

Ocular Project —Simplyifying Microscopy Diagnosis through Artificial Intelligence

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Presenter

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Microscopy Diagnosis





Health diagnostic burden

Currently in Uganda, and many developing countries

- Malaria has been reported as one of the leading cause of death accounting for over 27% of lives of Ugandans
- Patient in big numbers wait to be diagnosed.



Currently in Uganda, and many developing countries

- Most of these countries don't have enough trained lab technicians.
- In Ghana, 1.72 microscopes per 100,000 population, but only 0.85 trained laboratory staff per 100,000 population .





Microscopy Diagnostic challenge

Currently in Uganda, and many developing countries

- SOP requires not to view more than 20 slides a day
- IMicroscopy is eye straining





Concept detail

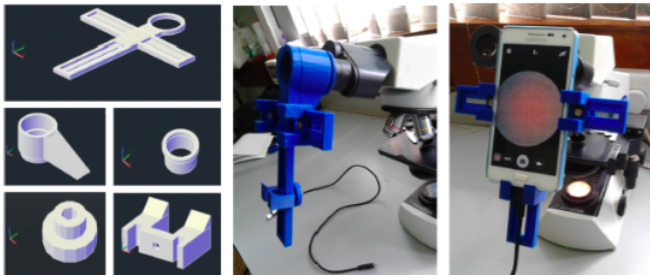


Figure: Adapter set up and attachment.



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Concept detail





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Concept detail





Captured image

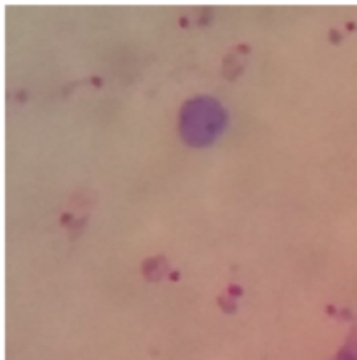
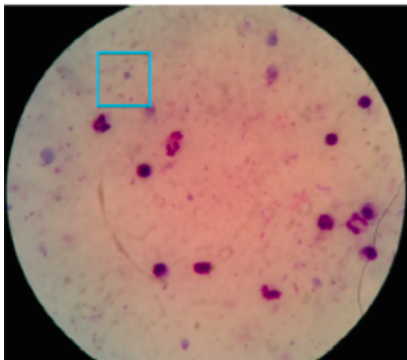


Figure: Malaria microscopic image captured with a smartphone.



Plasmodium detection accuracy

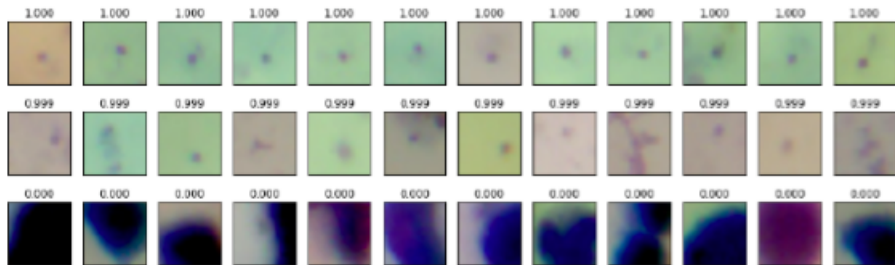


Figure: Plasmodium detection results.



ROC AUC for malaria, TB and intestinal parasites detection

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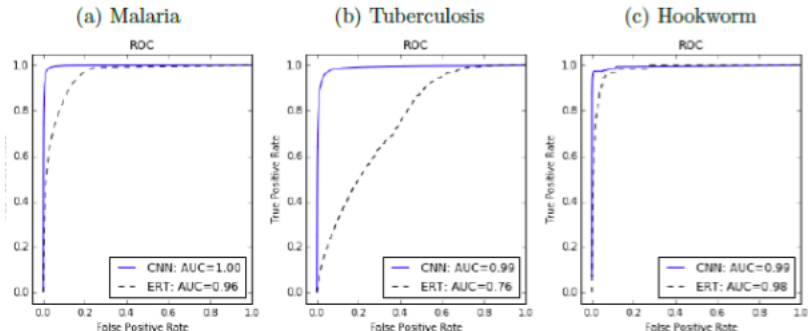


