Module 6
Internet of Things using Machine Learning

End-to-end Machine Learning solutions

Hello!

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Field of work: Machine Learning, Pattern Recognition, Biomedical Engineering/

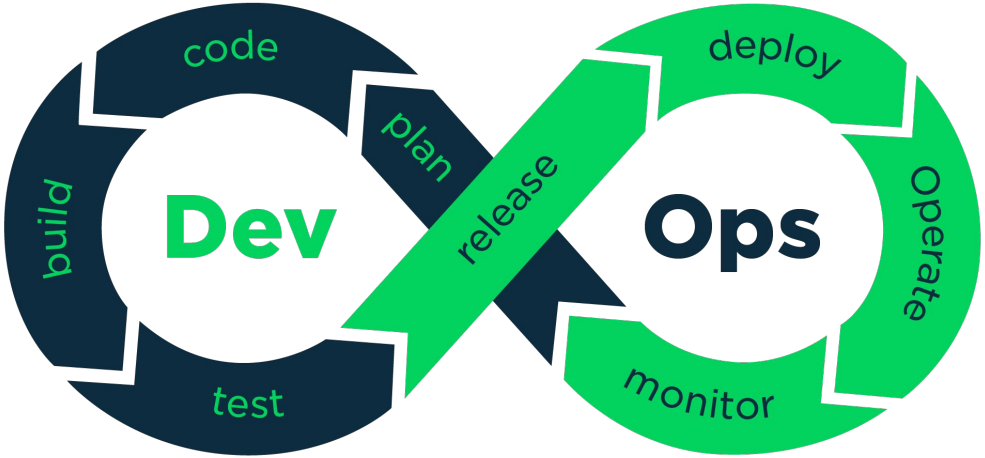
Contents

- DevOps vs MLOps
- Docker
- A ML model into production

DevOps vs MLOps

First things first

DevOps?



First things first

DevOps?

Continous Integration (CI)
Continous Delivery (CD)

First things first

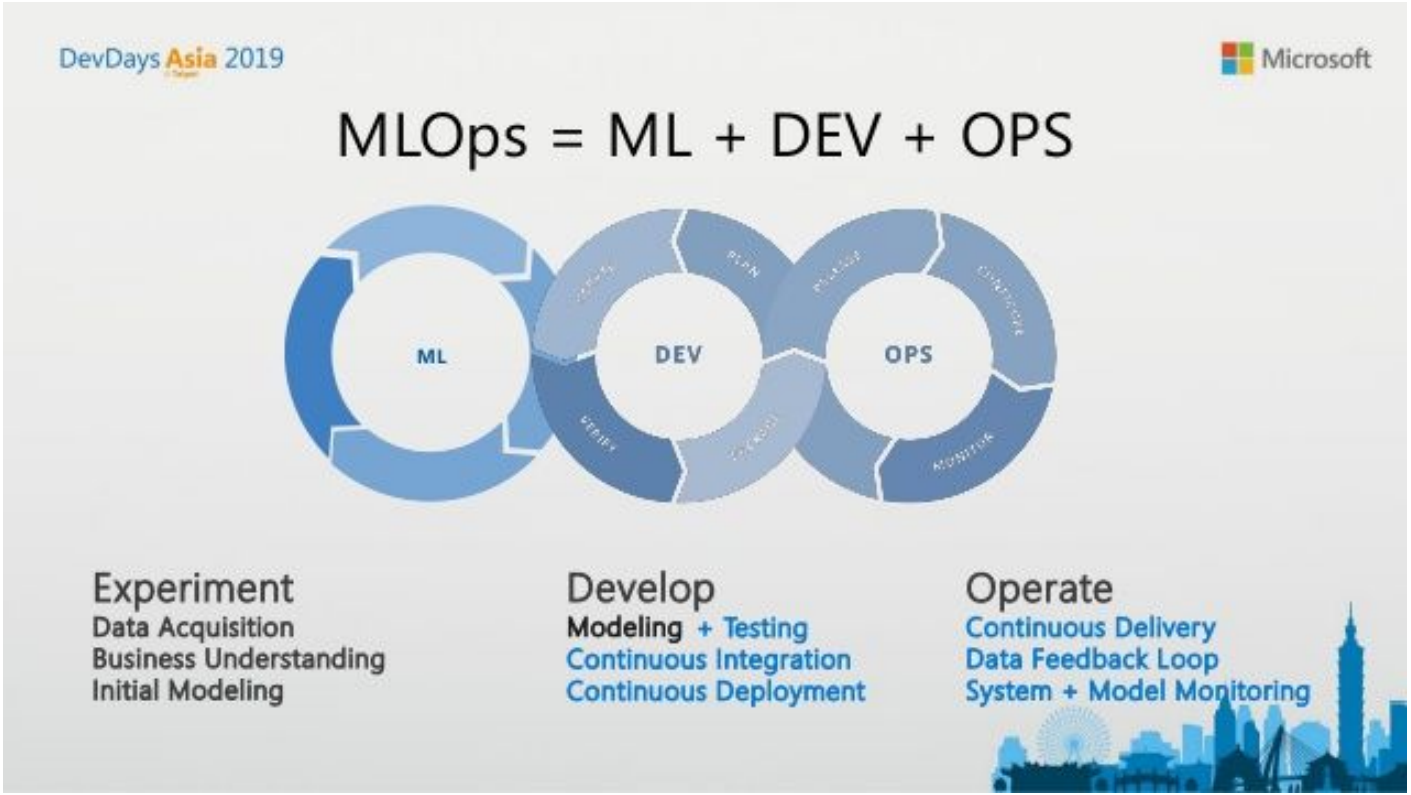
MLOps?

