INNOVATE

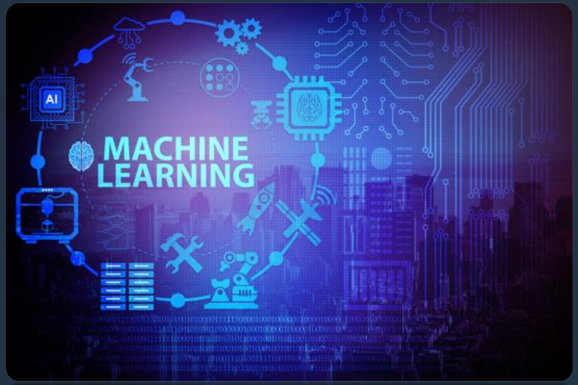
DATA AND AI/ML EDITION

Scalable data preparation & ML using Apache Spark on AWS

Suman Debnath

Principal Developer Advocate, Data Engineering
Amazon Web Services

Personas



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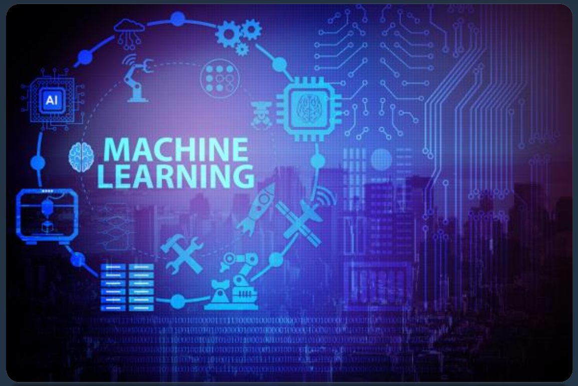
Data science

Python, R, TensorFlow, PyTorch



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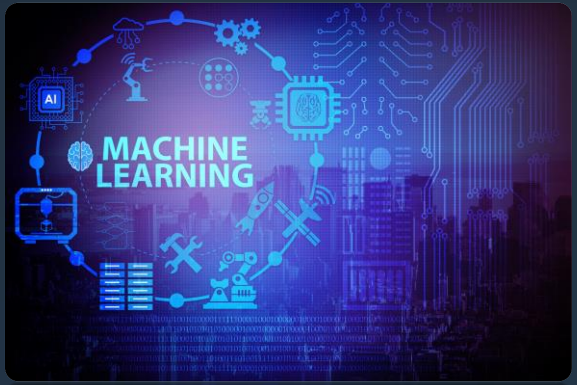

