BLOOMOPTIX

Real-Time HAB Monitoring via Artificial Intelligence Enhanced Digital Microscopy

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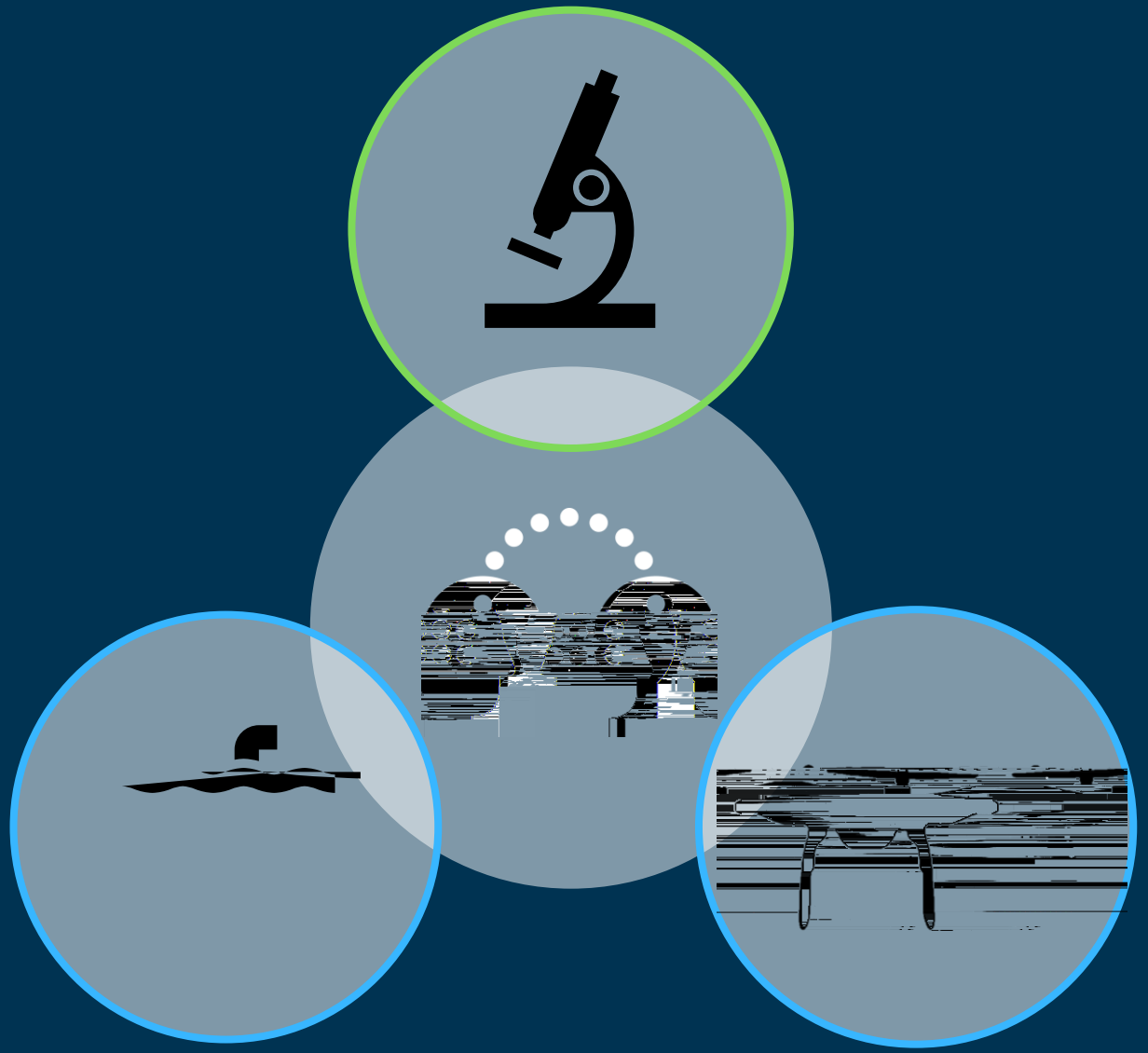


