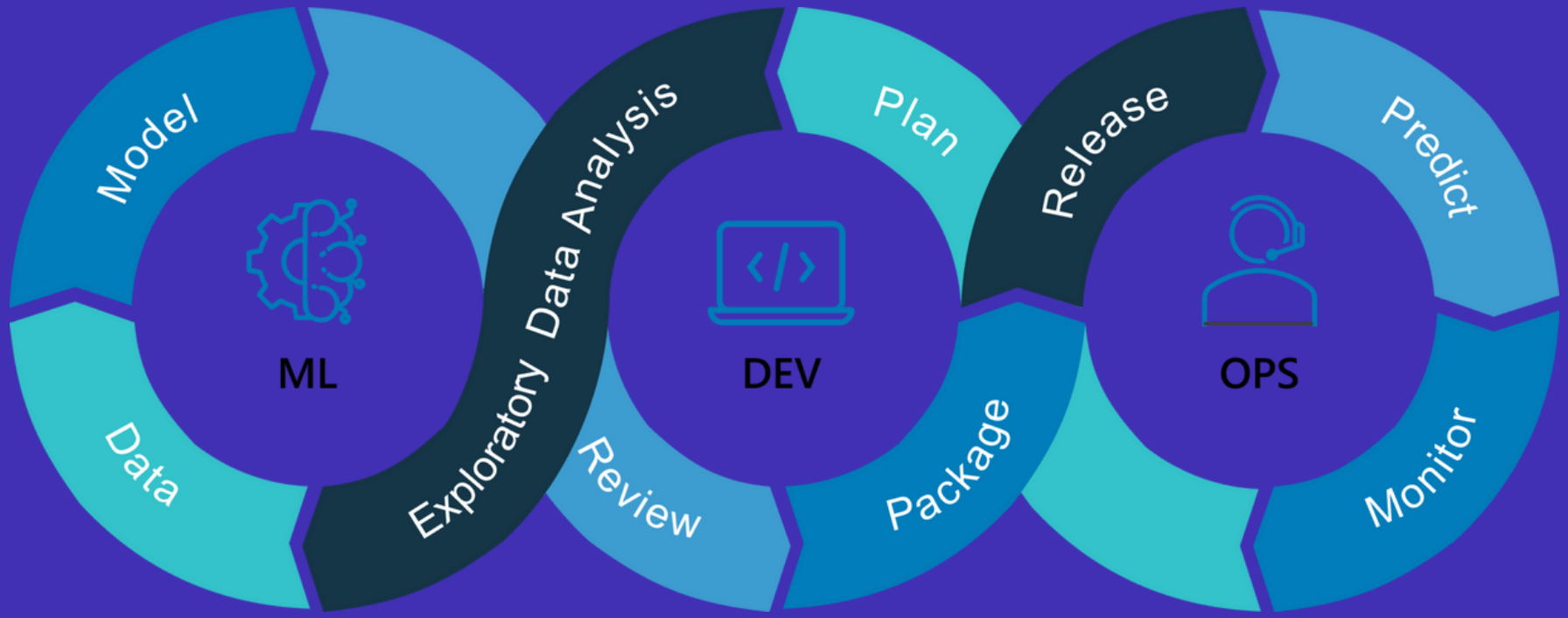
DevOps for Machine learning at Enterprise Scale using AWS Sagemaker



ABOUT ME

CLOUDNLOUD TECH COMMUNITY - LEADER
AND
CO-ORGANISER AWS DATA USER GROUP
BANGALORE

I have 50+ Technical Certification in AWS, Azure, IBM Cloud, CKA/CKAD, TOGAF Level 2 Certified

I started my career as humble Hardware and Networking engineer in 2005 in HCL Infosystem.

Over the last 18 years in my IT Career, I have worked as Wintel, Linux Middleware Engineer, Infrastructure Architect, Cloud Solution Architect, Bigdata Manager, DevOps Leads, and DataPlatform Lead Engineer. I worked in Europe, Canada, and the US for a brief period of time.

I always love to learn - Unlearn - Relearn, Motivated to Share knowledge with peers, community and learn from them.

