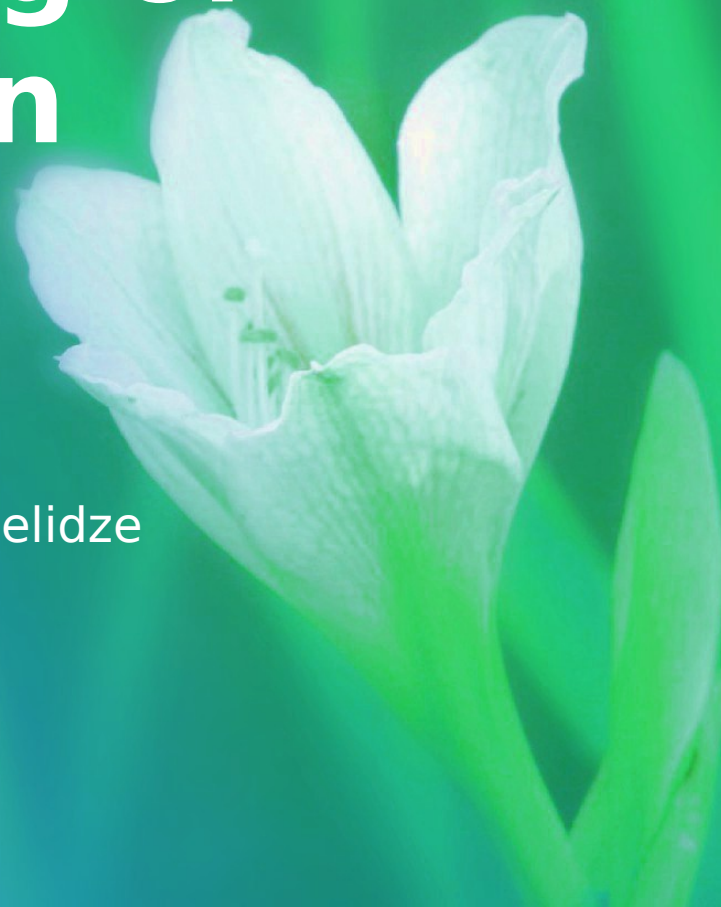# DevOps-enclosing of Plant Recognition ML/DL-Project

MLOps | Bootcamp | JUL24

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Mentor: Sebastien SIME
DATASCIENTEST

9. September, 2024

Agenda

0   Context & Objectives

1   Architecture Diagram

2   Limitations
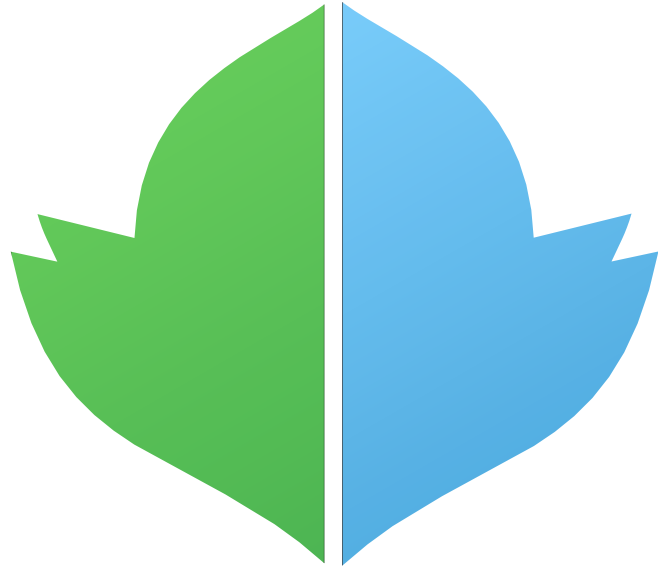
3   Demonstration of Use

Context & Objectives

- Significant challenges in monitoring plant health and diagnosing diseases promptly

- Early detection of diseases is crucial for preventing widespread crop damage, ensuring food security, and optimizing agricultural output

