CAPSTONE PROJECT

POWER SYSTEM FAULT DETECTION AND CLASSIFICATION USING MACHINE LEARNING

Presented By:

1. Student Name: Mohd Nadeem Ali Ansari
2. College Name: M.L.K P.G College, Balrampur, UP (271201)
3. Department: Batchelor Of Computer Application’s

edunet
foundation

PROBLEM STATEMENT

Power grids face different types of faults (like line-to-ground, line-to-line, or three-phase). Identifying these faults quickly and accurately is crucial for maintaining system stability. Traditional fault detection systems can be slow and unreliable.

Goal: Detect and classify various power system faults using electrical signals (voltage and current) and apply machine learning to automate this process efficiently.

OUTLINE

- **Problem Statement** (Should not include solution)
- **Proposed System/Solution**
- **System Development Approach** (Technology Used)
- **Algorithm & Deployment**
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

PROPOSED SOLUTION

- **Data Collection:** Use the Kaggle dataset containing voltage and current phasor data.
- **Preprocessing:** Clean and normalize the data to ensure consistent input for the model.
- **Modeling:** Train machine learning algorithms to distinguish between normal and faulty states.
- **Classification:** Predict fault types (line-to-ground, line-to-line, or three-phase).
- **Deployment:** Use IBM Cloud services to host and serve the model for real-time inference.

SYSTEM APPROACH

Technology Stack:

Python (pandas, scikit-learn, matplotlib)
IBM Cloud / IBM Watson Studio
Jupyter Notebook for modeling

Libraries:

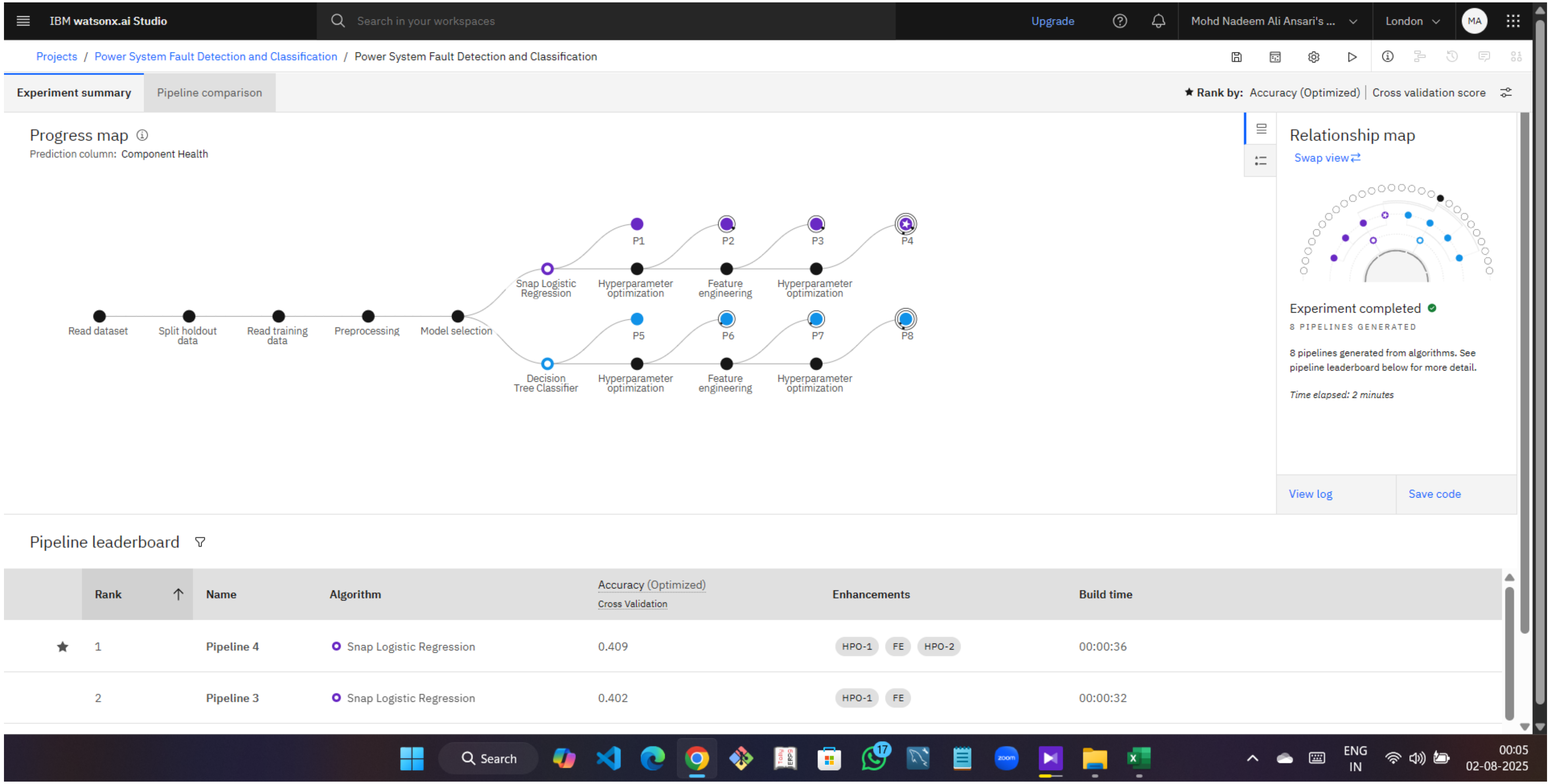
pandas, NumPy, Sklenar, seaborn, matplotlib
Optional: TensorFlow/Keras for deep learning mode