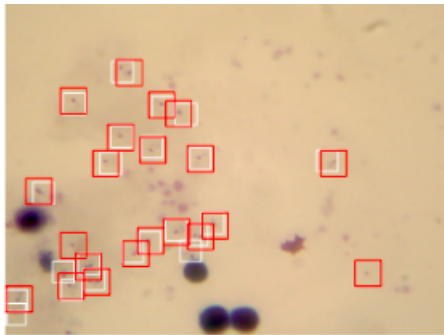
Figure: Deep learning ROC accuracies.



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Detected Objects for plasmodium and bacilli(right).

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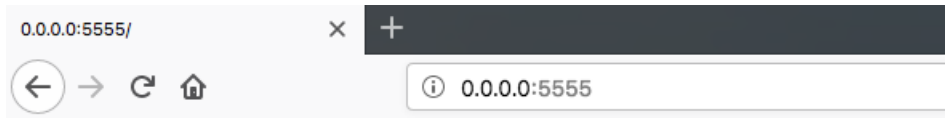




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Server end app.



OCULAR PROTOTYPE

Browse...

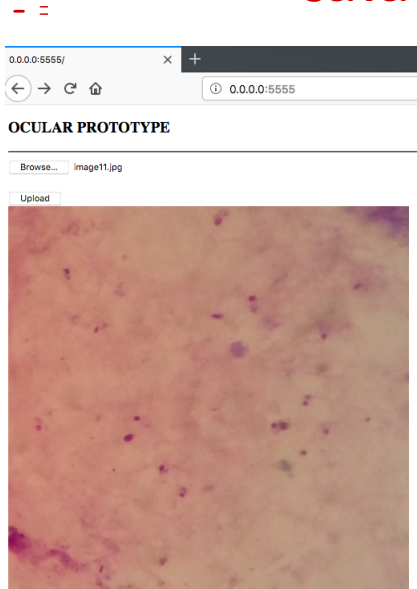
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Upload



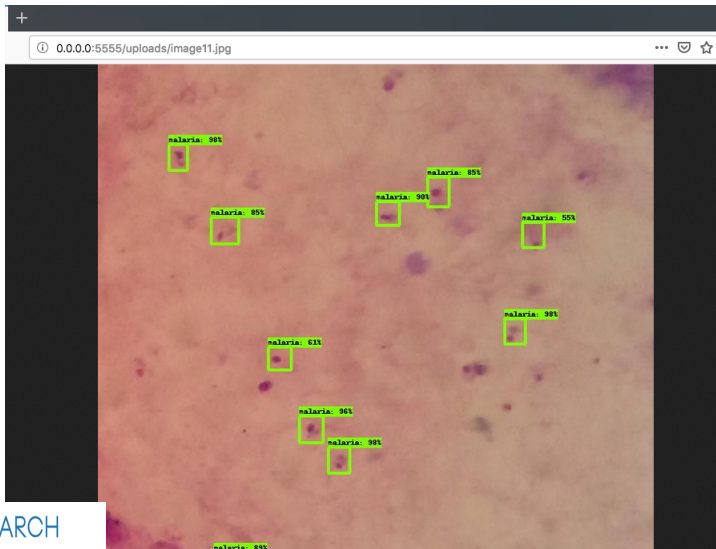
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Server end app.





Server end app.





Future work

Scale out for in field system deployment (both server end and mobile diagnostic deployment);

- Public Health Care Facilities through Ministry of Health.
- Private Health Care Facilities
- Medical Training Centres.
- Have the detector on the smart phone be both location and time aware to feed into electronic health records for efficient Disease spatial analysis.



Special Thanks

To;

- Our collaborators in Mulago main referral hospital...who,
- Provided the images, annotations and confirmation of diagnostic results. AND
- Our initial funders, Grand Challenges Canada.



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Thank you!

Questions?