- Just a handful of tools (all of questionable reliability) available on the market so far
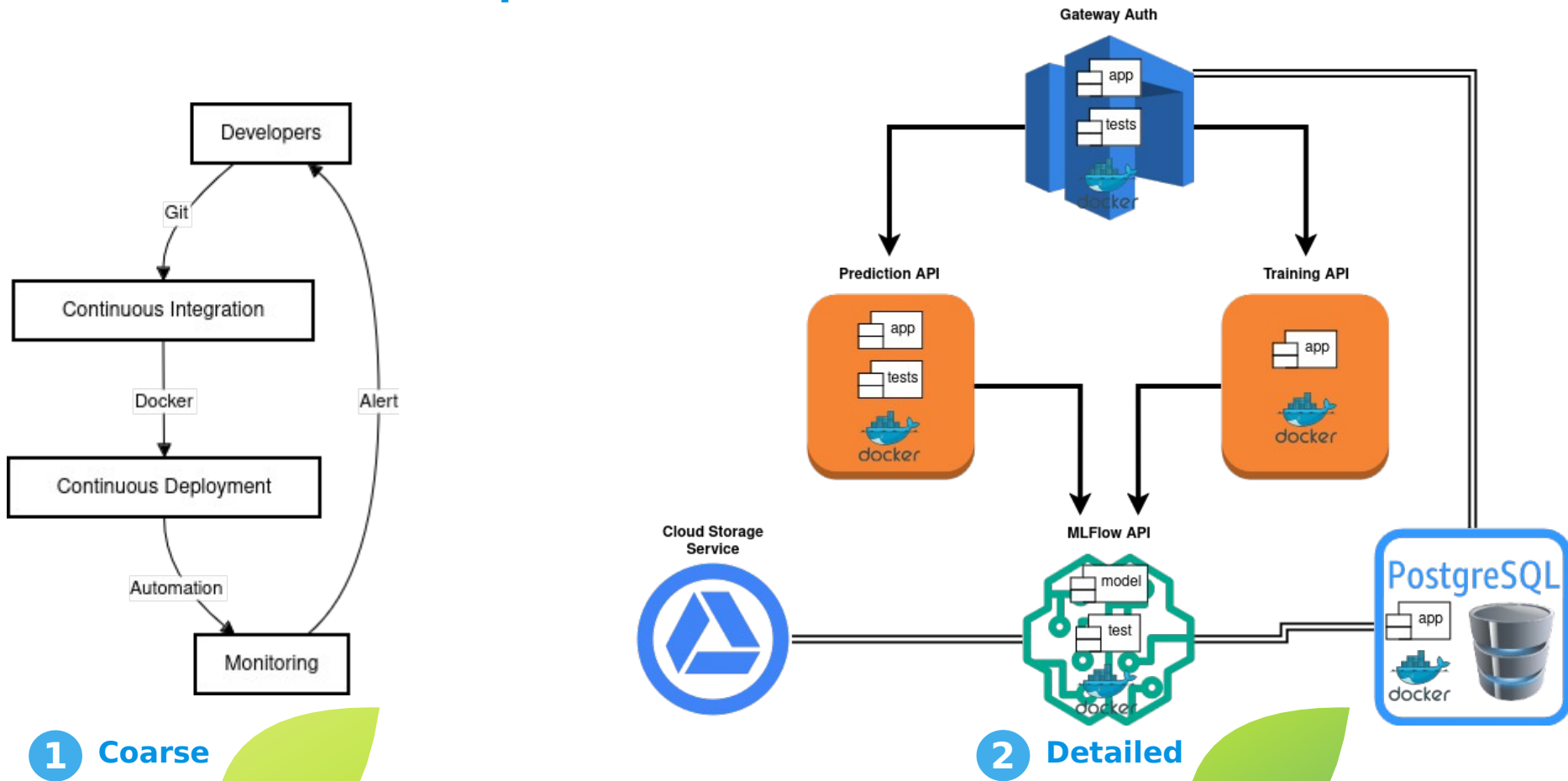
- Develop an AI-driven solution that can detect plant species and diagnose diseases from images

- REST API as primary interface enabling easy integration with existing software solutions

- Simplistic GUI allowing easy monitoring of application health and managing user permissions

Architecture Diagram

Speaker: Arif

Implementation Scheme

Gateway Auth

app

tests

Prediction API

app

tests

Training API

app

Cloud Storage Service

MLFlow API

model

test

PostgreSQL

app

1 Coarse

2 Detailed

Created with diagrams.net

Developers

Git

Continuous Integration

Docker

Continuous Deployment

Automation

Monitoring

Alert

Restraining Forces

Power | Time

Limited CPU/GPU-resources at our disposal significantly **impaired debugging** and led to employing mere fractions/ **subsamples** of available data.

MLOps | Time

We had to focus on truly required and DevOps-specific functionality, and thus implemented the system without **dedicated monitoring service** (Grafana | Prometheus) as well as **large-scale container management** (k8s).

We limited spinning up our multi-container app to the single-hosted environment orchestrated by Docker Compose.

