

Skin In the Game: Diagnosing Skin Conditions and Bug Bites on a Cell Phone Using Machine Learning

Abstract

Skin in the Game is programmed to diagnose common skin conditions such as acne, eczema, rosacea, hives, and ringworm. It can also detect certain bug bites (ticks, mosquitos, bed bugs).

Users simply take a picture of their skin condition or bug bite with their iPhone, and software, programmed with a machine learning algorithm, predicts what kind of skin condition or bug bite the user has.

Background

What are software algorithms?

- Algorithms are the coded instructions for computer software.

What is a machine learning algorithm?

- A machine learning algorithm instructs a computer to learn from experience and make predictions based on the data it has been given.

Hypothesis

If I use software, powered by machine learning algorithms, and a high volume of data and images from the internet, I should be able to turn a cell phone into a low-cost diagnostic tool that can be used to identify various skin conditions and bug bites.

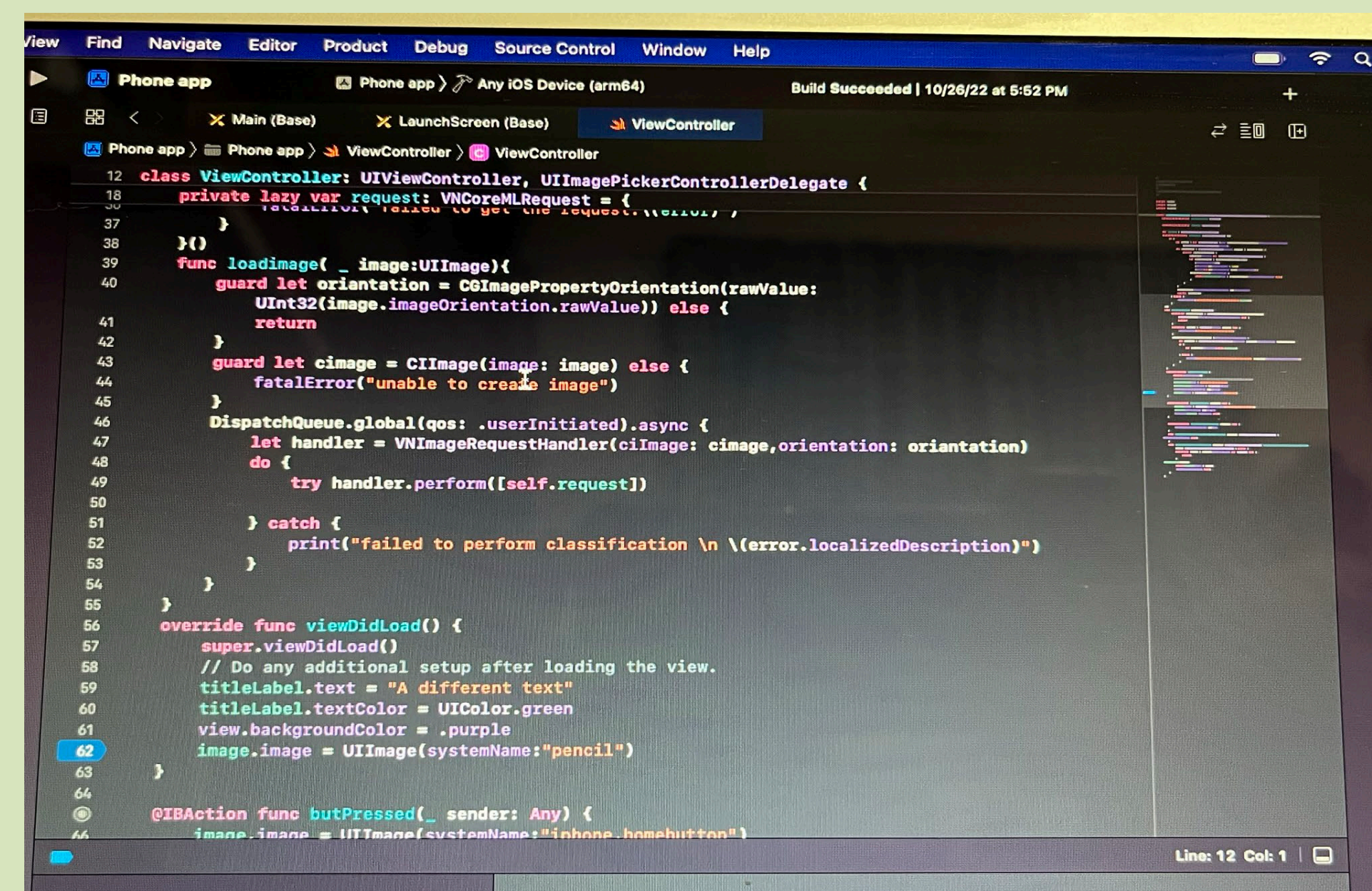
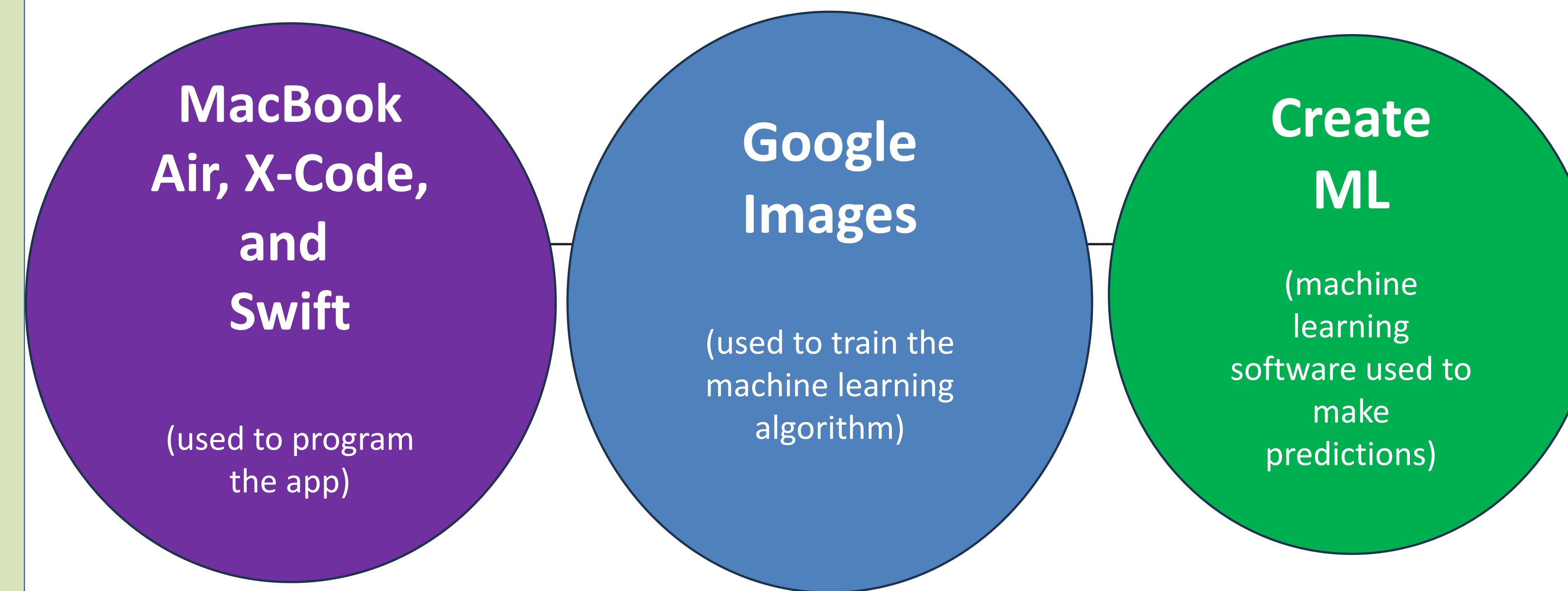