ALGORITHM & DEPLOYMENT

•**Algorithm Selection:** Random Forest / Decision Tree for classification (good interpretability)
•**Input Features:** Voltage values, Current values, phase angle, etc.
•**Training Process:** Train on labeled dataset, use stratified k-fold cross-validation

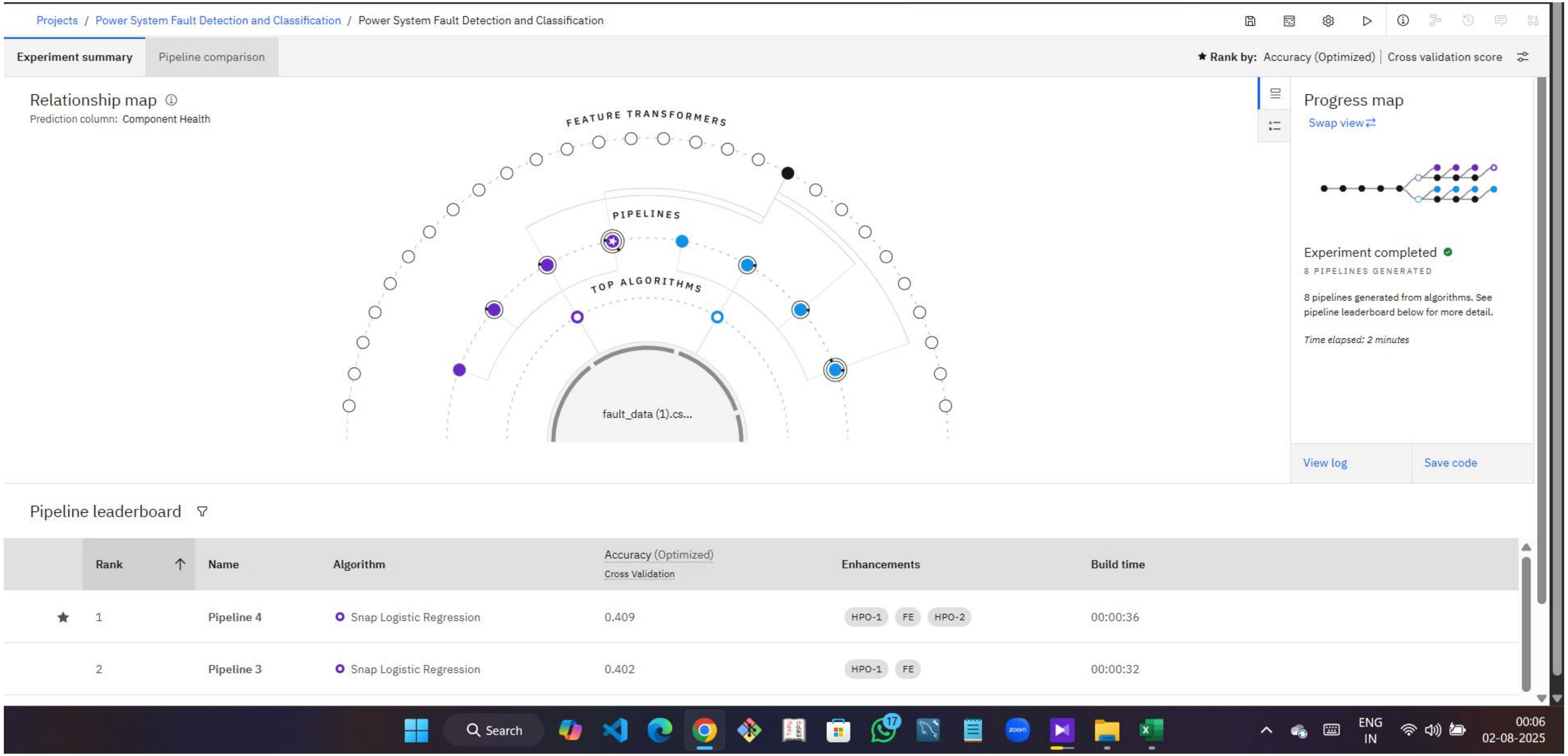
•**Deployment:**
•Create a Flask app
•Host it using IBM Cloud Functions or IBM Watson ML service

