

Machine Learning Operations

INTRODUCTION:

During Industrial revolution raise of physical machine required organizations to systematize form factories assembly lines and everything we know about **automated manufacturing**.



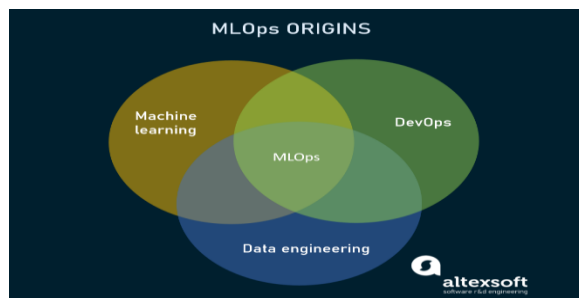
During the first tech boom agile system helped organizations **Operationalize** product life style paving the way for continous innovation by clearing waste and automating processes for creation.

Devops further optimized production lifestyle and introduced a new element and that of big data.

Now with more businesses now turing towards **Machine Learning** insights we one the cusp of another wave of operationalization

MLOPS:

MLOps is a set of practices that drives a seamless integration between your development cycle and your overall operation process can also transform how your organization handles bigdata



The complete Mlops process includes three broad phases :

1. DESIGN:

- Requirement engineering
- ML uses-cases prioritization
- Data availability check

2. MODEL DEVELOPMENT:

- Data engineering
- ML engineering
- Model testing & validation

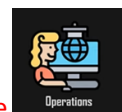
3. OPERATIONS:

- ML model deployment
- CI/CD pipelines
- Monitoring & triggering

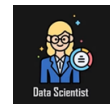
WHY MLOPS:

- MLOps inculcates new regulations & best practices
- MLOps heps to avoid bottlenecks with better division of expertise
- MLOps combines the expertise of all for more effcent ML

Expertise are as follow:



Operationlist have **Business knowledge**



Data scientist knows & understand **data**



ML expert understand **ML Algorithm**



Researcher understand **core concept**

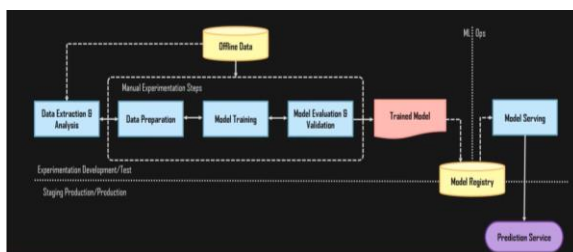
PRINCIPLE OF MLOPS:

- Automation:
Automate the workflow steps without any manual intervention
- Continuous X:
Includes continuous integration, deployment, testing & monitoring
- Versioning:
Tracks ML models and datasets with version control systems
- Experiment Tracking:
Multiple experiments on model training are prallely executed
- Testing:
Tests for features & data. Model development & infrastructure
- Monitoring:
Monitor to assure that the ML model performs as expected
- Reproducibility:
Should produce identical results given the same input

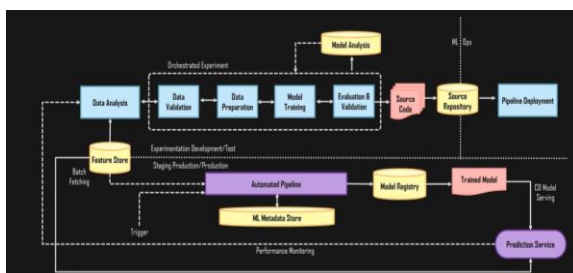
How does MLOps work:

MLOps works similar as Devops. Levels of MLOps work are as follow-

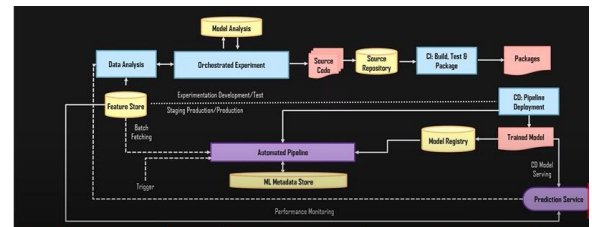
1. Manual Process:



2. ML Pipeline Automation:



3. ML Pipeline Automation:



Advantage:

- Rapid Innovation
- Reproducible workflow
- Easy deployment
- Higher Precision
- Effective Management
- ML resource management system & control