Recommended to listen:

- Podcast – Machine Learning e ML Ops (BR)
- Podcast – Data Hackers e ML Ops (BR)
- Podcast – Data Skeptic ML Ops (US)

First things first

MLOps?



First things first

MLOps?

The main difficulties are

- Team skills
- Model dev (it is a standalone research itself - Experimentation)
- Testing (Validation dataset, metrics and so on)
- Deployment (Pipelines? Manually transformation? Frameworks?)
- Production (Model's performance decay)

First things first

MLOps?

Diffs

- **CI** is no longer only about testing and validating code and components, but also testing and validating data, data schemas, and models**.**
- **CD** is no longer about a single software package or a service, but a system (an ML training pipeline) that should automatically deploy another service (model prediction service).
- **Continuous training (CT)**

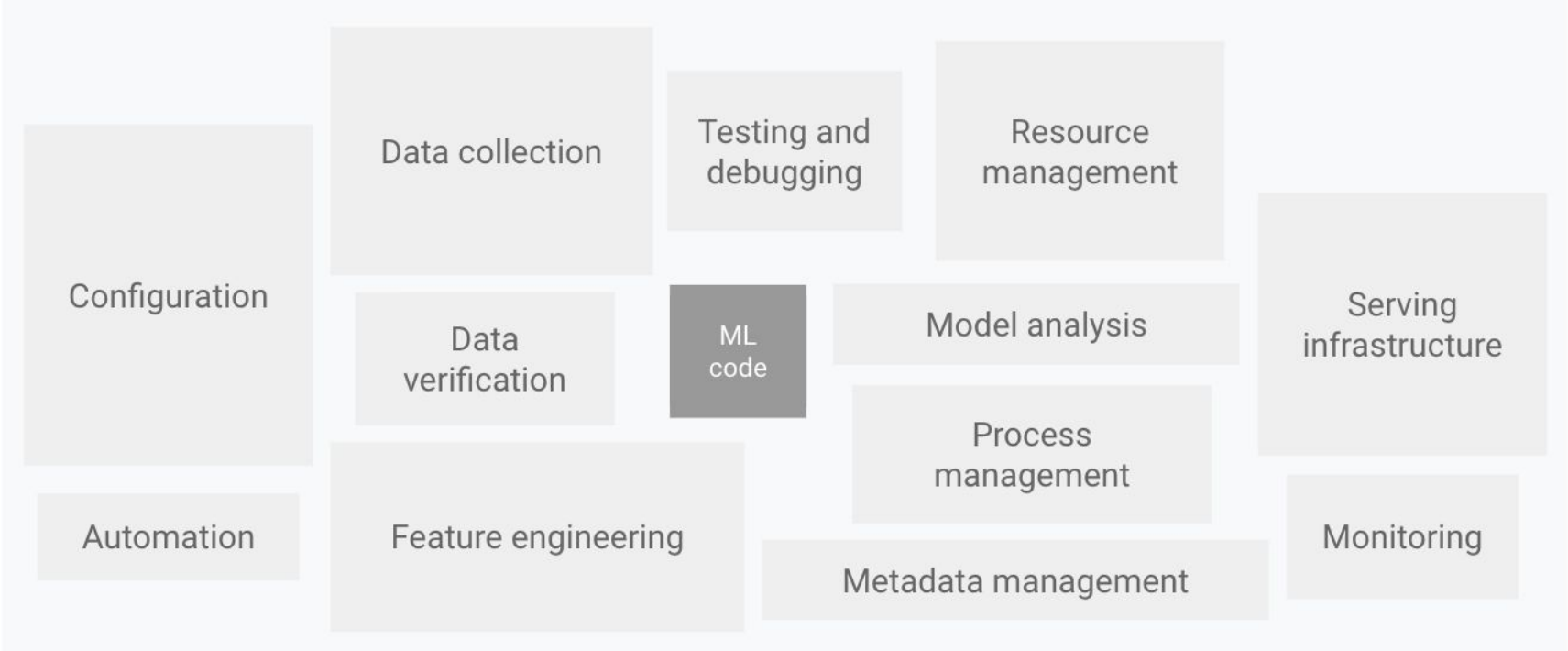
