Computer Vision for Malaria Detection

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Capstone Project Presentation, MIT ADSP

November 7th, 2021

Key Takeaways

Motivation: Detect Malaria *Automatically* from Patient Blood Smear

- More reliable, standardized and less costly than manual diagnosis
- Huge public health and economic benefits if deployed at scale

Solution Design: Computer Vision Model

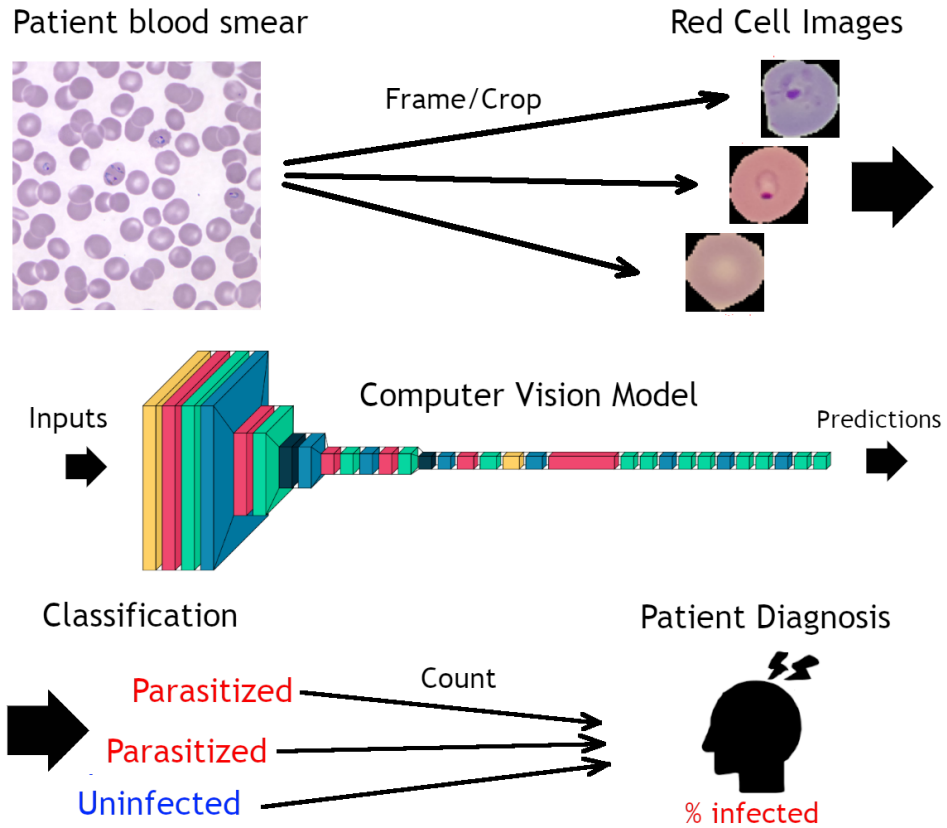
- Trained on database of microscopic red cell images
- Automated malaria detection that is fast, accurate and flexible

Microscopic Red Cell Images (Uninfected or Parasitized by Malaria)

Solution Design

Experimental Protocol:

- Red cell images are extracted from patient blood smear
- Computer vision model predicts if cells are parasitized or uninfected
- Count of parasitized cells determines level of malaria infection

