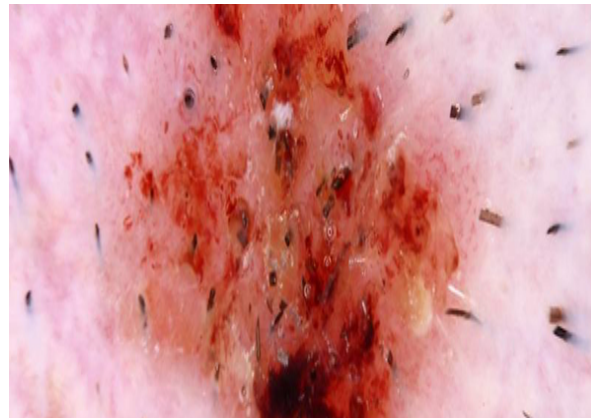# Biopsy Guide

Identify high-risk lesions on-demand in your practice with just a photo!

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BACKGROUND

1
- Skin biopsies are essential to establish a diagnosis in skin diseases

2
- Biopsy utilization has increased rapidly and represents a significant cost to the U.S. Healthcare system

3
- There are no benchmarks or baselines to guide the practice of skin biopsies – only clinical judgment

4
- Less than half of all suspicious lesions that are biopsied are actually malignant (44%)

SOLUTION

A lesion malignancy risk evaluation tool based on a convolutional neural network trained on thousands of images of cancerous and non-cancerous lesions!

YAY!!!