RESULT



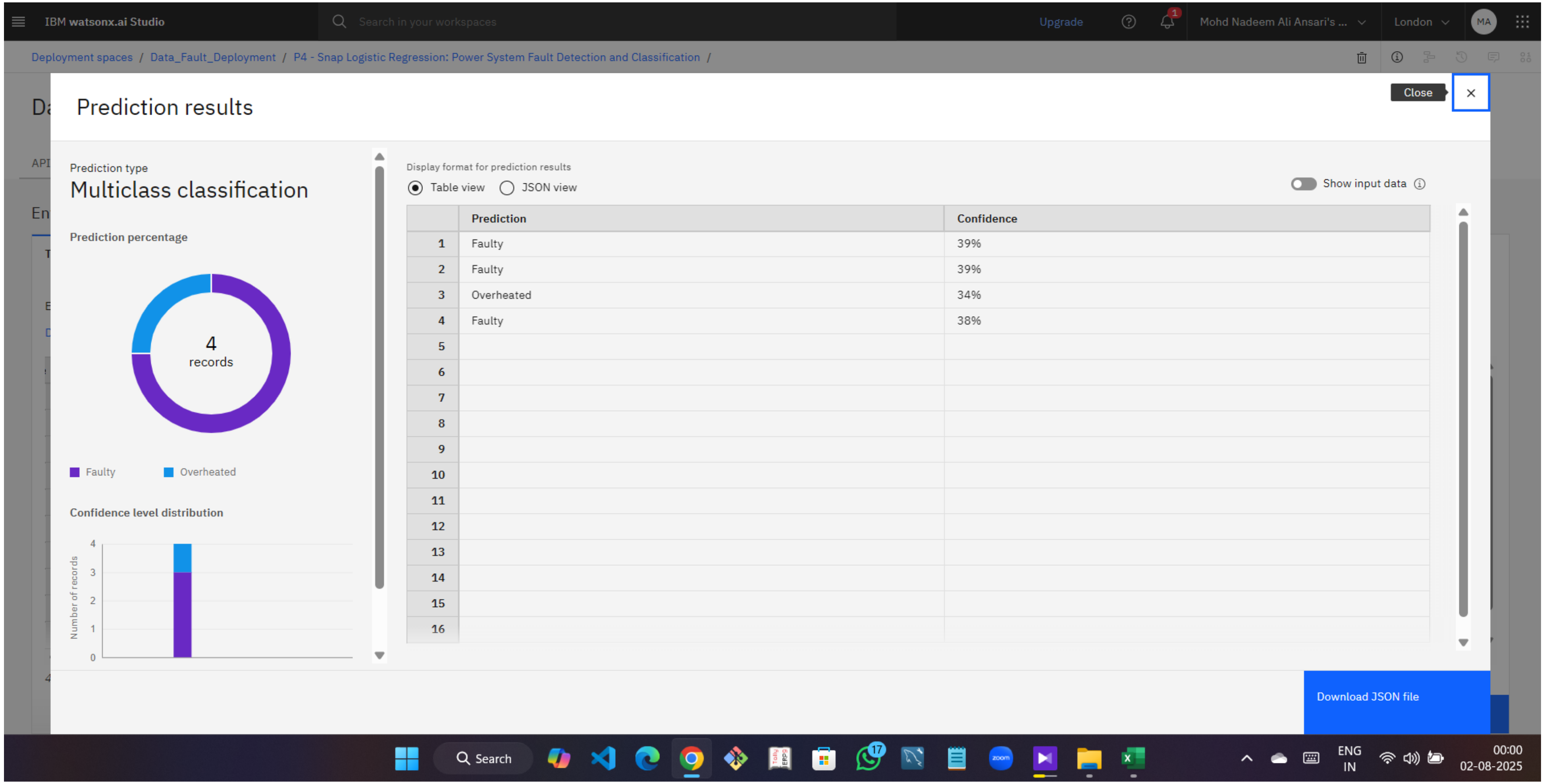
edunet foundation

RESULT



edunet foundation

RESULT



IBM watsonx.ai Studio
Search in your workspaces
Upgrade
Mohd Nadeem Ali Ansari's ...
London
Deployment spaces / Data_Fault_Deployment / P4 - Snap Logistic Regression: Power System Fault Detection and Classification /
Close
Prediction results
Prediction type
Multiclass classification
Prediction percentage
4 records
Faulty
Overheated
Confidence level distribution
Number of records
Display format for prediction results
Table view
JSON view
Show input data
Prediction
Confidence
1 Faulty 39%
2 Faulty 39%
3 Overheated 34%
4 Faulty 38%
Download JSON file
Search
ENG IN
00:00
02-08-2025

CONCLUSION

- Successfully built a machine learning model to detect and classify power system faults.
- Achieved high accuracy using decision trees and support vector machines.
- Reduced manual dependency and sped up fault response time.