First things first

MLOps?

Diffs

- **CI** is no longer only about testing and validating code and components, but also testing and validating data, data schemas, and models**.**
- **CD** is no longer about a single software package or a service, but a system (an ML training pipeline) that should automatically deploy another service (model prediction service).
- **Continuous training (CT)** is a new property, unique to ML systems, that's concerned with automatically retraining and serving the models.

First things first
MLOps?



First things first

MLOps?

General steps of a ML model development?

First things first

MLOps?

General steps of a ML model development?

- Data extraction
- Data analysis
- Data preparation
- Model training
- Model evaluation
- Model validation
- Model serving
- Model monitoring

First things first

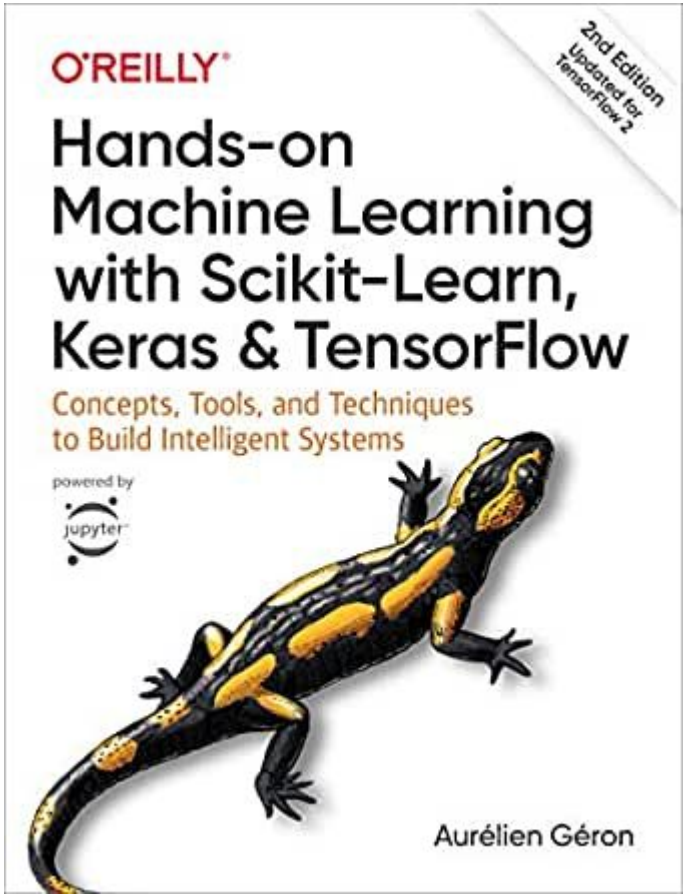
MLOps?

