

Enumeration of Bacterial Colonies



Objective

- Detect and count bacterial colonies of varied types on images of different types of Petri dishes
- Target Accuracy: 90% of human performance

Dataset

- Proprietary dataset - provided by client
- Summary: RGB images; N ~ 200 for one type of Petri dish

Key Highlights

Background

- Petri dishes are widely used for analysis of various microbiological research
- After appropriate sample preparation, microbial objects grown on Petri dishes are analyzed. Automated analysis of images of Petri dishes can accelerate research work as well as clinical studies

Method

- 10X Data Augmentation
- Faster RCNN + Inception V2 architecture for bounding box based object detection
- Transfer learning

Outcome

- Accuracy achieved: >90 % of human performance
- Transfer learning: Trained model with limited dataset size (< 200 data samples for each type of Petri dish)
- Deployment done on Single Board Computer having NVIDIA Pascal GPU - 256 CUDA Cores, to achieve the desired timing performance

Tools & Technologies:

- Python, Tensorflow, OpenCV, NVIDIA Jetson TX2