

Mini Project Report : Defect Type Prediction using Multi Layer Perceptron.

Overview :

This project involves building a machine learning pipeline to predict defect types from manufacturing inspection data.

The solution uses Tensorflow (Keras), integrated with streamlit for prediction, and automated using Github actions for CI/CD.

Steps involved :

1)* Data Preparation and Preprocessing :

- a) Loaded Manufacturing defects data with multiple features.
- * Cleaned the data and performed one-hot encoding on categorical variables using `pandas.get_dummies`.
- * Use [Standard Scaler] to normalize the input features.

2) Model Building and Training :

Build a multi-layer Perceptron (MLP) model using Keras with 2 hidden layers. (64 and 32 units).

- * used categorical cross entropy loss and Adam optimizer
- * Split the data into Training and Test sets and train the model for

Step 3: Building ML flow:

- * I also used MLflow steps to develop artifacts in an mlflow experiment which the required metrics to visualize the result in MLflow UI.

Step 4: Model Saving and Serving:

- * Saved the Trained model `mlp_model.h5` with the preprocessing tools.
- * Created a streamlit app to achieve real-time interaction with users using simple UI.

Step 5: Github Actions Automations:

- * Set up a Python environment
- * Installed dependencies from requirements.
- * Run mini-project.py automatically on push!

Key learnings from project :

- A Learned how to build and deploy a ML pipeline from data preprocessing to ~~the~~ display with streamlit
- A Use CI/CD to automate ML development using Github actions -
- * Used ML flow to log parameters, metrics and artifacts for better experiment tracking and reproducibility.