

EXPO

engineering ▲ design

COMPUTER VISION ASSISTED IDENTIFICATION OF KILLER YEAST STRAINS



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OBJECTIVE

Design a machine vision solution to make the analysis of yeast samples more efficient and to identify any anomalies in the data.

BACKGROUND

Yeasts and the toxins emitted by them are used in a variety of professions (farming/agriculture, health/medicine, nutritional sciences, alcohol production, etc.).

VALUE PROPOSITION

It's important to analyze and research yeast strains and their toxins. This, however, can be an incredibly tedious process, especially when millions of samples need to be manually analyzed. Our goal is to partially automate the process.

KEY REQUIREMENTS

To accurately identify novel killer yeast strains

Detect location and action areas of killer yeasts in agar plate samples

Extract image and temporal features of interactions between killer and lawn yeasts

CONCEPT DEVELOPMENT

Finetune Sam1 Model to segment & classify the yeast lawn, toxin samples, Zone of Inhibition, and yeast lysis

Images go through pre-processing .

Model generates masks for the image samples:

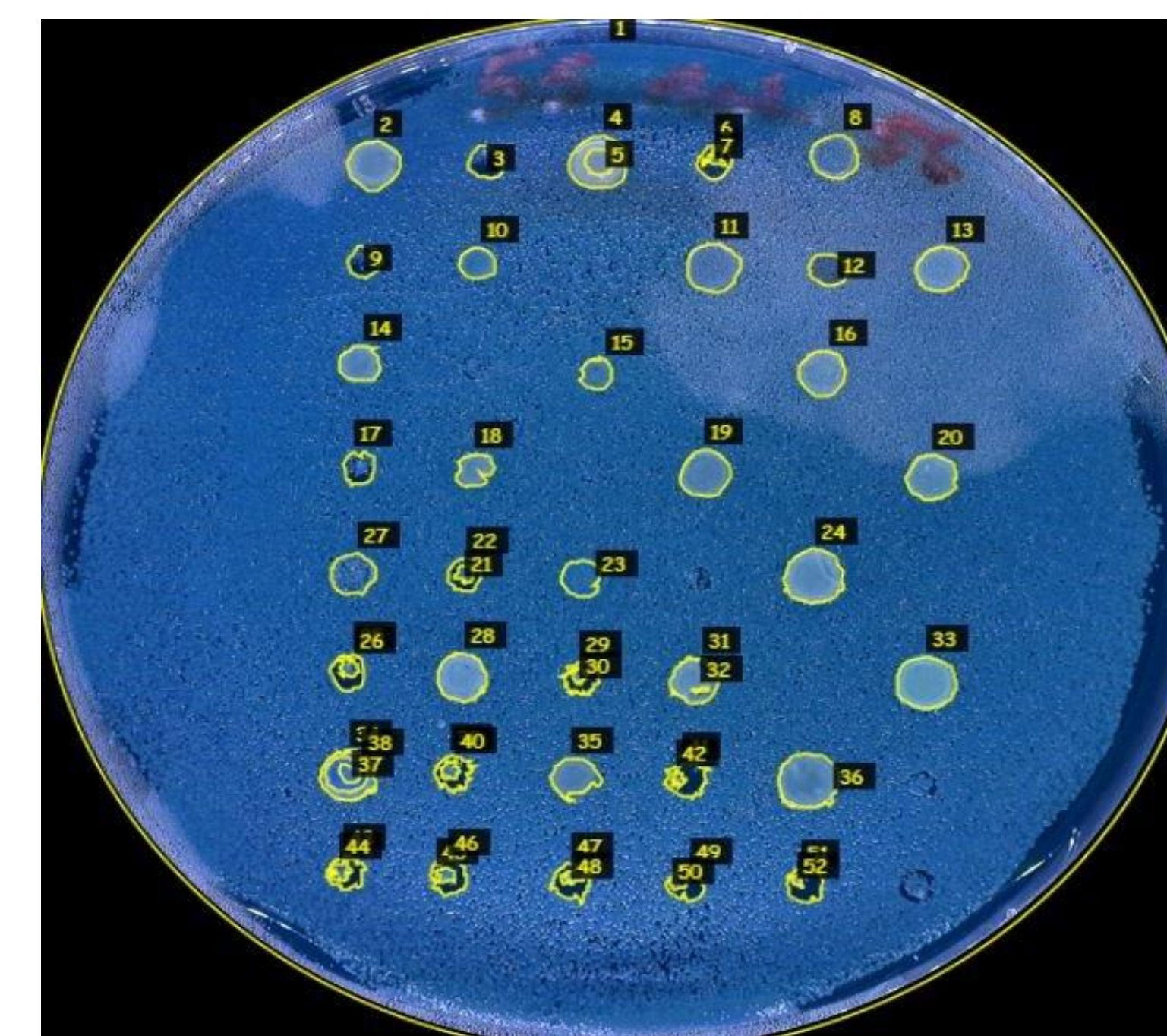
- Toxin samples.
- Zone of Inhibition (ZOI).
- Lysis Rings.

Analyze Masks and generate graphical output.

Categorize samples based on reaction & Flag anomalous samples.

VALIDATION

Test the Model on the test & validation datasets. SAM passes when accuracies are above 80% in the tests.



CONCLUSIONS

Initial project goals were ambitious, including a website and AML training to increase model robustness. Unfortunately a lack of biology expertise, and poor team communication reduced the projects scope.

RECOMMENDATIONS

Have Microbiologist create labels for data (to choose terminology for labels, and decide what elements of each lawn is anomalous.)

Expand dataset to improve finetuning

Find new ways to analyze the output.

