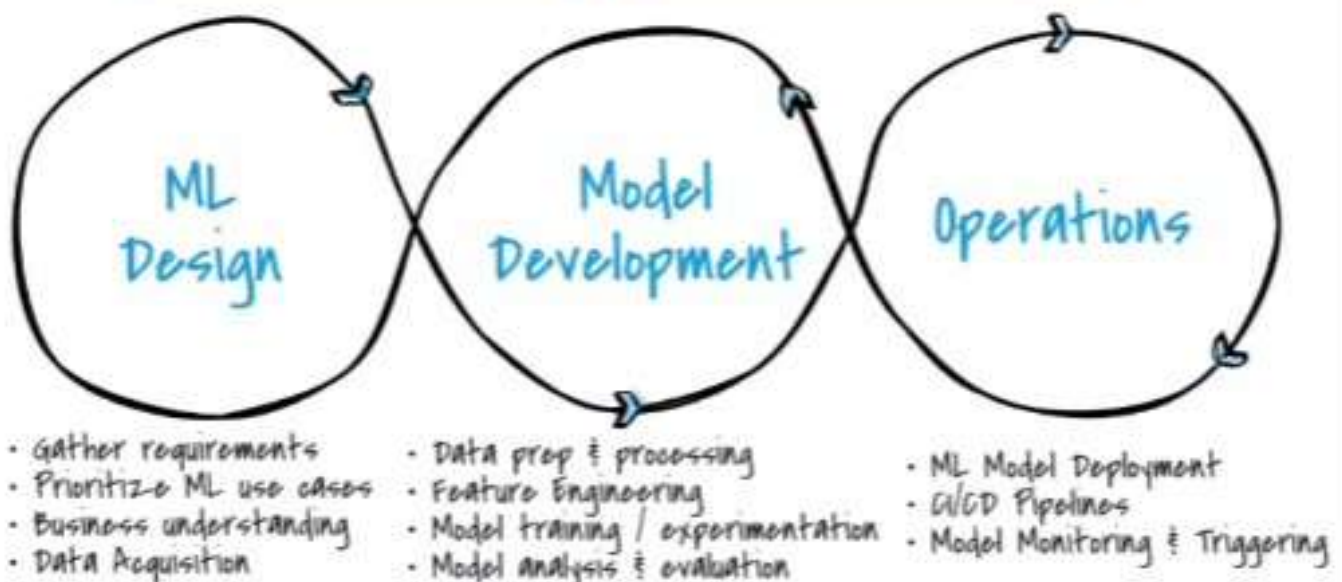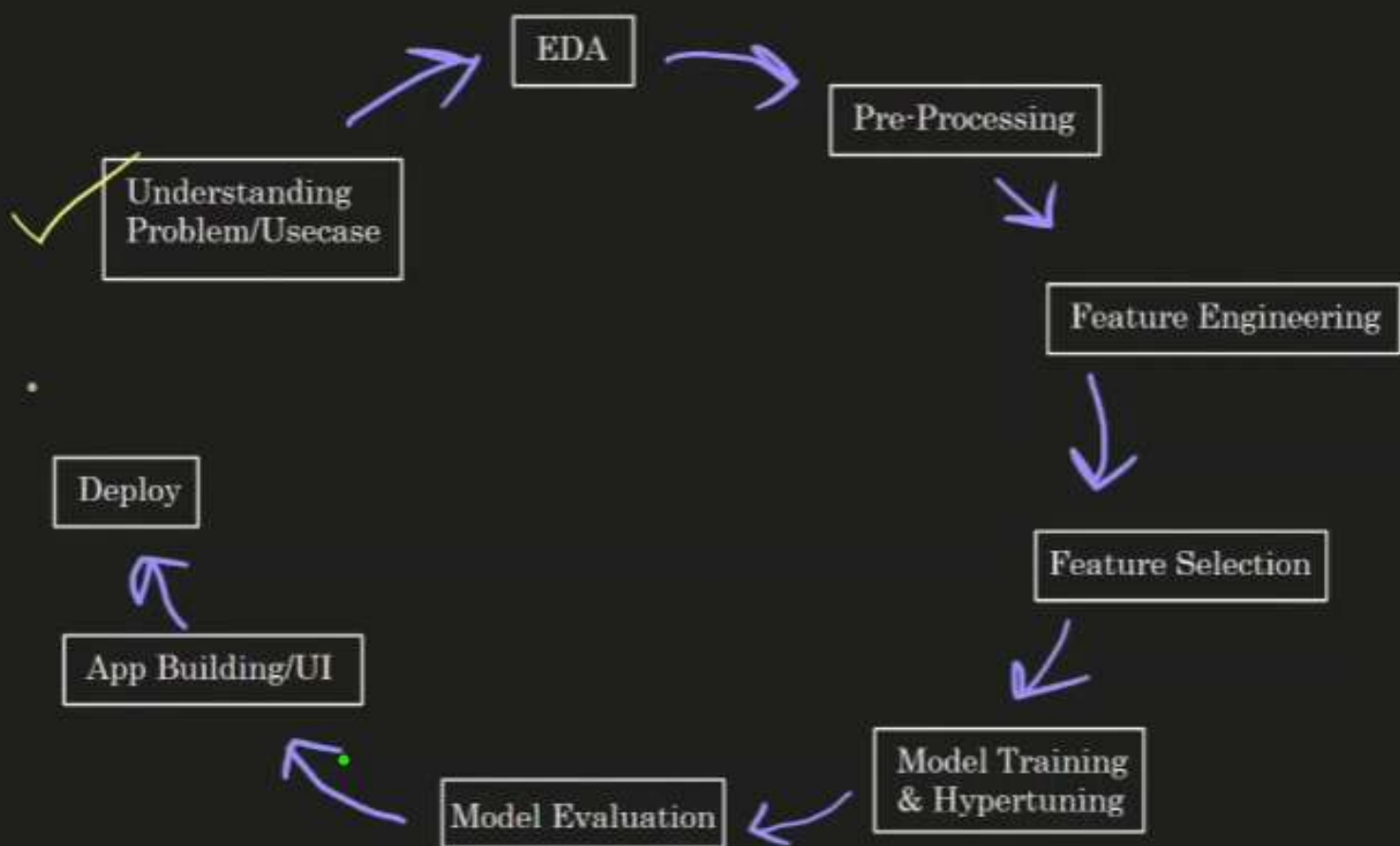# Introduction to MLOps