HOW IT WORKS

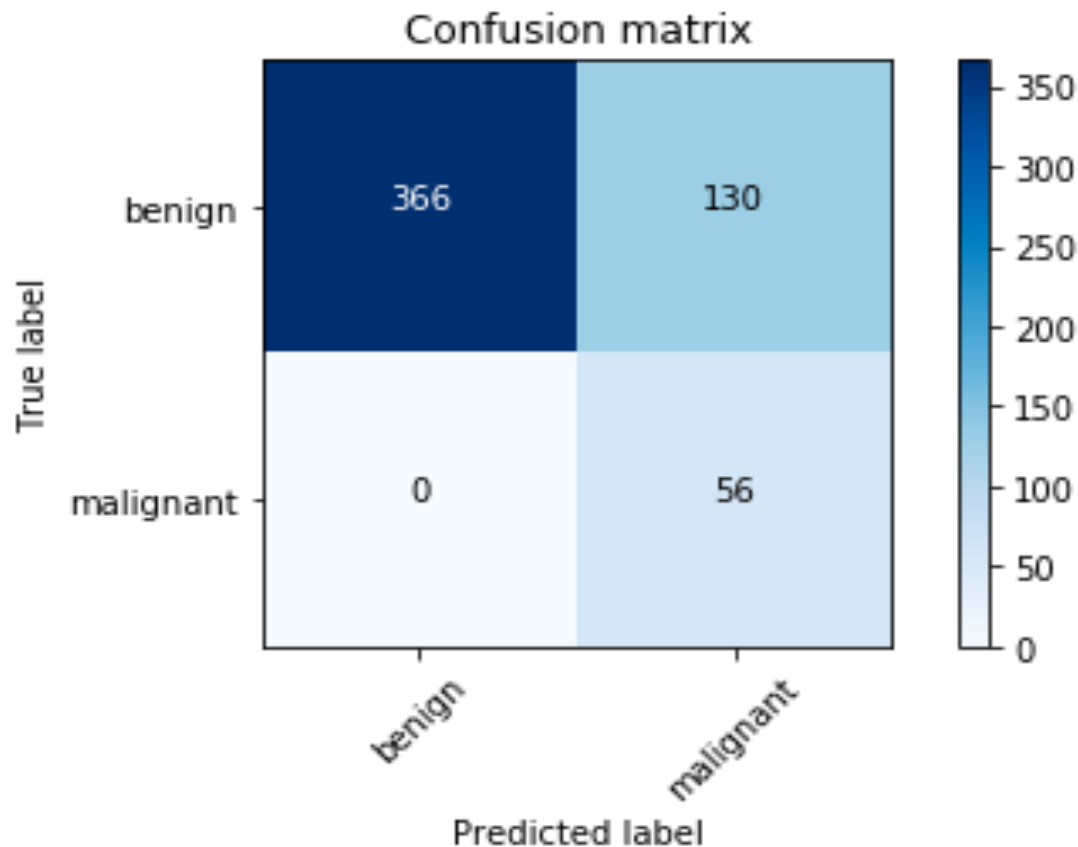**All you need is a smartphone!**

1. Take a photo of the lesion

2. Submit it to the Lesion Risk Assessment app

3. Instant result that guides your decision to biopsy

Model Evaluation

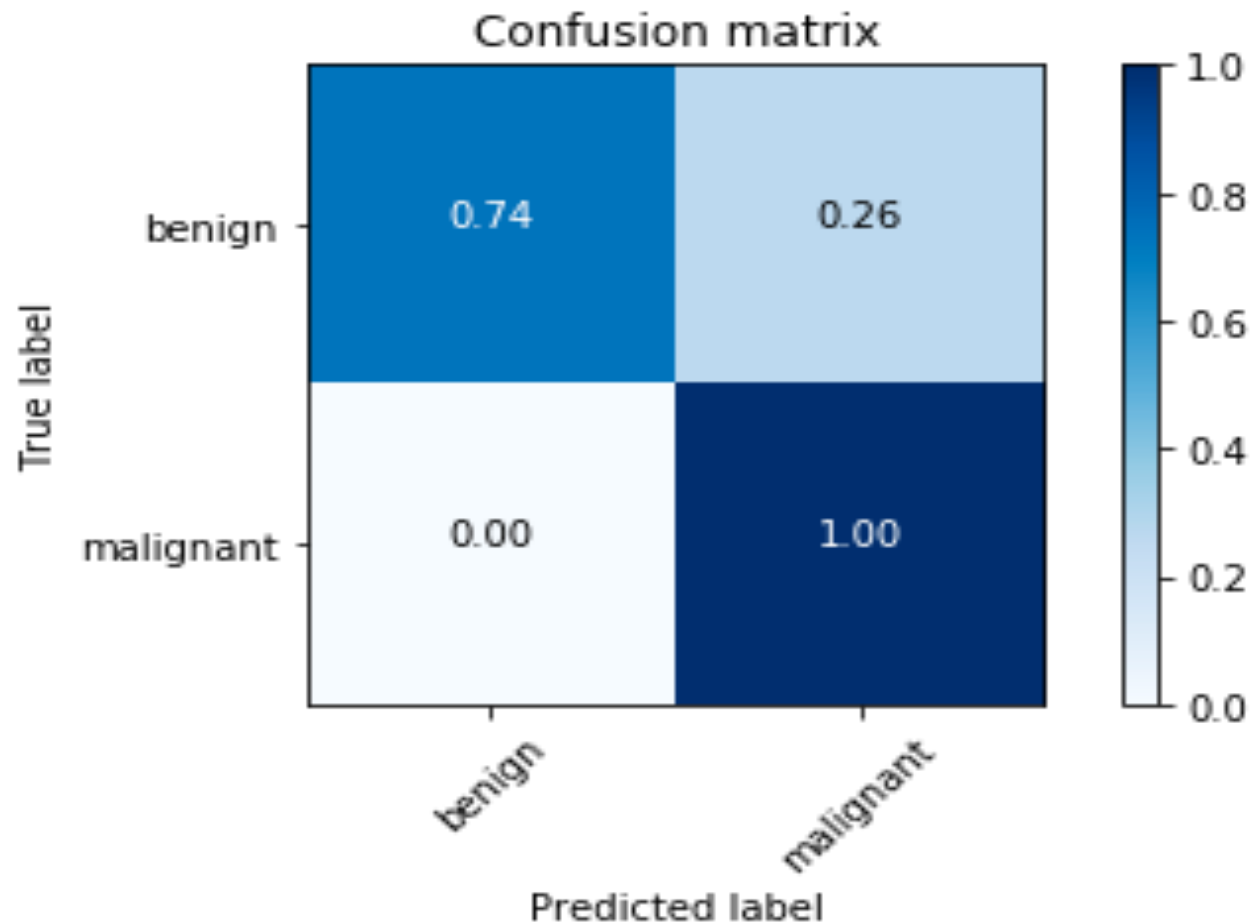- Accuracy = 76.5%
  - Percentage of the models correct predictions(TP+TN/ALL)

- Precision = 30%
  - Percentage of correct positive predictions (TP/TP+FP)

Confusion matrix

Model Evaluation

- RECALL = 100% (TP/TP+FN)
  - The percentage of positive cases caught!

Confusion matrix

Recommendations for Practice

- While clinical judgment is important, this model can help reduce the number of unnecessary biopsies

- Specificity and Sensitivity can be adjusted

- Increasing the Sensitivity decreases the Specificity

  - (more malignancies are missed as we decrease the number of benign lesions identified as risky and to be biopsied)

Future Work

- More images for continuously updated model – MORE DATA!
    - Seek to include more malignant images to improve class imbalance

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- Secure funding for a study that submits additional photos and biopsy results to make the model more robust

- Consider the establishment of guidelines for skin biopsy with the utilization of image capturing

ANY QUESTIONS?

Don't forget to get your skin checked annually
**a message from your friendly neighborhood nurse