2019

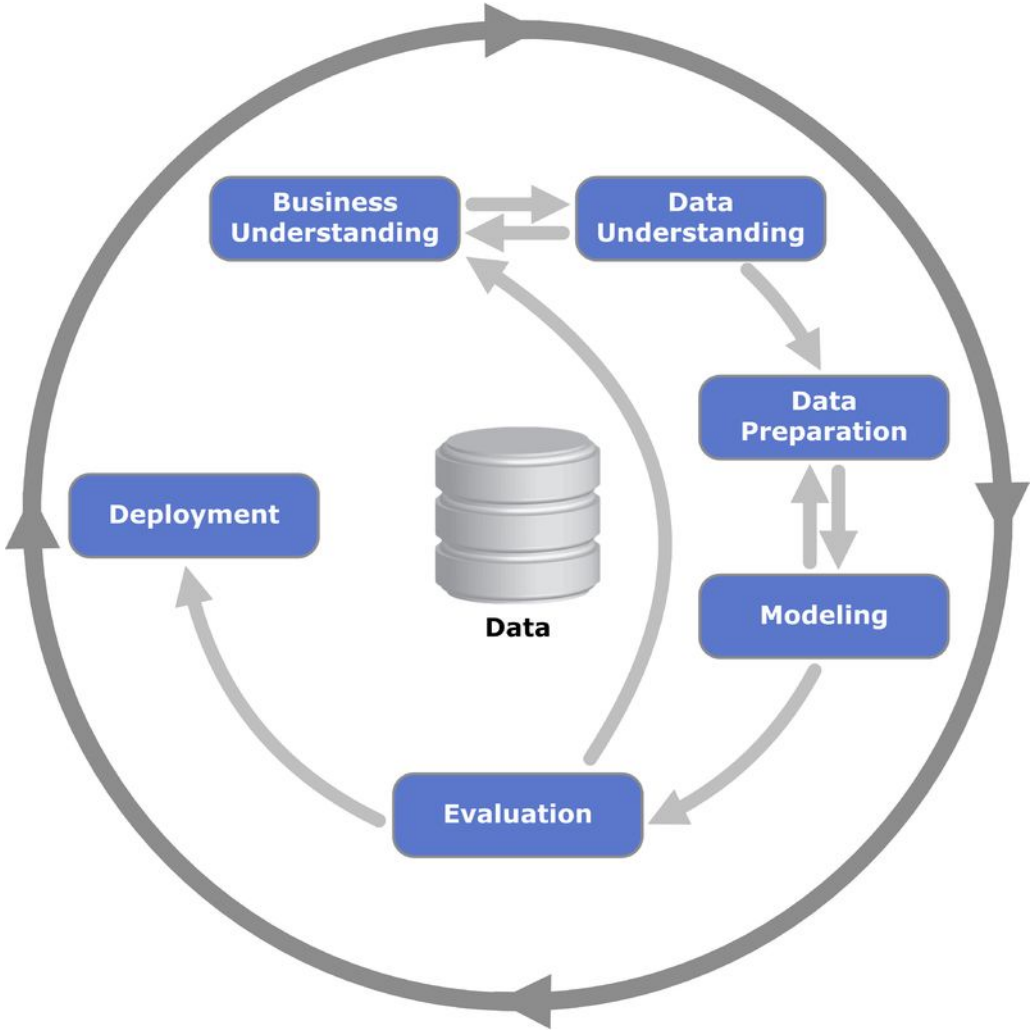
Data Science and AI

Deployment of Machine Learning Models

Agenda

- CRISP-DM Methodology
- Importance of Deployment
- Data Pipeline
- Machine Learning Model in Production
- Case Study
- Labs

CRISP-DM Methodology



- Business understanding
- Data understanding
- Data preparation
- Modeling
- Evaluation
- Deployment

Source: What is the CRISP-DM methodology?

