition forecasts are improved, using the Gradient Descent approach. Gradient Descent reduces prediction errors and improves the model's accuracy through iterative parameter change. The attrition prediction system is made accessible and user-friendly by using Flask, a web framework built on Python. As a result, the system may be implemented as a web application, allowing businesses to quickly enter personnel data, get attrition projections, and access information on attrition risk factors. Using data from actual employees, the study assesses how well the Gradient Descent and Random Forest models perform when paired with Flask. The system's prediction abilities are evaluated using measures including accuracy, precision, recall, and F1 score. The outcomes show how this strategy is effective in identifying workers who are in danger of leaving their jobs and enabling proactive retention tactics. Organizations can now forecast staff turnover with greater accuracy and usability thanks to the Flask framework's incorporation of machine learning methods like Random Forest and Gradient Descent. Employing this system enables organizations to take well-informed decisions, allocate resources efficiently, and increase employee retention, all of which boost organizational performance and stability.*

Keywords: Employee attrition, Machine learning (ML), Random Forest (RF), Gradient Descent (GD), Flask

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