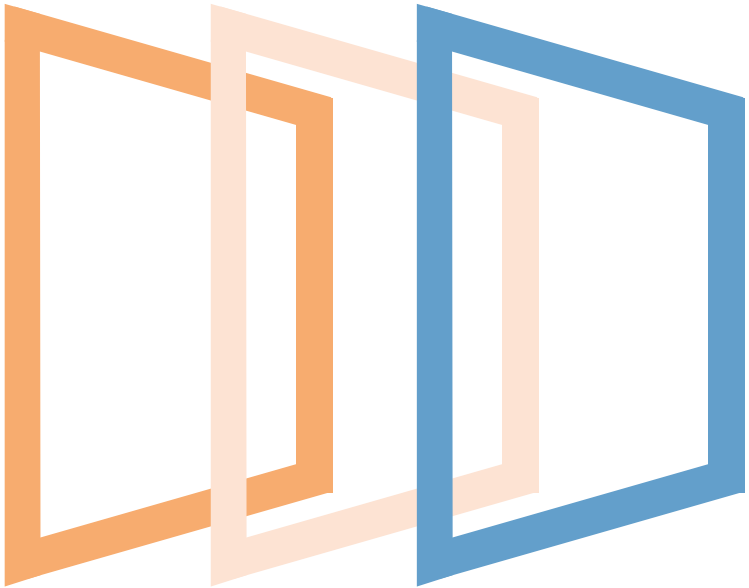
Desvendando IA e Machine Learning

Thaís Ratis

Diego Alexandre

Práticas Tecnológicas, 07.11.2023



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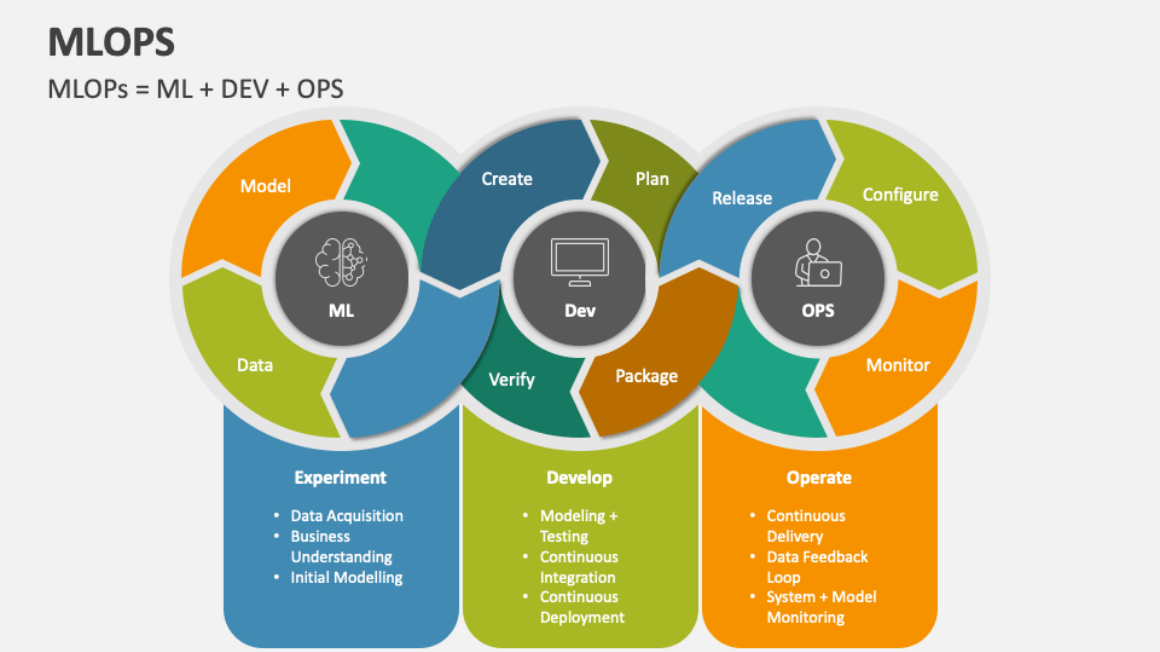
MLOps


MLOPS
Machine Learning
03
01
MLOPS
DevOps
02
Data Engineering

O que é MLOps

O MLOps é a prática de combinar desenvolvimento de software e operações para implementar, gerenciar e evoluir modelos de aprendizado de máquina de forma eficiente.



Benefícios do MLOps

1. Melhoria de Performance
   - Otimização contínua dos modelos para obter resultados cada vez melhores.

2. Escalabilidade
   - Possibilidade de lidar com grandes volumes de dados e modelos complexos.

3. Confiabilidade
   - Análise, monitoramento e alertas para evitar falhas e garantir a estabilidade dos modelos.

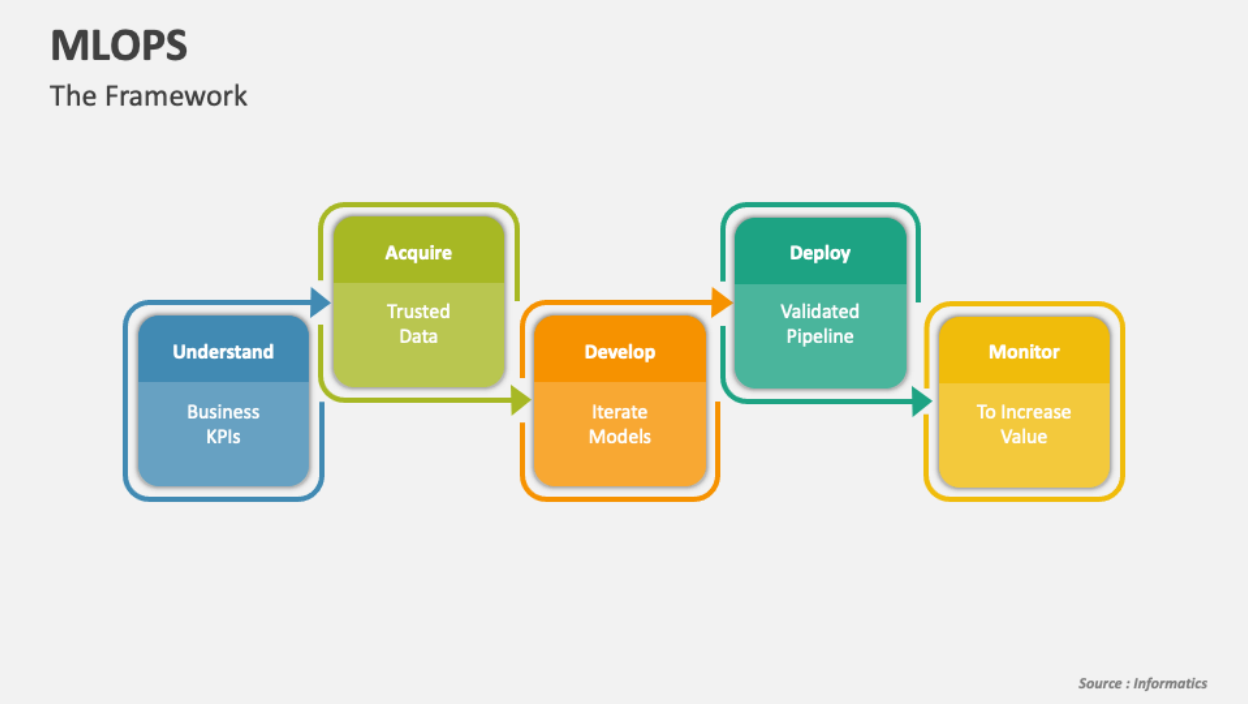
MLOps


MLOPS
Best Practices
01
Co-Team
Operations
02
ML
Pipelines
03
Monitoring
04
Versioning
05
Validating
MLOPS
Source : bmc

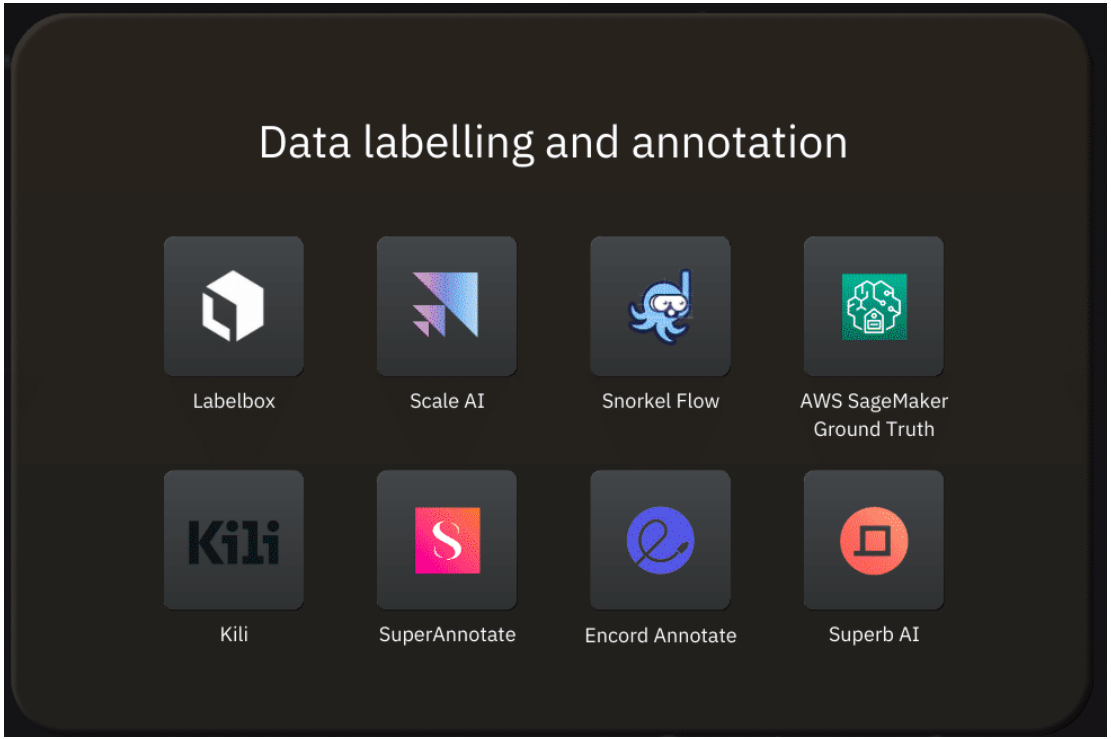
Melhores práticas para a implementação do MLOps