Data engineering
Apache Spark, Hive, Presto

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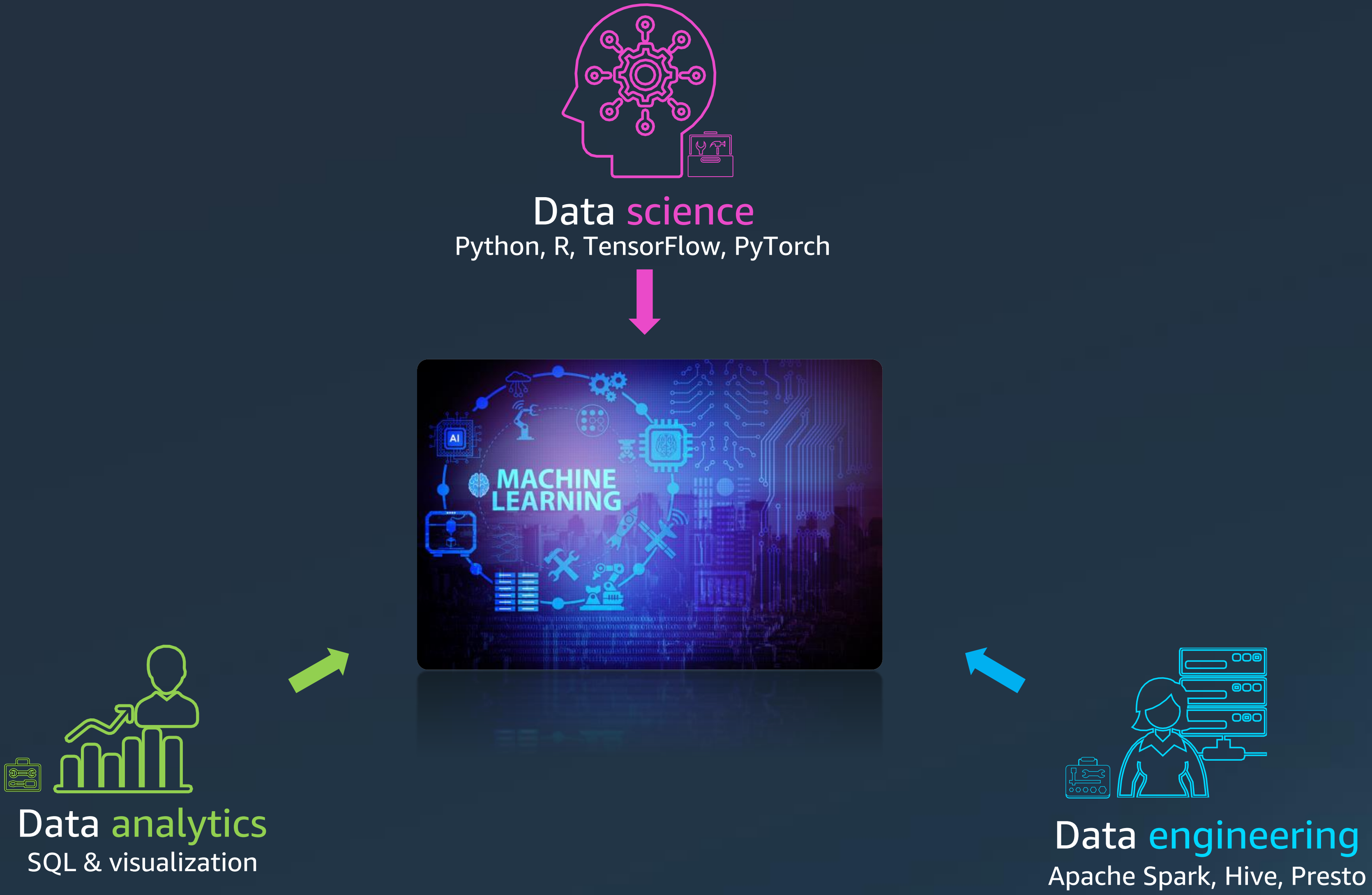

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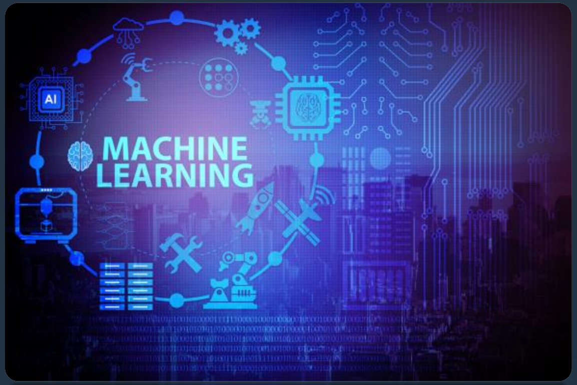
Switching between multiple notebooks, tools, and interfaces reduces productivity



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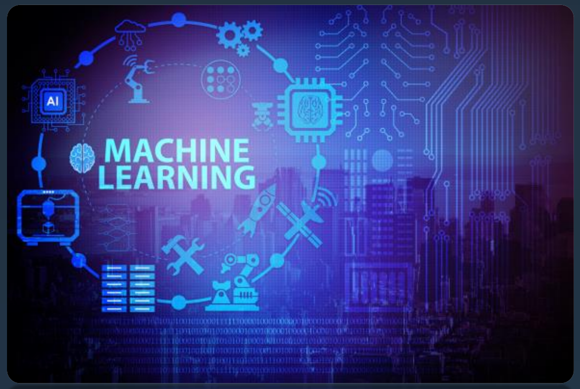