Figure 1. Prototype build of app inside X-Code

Methods and Materials



Results

Skin In the Game Efficiency % After Multiple Testing Rounds

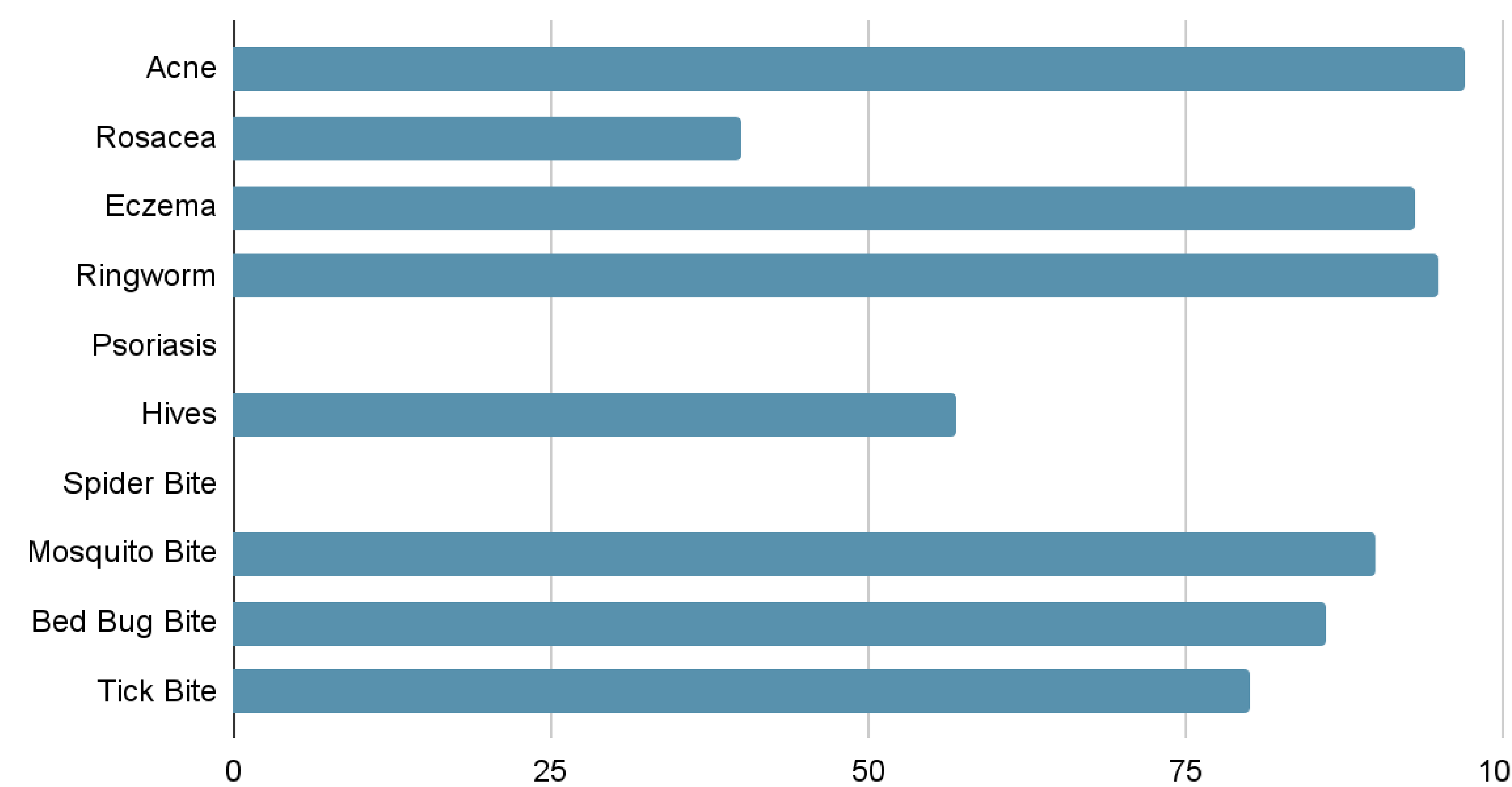


Figure 2. Graph of App's efficiency after 20 rounds of testing per skin condition or bug bite

Conclusions

Yes, a cell phone can be programmed to identify bug bites and skin conditions.

However . . .