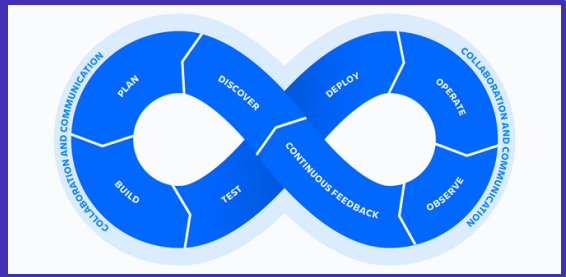
Session Details

01	DEVOPS	• DevOps Principle, Outcome and Values.
02	MLOPS	• Machine Learning Lifecycle • ML - 101 • MLOps Overview and Benefits
03	SAGEMAKER	• Sagemaker Overview and Lifecycle
04	REFERENCE ARCH	• Enterprise Scale MLOps Arch using Sagemaker
05	LAB / DEMO	• Sagemaker MLOPS Template
06	QA AND FEEDBACK	• Feedback about the session

DEVOPS PRACTICE

- Continuous Development
- Continuous Code Testing - Quality
- Continuous Code Testing - Security
- Continuous Integration
- Continuous Delivery
- Continuous Deployment
- Continuous Monitoring
- Infrastructure as Code

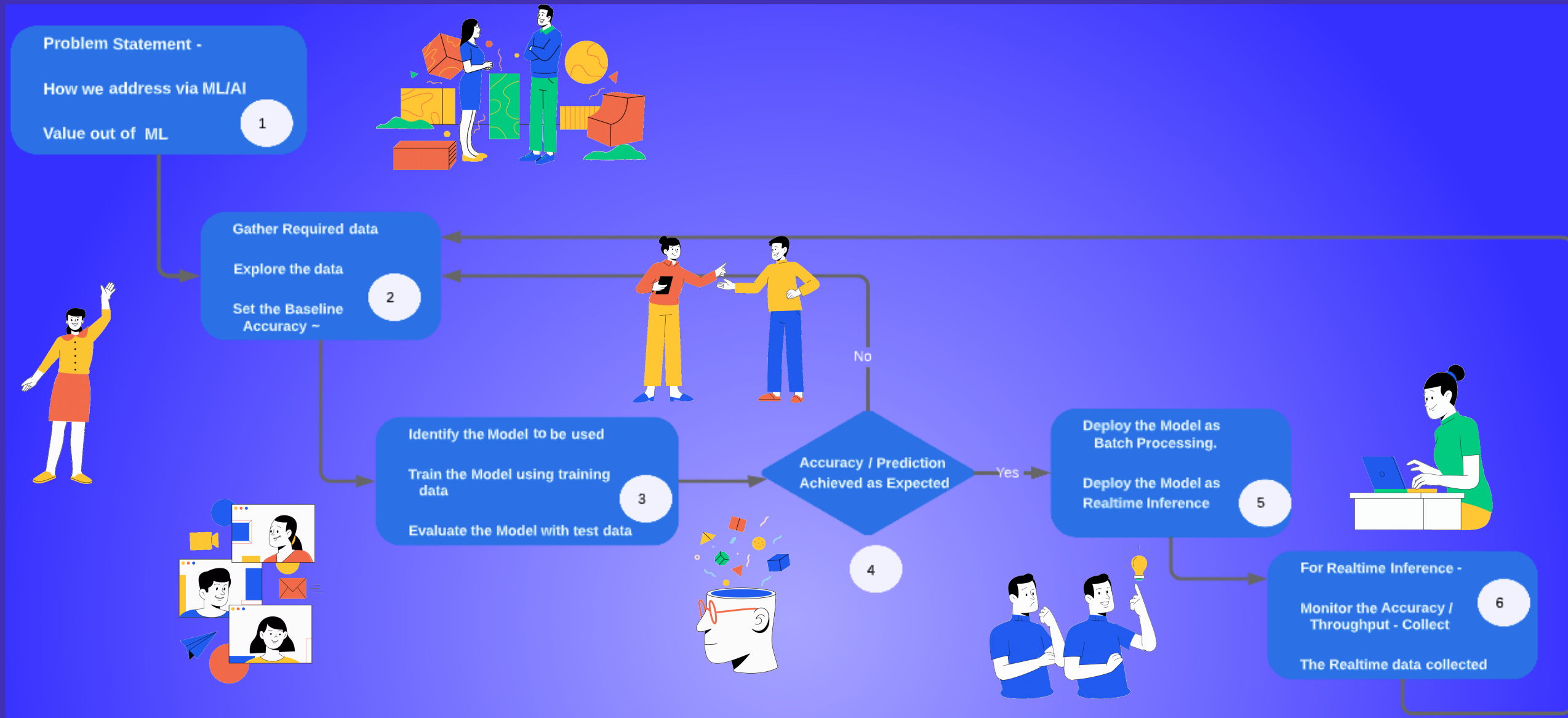
Continuous Improvement



DEVOPS OUTCOMES

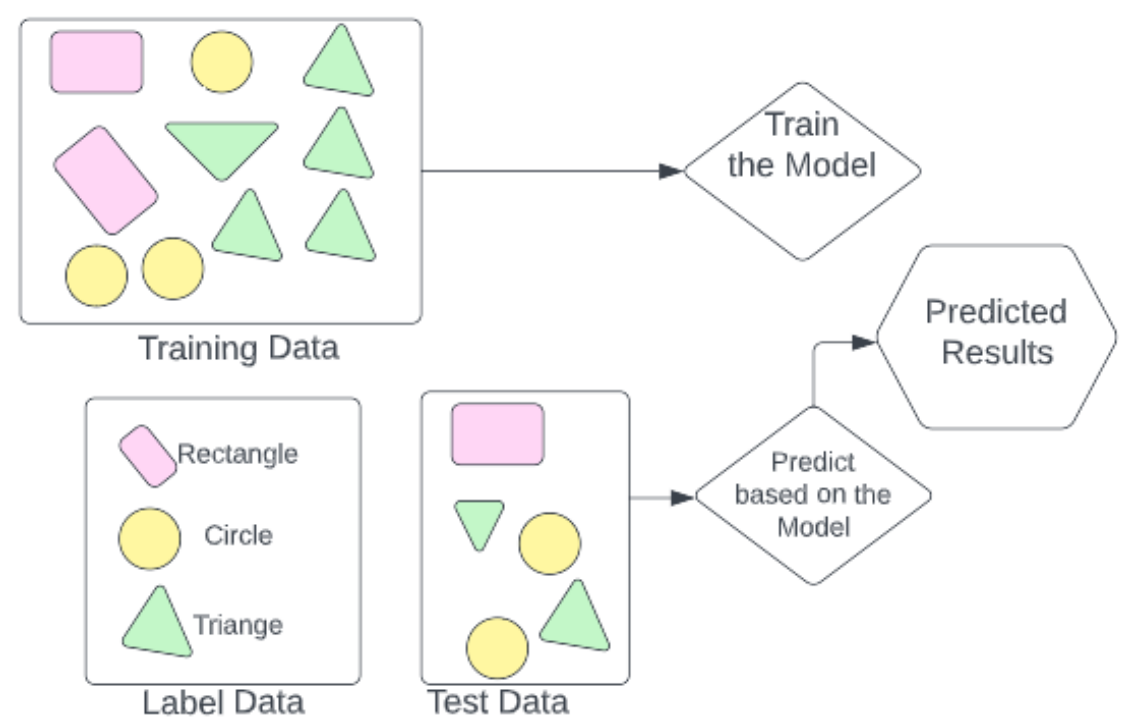
- Faster Product Delivery
- Automation to Improve effeciency
- Shift Left approach
- Quality Deliverable
- Greater innovation