Data preparation and analytics are foundational components of ML workflows

Data analytics
SQL & visualization

Data engineering
Apache Spark, Hive, Presto

Challenge

BUILD END-TO-END DATA PREPARATION AND ML WORKFLOWS ON AMAZON SAGEMAKER STUDIO

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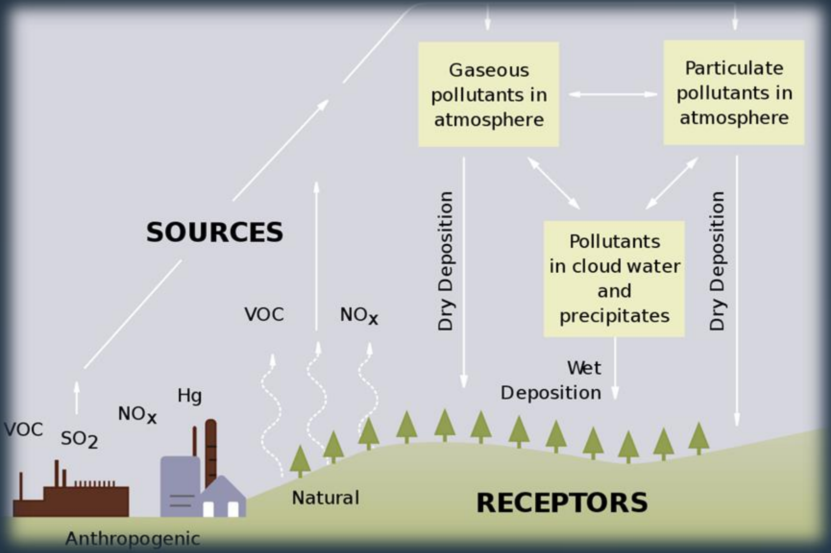
BUILD END-TO-END DATA PREPARATION AND ML WORKFLOWS ON AMAZON SAGEMAKER STUDIO

Build a machine learning model which can help to **predict the amount of NO_2** in the area **based on weather conditions**


Gaseous pollutants in atmosphere
Particulate pollutants in atmosphere
SOURCES
Dry Deposition
Pollutants in cloud water and precipitates
Dry Deposition
VOC
NOx
Wet Deposition
Hg
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SO2
Natural
RECEPTORS
Anthropogenic

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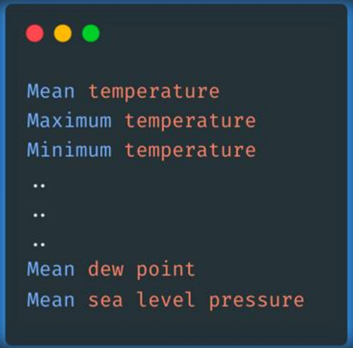
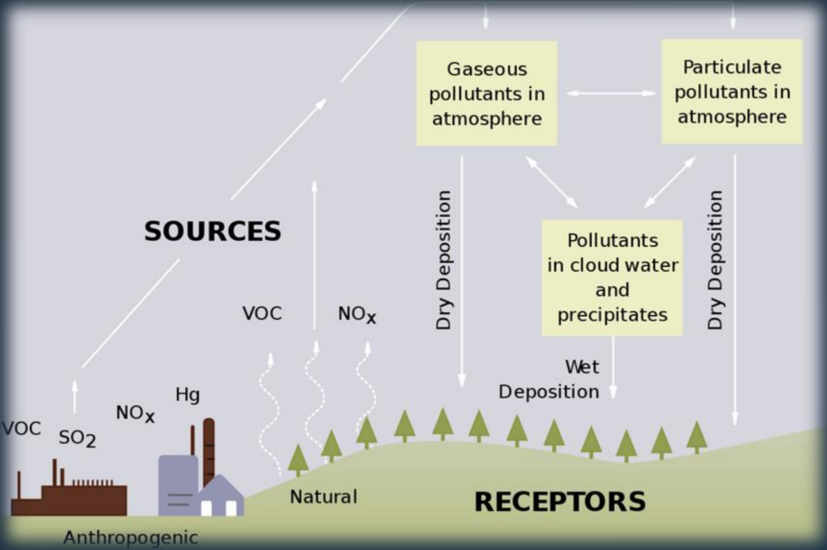


```
Mean temperature
Maximum temperature
Minimum temperature
..
..
..
Mean dew point
Mean sea level pressure
```