My first contact (?) with ML Ops

First things first

MLOps?

My first contact (?) with ML Ops



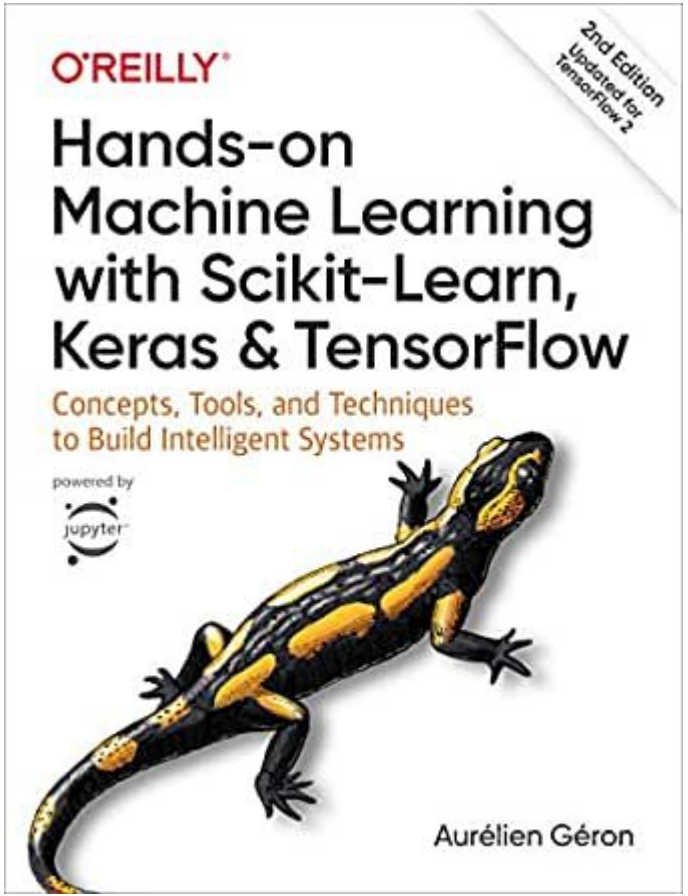
First things first

MLOps?

My first contact (?) with ML Ops

Chapter 2. End-to-End Machine Learning Project

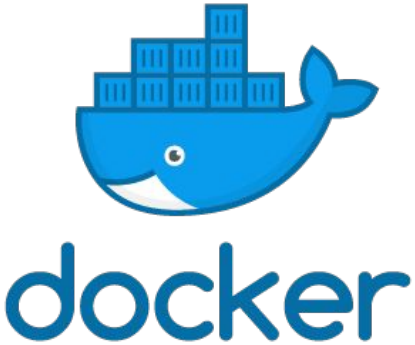
Every data scientist should complete this chapter!



First things first

MLOps?

To assist this whole process for placing model into production we have:



First things first

MLOps?