MACHINE LEARNING LIFECYCLE HIGHLEVEL



Machine Learning 101

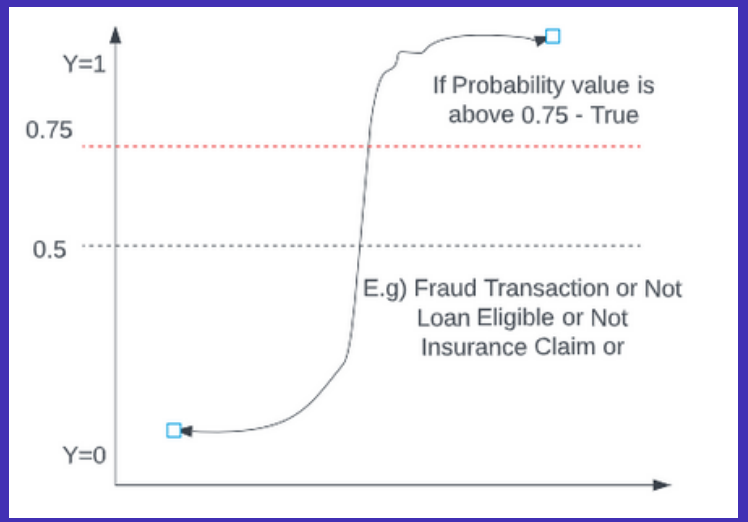
SUPERVISED LEARNING



CLASSIFICATION

LINEAR REGRESSION

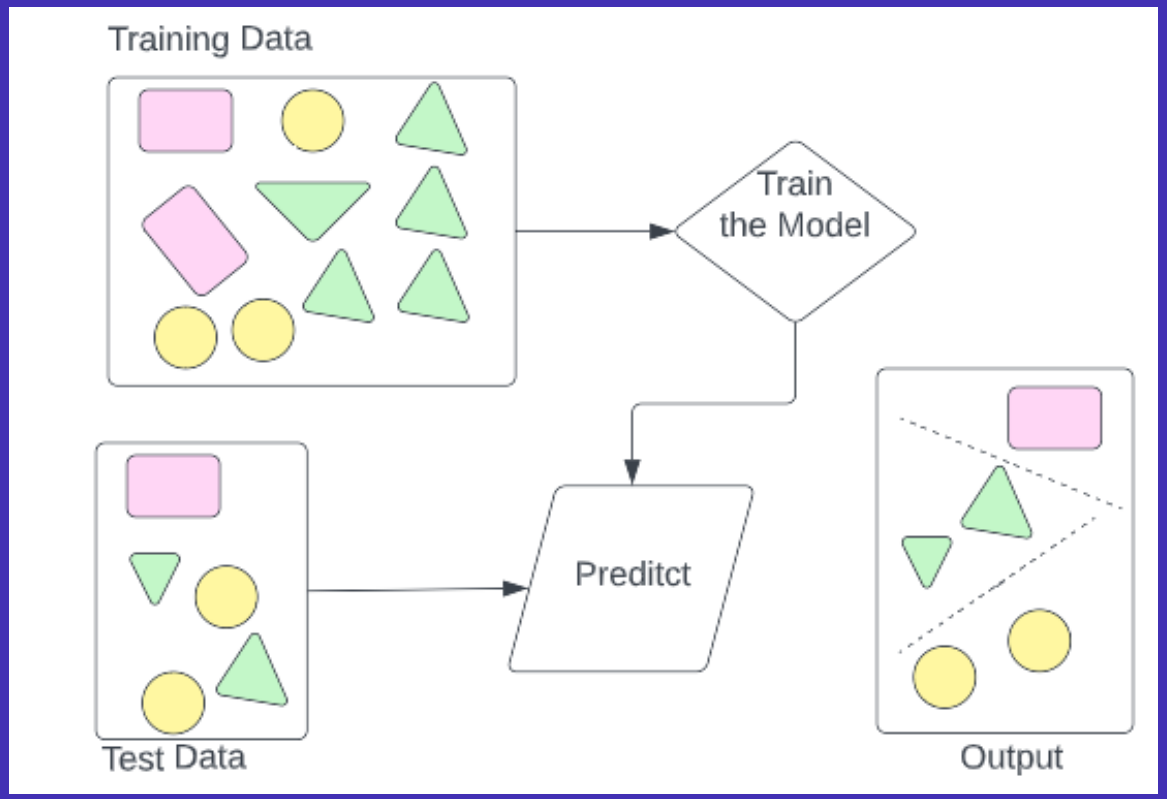
LOGISTIC REGRESSION



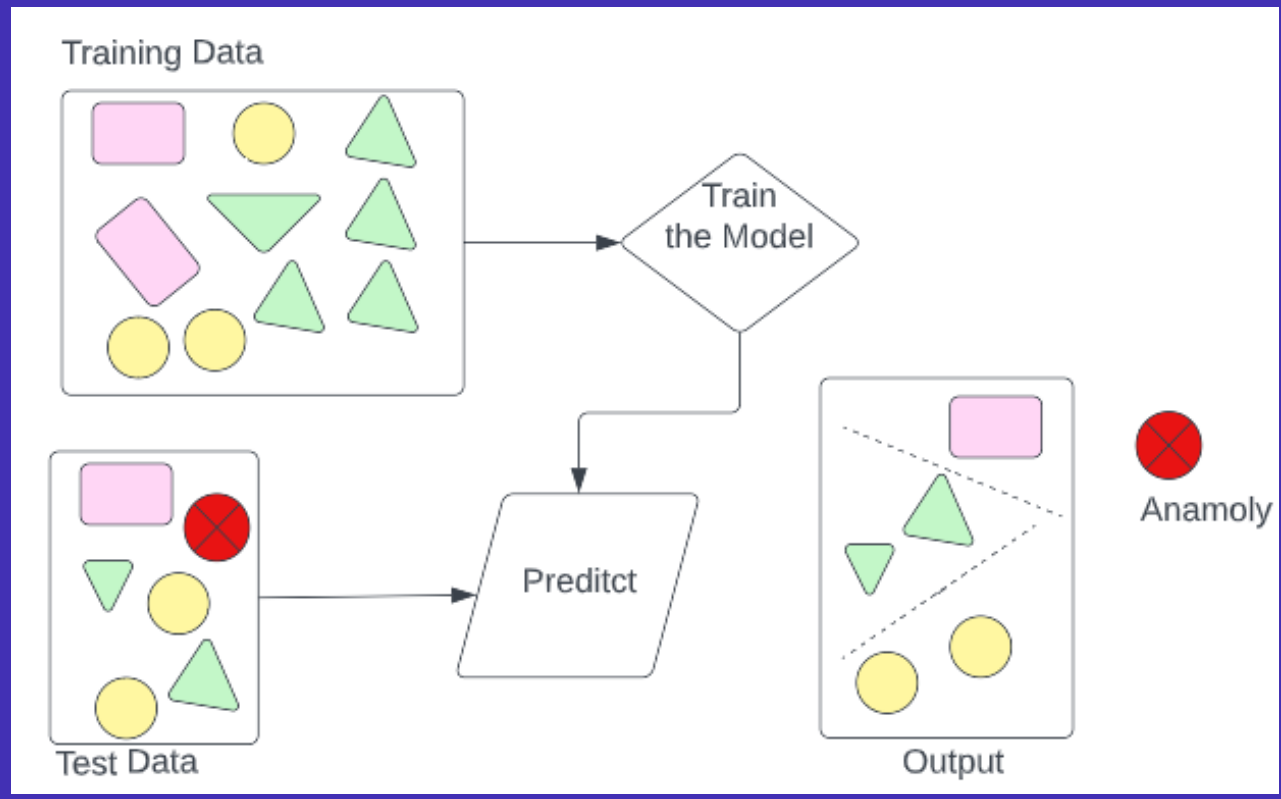
REGRESSION

Machine Learning 101

UNSUPERVISED LEARNING



CLUSTERING

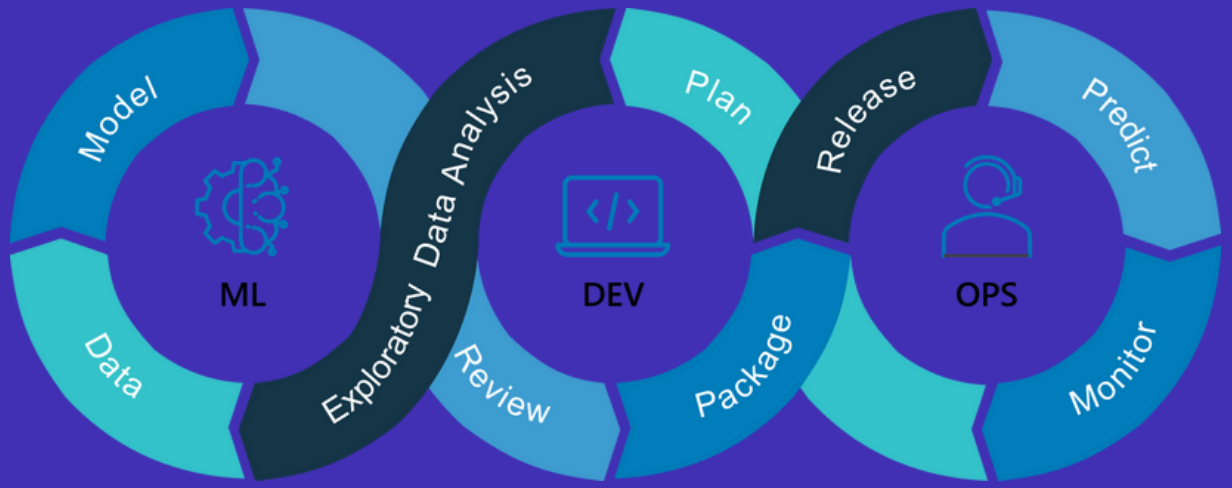


ANAMOLY DETECTION

MLOPS OVERVIEW

- Machine Learning Operation (MLOps) adapt the principle of DevOps to Machine learning (ML) and Artificial Intelligence (AI).
- In DevOps, We need collaboration from development and Operation Team for successful adaption and outcomes.
- In MLOps, We expect a collaborate and streamlined approach from DataScientist, Data Engineer, ML Engineer and ML Operations Engineer.