- Padronização
  - Estabeleça diretrizes claras para o desenvolvimento, treinamento e implantação de modelos.
- Monitoramento Contínuo
  - Acompanhe o desempenho dos modelos e faça melhorias regulares.
- Documentação
  - Registre todas as etapas do processo para facilitar a manutenção e a colaboração.

MLOps


MLOPS
The Framework
Understand
Business KPIs
Acquire
Trusted Data
Develop
Iterate Models
Deploy
Validated Pipeline
Monitor
To Increase Value
Source : Informatics

Ferramentas de MLOps



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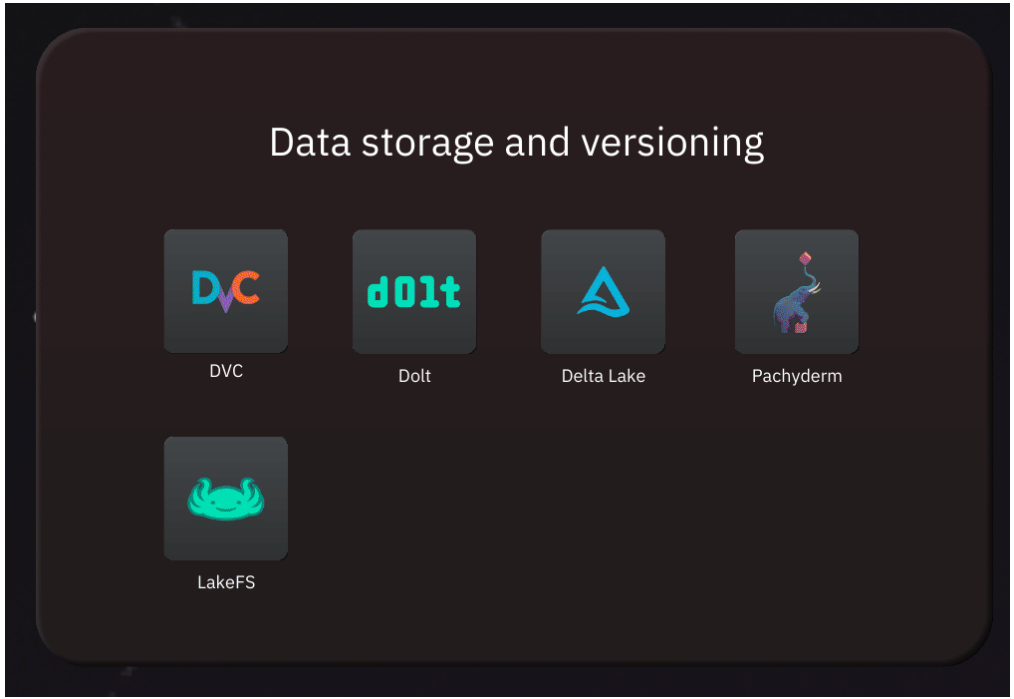

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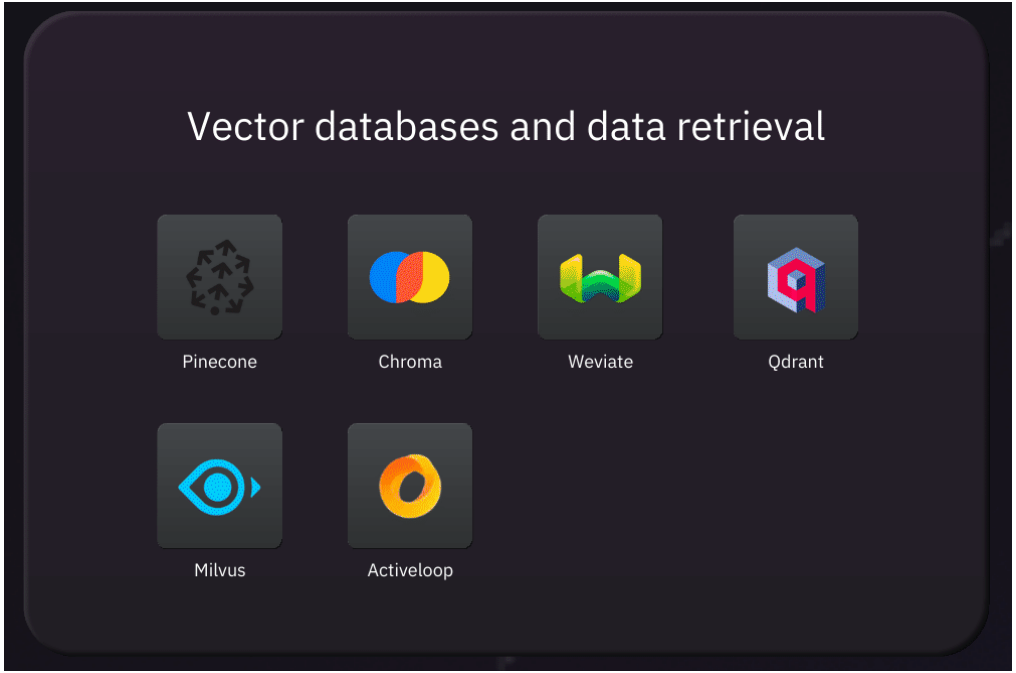

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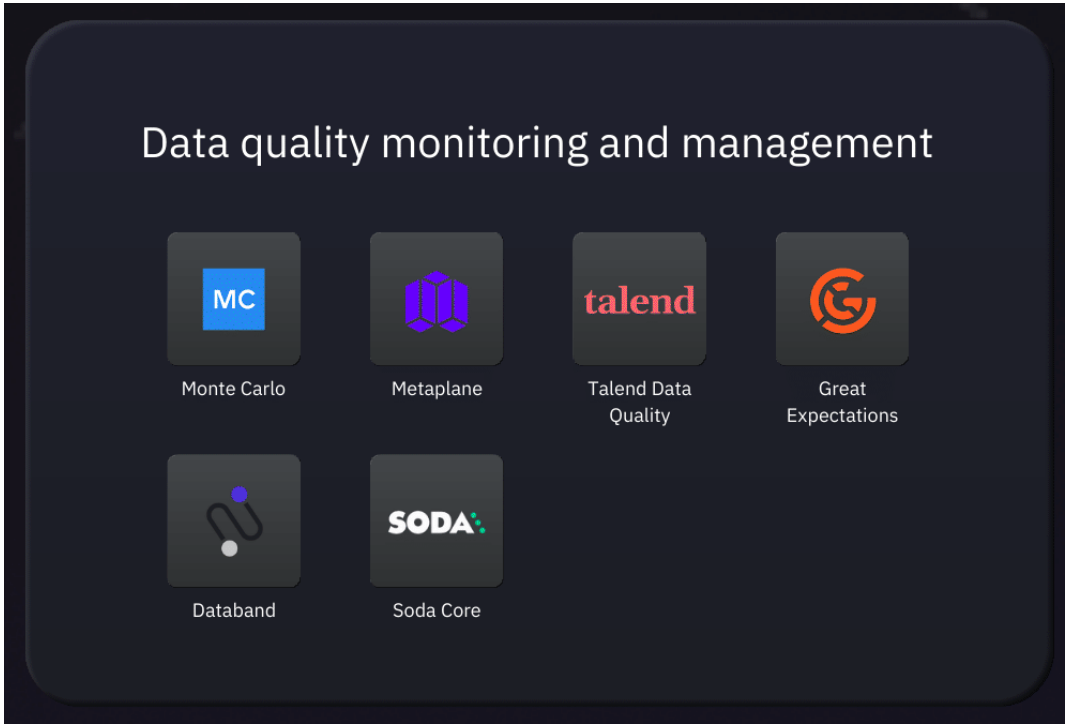

