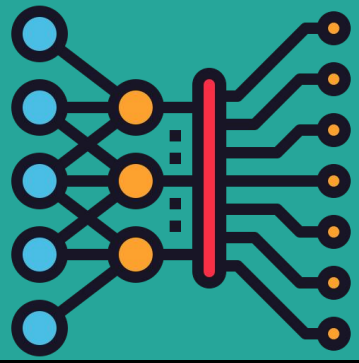
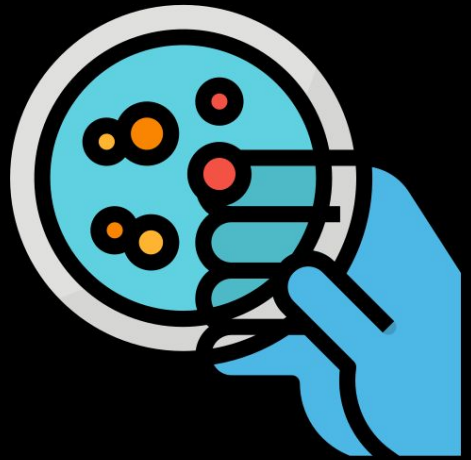


Bacteria Object Detection on Agar: A proof of concept

—

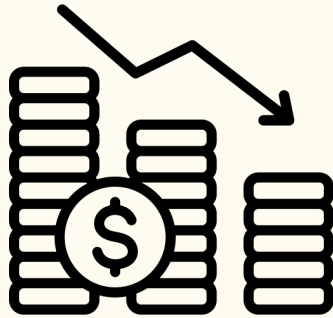
By Dietrich Nigh

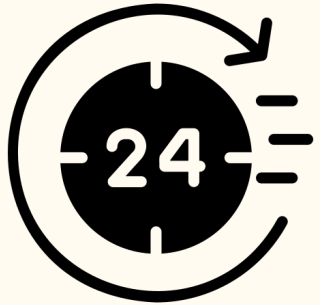


Team

Dietrich Nigh
B.A. Biology, University of Pennsylvania
Data Science Certification, Flatiron School

Manual Classification is time and resource intensive





Agenda

Business Problem

Data Overview

The Model

Future Steps

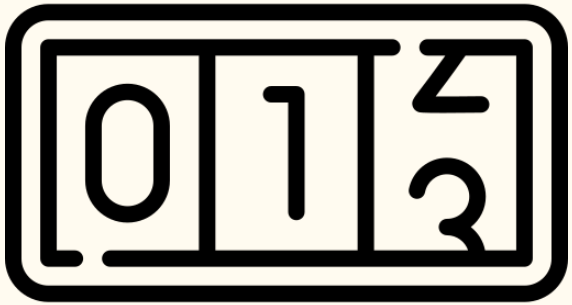
The Business Problem

Agar Plates are a staple of the lab

- Invented 1880s
- Used for culturing and isolation
  - Bacteria and Fungi
- 85 millions used annually
- Wide range of applications

Laborious

- Hand Counts
  - 30 to 300
- Easy to over or under seed
- Verification counts needed