01 Current Monitoring Approaches

02 Advancements in Artificial Intelligence and Digital Microscopy

AI-DRIVEN WATER ANALYSIS

TRADITIONAL CELL COUNTING AND ID

Results in Several Days

BLOOMOPTIX

Automation produces near real-time results

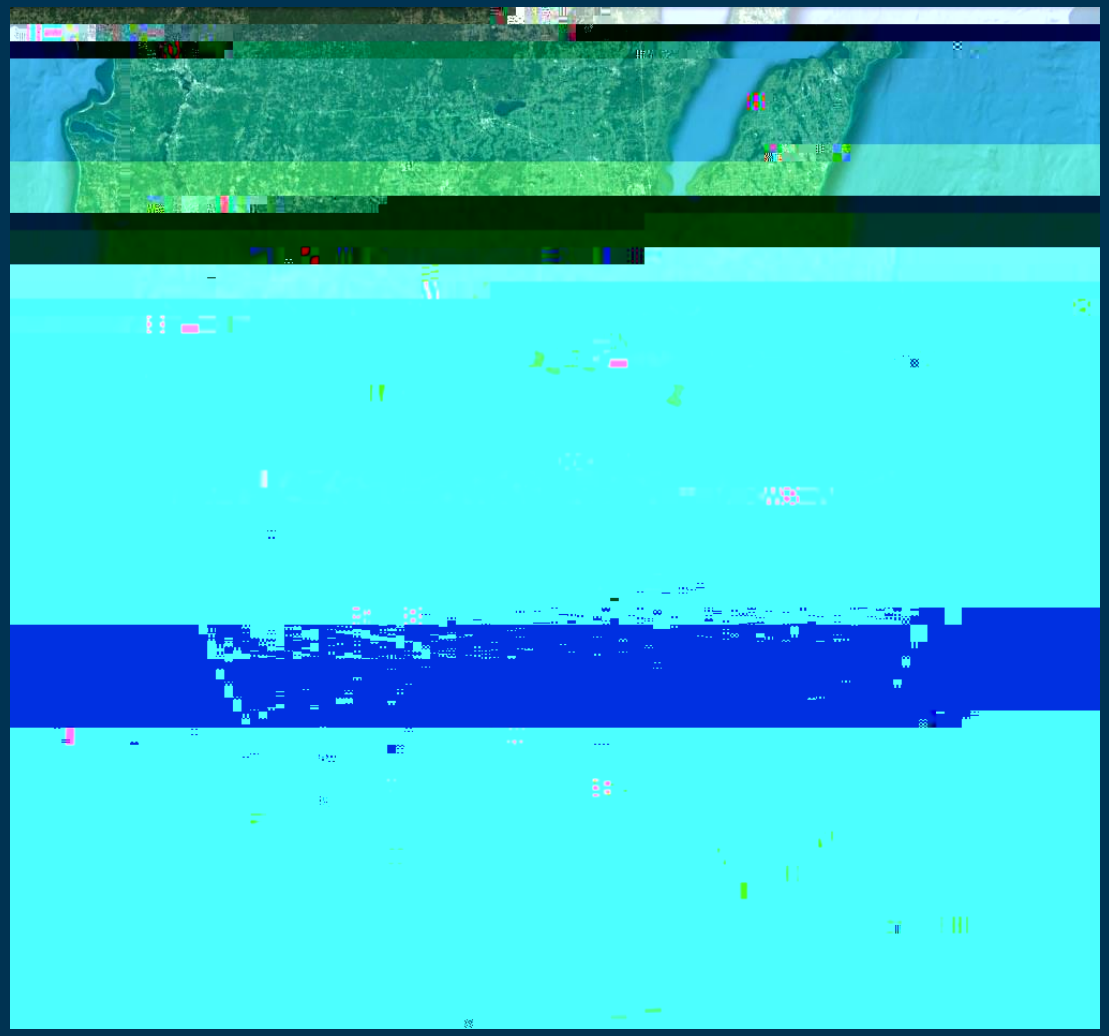
Advancements in Field Microscopy

- High Resolution
- Linked Wirelessly to Cellphone
- Highly Portable & Rugged
- Easy to Use
- Low Cost
- Used by Experts & Amateurs

