

## Assignment: AI & ML Role - Python Programming

### Objective:

This assignment aims to evaluate your proficiency in Python programming and your understanding of key concepts in artificial intelligence (AI) and machine learning (ML).

### Instructions:

You are tasked with completing the following assignment, demonstrating your skills in AI and ML using Python programming:

### Problem Statement: Predicting Employee Attrition

**Dataset:** IBM HR Analytics Employee Attrition & Performance

### Instructions:

1. Dataset Analysis and Preprocessing:
  - Download the IBM HR Analytics Employee Attrition & Performance dataset from a reputable source (e.g., Kaggle).
  - Analyze the dataset to understand its structure and features. It contains various attributes related to employee demographics, job roles, satisfaction levels, performance ratings, etc., along with a target variable indicating whether an employee has left the company (Yes or No).
  - Perform preprocessing steps such as handling missing values, encoding categorical variables, and scaling numerical features if necessary.
2. Model Development:
  - Split the dataset into training and testing sets.
  - Choose suitable machine learning algorithms (e.g., logistic regression, random forest, support vector machine) for binary classification.
  - Implement the selected algorithm(s) using Python libraries like scikit-learn or pytorch.
  - Train the model(s) on the training data and evaluate their performance using metrics such as accuracy, precision, recall, and F1-score.
3. Model Evaluation and Optimization:
  - Analyze the performance of the trained model(s) using evaluation metrics.

- Explore techniques for model optimization, such as hyperparameter tuning, feature selection, or model ensemble methods, to improve performance.
  - Optimize the model parameters and evaluate the impact on model performance.
4. Documentation and Presentation:
- Document the entire process, including dataset analysis, preprocessing steps, model development, evaluation results, and optimization techniques used.
  - Prepare a concise report summarizing your findings, insights gained, challenges encountered, and recommendations for reducing employee attrition.
  - Optionally, create a presentation to showcase your work, highlighting key steps, results, and conclusions.

## **Submission:**

Submit your assignment as a google drive link (public) or github containing:

- Python code files (.py) implementing the data analysis, model development, and evaluation.
- A README file providing instructions for running the code and any additional information.
- A PDF report summarizing your findings and insights.
- A video presentation for showcasing your work (important).

Note: If you encounter any technical difficulties or have questions regarding the assignment, please feel free to reach out to us at [pm@heliverse.com](mailto:pm@heliverse.com) or [anmol@heliverse.com](mailto:anmol@heliverse.com).