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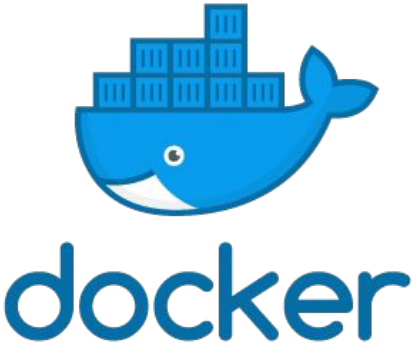
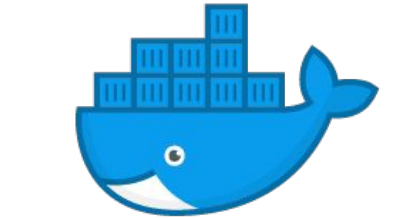


Docker

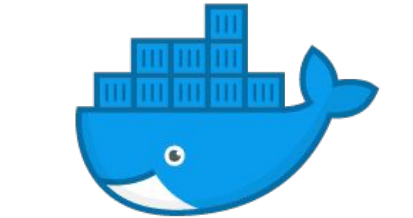


What is a container?

Docker and the rise of Microservices

Why Docker Engine?

Who is using Docker?

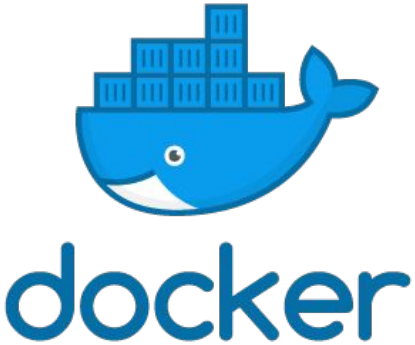


And what does it have to do with ML?

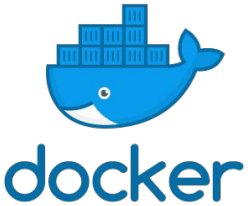

docker


kubernetes


Kubeflow



Installation

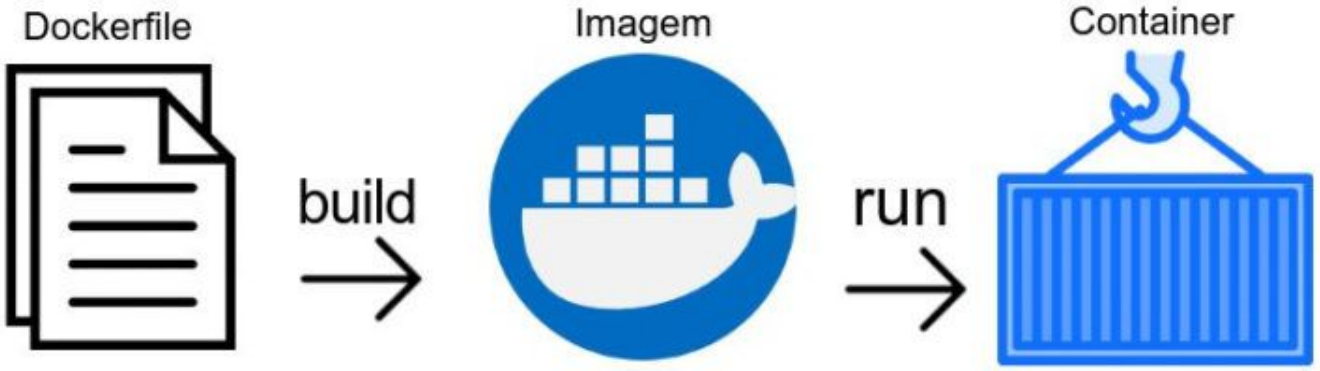


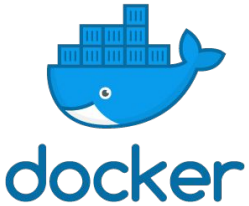
Getting started

Base CLI commands:

```
docker --version
docker ps or docker container ls
docker image ls
docker system prune (CAREFUL)
```