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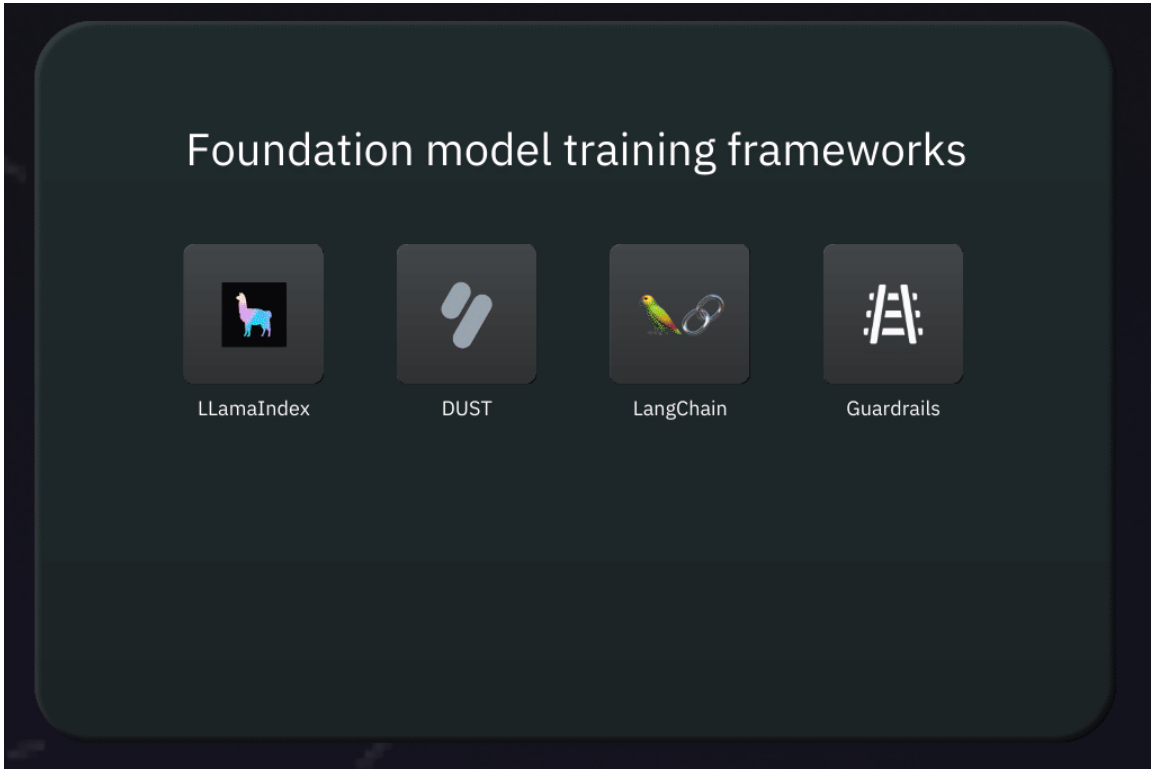

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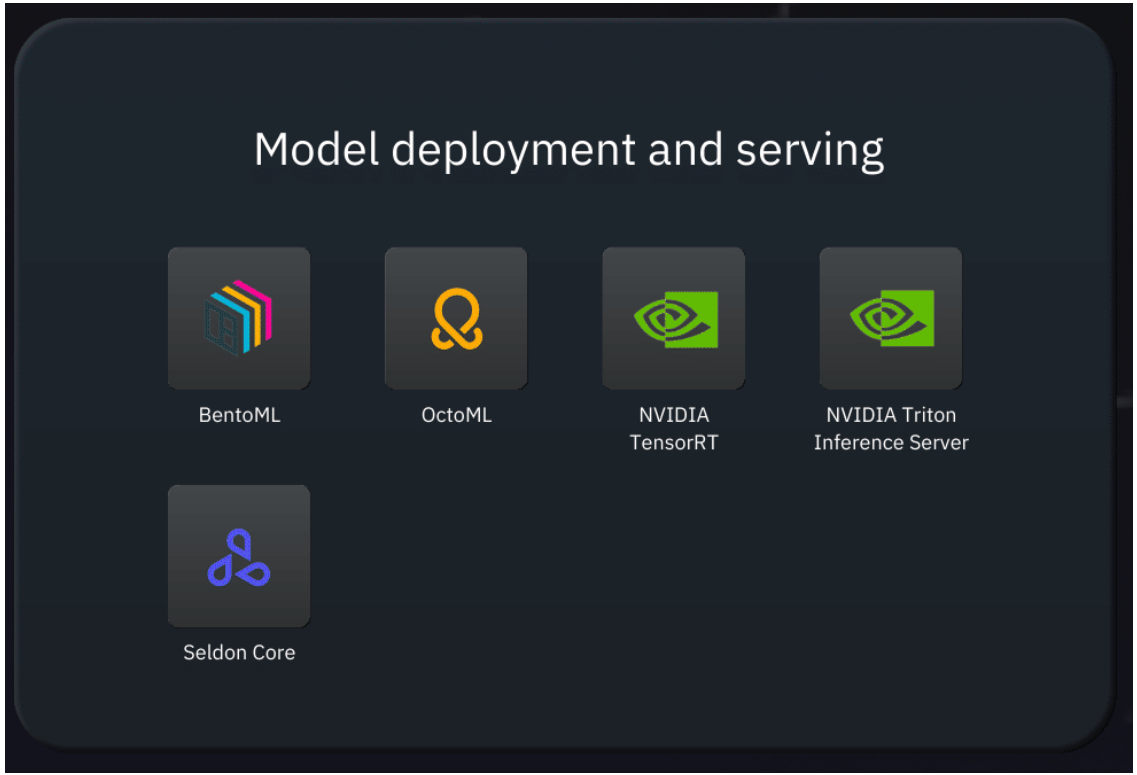

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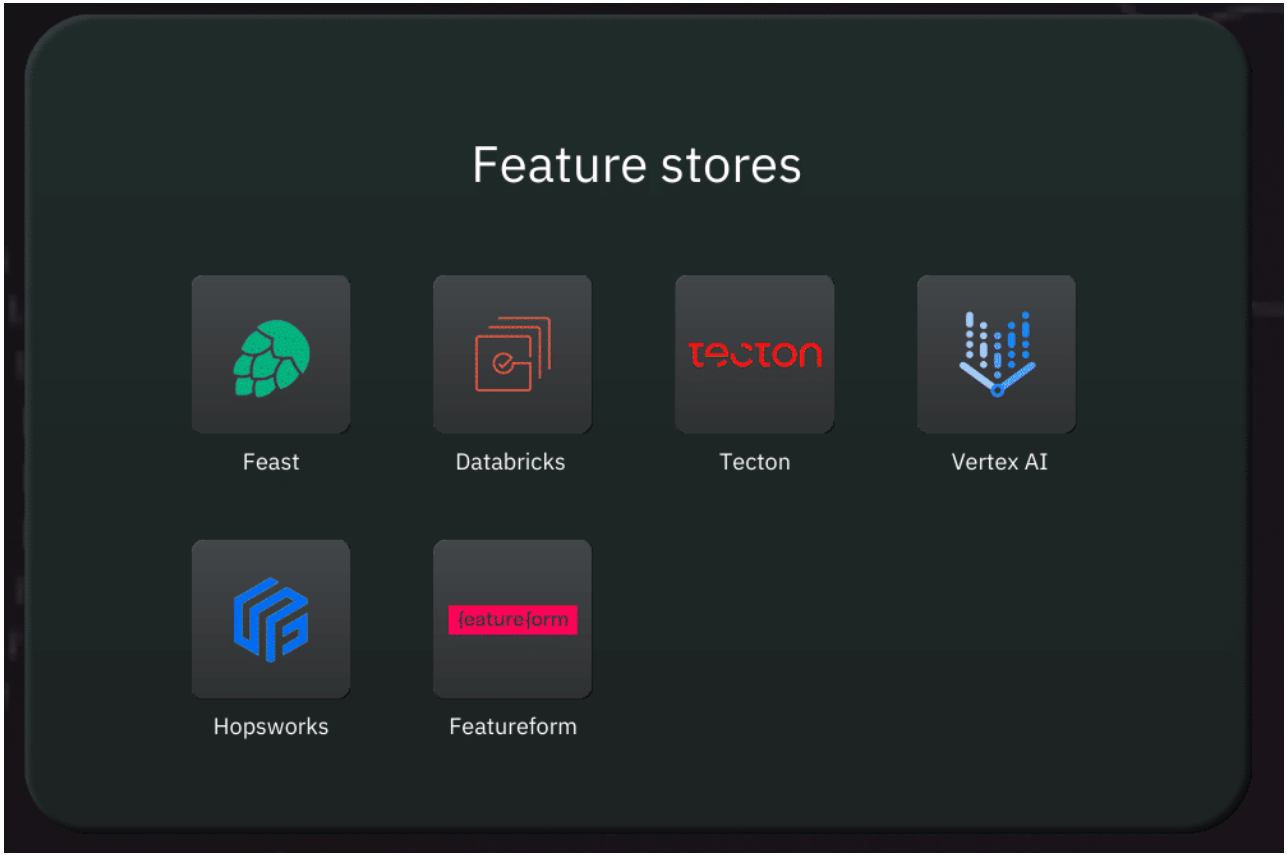

