MACHINE LEARNING MODEL COMPUTATION IN AWS AND AZURE

Cloud Computing
High Integrity Systems
Frankfurt University of Applied Sciences

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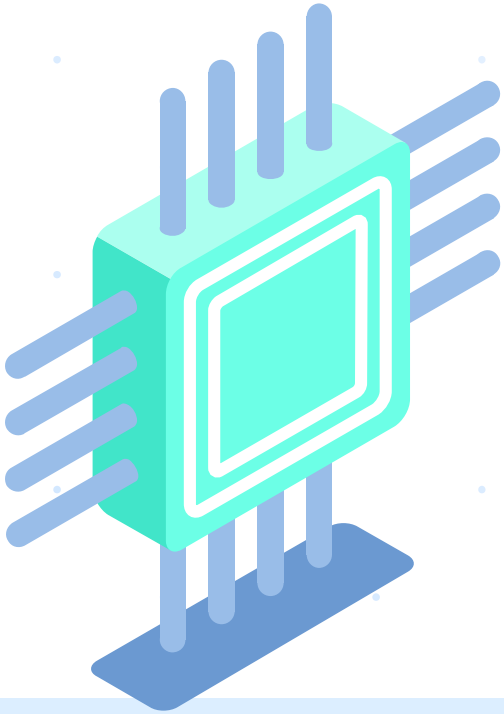
CONTENTS



INTRODUCTION

1

INTRODUCTION

Machine Learning

- Recognizing patterns on the basis of existing databases
- Help of algorithms and statistical models
- Solve new problems
- Analyze previously unknown data

WHAT IS REQUIRED?

- *as much computing capacity as possible* to get out
- *as much data* as
- *as short a time as possible*
- to be able to derive *as many valid and generalizable patterns and laws as possible.*

WHAT IS THE PROBLEM?

- Computing capacity becomes expensive.
- Investments have to be made in a powerful server infrastructure.

MACHINE LEARNING IN THE CLOUD

- Server operated by the cloud provider.
- Various resources such as *applications* (**SaaS**), *computing platforms* (**Paas**) or a *complete IT infrastructure such as storage or servers.*

Advantages

- Simple and inexpensive setup
- Any scalability
- No unused resources
- No long-term contracts

WHERE ARE WE ON THE JOURNEY?

1. Introduction
2. What is Required? What is the Problem?
3. Machine Learning in the Cloud
4. **Use Case & Motivation**
5. Technologies Used
6. Implementation
    A. Dataset Preparation
    B. AWS Implementation
    C. Azure Implementation
7. Future Scope
8. Conclusion

USE CASE & MOTIVATION

Process medical images and diagnose any key pathology present in each image.

Diagnostic tool based on a deep-learning framework for the screening and diagnosing of Pneumonia.

Enabling earlier treatment and better clinical outcomes.

TECHNOLOGIES USED

Amazon SageMaker

Builds ML models

S3 Bucket

Stores data

Jupyter Notebook

Computations, visualizations

IAM

Controls access to AWS resources.

