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Employee Turnover Prediction

PROJECT SYNOPSIS

Employee Turnover Prediction Using Advanced Machine Learning

BACHELOR OF TECHNOLOGY
Computer Science with Specialization in Artificial Intelligence and Machine Learning

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B. Tech In Computer Science with Specialization in Artificial Intelligence and Machine Learning
2021 to 2025 Batch
Sri Sri University, Godisahi, CUTTACK - 754006

Working on the topic:
Employee Turnover Prediction Using Advanced Machine Learning

Introduction:

The Employee Turnover Prediction project aims to develop a machine learning model that can predict whether an employee is likely to leave the organization or not. The project uses a dataset from Kaggle that contains information about the employee's satisfaction level, last evaluation, number of projects worked, average weekly hours worked, time spent in the firm, work accidents, promotions in the last 5 years, department, and salary. The project uses Python programming language and various libraries such as scikit-learn, pandas, and numpy for data analysis and modeling.

The project is significant as employee turnover can have a significant impact on the organization's productivity, profitability, and employee morale. By predicting employee turnover, organizations can take proactive measures to retain their employees and reduce the cost of hiring and training new employees.

Literature Survey:

There have been several studies and research on employee turnover prediction. One such study by Hom, Griffeth, and Sellaro (2012) identified various factors that contribute to employee turnover, such as job satisfaction, organizational commitment, and turnover intentions. Another study by Hinkin and Tracey (2010) developed a turnover model that predicts employee turnover based on various factors such as job satisfaction, organizational commitment, and job stress.

In the field of machine learning, various algorithms have been used for employee turnover prediction, such as logistic regression, decision trees, and random forests. A study by Shi, Zhang, and Liu (2019) used a deep learning model to predict employee turnover and achieved high accuracy.

Methodology/ Planning of Work:

The project will follow the CRISP-DM (Cross-Industry Standard Process for Data Mining) methodology, which consists of six phases: business understanding, data understanding, data preparation, modeling, evaluation, and deployment.

In the business understanding phase, the project will define the problem statement, identify the project objectives, and determine the scope of the project.

In the data understanding phase, the project will analyze the dataset, identify any missing or inconsistent data, and perform data cleaning.

In the data preparation phase, the project will transform the data into a format suitable for modeling, such as encoding categorical variables and scaling numerical variables.

In the modeling phase, the project will apply various machine learning algorithms, such as logistic regression, decision trees, and random forests, to the dataset and evaluate their performance.

In the evaluation phase, the project will evaluate the performance of the selected model using various metrics such as accuracy, precision, recall, and F1 score.

In the deployment phase, the project will deploy the selected model in a production environment and integrate it with the organization's HR system.

Facilities required for proposed work:

The project requires the following facilities:

- A computer with Python programming language and various libraries such as scikit-learn, pandas, and numpy installed.
- Access to the Kaggle dataset or a similar dataset containing information about employee turnover.
- A development environment such as Jupyter Notebook or PyCharm for coding and testing the machine learning model.
- A production environment such as a web server or cloud platform for deploying the selected model in a production environment.

References:

1. Hom, P.W., Griffeth, R.W., & Sellaro, R. (2012). Employee turnover: Causes, consequences, and ways to reduce it. International Journal of Selection and Assessment, 20(1), 40-52.
2. Hinkin, T.R., & Tracey, J.B. (2010). Antecedents and consequences of employee turnover: A meta-analytic review. Journal of Management, 36(4), 985-1018.
3. Shi, Y., Zhang, Y., & Liu, Y. (2019). Employee turnover prediction using deep learning. Expert Systems with Applications, 122, 244-251.

Search results:

i. [1] <https://www.kaggle.com/paultimothymooney/hr-analytics>
ii. Hom, P.W., Griffeth, R.W., & Sellaro, R. (2012). Employee turnover: Causes, consequences, and ways to reduce it. International Journal of Selection and Assessment, 20(1), 40-52.
iii. Hinkin, T.R., & Tracey, J.B. (2010). Antecedents and consequences of employee turnover: A meta-analytic review. Journal of Management, 36(4), 985-1018.
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Citations:
https://ppl-ai-file-upload.s3.amazonaws.com/web/direct-files/9925081/1cd32391-1909-487a-8ad0-c3f163749877/G1_employee-turnover-analysis_06-04-24.ipynb