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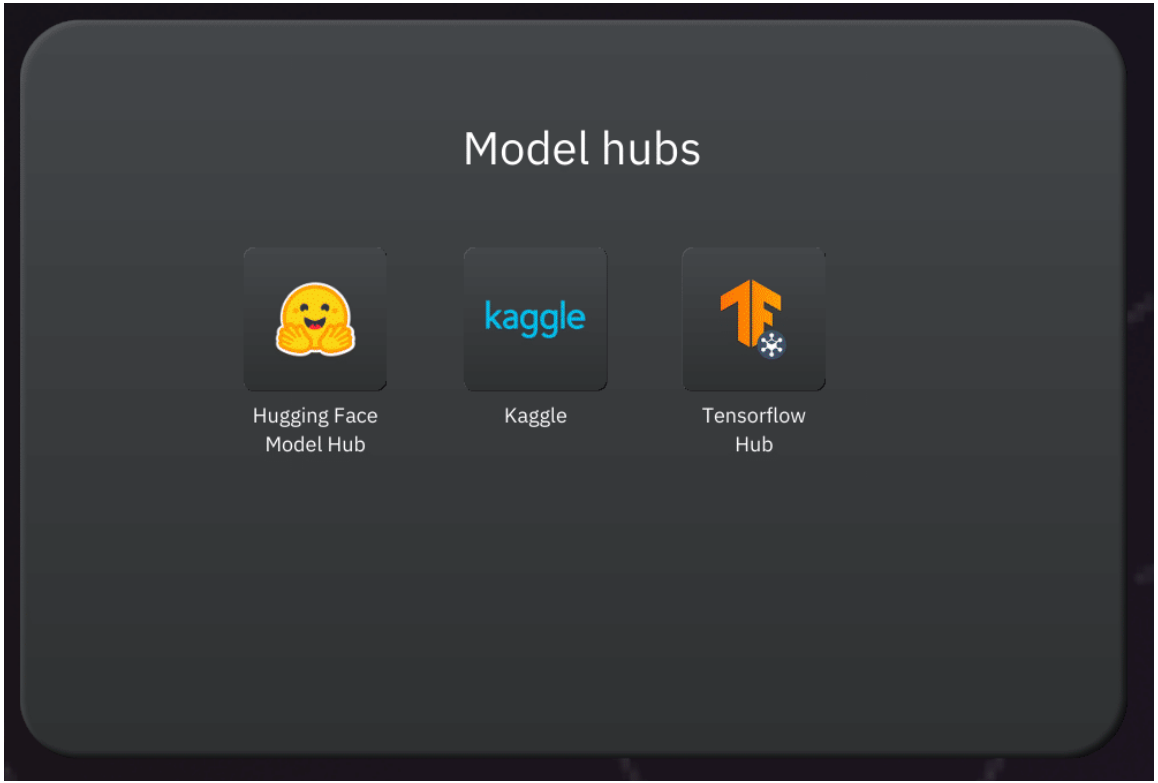

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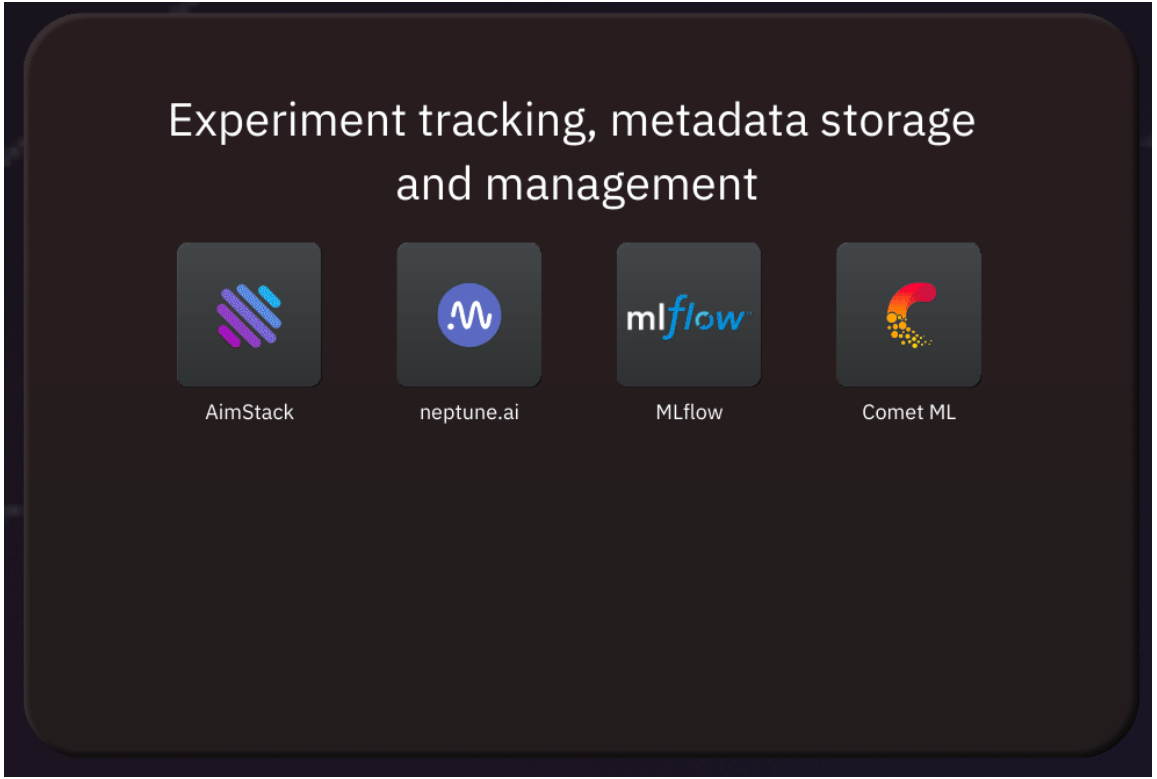

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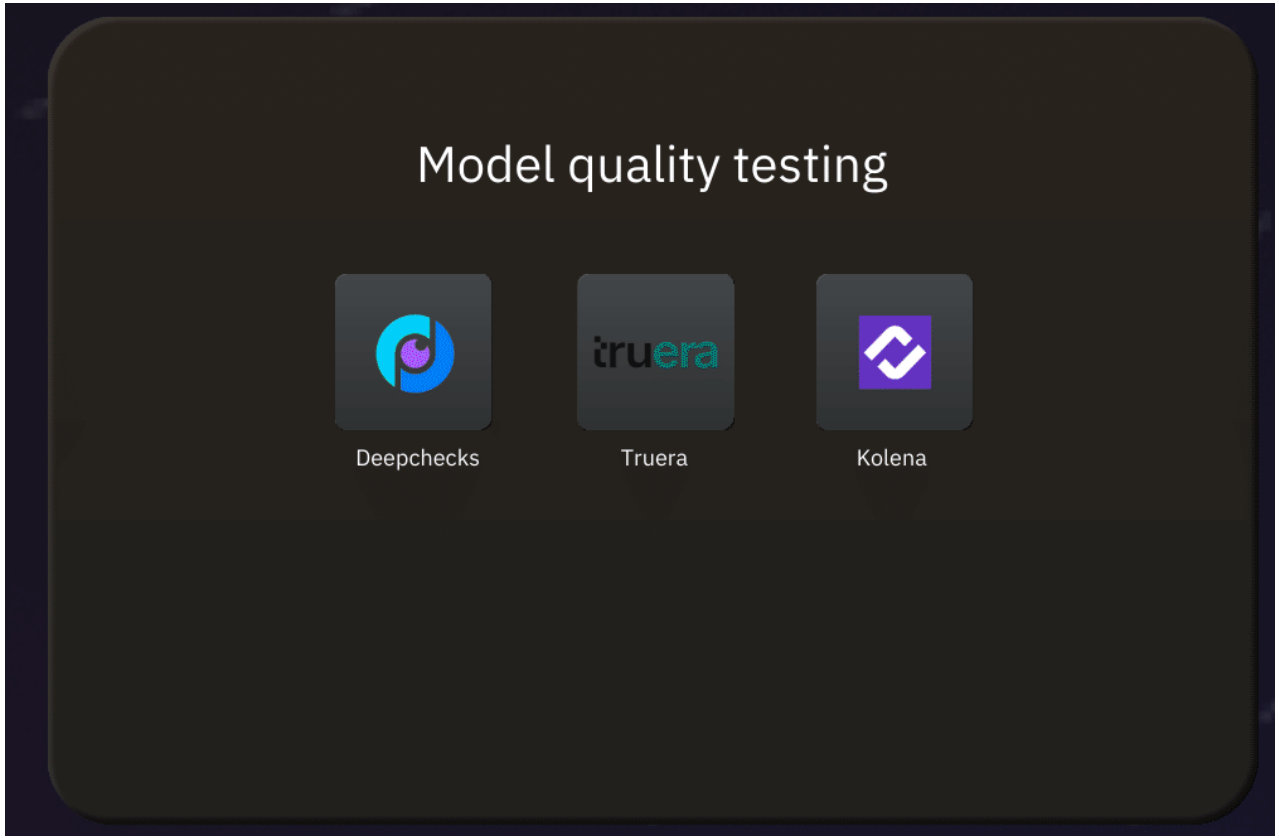