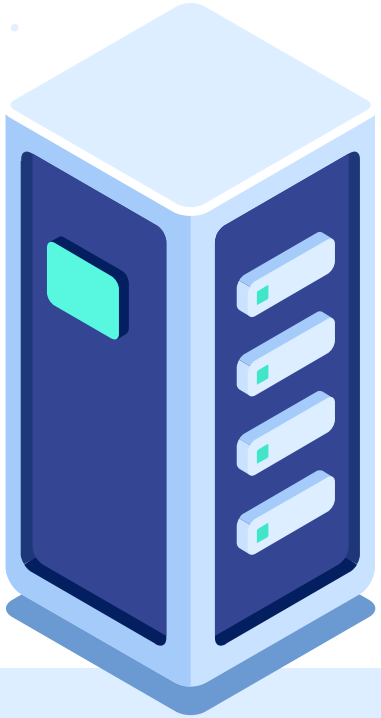
AzureML

Builds ML models

Azure Blob Storage

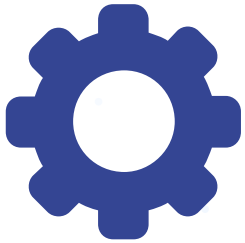
Object storage solution for the cloud

4



IMPLEMENTATION

AWS AND AZURE



DATA

- Model that can diagnose pneumonia using a chest X-Ray as the input.
- 5,856 validated chest X-ray images in this dataset
- Dataset is divided into training, and test set.
- Two sets of independent patients' images.
- The following labels are placed on images:
  (disease: NORMAL/BACTERIA/VIRUS) - (randomized patient ID) - (image number of a patient).

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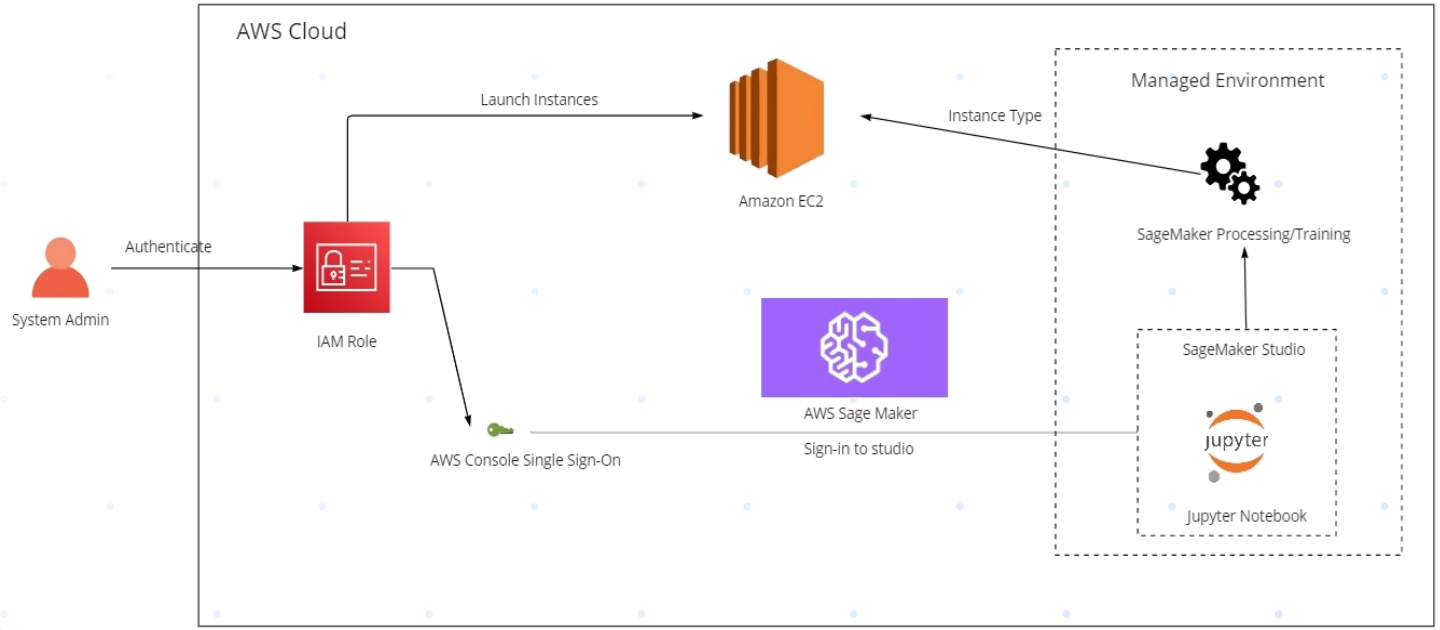
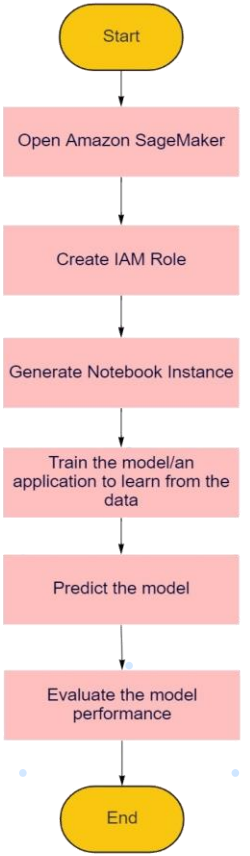
AWS IMPLEMENTATION