Input



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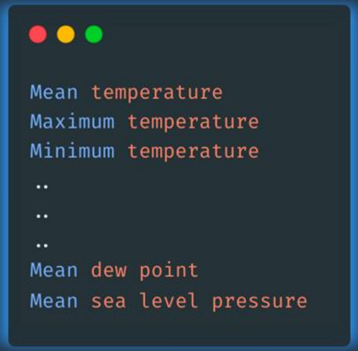

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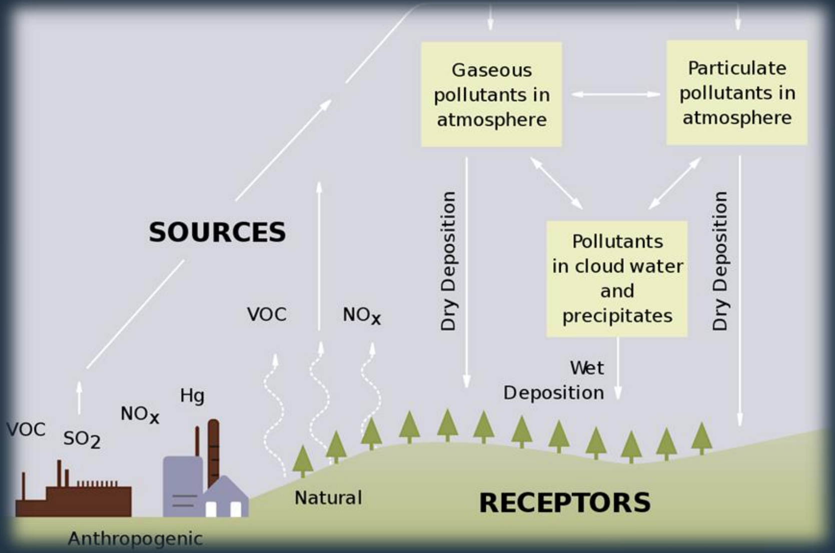

