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High Level Design (HLD)

Employee Attrition Prediction

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Document Version Control

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24/01/2022	1.0	Added Introduction and General description	Amit Kumar
1/01/2022	1.1	Added Design details and abstract	Amit Kumar
7/01/2022	1.2	Created and organized whole document	Amit Kumar
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14/01/2022	1.4	Checked and added Performance	Amit Kumar
19/01/2022	1.5	Added Conclusion and References	Amit Kumar
21/01/2022	2.0	Updated diagrams in Design Details	Amit Kumar

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Table of Content

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Abstract

Quitting job of Employees consisting is a challenging thing for any organization to make their reputation and working consistence. It can lead organization to huge loss. Employee are the backbone of any working organization and their loyalty, dedication for their work and some other parameters plays important role to be with the company. Employee Attrition predication can be calculated with some common factors i.e., dataset of previous employee details who are currently with the company and who quitted. Using some basic details, we can predict the whether he/she is going to leave or not.

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Introduction

1. Why this High-Level Design Document?

The purpose of this High-Level Design (HLD) Document is to add the necessary detail to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions prior to coding and can be used as a reference manual for how the modules interact at a high level.

The HLD will:

- Present all the design aspects and define them in detail
- Describe the user interface being implemented
- Describe the hardware and software interfaces
- Describe the performance requirements
- Include design features and the architecture of the project

2. Scope

The HLD documentation presents the structure of the system, such as the database architecture, application architecture (layers), application flow (Navigation), and technology architecture. The HLD uses non-technical to mildly technical terms which should be understandable to the administrators of the system.

3. Definition

The terms used in the projects are:

- EAP: Employee Attrition Prediction
- ML: Machine Learning
- Org: Organization

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General Description

1. Product Perspective

Employee attrition Predication application is machine learning based Logistic regression model which helps to determine the employee's decision of quitting his job in advance. It can help to instruct the organization's board members if they should open some job or treating their employee on the way they can stick to the company.

2. Problem Statement

To create the machine learning based solution to predict Employee attrition predication based on the parameters.

3. Problem Solution

Develop this EAP application to predict the employee decision for leaving or not which can help organization if they need to hire some employee or treat their existing employee well.

4. Further Improvement

This project can be extended by using some frontend / interface which can be easily use by normal user and make it elegant. It can predict data in few seconds which is very time saving.

5. Data Required

To train the data we need a dataset which is available on the portal and can be accessed using the link down below:

https://github.com/viehgroup/dataset/blob/main/Employee%20Data

6. Tools Used

- Python programming language and frameworks such as NumPy, warnings, Pandas, Scikit-learn, Matplotlib, Seaborn are used to build the whole model.
- PyCharm and Google Collab is used as IDE.
- For visualization of the plots, Matplotlib and Seaborn are used.
- GitHub is used as version control system.

7. Constraints

The EAP system should be easy to use and user friendly. It should have use different model to calculate the data and make prediction.