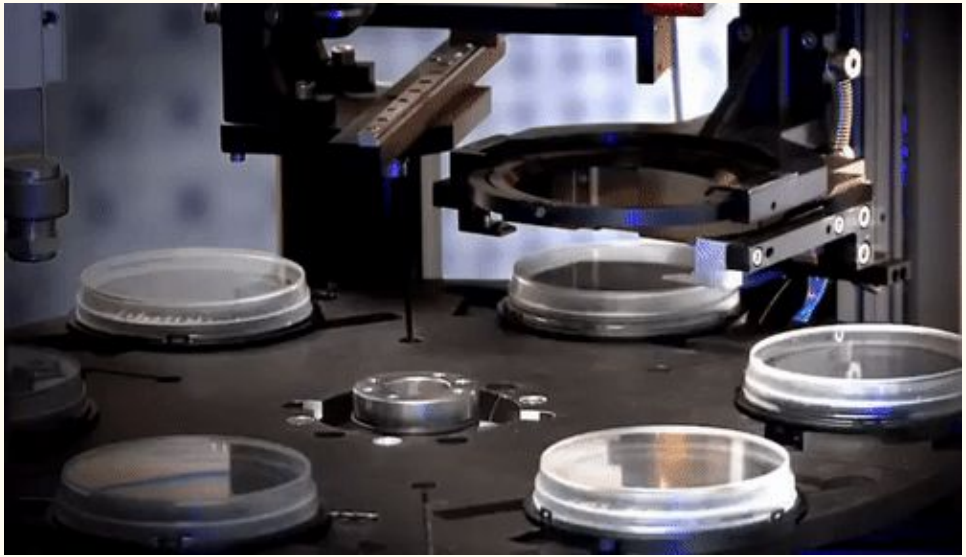
Time intensive

- Years of training
- 4 to 24 hours
- Making the plates

How can bacteria classification be more accurate, yet require less training?

Automation!!!

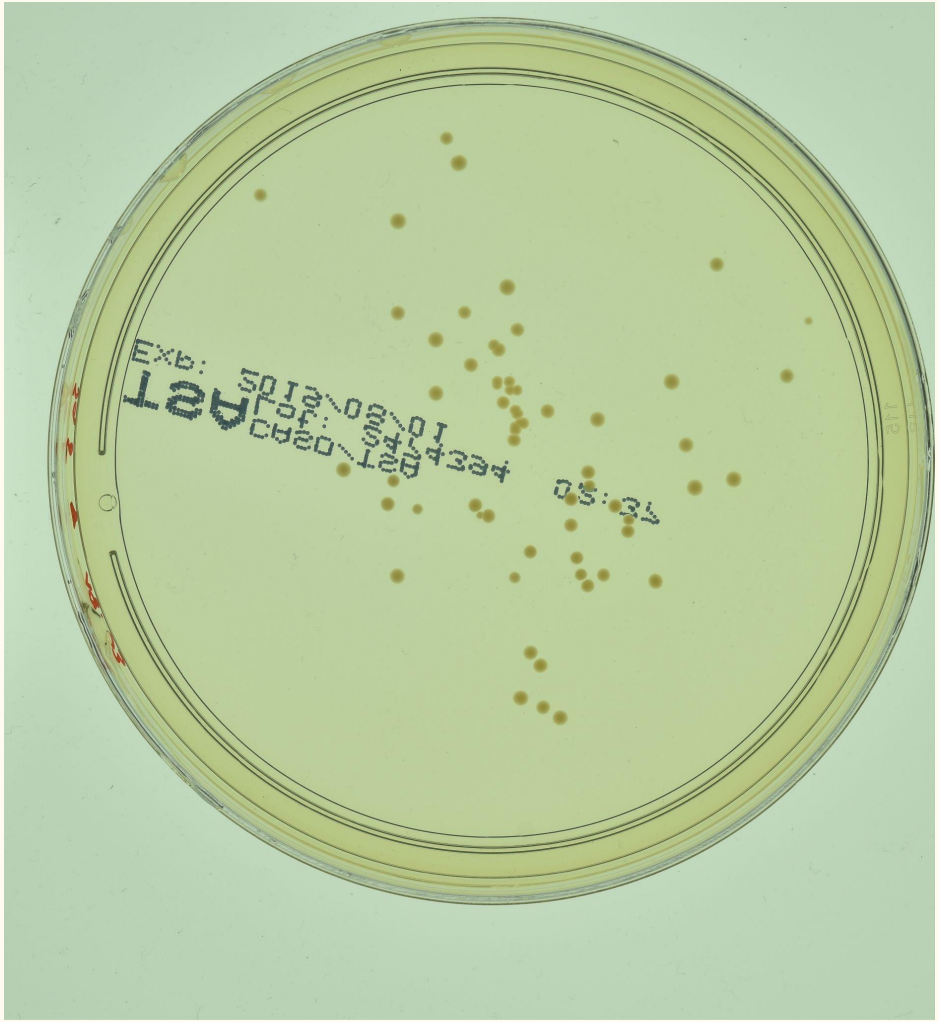
- Several steps already automized
- Pretrained model
- Less counting
- Fast, accurate classification



Data Overview

Data Used

- NeuroSYS Research data
  - academic license.
- 13000 images
- five different microorganisms
  - S.aureus
  - B.subtilis
  - P.aeruginsoa
  - E.coli
  - C.albicans
- Limitations