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```
no2_avg
```

Input

Prediction

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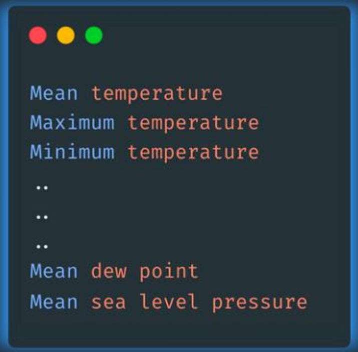

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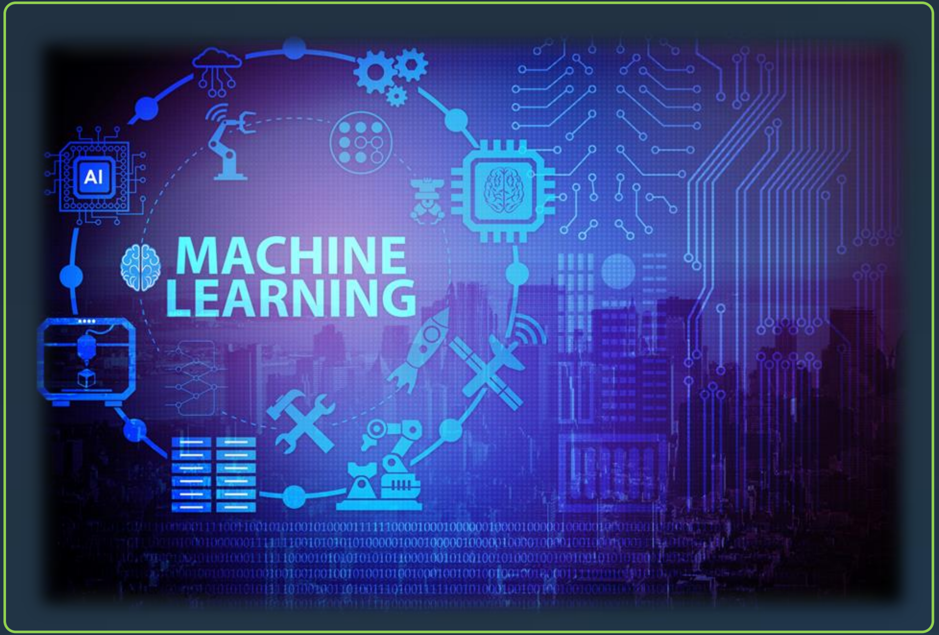
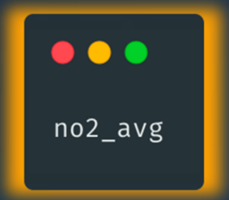


We need to ***build this machine learning*** **model**



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Prediction

Our tasks

BUILD END-TO-END DATA PREPARATION AND ML WORKFLOWS ON AMAZON SAGEMAKER STUDIO

Our tasks

BUILD END-TO-END DATA PREPARATION AND ML WORKFLOWS ON AMAZON SAGEMAKER STUDIO

Clean and prepare data using Apache Spark for use in machine learning

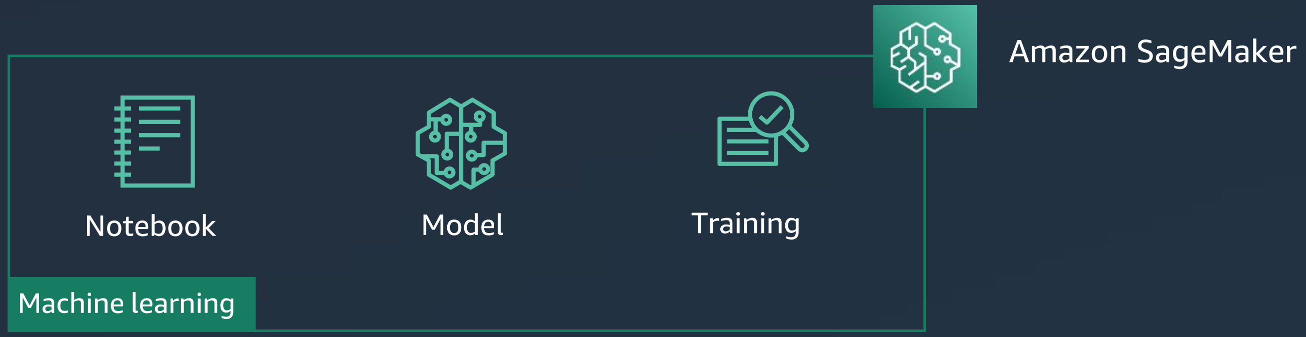
Our tasks

BUILD END-TO-END DATA PREPARATION AND ML WORKFLOWS ON AMAZON SAGEMAKER STUDIO

Clean and prepare data using Apache Spark for use in machine learning