Patent Reference: https://patents.google.com/patent/WO2015145098A1/en?oq=iolight

03 Phase 1: Cell Counting Model and Image Acquisition

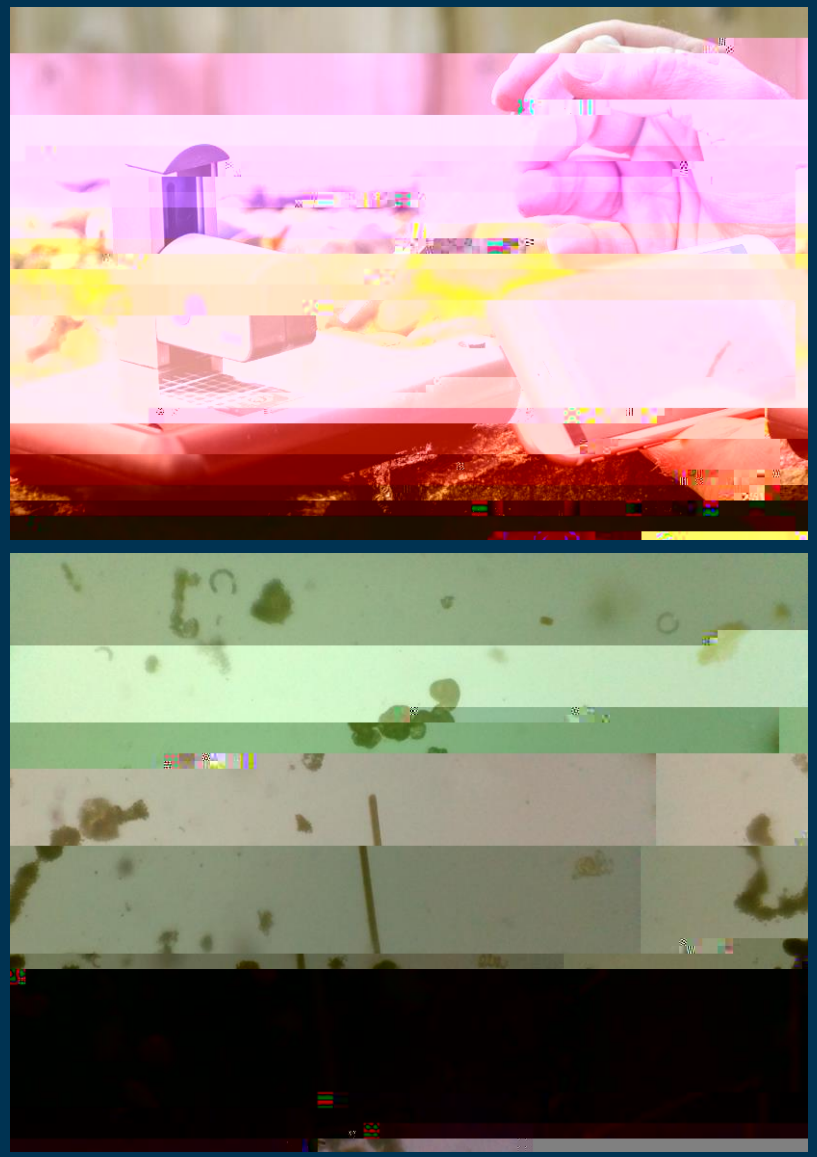
Methods: Data Collection & Sampling



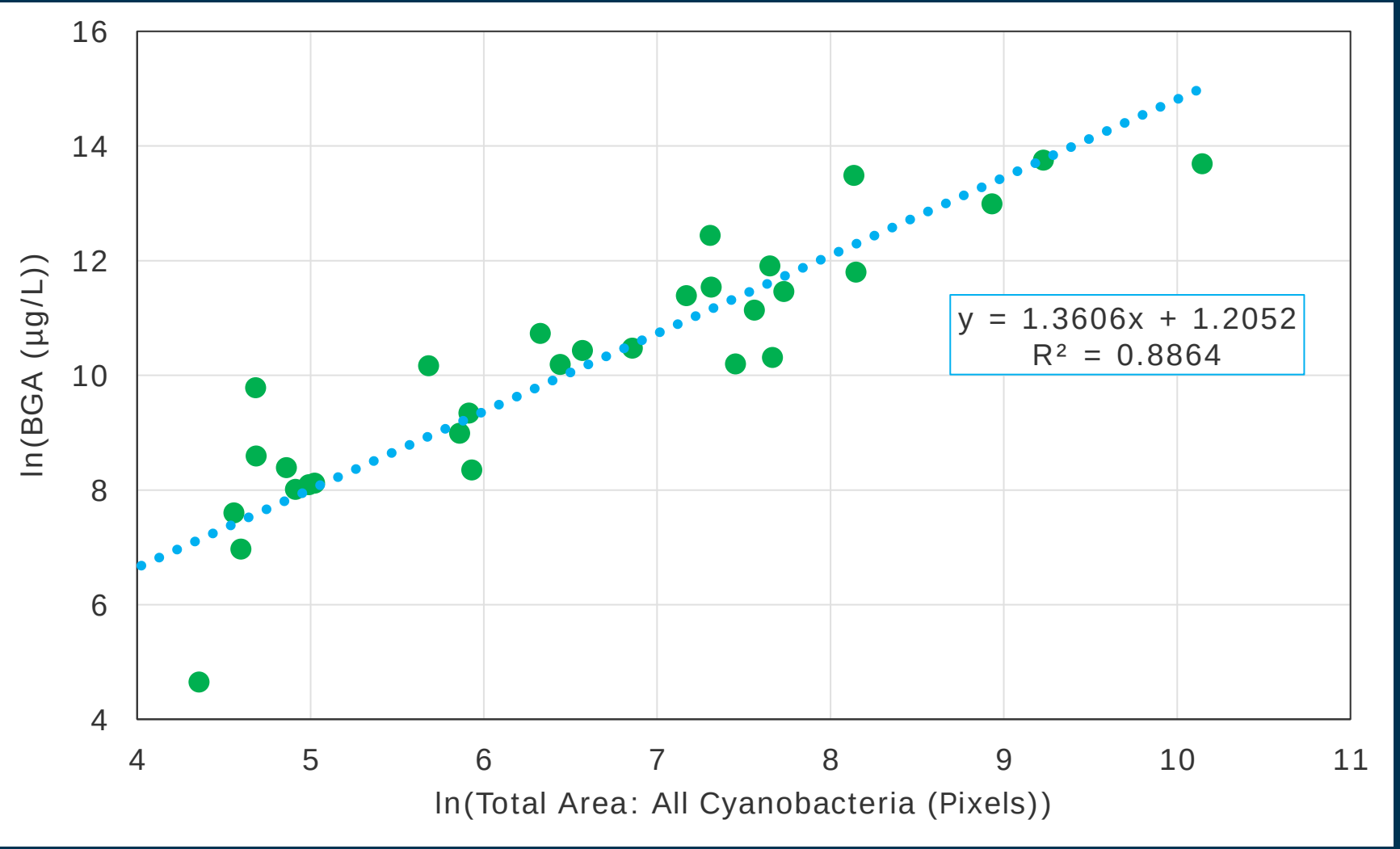
15,000 images collected