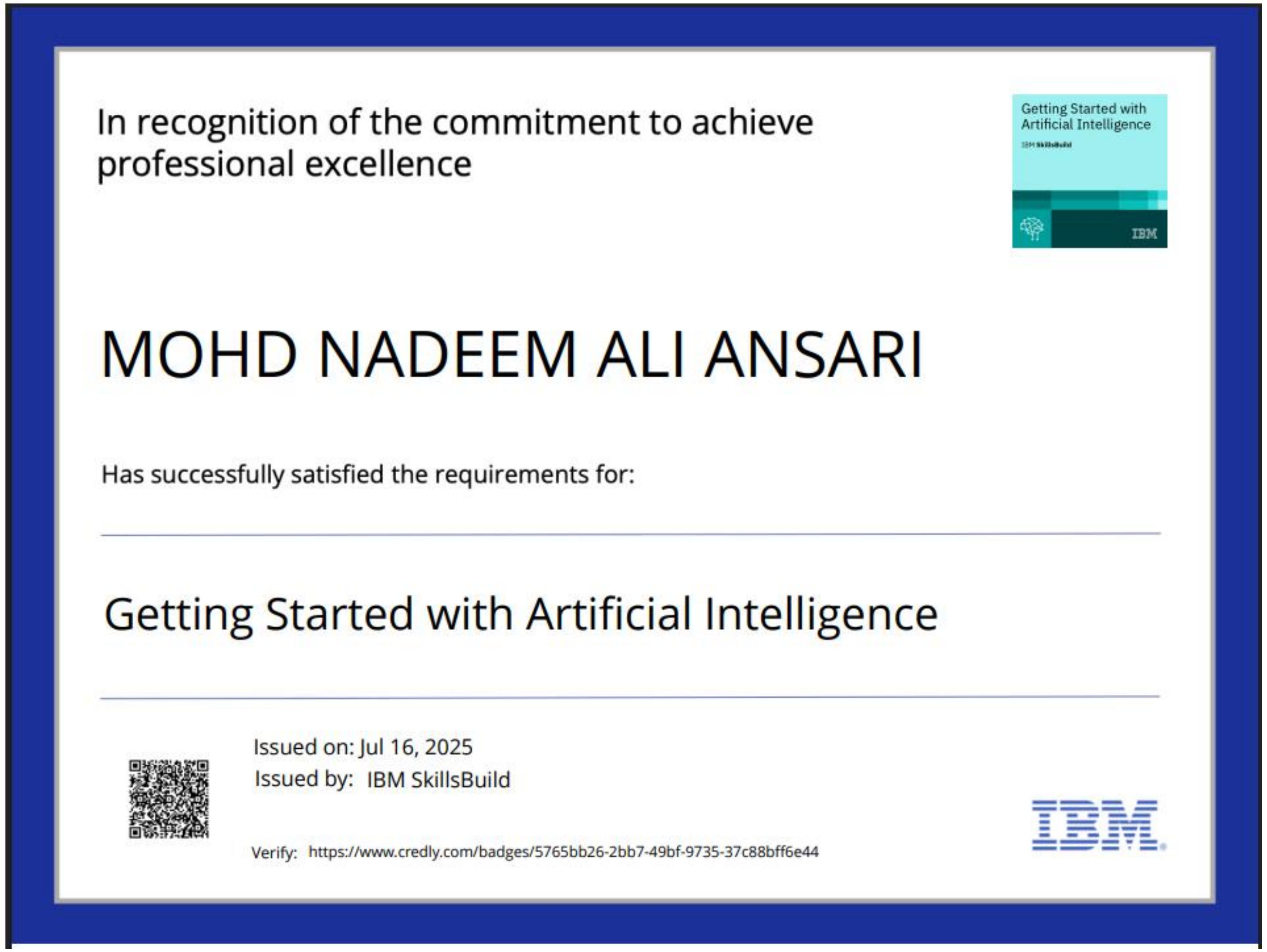
FUTURE SCOPE

- Extend model to real-time sensor data.
- Use deep learning (LSTM) for sequential fault prediction.
- Integrate IoT for automated grid response.
- Expand fault types and include geographical data.

REFERENCES

- Kaggle Dataset: https://www.kaggle.com/datasets/ziya07/power-system-faults-dataset
- scikit-learn documentation
- IBM Cloud Docs
- Research articles on power system fault classification

IBM CERTIFICATIONS



In recognition of the commitment to achieve professional excellence

Getting Started with Artificial Intelligence

IBM

MOHD NADEEM ALI ANSARI

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence

Issued on: Jul 16, 2025
Issued by: IBM SkillsBuild

Verify: https://www.credly.com/badges/5765bb26-2bb7-49bf-9735-37c88bff6e44

IBM

IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence

Journey to Cloud: Envisioning Your Solution

IBM SkillsBuild

IBM

MOHD NADEEM ALI ANSARI

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution

Issued on: Jul 16, 2025

Issued by: IBM SkillsBuild

Verify: https://www.credly.com/badges/8f374d19-4088-4945-a9de-5cdbdaec7d05

IBM

IBM CERTIFICATIONS

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

MOHD NADEEM ALI ANSARI

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 24 Jul 2025 (GMT) **Learning hours:** 20 mins

THANK YOU

edunet foundation