- Machine learning operations (MLOps) are a set of practices that automate and simplify machine learning (ML) workflows and deployments. It is the development and use of machine learning models by development operations (DevOps) teams. MLOps adds discipline to the development and deployment of machine learning models, making the development process more reliable and productive.

Machine Learning Operations (MLOps)

ML Design	Model Development	Operations
• Gather requirements • Prioritize ML use cases • Business understanding • Data Acquisition	• Data prep & processing • Feature Engineering • Model training / experimentation • Model analysis & evaluation	• ML Model Deployment • CI/CD Pipelines • Model Monitoring & Triggering

Issues with DS practice without MLOps

1. Low Coding standards - OOPS concept, Modular coding, logging, exception etc

2. No Data Management - Data Ingestion/Artifacts etc

3. Versioning - Code, Data, Model

4. Data Pipeline / Experiments

5. No CICD concept

6. Scalability & Monitoring (Production) - Kubernetes, Prometheus, Grafana

7. Cross team friction

Dev

Development
Testing
QA Team

OPS

Delivery
Deployment
Maintainance

VIKASH
DAS.

1. Code standards - OOPS concept, modular coding, work with logging module for better debugging, managing (artifacts, components, pipeline etc)

2. Code Versioning - Git & GitHub (Bitbucket, GitLab)

3. Data/Model versioning, maintaining data pipeline & experimentation - DVC, MLflow (Neptune, Seldon, Kubeflow, ZenML)

4. CICD tools - GitHub Actions, CircleCI, TravisCI

5. Containerization for code reliability - Docker and Dockerhub

6. Scalability & Monitoring - Kubernetes, Prometheus, Grafana

7. AWS Services - IAM User, ECR, S3, EC2 etc

All in one services - AWS Sagemaker, Google Vertex AI, Azure ML