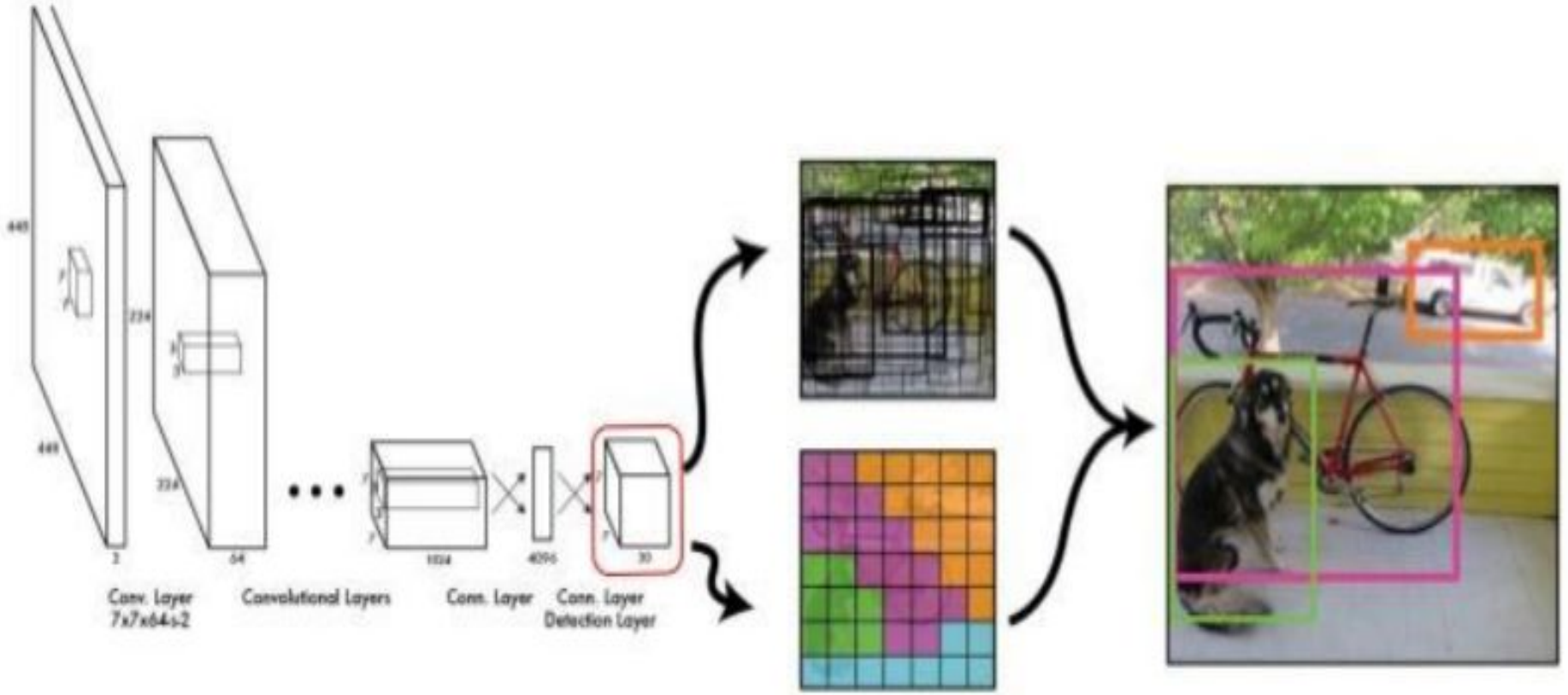

Exb:
05:34


Exb:
02:43

The Model

YOLO: You Only Look Once