Train the ML model using SageMaker to predict the NO_2 level of air

Our solution



Amazon SageMaker

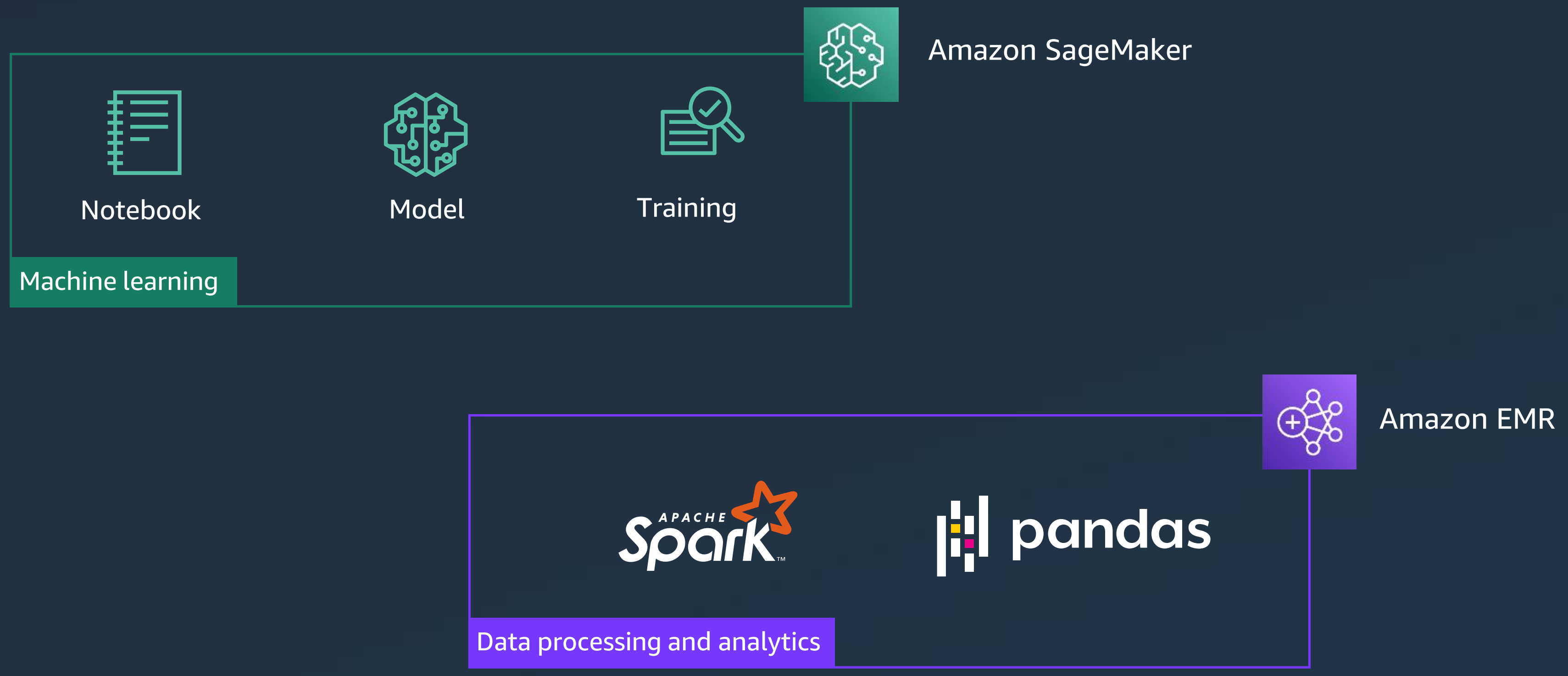
Notebook

Model

Training

Machine learning

Our solution



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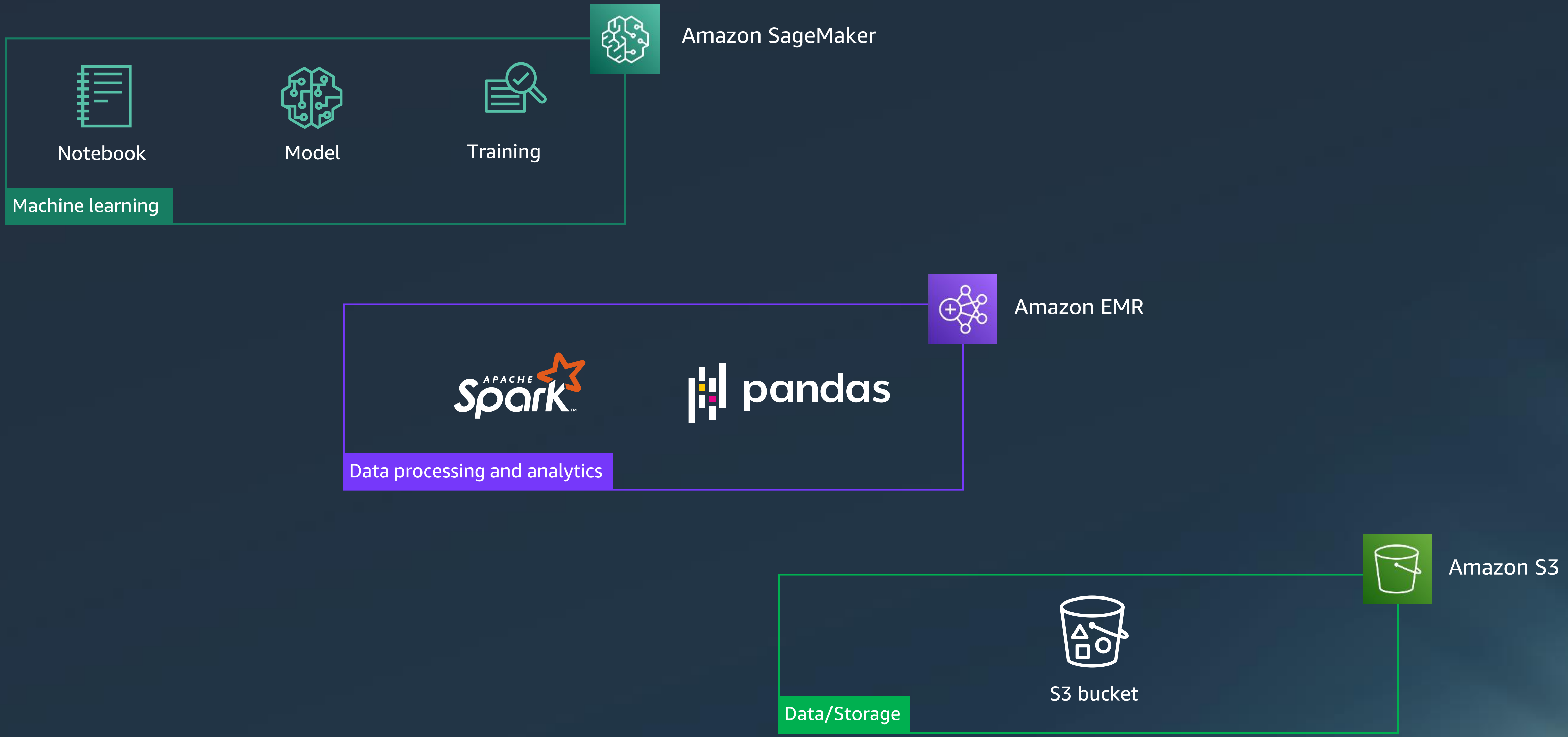
Amazon EMR

Apache Spark

pandas

Data processing and analytics

Our solution



Amazon SageMaker

Notebook

Model

Training

Machine learning

Amazon EMR

APACHE Spark

pandas

Data processing and analytics

Amazon S3

S3 bucket

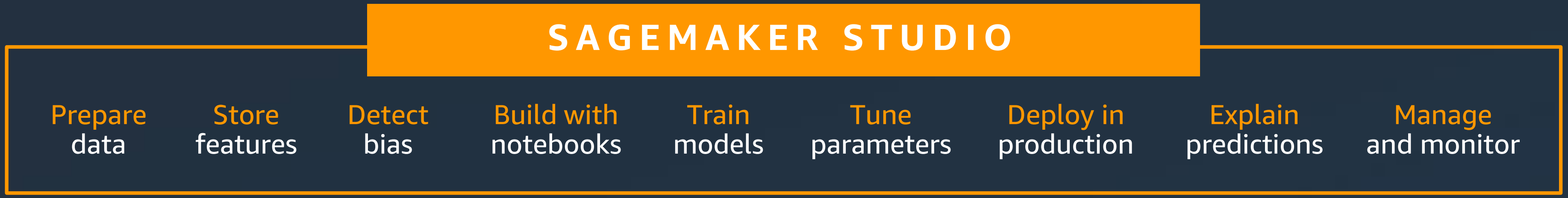
Data/Storage

Amazon SageMaker Studio

FULLY INTEGRATED DEVELOPMENT ENVIRONMENT (IDE) FOR MACHINE LEARNING

Amazon SageMaker Studio

FULLY INTEGRATED DEVELOPMENT ENVIRONMENT (IDE) FOR MACHINE LEARNING



SAGEMAKER STUDIO

Prepare data

Store features

Detect bias

Build with notebooks

