



Hand gestures recognition on iOS mobile applications

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ABSTRACT

Aiming for using hand gestures to control iOS Apps, we implement an App of hand gestures recognition on iOS. We use iPhone's camera to capture the real-time images and then use Deep Learning to differentiate the type of the gestures.

BACKGROUND

Virtual Reality (VR) and Augmentation Reality (AR) technologies are very popular concepts in these days. They help people to feel like in a virtual environment or interact with some virtual objects in the real world. And more excitingly now, we can easily use these technologies just through our smart phones and cardboards.

However, it's not easy for us to make interactions with the mobile devices, especially when they are put into the cardboards. And also, it's inconvenient to use additional controlling devices.

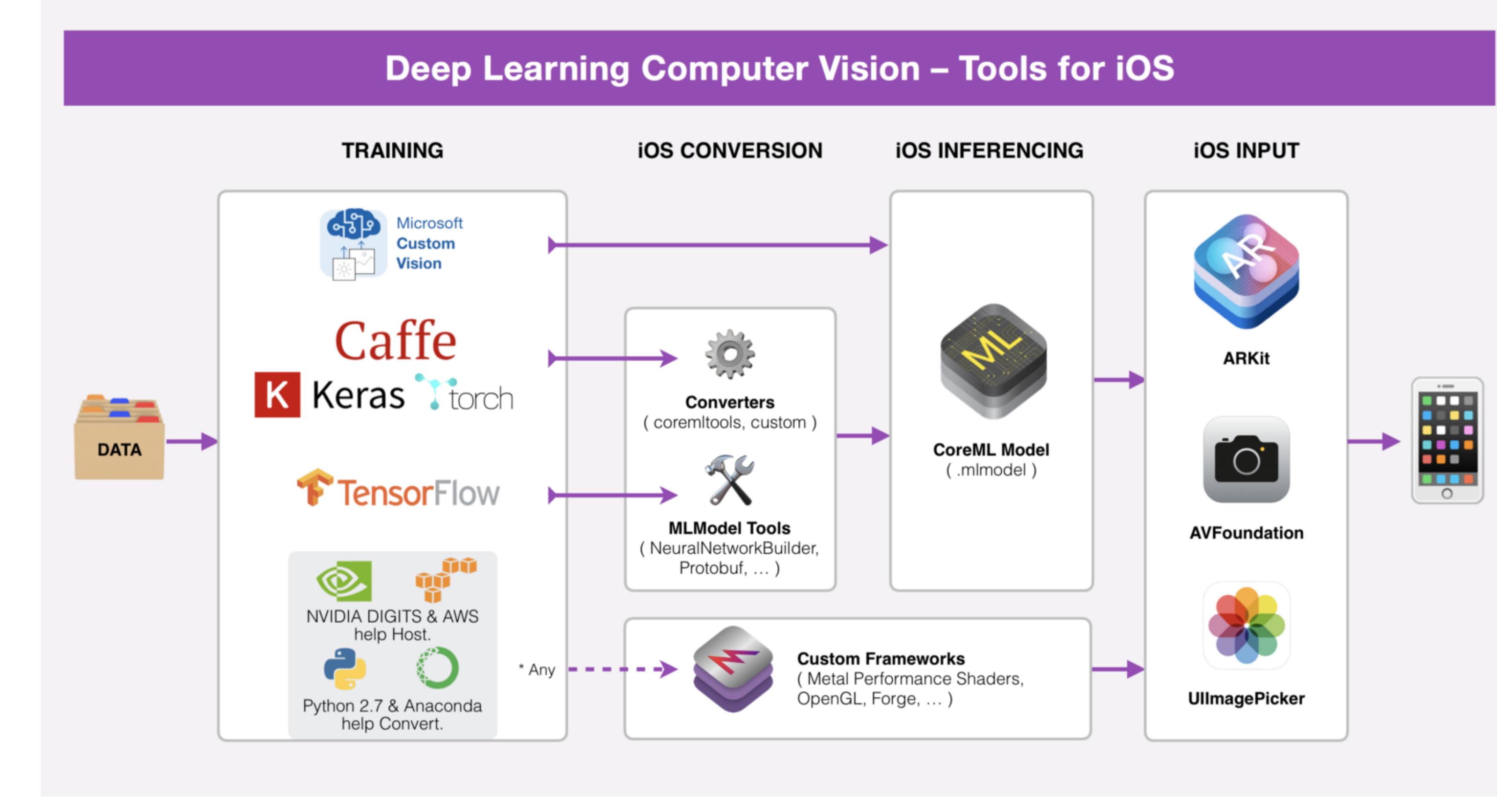
Computer vision is a way to help us build an interaction method. And by using the Apple Core ML and Vision kit, we can easily deploy them into iOS mobile devices.