- Skin in the Game is clearly more effective when predicting certain skin conditions/bug bites and less effective when predicting others. Training the algorithm further with more pictures would improve the app
- The spider bite category had to be eliminated because I could not find enough spider bite images on Google that were not under copyright to make the app effective
- The app could not distinguish between eczema and psoriasis
- Background lighting and photograph angles impact the efficacy of the app. Sometimes the prediction changed based on where I positioned the phone when taking a picture

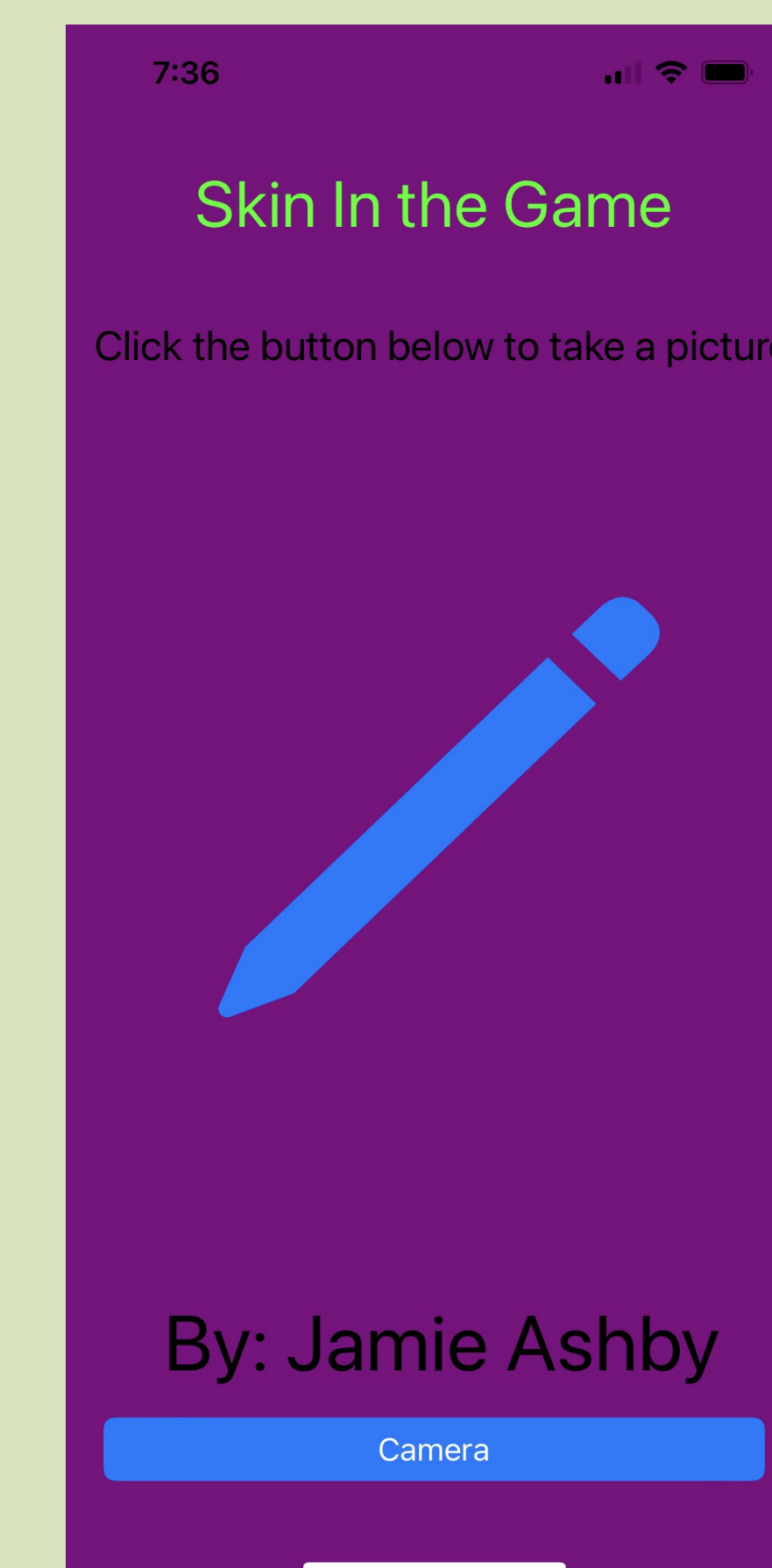


Figure 3. Front Page of app

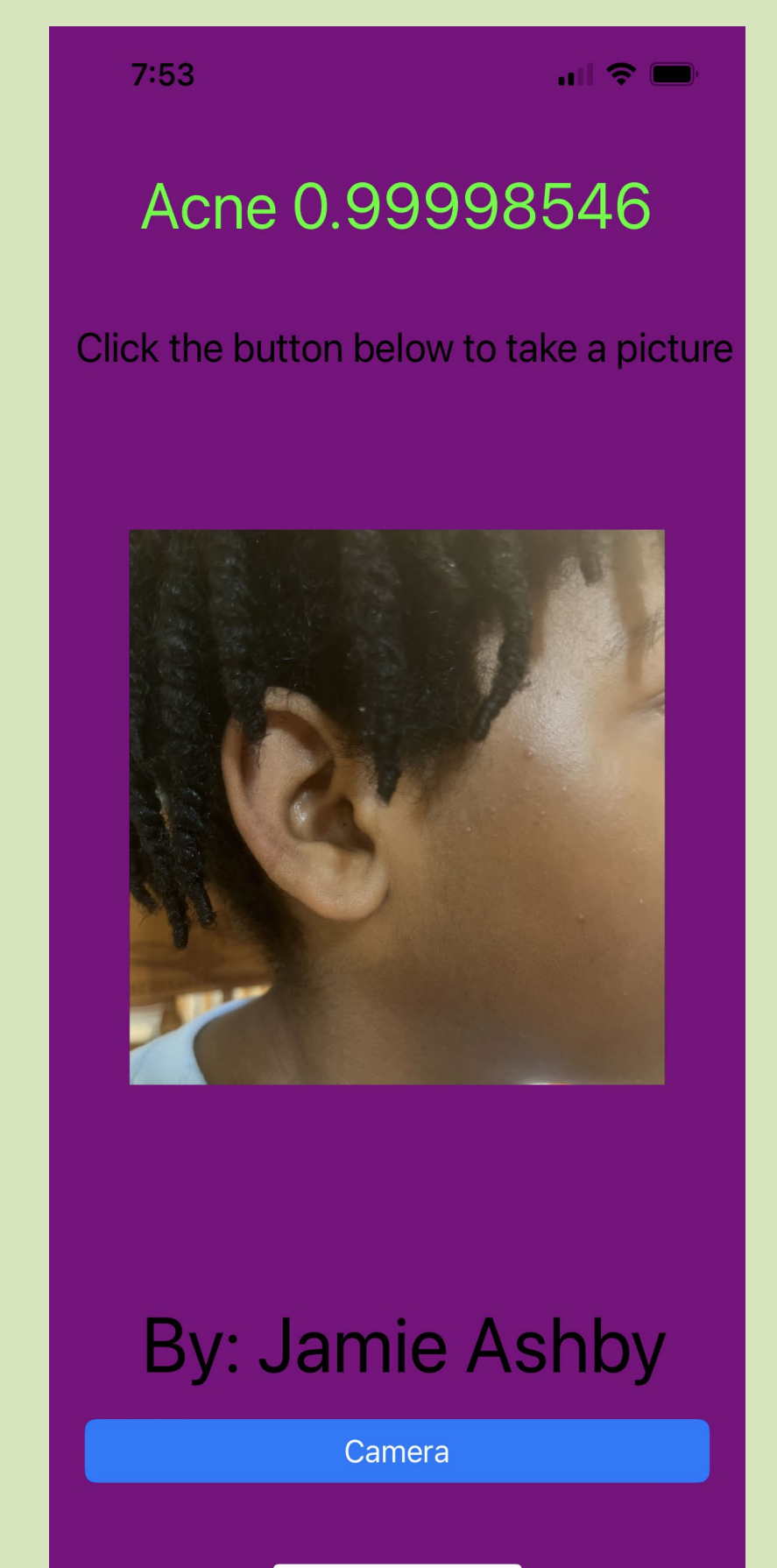


Figure 4. App Diagnosis after photo taken inside app

References

- Lane, Dale. *Machine Learning for Kids: An Interactive Introduction to Artificial Intelligence*. No Starch Press, 2021.
- CodeWithChris. (2022). How to make an App in 14 Days series <https://youtu.be/HJDCxhQaP0>
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