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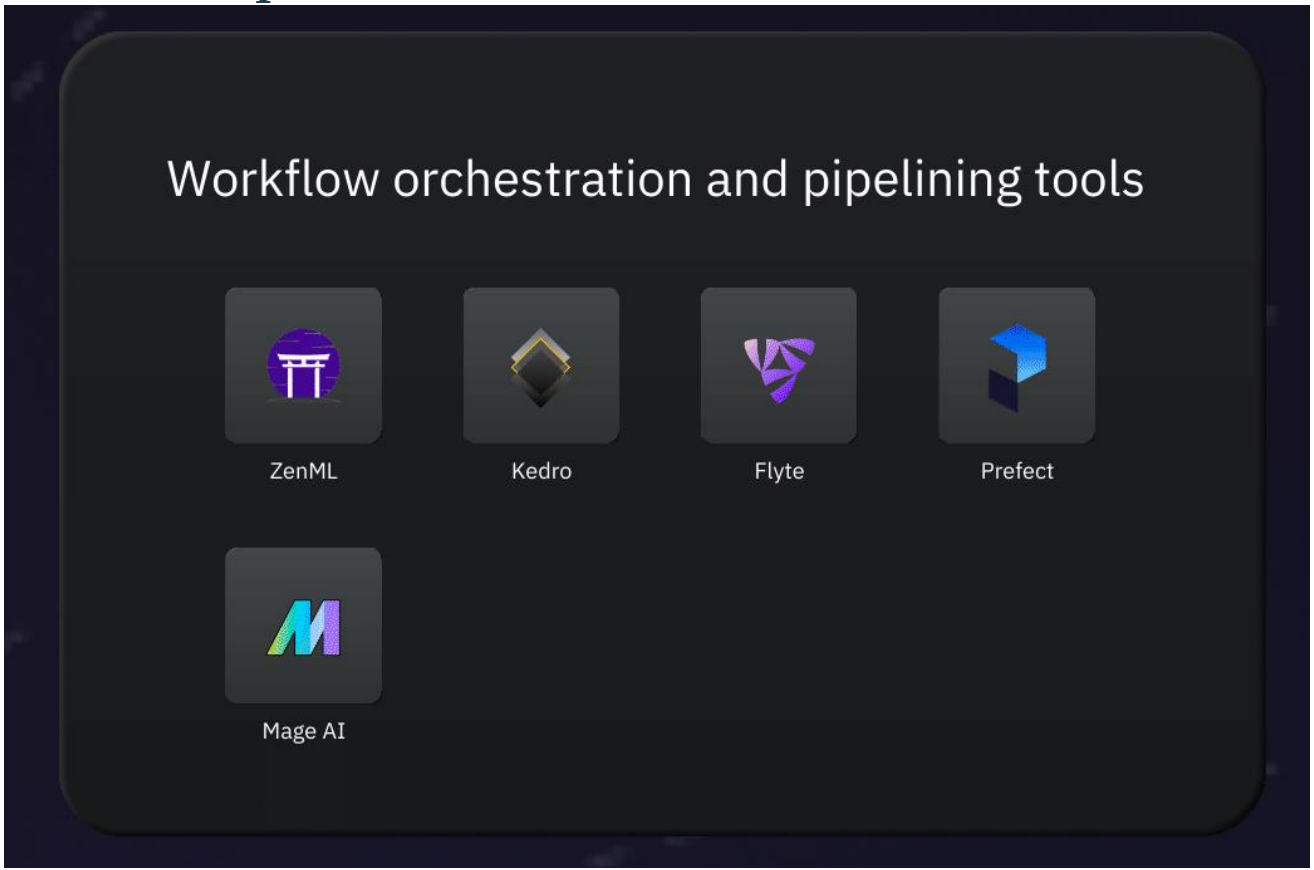

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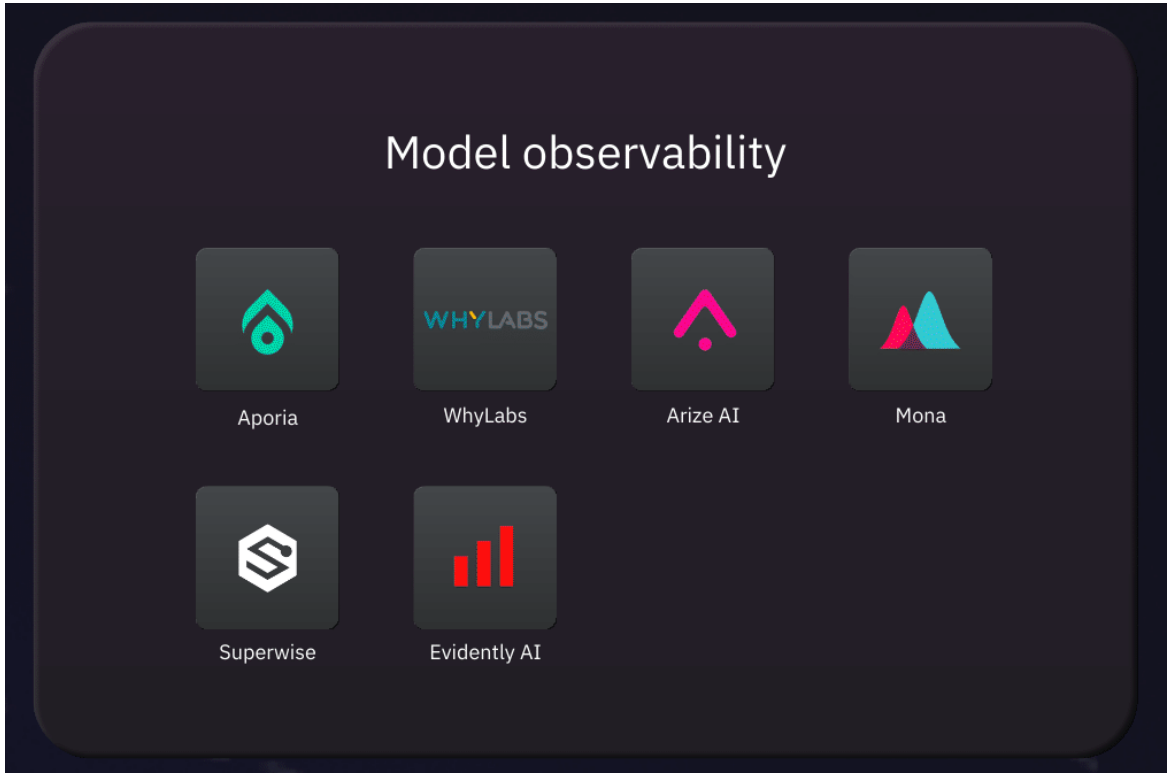

Ferramentas de MLOps

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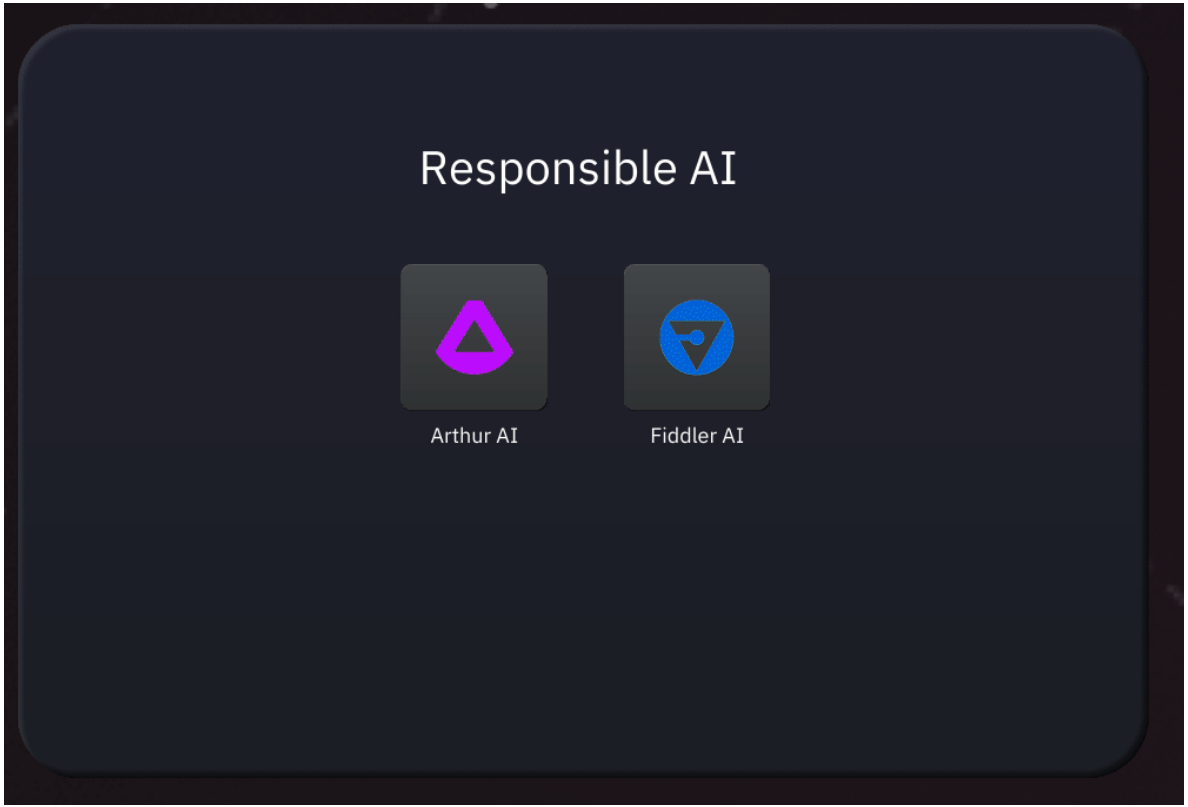

