CAPSTONE PROJECT

POWER SYSTEM FAULT DETECTION AND CLASSIFICATION

Presented By:

1. Student Name-Atharva Pate
2. College Name-MIT Academy Of Engineering
3. Department-Computer Engineering

edunet foundation

OUTLINE

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

PROBLEM STATEMENT

Electric power distribution systems face frequent faults like line-to-ground, line-to-line, and three-phase faults. Quick and accurate identification is crucial to minimize outages and maintain grid stability. Traditional protection systems struggle with real-time fault classification, especially under complex conditions.

PROPOSED SOLUTION

The proposed system uses machine learning techniques on IBM Cloud to classify faults in power distribution networks. It processes real-time electrical measurements (voltage and current phasors) to distinguish:

•Normal conditions
•Line-to-ground faults
•Line-to-line faults
•Three-phase faults

Key Components:
•Data Collection (Phasor measurements)
•Feature Extraction (Signal processing)
•Model Training (ML algorithm)
•Real-time Fault Classification
•Cloud Deployment (IBM Cloud services)

SYSTEM APPROACH

The "System Approach" section outlines the overall strategy and methodology for developing and implementing **the Power system Fault Detection and Classification**. Here's a suggested structure for this section:

- **System requirements**

  IBM Cloud

  IBM Watson studio for model development and deployment

  IBM cloud object storage for dataset handling

ALGORITHM & DEPLOYMENT

- **Algorithm Selection:**

  Random Forest Classifier (or SVM based on performance)

- **Data Input:**

  Voltage, Current, and phasor measurments from the dataset

- **Training Process:**

  Supervised learning using labelled fault types

- **Prediction Process:**

  Model deployed on IBM watson studio with API endpoint for real-time predictions

RESULT

Prediction results

Prediction type

Multiclass classification

Prediction percentage

Line Breakage

Transformer Failure

Display format for prediction results

(•) Table view ( ) JSON view

Show input data

	Prediction	Confidence
1	Line Breakage	39%
2	Transformer Failure	35%
3		
4		
5		
6		
7		
8		
9		
10		
11		

Download JSON file

CONCLUSION

- The ML-based fault classification system significantly improves accuracy and response time over traditional protection methods. Real-time analysis helps utilities reduce outage time and improve grid resilience.

GITHUB LINK:

https://github.com/pateatharva77/Power_System_Fault_Detection_AL

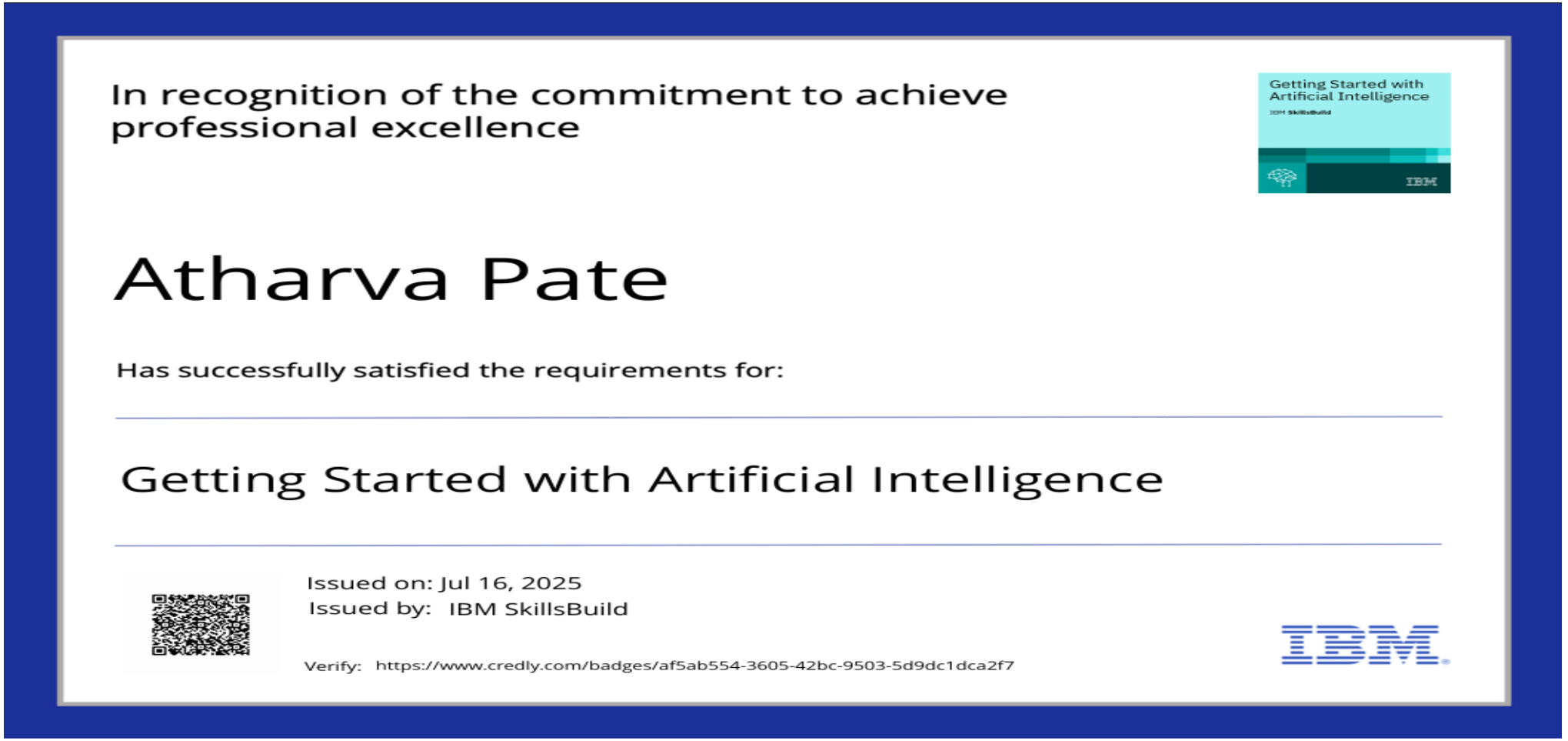
FUTURE SCOPE

- Expand to transmission grid faults
- Integrate with real-time IoT sensor networks
- Use deep learning models (e.g., LSTM) for better temporal pattern detection
- Add predictive maintenance features

REFERENCES

- IEEE papers on power system fault detection
- IBM Cloud documentation
- Scikit-learn, TensorFlow libraries
- Research on phasor measurement-based fault analysis

IBM CERTIFICATIONS



edunet foundation

IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence

Journey to Cloud: Envisioning Your Solution
IBM SkillsBuild
IBM

Atharva Pate

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/5ca2fd93-4564-492e-a875-3ddd113ff68b

IBM

edunet foundation

IBM CERTIFICATIONS

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Atharva Pate

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

edunet foundation

THANK YOU

edunet foundation