mAP50: 97%
mAP50-95: 70 %
Precision: 97 %

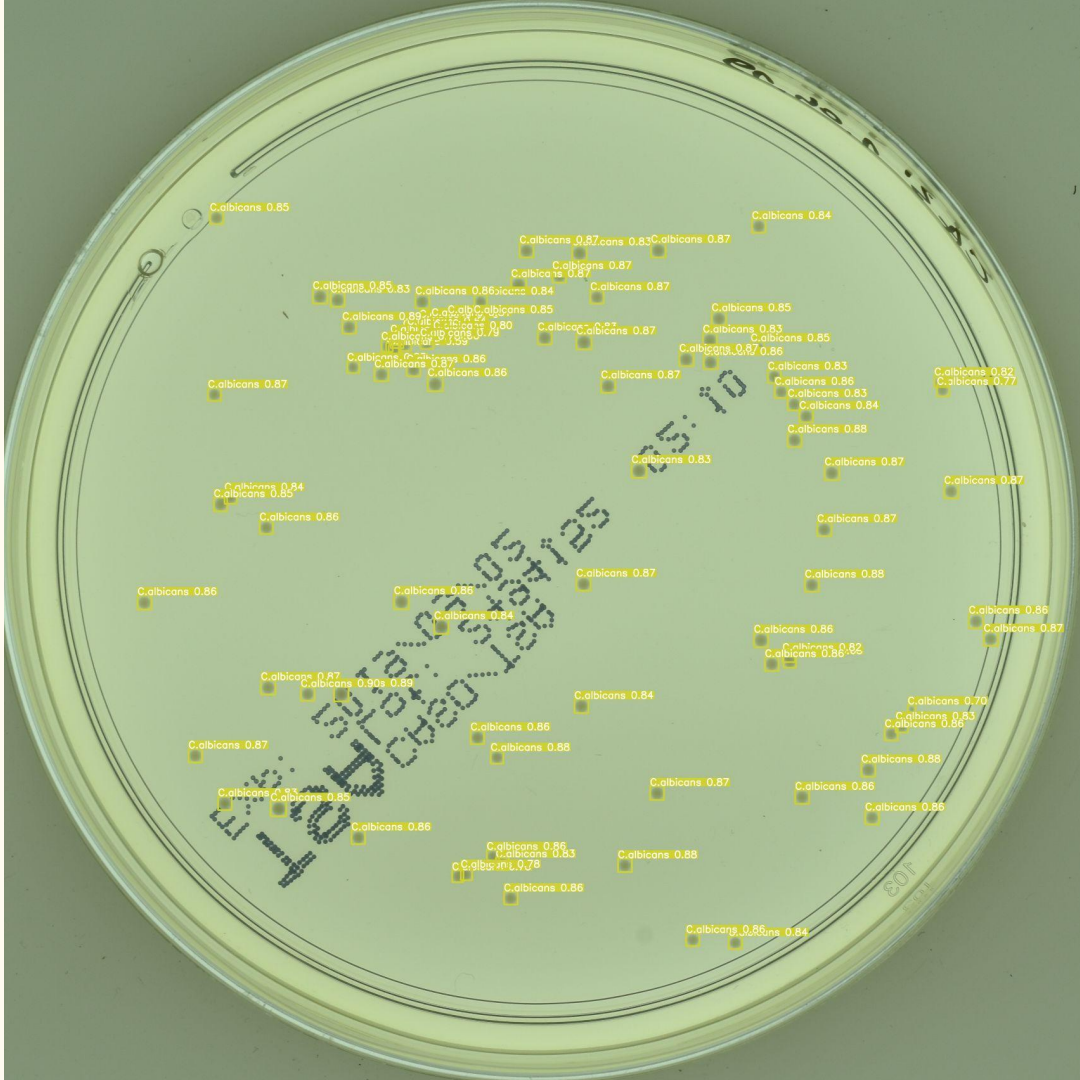


Example:

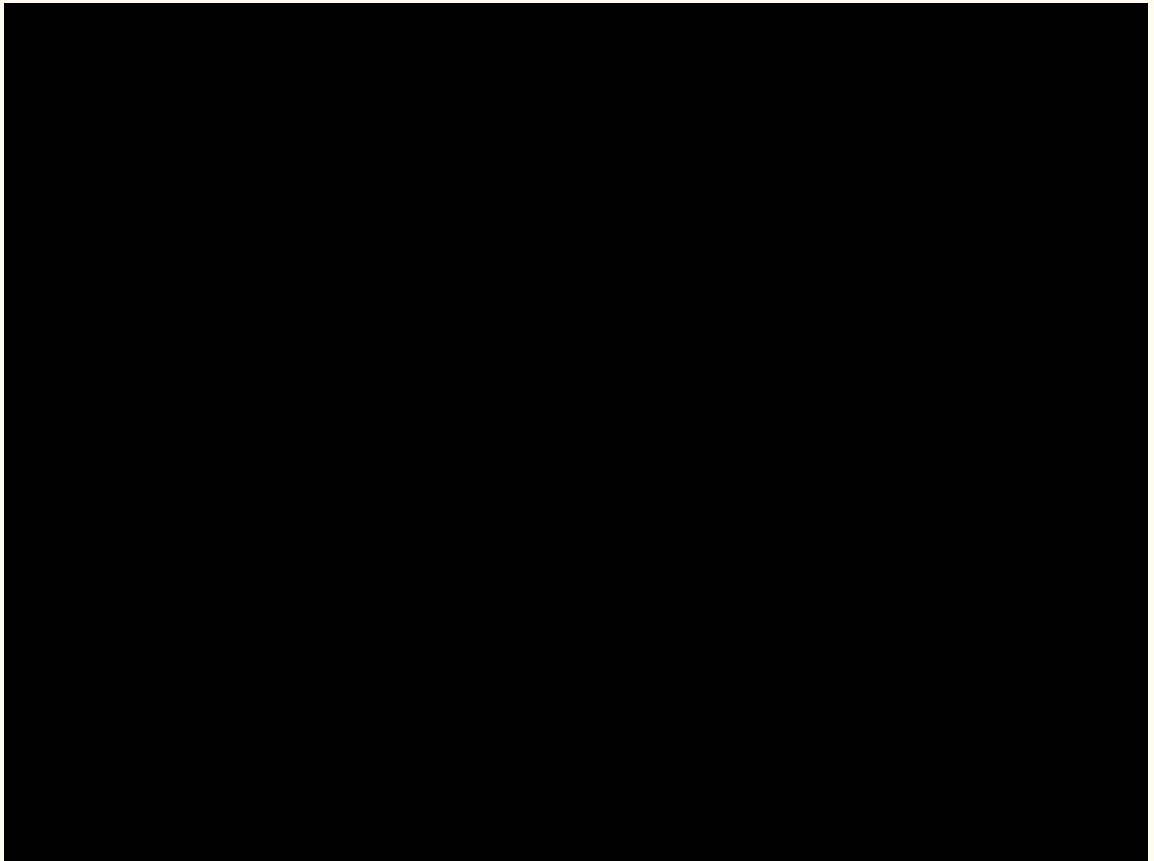
- 91 *C. Albicans* colonies

Example:

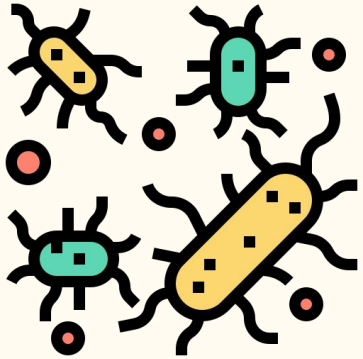
- 91 *C. Albicans* colonies
- Returns label colonies and count
- Less than 2 seconds

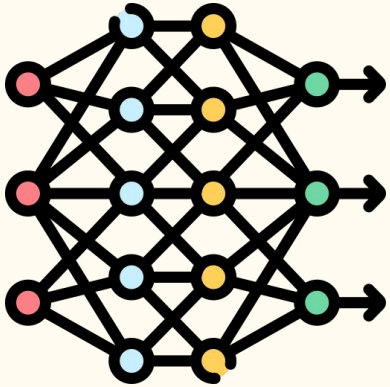


Demo of Flask Deployment: $<$ 30 seconds

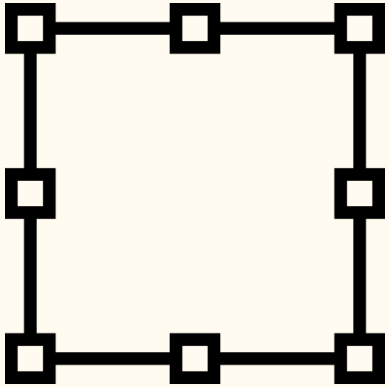


Future Steps






GRANT



Thank you

Any Questions?