- With multiple personas involved and complex lifecycle of machine learning, We need strong MLOPS Practice to provide a better AI/ML Products.
- Let us learn more on Machine learning lifecycle

Benefits of MLOps



Productivity

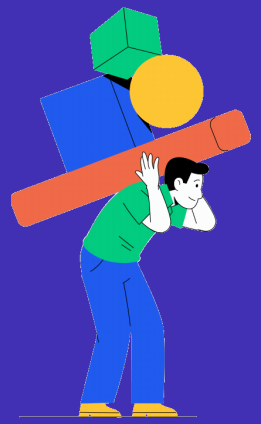
Repeatability

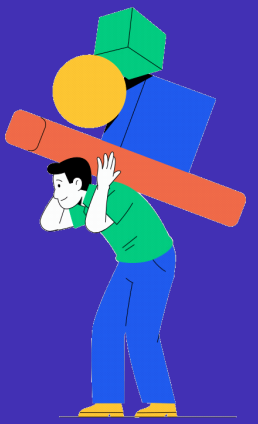
Auditability

Data and model quality.

Explainability

MLOPS CHALLENGES





SAGEMAKER OVERVIEW

- Amazon SageMaker is a fully managed machine learning service. With SageMaker, data scientists and developers can quickly and easily build and train machine learning models, and then directly deploy them into a production-ready hosted environment

- Sagemaker Environment - provides an integrated Jupyter authoring notebook instance for easy access to your data sources for exploration and analysis, so you don't have to manage servers.

- It provided lot of Foundation Models, Common Machine Algorithm using AutoML. Also it helps to train the model using large amount of data using distributed environment.

- With native support for bring-your-own-algorithms and frameworks, SageMaker offers flexible distributed training options that adjust to your specific workflows. Deploy a model into a secure and scalable environment by launching it with a few clicks from SageMaker Studio or the SageMaker console.

SAGEMAKER LIFECYCLE

BUILD

- Sagemaker Studio
- Auto ML
- Jumpstart Models
- Build Local

TRAIN

- Compute Choice
- Hyper Parameter Optimization (HPO)
- Distribute Training
- Debugger and Experiments
- Sagemaker Pipeline