Getting started





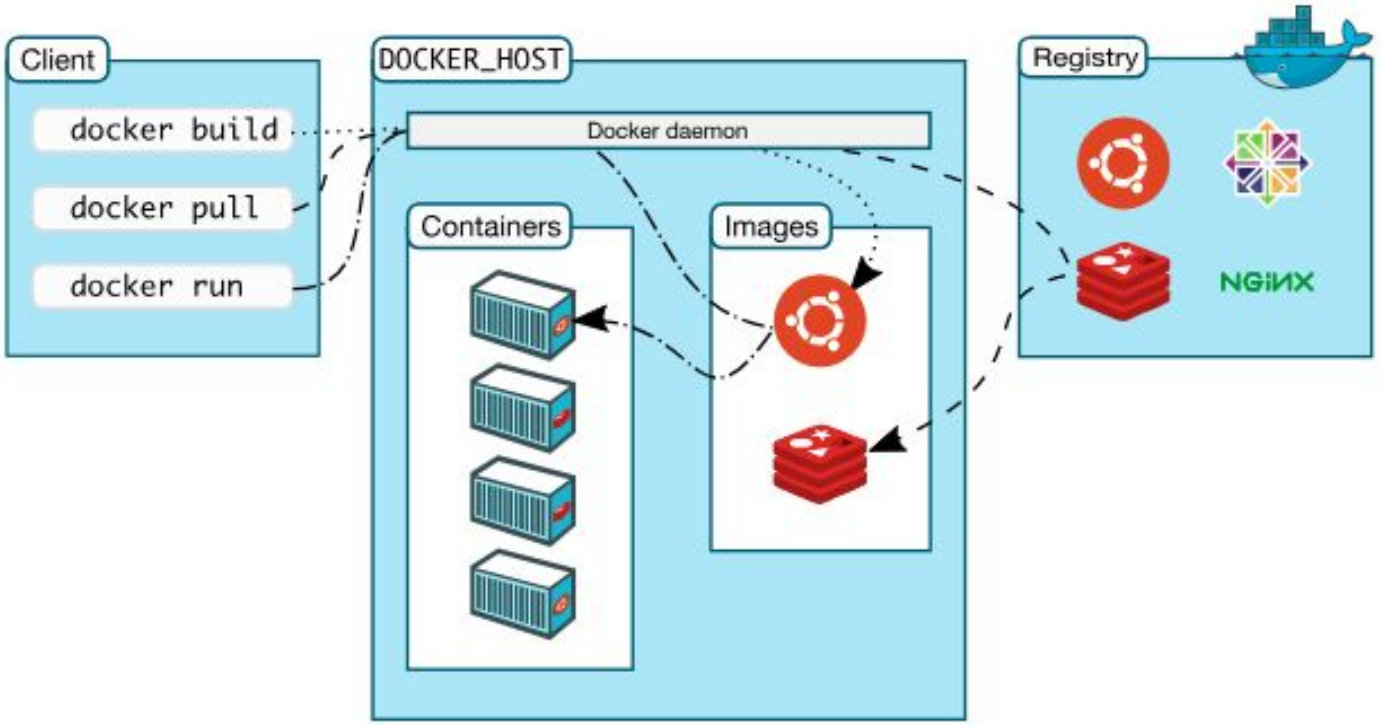
Getting started

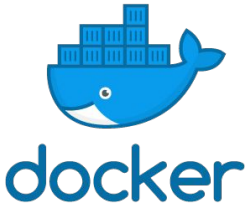
Base CLI commands:

```
docker pull <registry/container_name> (Docker Hub)
docker run <container_name> (LOCAL)
docker run <registry/container_name> (Docker Hub)
```

Example - hello world browser

Getting started





Getting started

Walking though "Example - hello world browser"

- Create a `Dockerfile`
- Build the app using `docker build -t <image_name> <directory of the Dockerfile>`
- Run the app using `docker run <pars> <image_name>`

Docker Compose

A ML model into production

API

What is a Rest API?

API

API

Github repo:

https://github.com/lapisco/Data_Science_Trainee_Program

LAPISCO

Laboratório de Processamento de Imagens, Sinais e Computação Aplicada

Thanks!

Any questions?

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Lattes curriculum
LAPISCO website

Appendices