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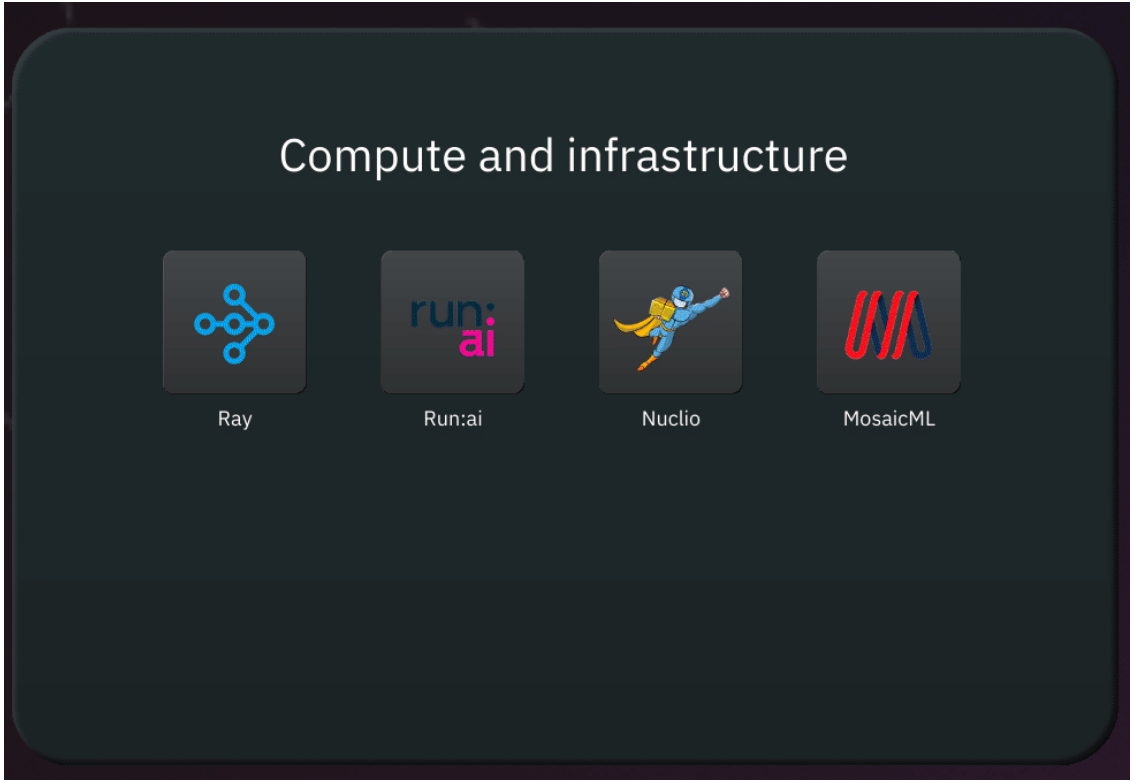

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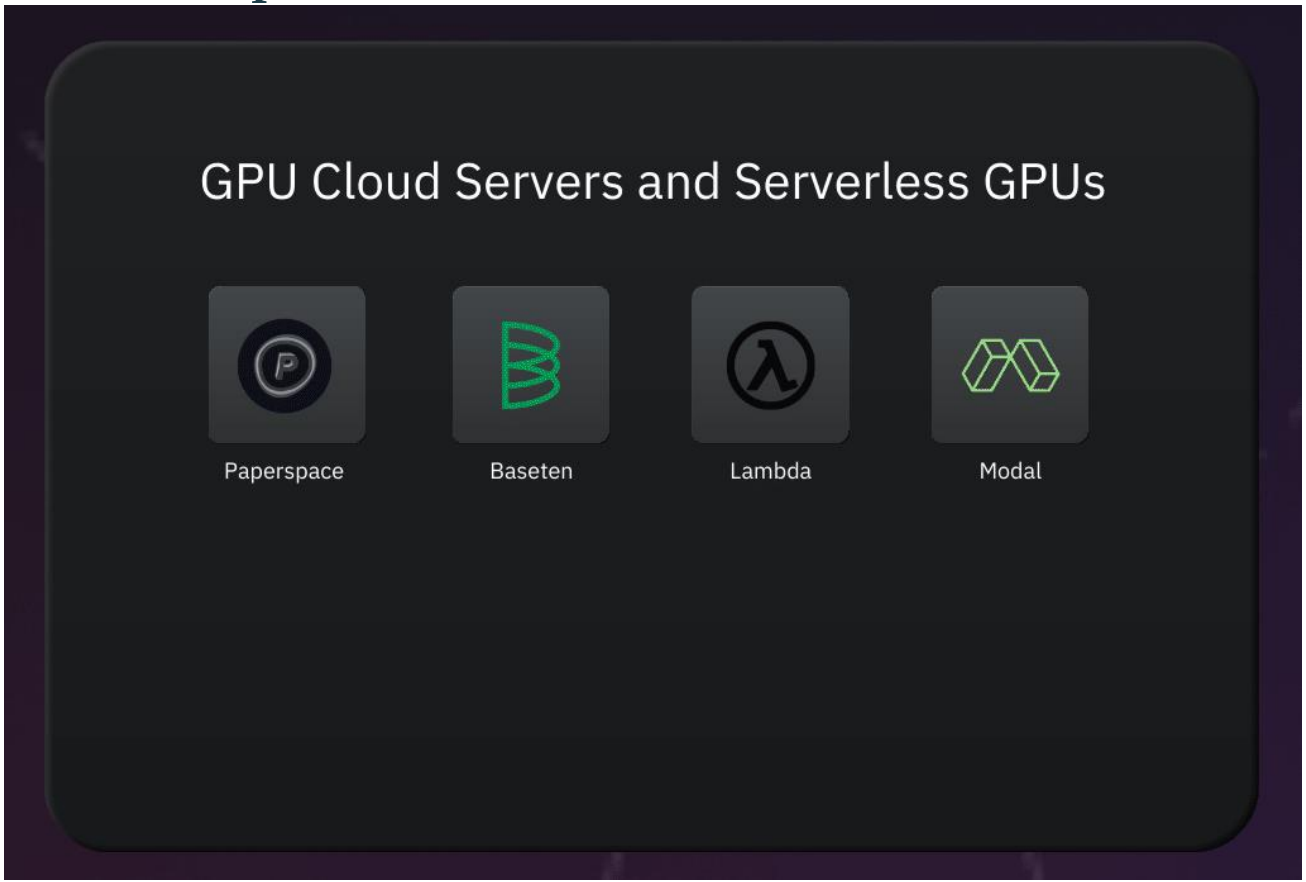