Data & Model | Time

Substantially resource demanding **(re)training** of over 50-layer deep CNN model(s) on 54292 – 64457 images weighing ~ 2 GB.

Complexity

Labeling of new data was excluded due to the subtle complexity in visual identification of plant diseases as well as sparsity of (heterogeneous) data [only < 5% of truly unseen yet noisy data over 27 classes].
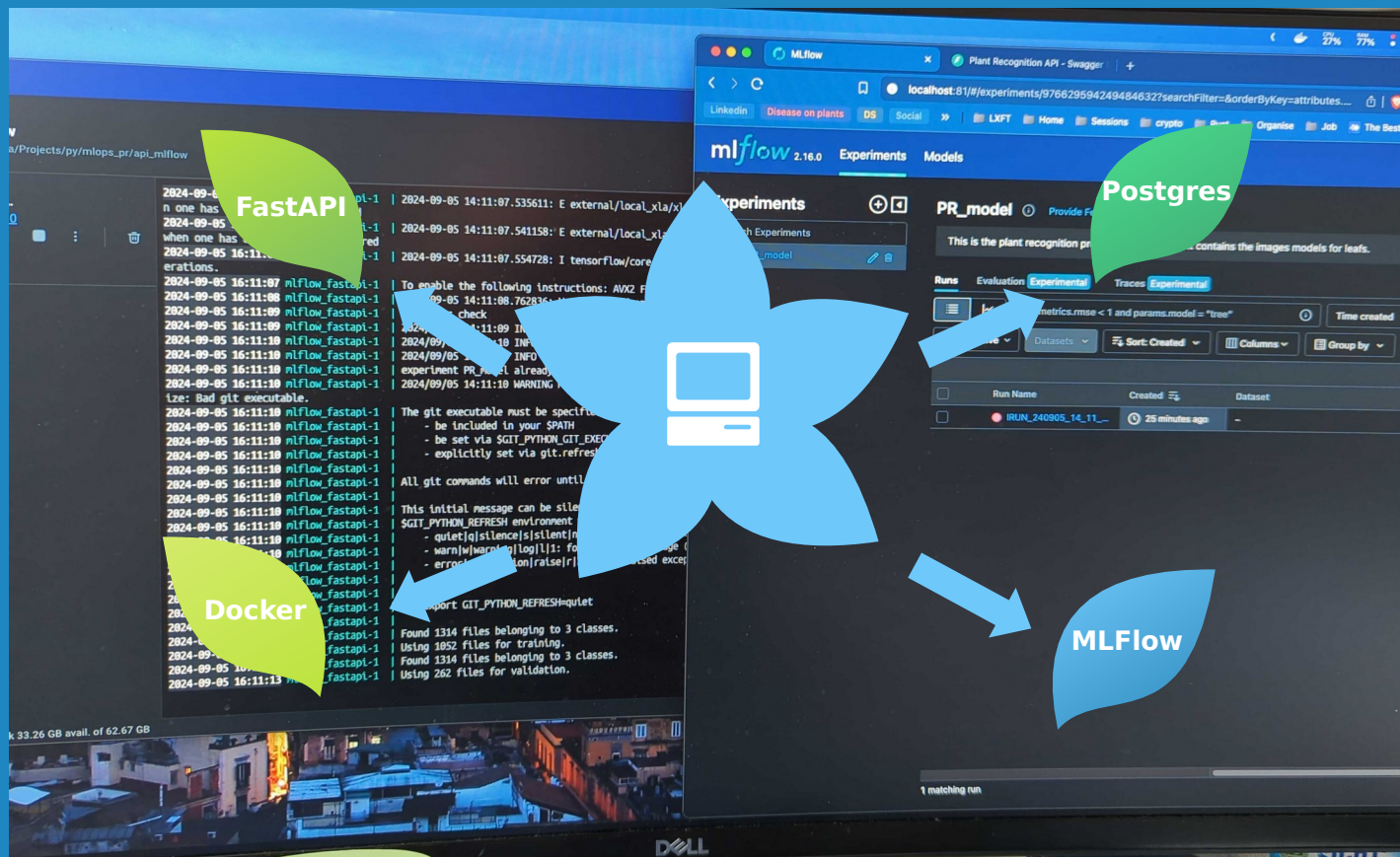
Hard facts: although backed with the world's largest biodiversity observatory, *Pl@ntNet app* identifies an image of scab-diseased apple leaf as mexican plum with top-1 confidence of 12.5%.

Original (unedited) image taken from Latest Quality

Screen icon by Garik Barseghyan from Pixabay

Thank you!