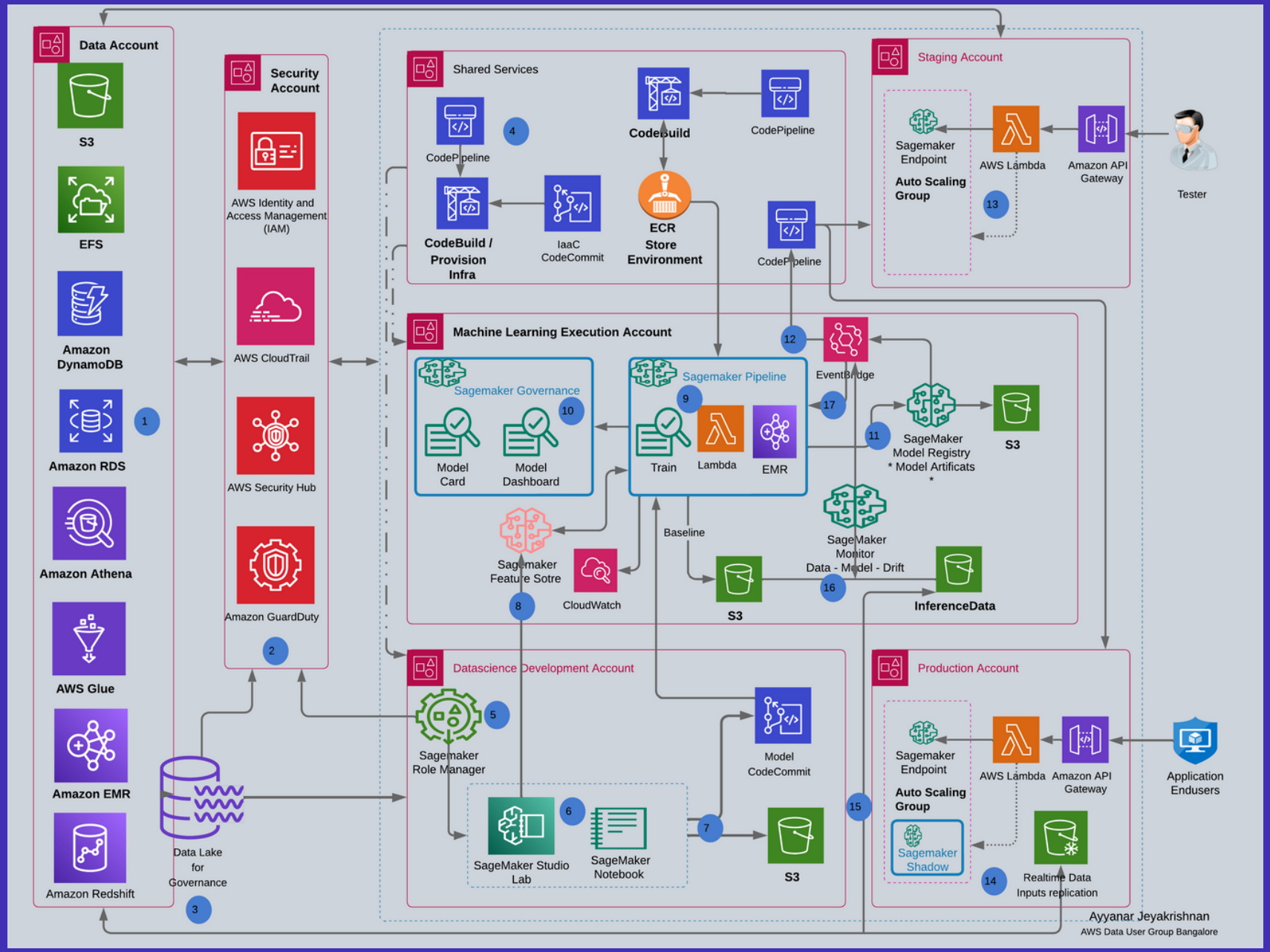
DEPLOY

- Real-Time Inference
- Batch Transform
- Serverless Inference
- Asynchronous Inference
- Single, Multi Model, Multi Container Endpoints
- Inference Pipeline

ML GOVERNANCE

- Role Manager
- Model monitoring
- Model Cards
- Model Dashboard
- Shadow Variant

MLOPS WITH SAGEMAKER - HIGHLEVEL REFERENCE ARCHITECTURE



Demo

AWS Sagemaker MLOPS Template

GITHUB REPO

- Presentation

https://github.com/aws-data-usergroup-bangalore/aws-dugb-sagemaker-beginner