The platform is user friendly at all experience levels

Even with human intervention, result turnaround times were rapid (90 mins) and provided meaningful data to our volunteers



Results: Fluoroprobe Comparison



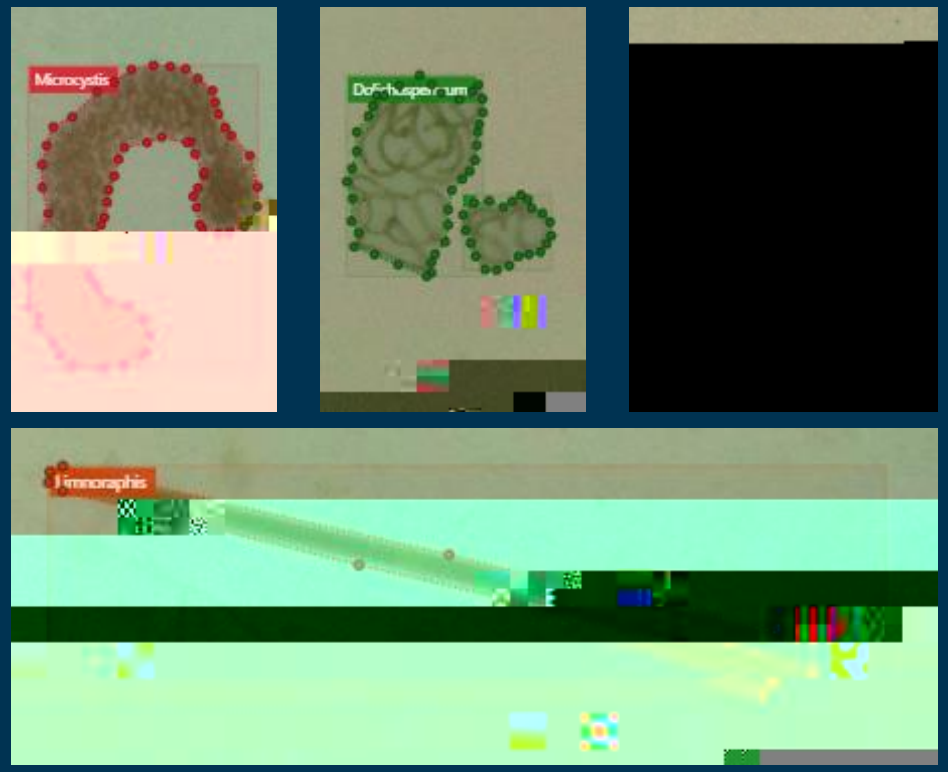
04 Phase 2: Image Processing and AI Build