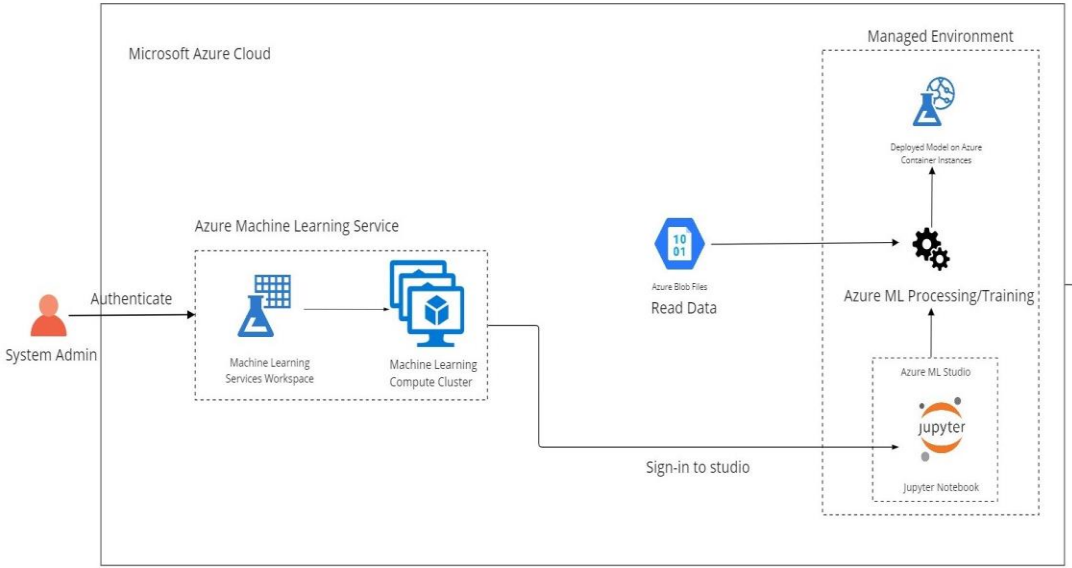
ARCHITECTURE

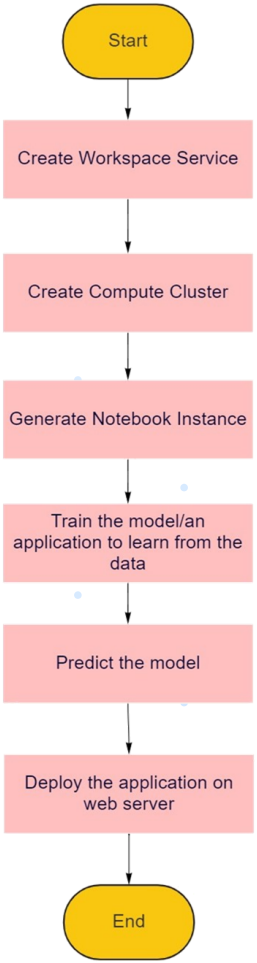




AZURE IMPLEMENTATION

ARCHITECTURE





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FUTURE SCOPE

- Can enhance the model by leveraging current models or by developing new ones.
- Can make use of fast or flask APIs to expand our AWS model.

CONCLUSION

- The approach we developed on AWS is independent of any cloud or local platform whereas the code on Azure includes Azure ML libraries, making it impossible to use the same code on other platforms.

- Our model detects Pneumonia quite effectively, but normal detection is not as successful. Because our purpose is to forecast pneumonia, which is being accomplished over here.

ANY QUESTIONS?

THANK YOU!