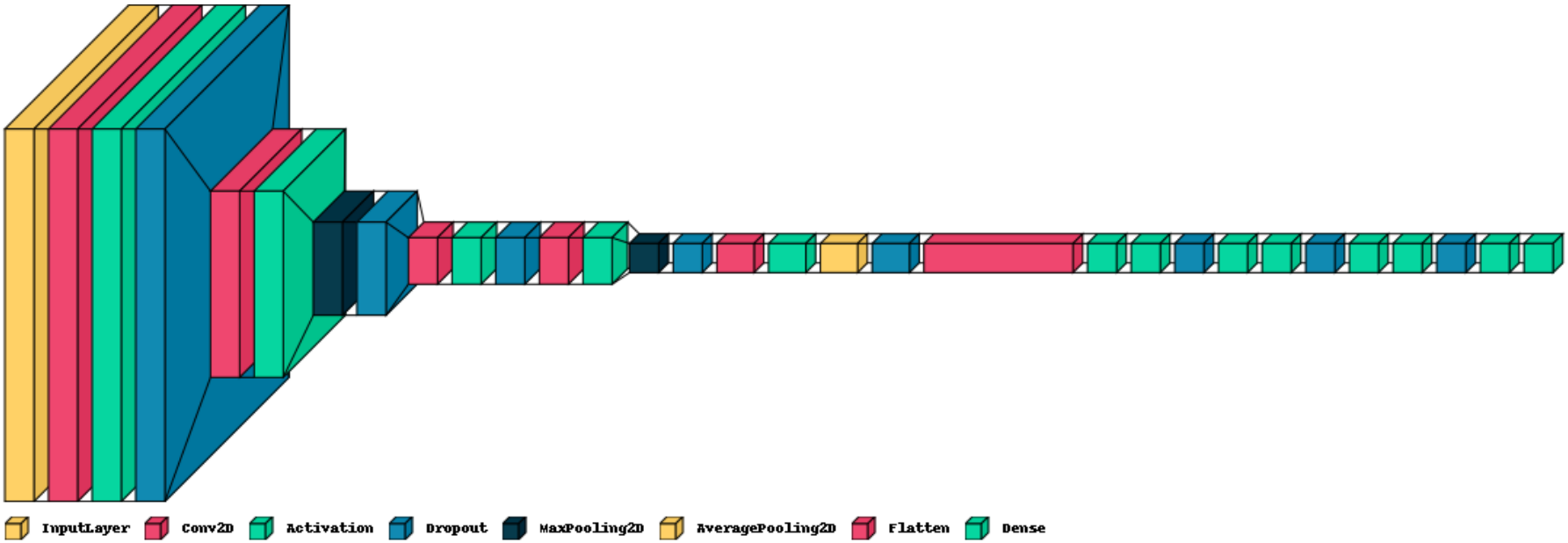


Experimental Protocol

Solution Design

Computer Vision Model: *Convolutional Neural Network*

- Deep yet lightweight architecture (flexible and fast)
- Trained on database of red cell images (augmented by rotations/flip)
- Reaches 96% accuracy without overfitting



Convolutional Neural Network Architecture

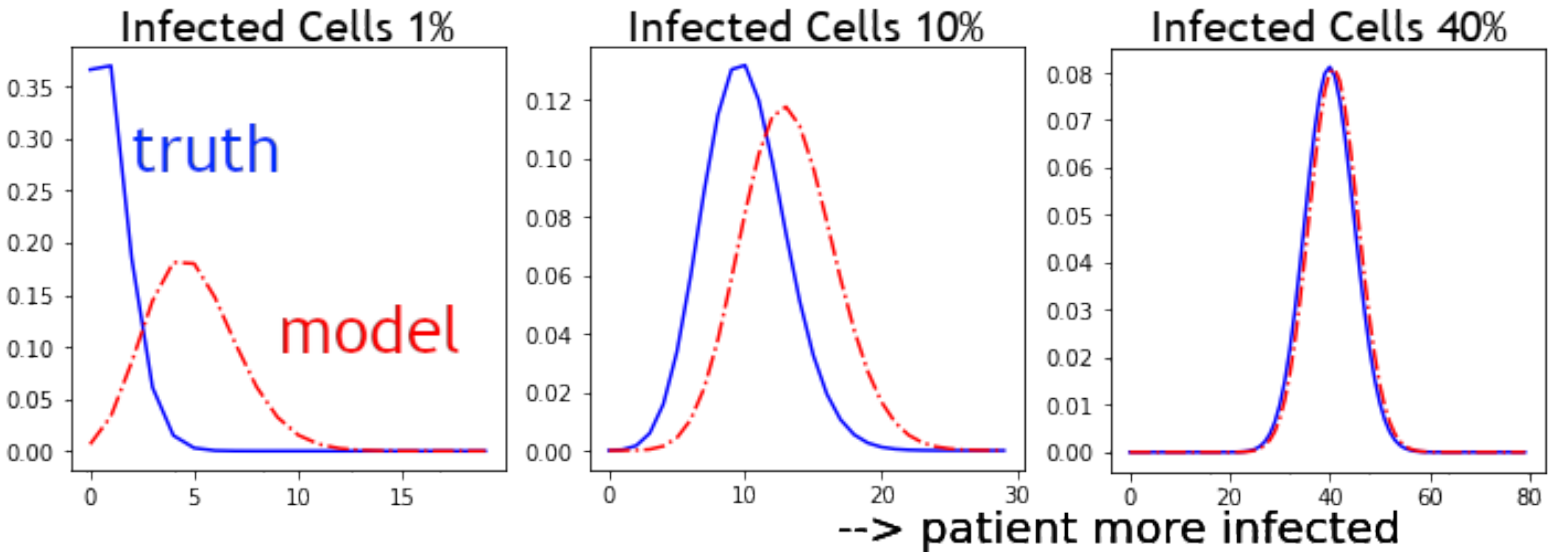
Key Recommendations

Actionables:

- Automated malaria detection that is fast, accurate and flexible
- Complements existing medical analysis and treatments

Remaining Challenges:

- Adapt protocol for early malaria detection (infected cells $<5\%$)
- Improve accuracy: data augmentation, feature engineering or more data



Count of Infected Cells by model (red) compared to truth (blue)

Questions

Thank you, Questions?