Methods: Computer Vision Accuracy Testing

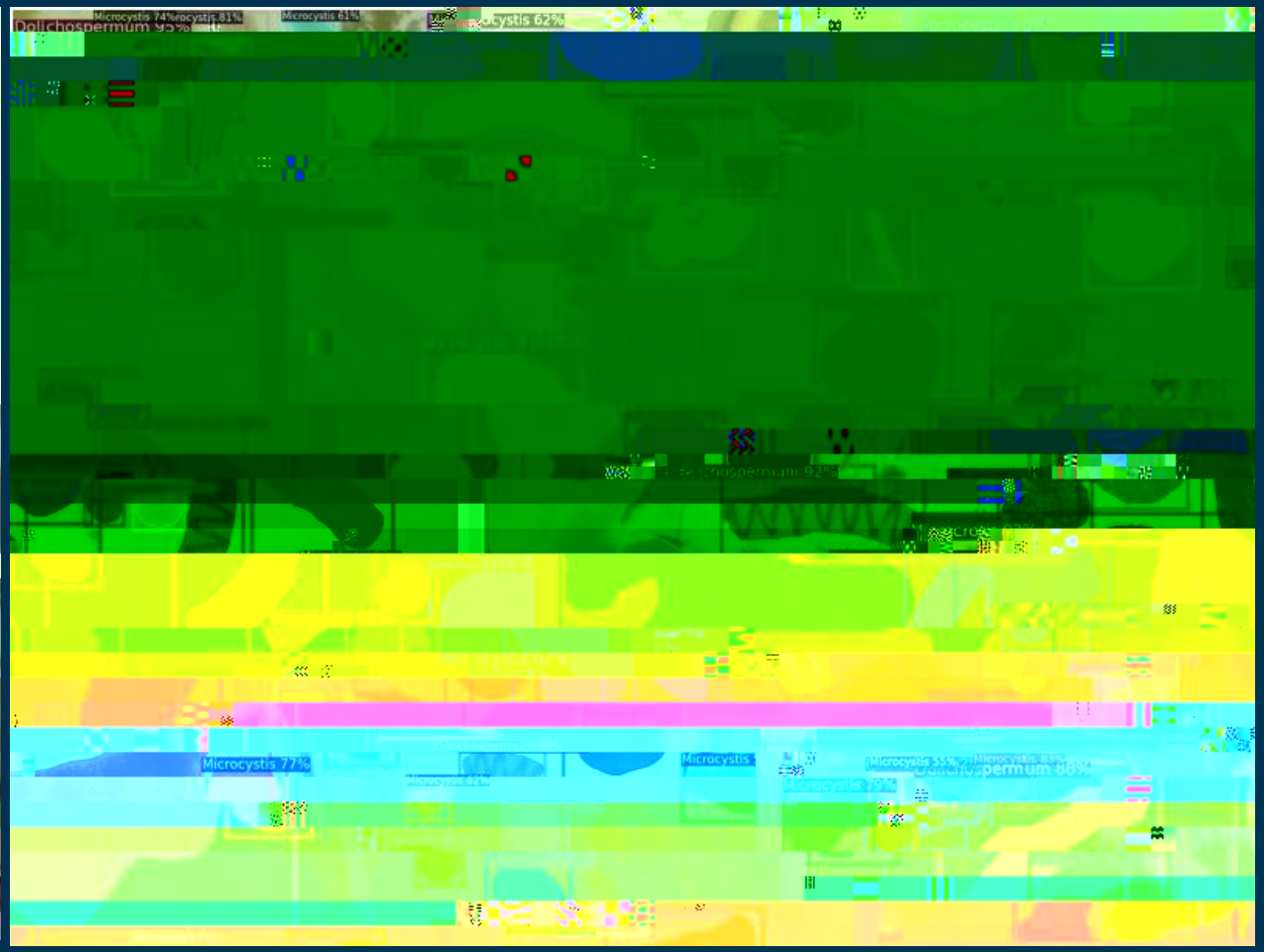
~5,000 images were manually labelled

Following labelling, a subset of 20% of those images were retained for validation testing