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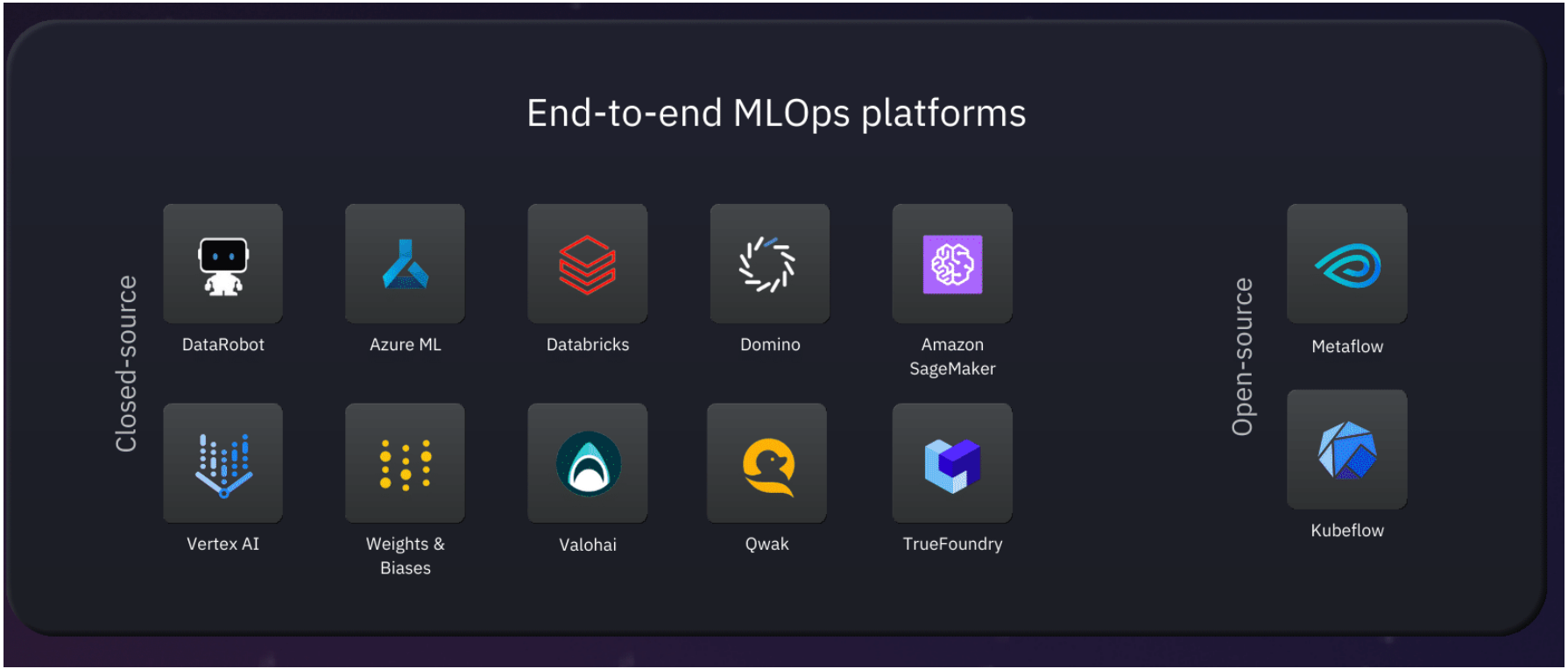
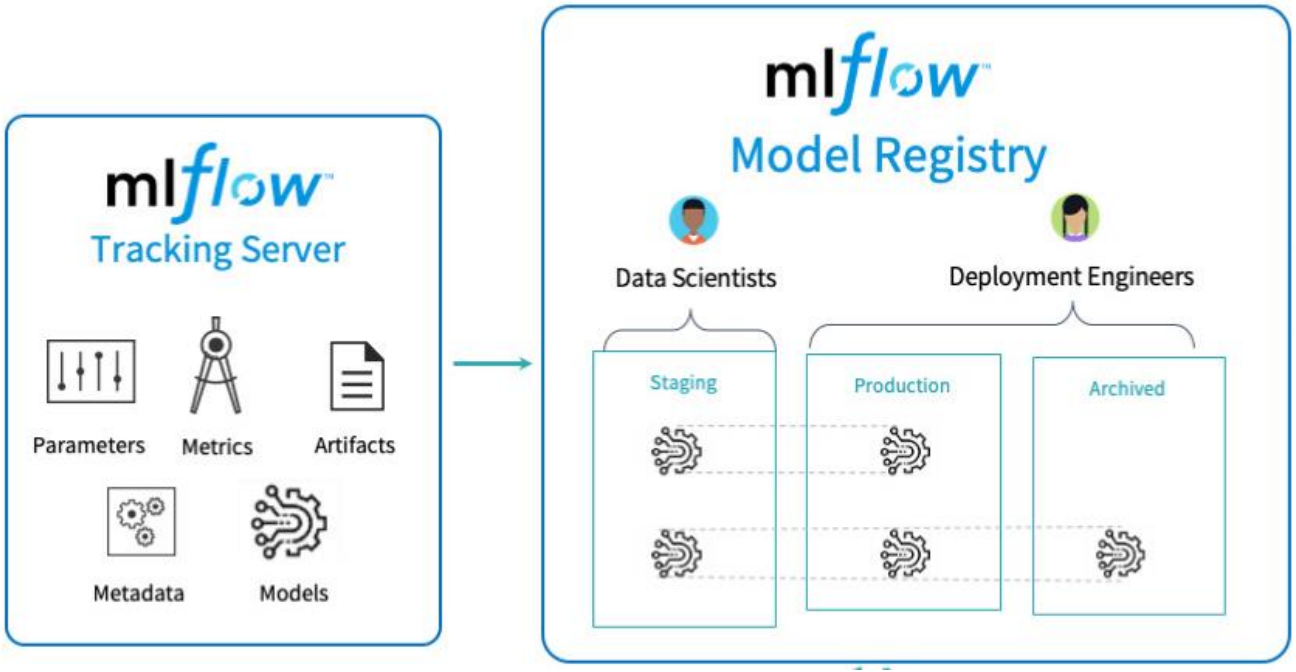


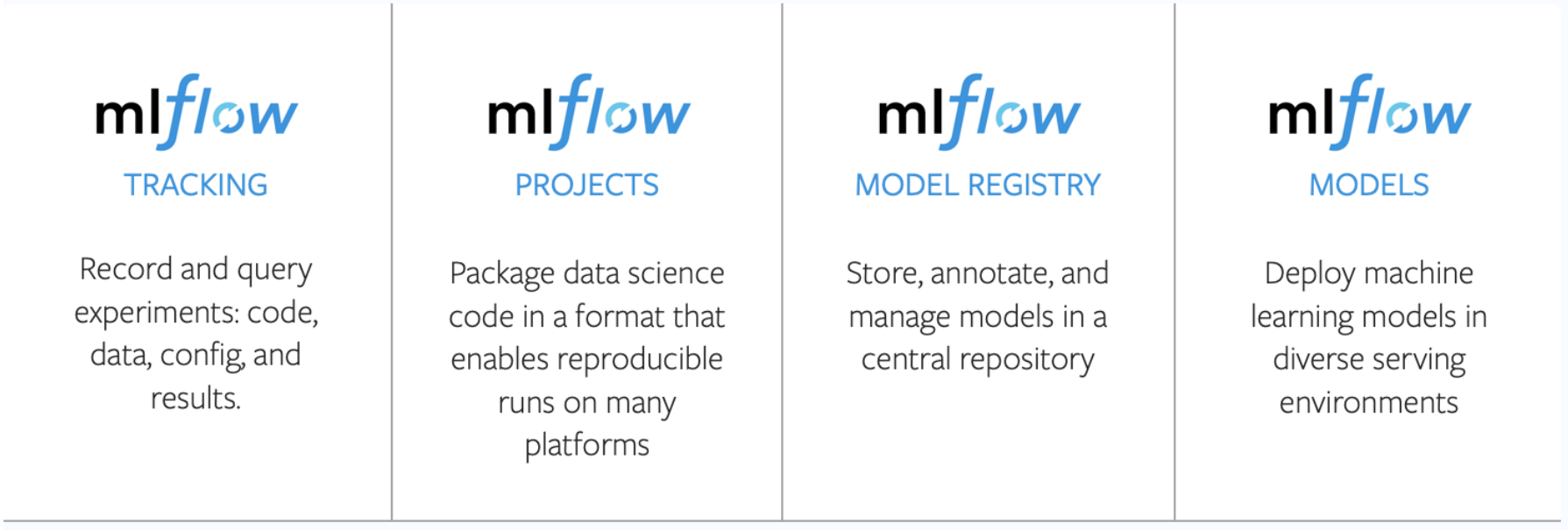
MLFlow

O MLflow é uma ferramenta desenvolvida para auxiliar no desenvolvimento e implantação de projetos de Machine Learning. Ele permite a organização, rastreamento e gerenciamento eficiente do ciclo de vida de modelos de ML.

MLFlow


mlflow
Tracking Server
Parameters
Metrics
Artifacts
Metadata
Models
mlflow
Model Registry
Data Scientists
Deployment Engineers
Staging
Production
Archived