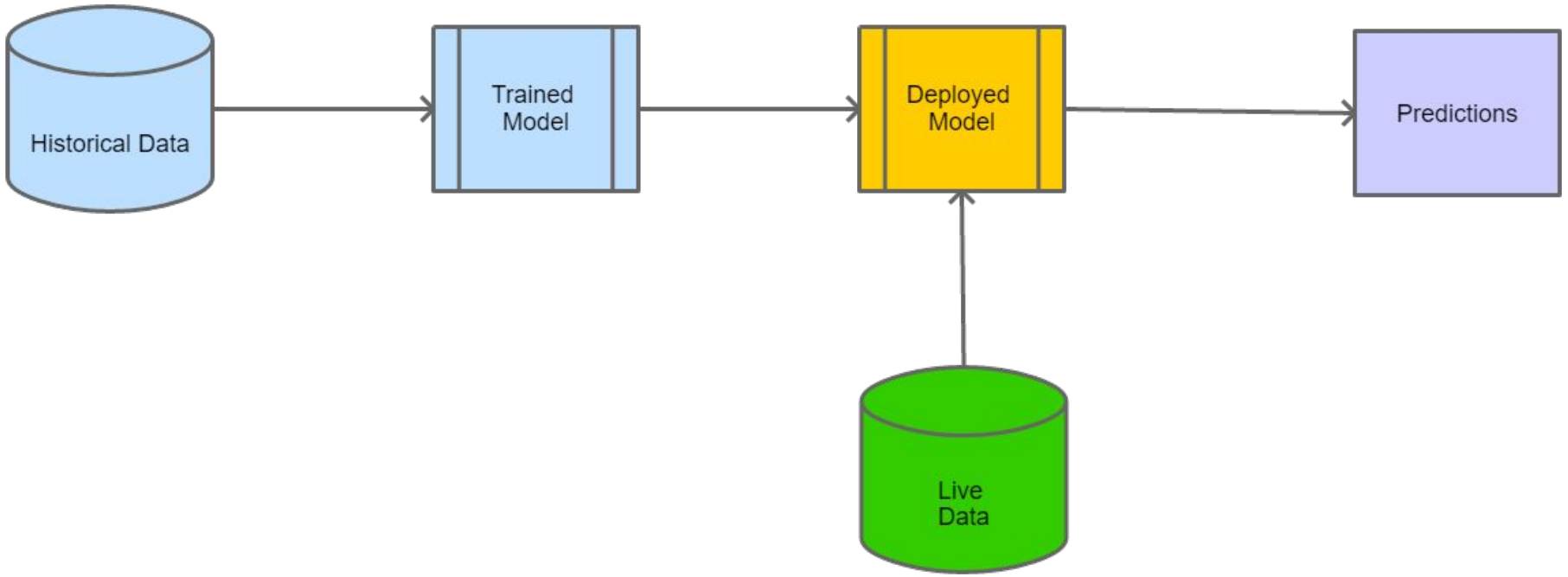
Why?

- Make Predictions Available to Everyone
- Measure Quality of The Productions Over Time
- Improve Prediction Quality With Feedback

What?

- Deployment
  - Making Model Predictions Easily Available
- Evaluation
  - Measuring Quality of Deployed Models
- Monitoring
  - Tracking Model Quality Over Time
- Management
  - Improving Deployed Models With Feedback