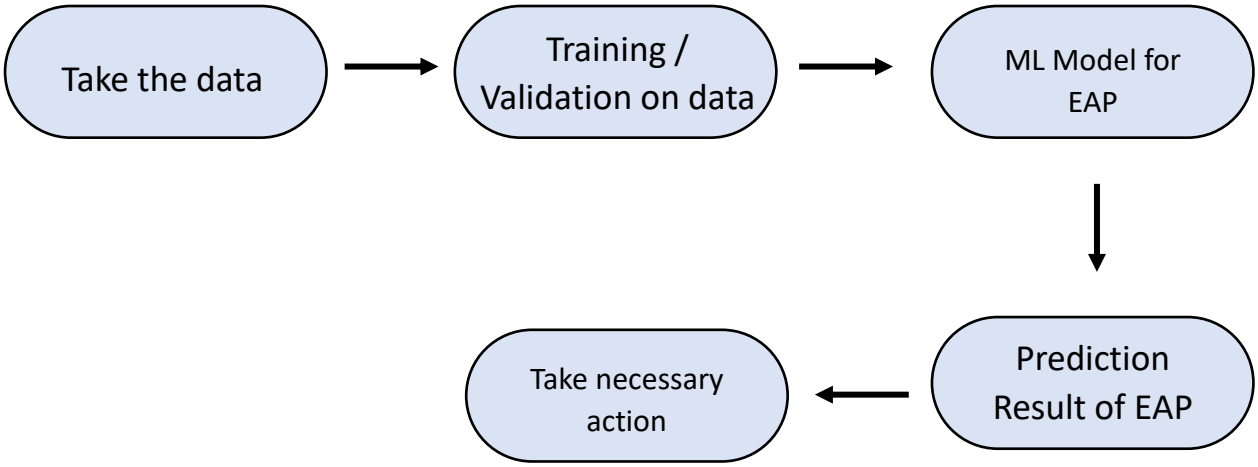
8. Assumptions

The main objective of this project is to examine the data about employee which is given through the CLI and make calculation on the basis of training data using ML and tell us whether that employee is about to leave the org. or not.

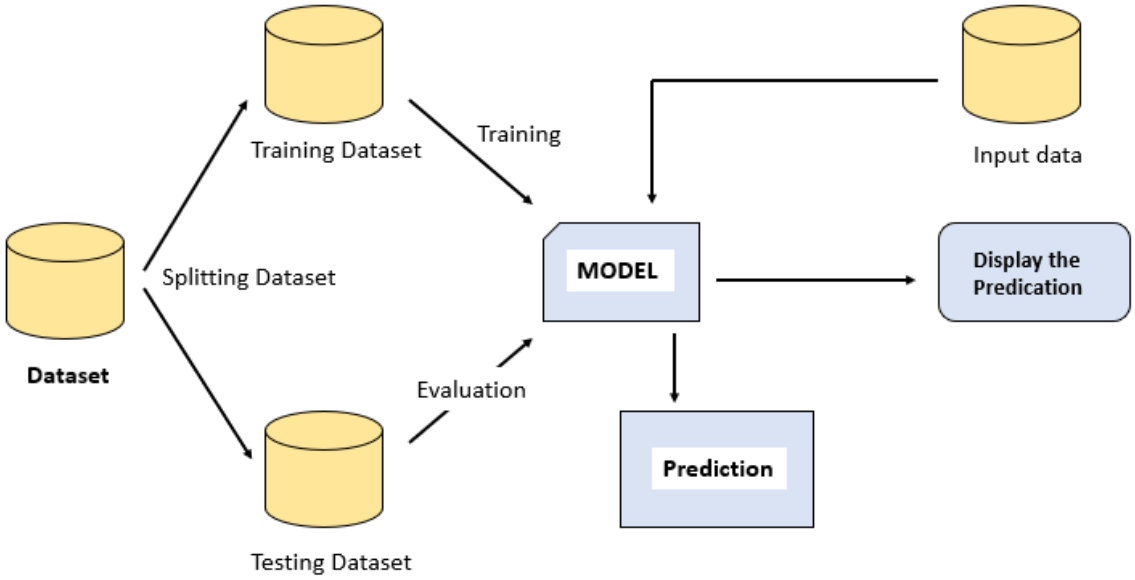
Design Details

1. Process Workflow

For identifying the different types of anomalies, we will use a machine learning model. Below is the process flow diagram.



Model Training and Evaluation



2. Error Handling

We got some error when creating this application in google collab which we solved. Some errors are related to some misunderstanding the dataset but solved by getting help of stack overflow and some other forums.

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Performance

1. Reusability

EAP should be as accurate as possible, so that it will not mislead the Organization. Best possible model will be used to predict EAP. Since we have used Google collab and documentation is available, our project follows reusability.

2. Application compatibility

Since we are using python and it is compatible with any platform, we follow Application compatibility

3. Resource utilization

At the initial stage, we were using high space to create the model. Once the model is created, our system only needs at least of 2GB RAM and 1 GB of storage to run the application smoothly. Whenever user tries to predict the EAP, system uses less than 19% of the processing power.

4. Deployment

The code is deployed in GitHub. The whole system can be used by using the GitHub code on google collab.

Conclusion

This project proposes the machine learning model for EAP. This model can be used for letting the organization about employee decision of leaving. It will be helpful to reduce attrition of employee. It also helps the organization to make their environment and system more interesting for employee.

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References

1. https://scikit-learn.org/stable/user_guide.html
2. https://numpy.org/doc/
3. https://seaborn.pydata.org/examples/regression_marginals.html
4. https://seaborn.pydata.org/examples/scatterplot_matrix.html
5. https://matplotlib.org/
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