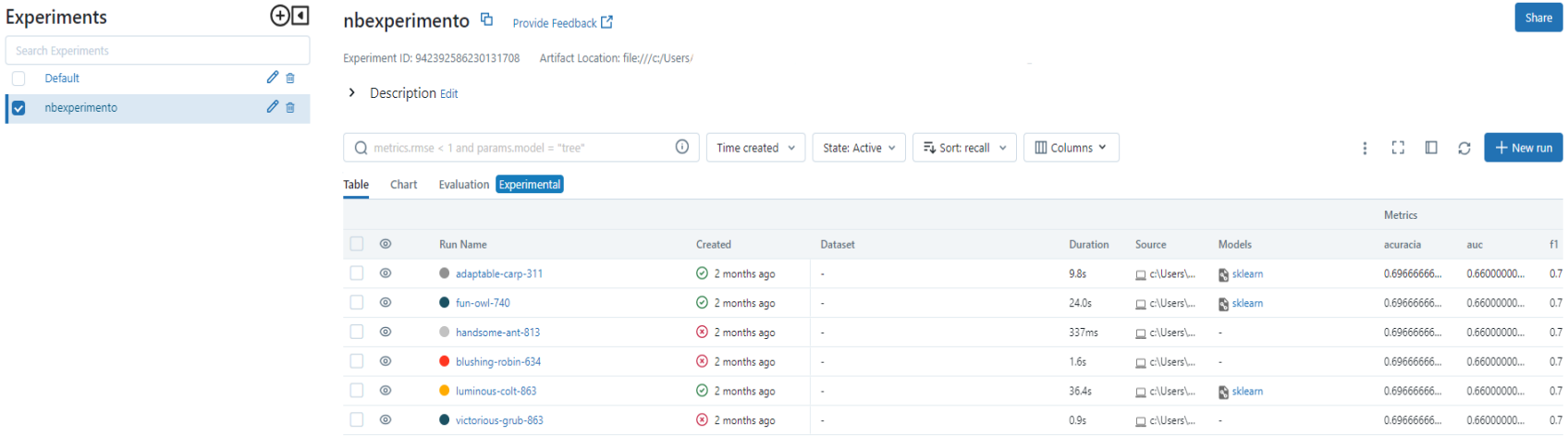
MLFlow componentes



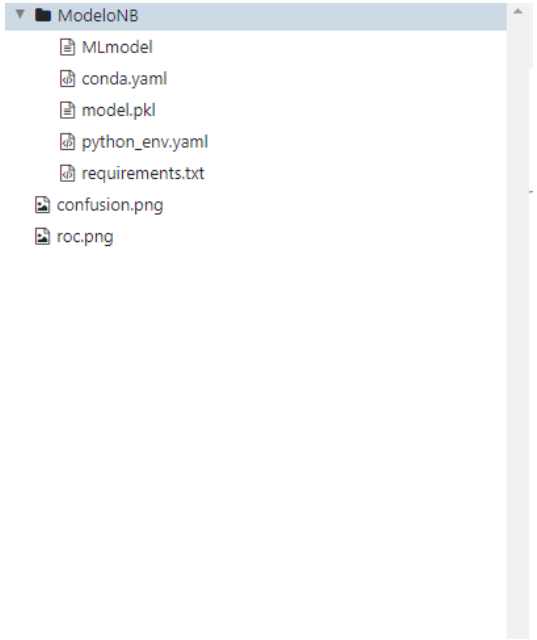
MLFlow componentes

O MLflow é composto por quatro componentes principais: Tracking, Model Registry, Models e Projects. O Tracking permite o rastreamento de experimentos e a reprodução de resultados. O Model Registry oferece recursos para o gerenciamento de modelos treinados. Já o Models dá as ferramentas tanto para fazer deploy local quanto conectar com outras ferramentas de deploy. Equanto que o Projects facilita o empacotamento de código, dependências e artefatos de modelos em um formato padronizado.

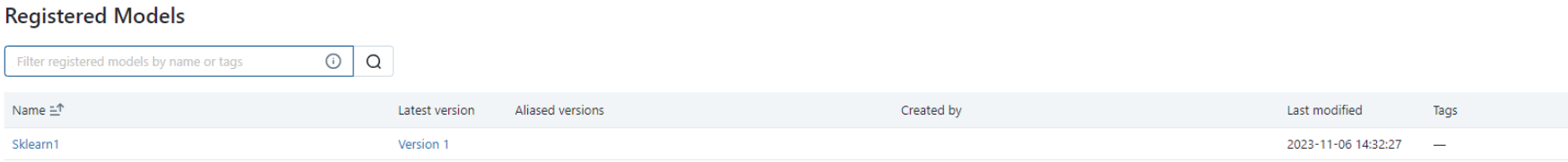
Tracking


Experiments
Search Experiments
Default
nbexperimento
nbexperimento
Provide Feedback
Share
Experiment ID: 942392586230131708
Artifact Location: file:///c:/Users/
Description Edit
metrics.rmse < 1 and params.model = "tree"
Time created
State: Active
Sort: recall
Columns
New run
Table
Chart
Evaluation
Experimental
Metrics
Run Name
Created
Dataset
Duration
Source
Models
acuracia
auc
f1
adaptable-carp-311 2 months ago - 9.8s c:\Users\... sklearn 0.69666666... 0.66000000... 0.7
fun-owl-740 2 months ago - 24.0s c:\Users\... sklearn 0.69666666... 0.66000000... 0.7
handsome-ant-813 2 months ago - 337ms c:\Users\... - 0.69666666... 0.66000000... 0.7
blushing-robin-634 2 months ago - 1.6s c:\Users\... - 0.69666666... 0.66000000... 0.7
luminous-colt-863 2 months ago - 36.4s c:\Users\... sklearn 0.69666666... 0.66000000... 0.7
victorious-grub-863 2 months ago - 0.9s c:\Users\... - 0.69666666... 0.66000000... 0.7

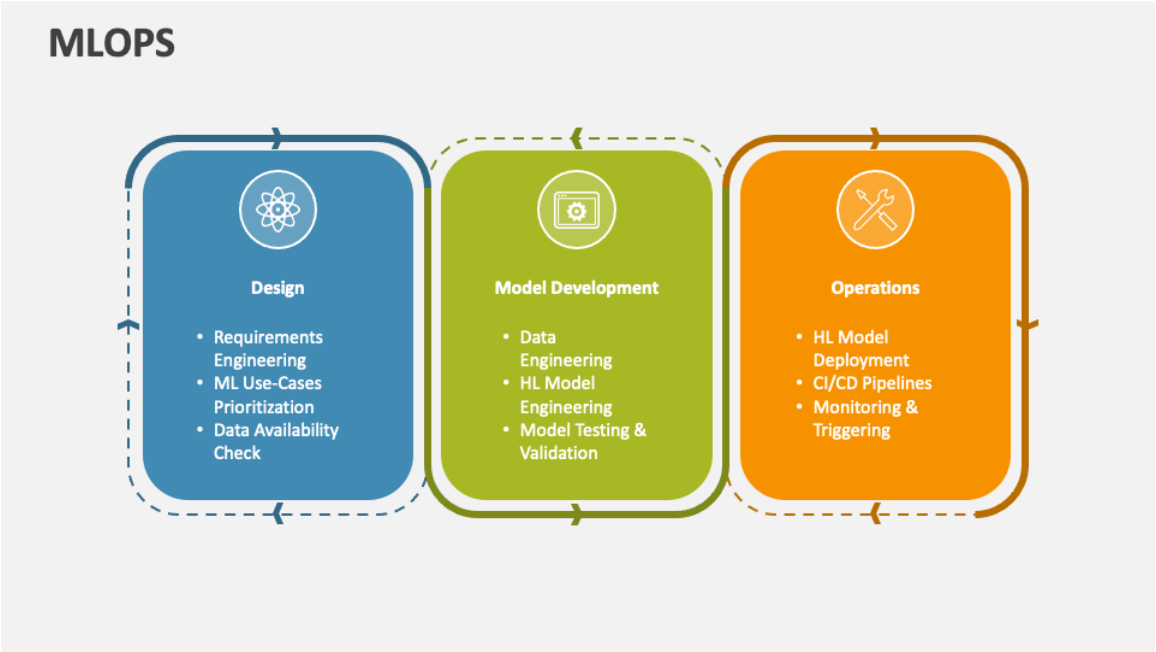
Projects


ModeloNB
MLmodel
conda.yaml
model.pkl
python_env.yaml
requirements.txt
confusion.png
roc.png

Model Registry



MLOps


MLOPS
Design
• Requirements Engineering
• ML Use-Cases Prioritization
• Data Availability Check
Model Development
• Data Engineering
• HL Model Engineering
• Model Testing & Validation
Operations
• HL Model Deployment
• CI/CD Pipelines
• Monitoring & Triggering

Referências

- https://neptune.ai/blog/mlops-tools-platforms-landscape
- https://mlflow.org/docs/latest/
- Course: MLOps: Implantação e Operação de Modelos de Machine Learning | Udemy Business
- https://www.activestate.com/wp-content/uploads/2018/10/webinar-slides-mlops.pdf
- https://drive.google.com/file/d/11sbsEWoYID5wIpU58CA6VSwKLAfB69xI/view
- https://www.collidu.com/presentation-mlops

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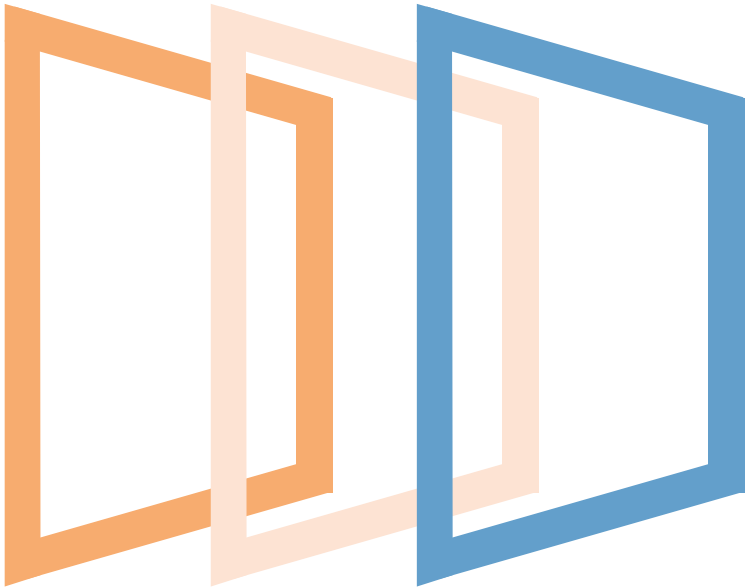

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