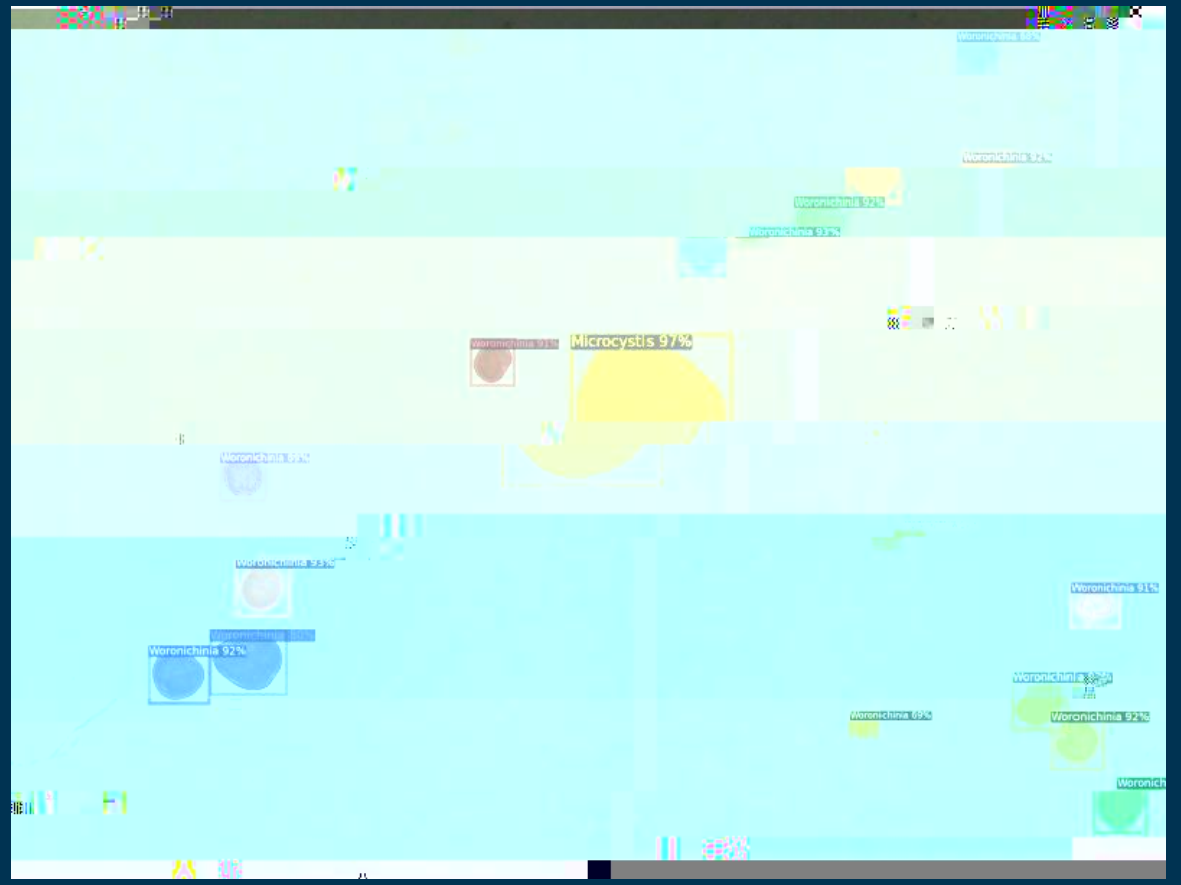
Computer Vision accuracy was tested against the manual labels of the subset, with human labels assumed to be ñcorrectò



Microcystis


Microcystis 74%
Microcystis 61%
Microcystis 62%
Microcystis 77%
Microcystis

Microcystis
Microcystis
Microcystis


Microcystis 97%
Woronichinia 92%
Woronichinia 92%

Conclusions: Phase 2 Findings

Application of AI produced cyanobacterial IDs with >90% accuracy

Accuracy of model can be greatly improved with further QA/QC steps and proper user training

Speed of analysis and repeatability is much greater than manual processing

05 Phase 3: Upcoming Validation Testing

Phase 3: Upcoming Validation Testing

Objectives:

1. Fully validate accuracy of AI-based cyanobacterial ID & counts in as many lakes as possible
2. Compare AI-collected data to standard lab data
3. Deploy Beta version of App & AI in the hands of users
   - ü Geolocation
   - ü Weather
   - ü Secchi Depth
   - ü Custom measurement for users

Scan QR code to participate!

Acknowledgements

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