Train models

Tune parameters

Deploy in production

Explain predictions

Manage and monitor

Amazon SageMaker Studio

FULLY INTEGRATED DEVELOPMENT ENVIRONMENT (IDE) FOR MACHINE LEARNING

SAGEMAKER STUDIO

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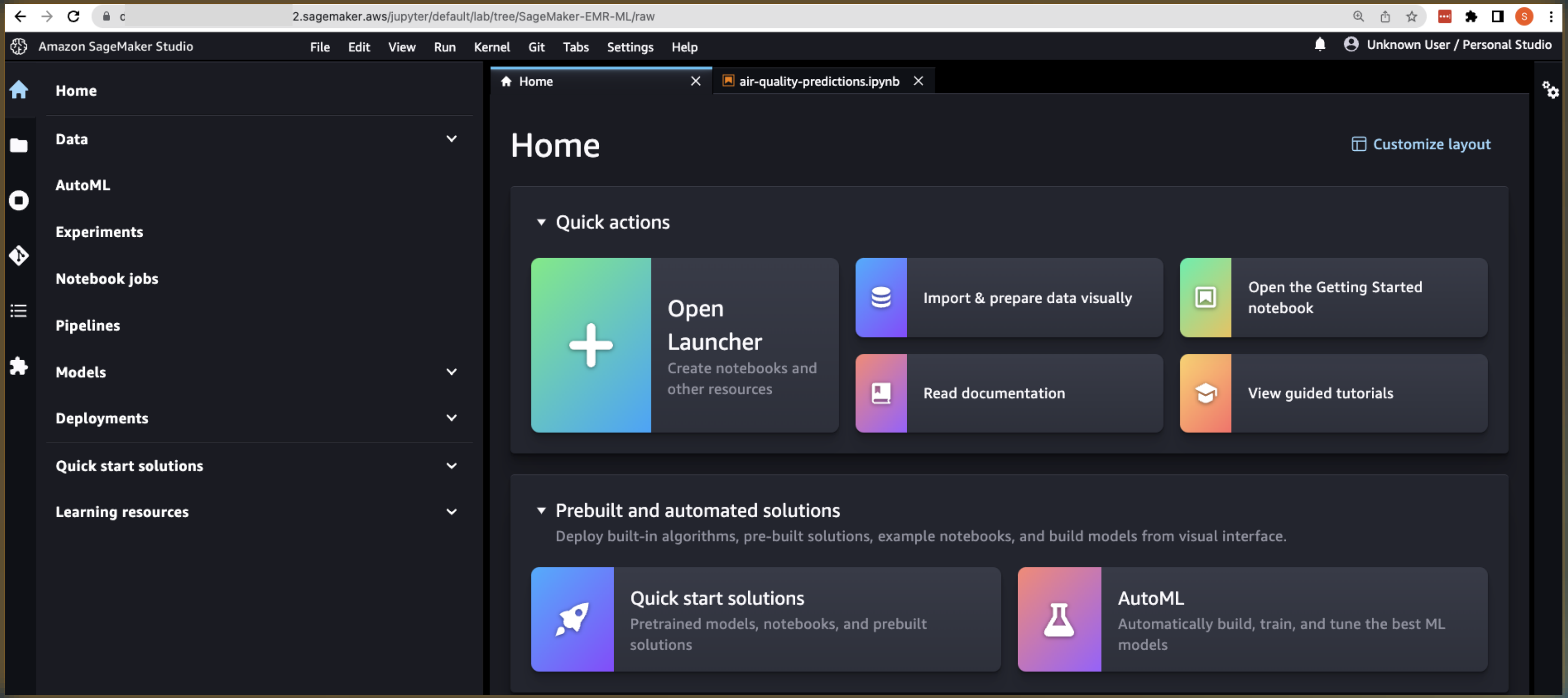

Home

Quick actions

- Open Launcher: Create notebooks and other resources
- Import & prepare data visually
- Open the Getting Started notebook
- Read documentation
- View guided tutorials

Prebuilt and automated solutions

Deploy built-in algorithms, pre-built solutions, example notebooks, and build models from visual interface.

- Quick start solutions: Pretrained models, notebooks, and prebuilt solutions
- AutoML: Automatically build, train, and tune the best ML models

github.com/debnsuma/sagemaker-studio-emr-spark.git

Demo

Visit the Data & AI/ML resource hub

Dive deeper into these resources, get inspired and learn how you can use AI and machine learning to accelerate your business outcomes.

- 6 steps to machine learning success e-book
- 7 leading machine learning use cases e-book
- Machine learning at scale e-book
- Achieving transformative business results with machine learning e-book
- Tackling our world’s hardest problems with machine learning e-book
- Accelerating machine learning innovation through security e-book
- … and more!

https://bityl.co/FqdC

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- Learn how to apply machine learning, artificial intelligence, and deep learning to unlock new insights and value in your role

- Take the steps today, towards validating your expertise with an AWS Certified Machine Learning – Specialty Certification

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Thank you!