Pipeline

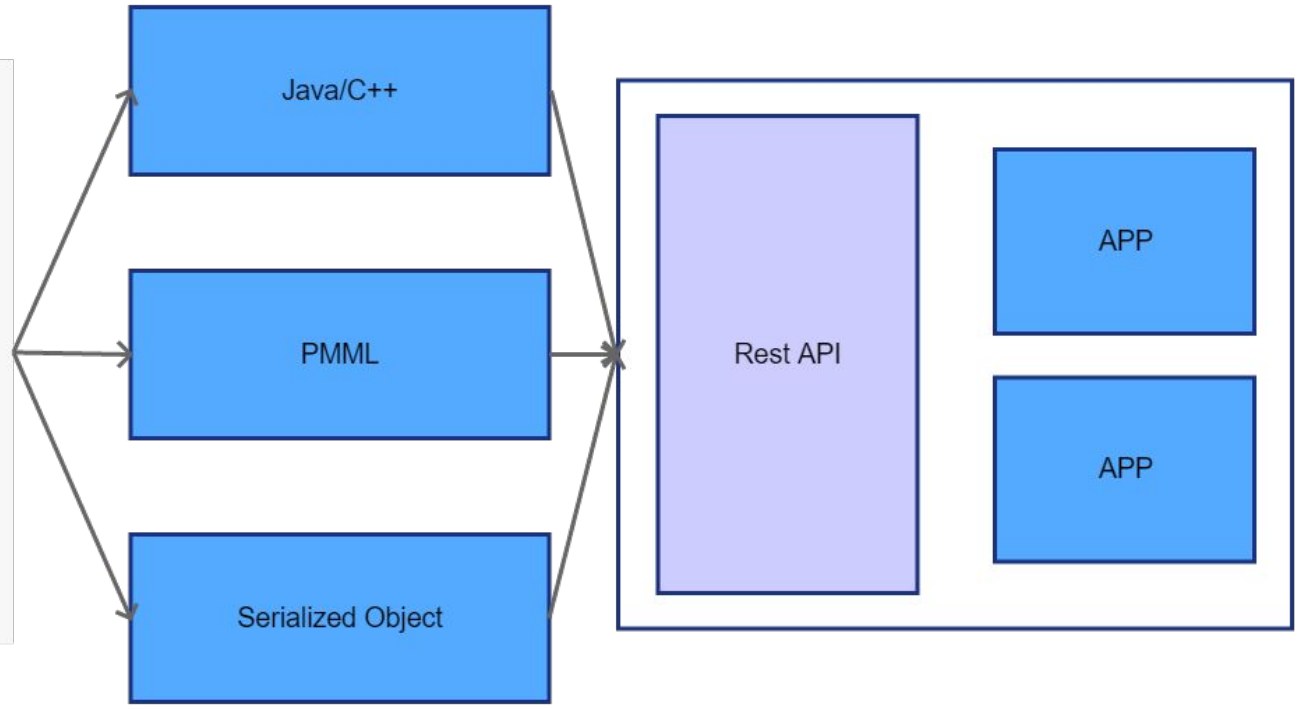


Machine Learning Model in Production

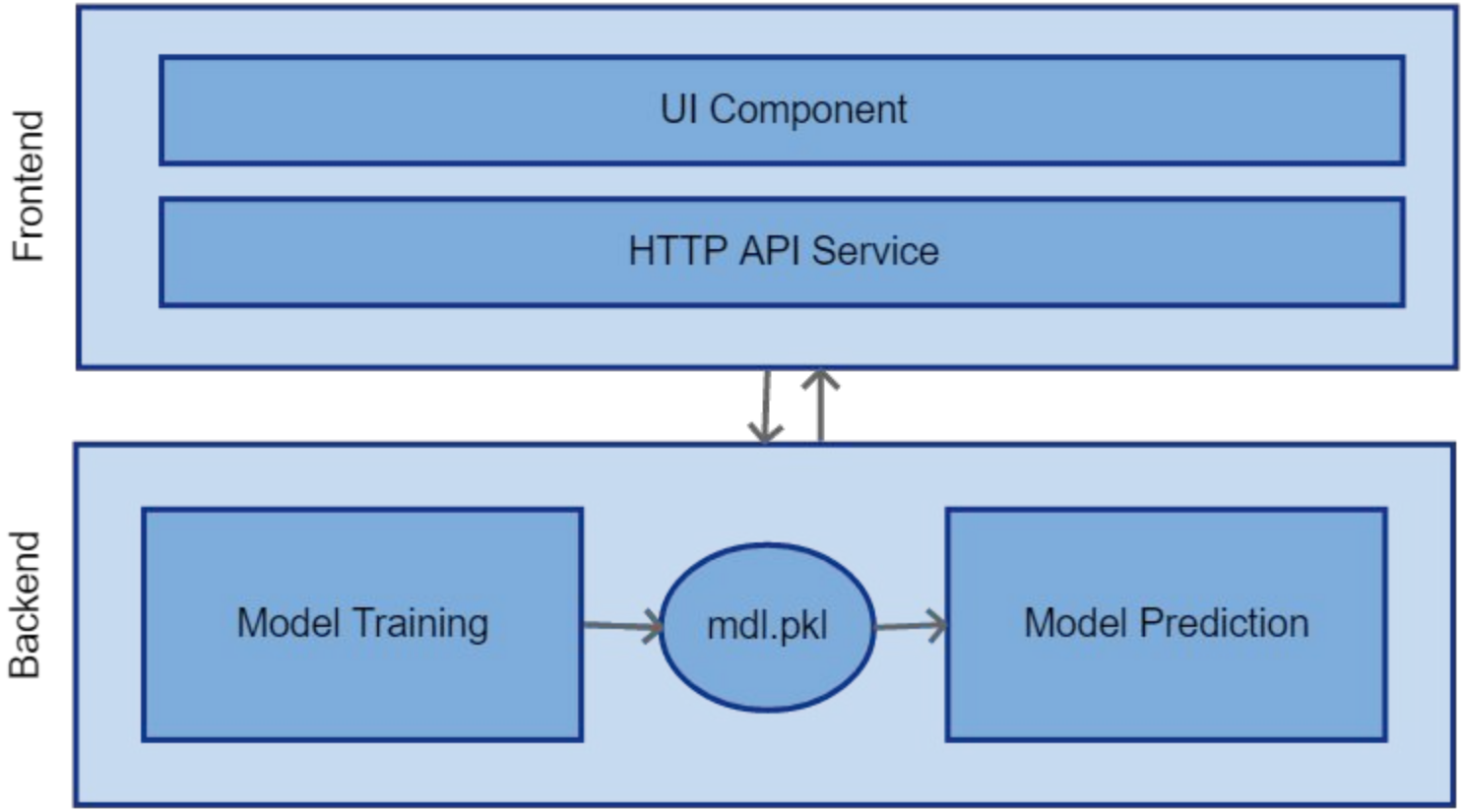
Python ML Model

```
X, y = make_classification(
    n_samples=1000
    , n_features=4
    , n_informative=2
    , n_redundant=0
    , random_state=0
    , shuffle=False
)
clf = RandomForestClassifier(
    n_estimators=100
    , max_depth=2
    , random_state=0
)
clf.fit(X, y)
```

Production Envoronment



Case Study



Lab 10.4

- Train the model using Jupyter notebook
- Save the trained model object as a pickle file (serialization)
- Create a flask environment that will have an API endpoint which would encapsulate our trained model and enable it to receive inputs (features) through GET requests over HTTP/HTTPS and then return the output after de-serializing the earlier serialized model
- Upload the flask script along with the trained model
- Make requests to the hosted flask script through a website, bot, android app or any other application capable of sending HTTP/HTTPS requests

Summary

- **Plan Deployment**
  - Summarise your deployment strategy including the necessary steps and how to perform them

- **Plan monitoring and maintenance**
  - Summarise the monitoring and maintenance strategy, including the necessary steps and how to perform them.

- **Produce final report**
  - Final report
  - Final Presentation

- **Review project**
  - Summarise important experience gained during the project. For example, any pitfalls you encountered, misleading approaches, or hints for selecting the best suited data mining techniques in similar situations could be part of this documentation.