Core ML is a development toolkit to help developers to implement Machine Learning techniques more easily. Developers can incorporate the trained machine learning models into the iOS development environment by using Core ML.

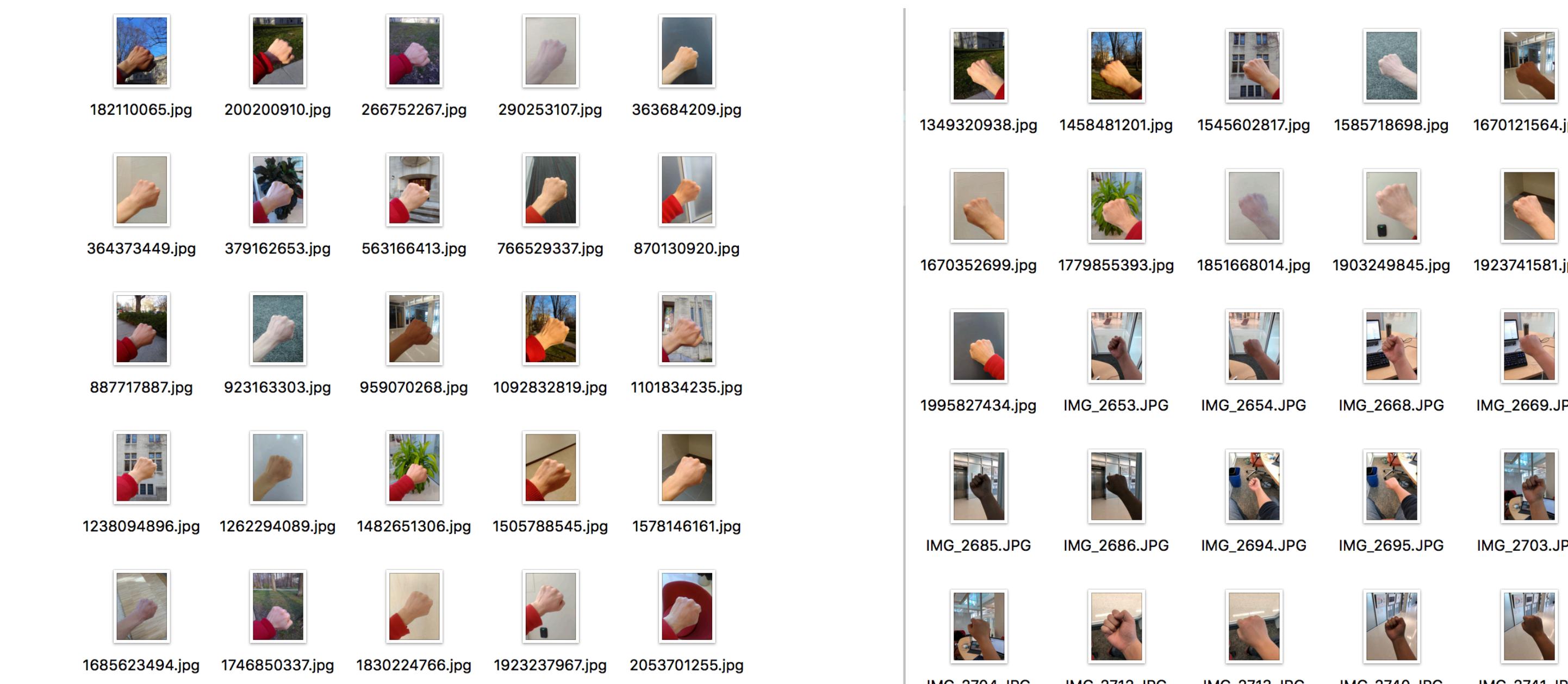
AIM

- Recognizing the hand gestures.
- Using recognition results to control the app.

METHOD



- Data set labels:
- “checkmark-hand”, “circle-hand”, “fist-hand”, “five-hand”, “index-hand”, “thumb-hand”



Training Data Set[1]

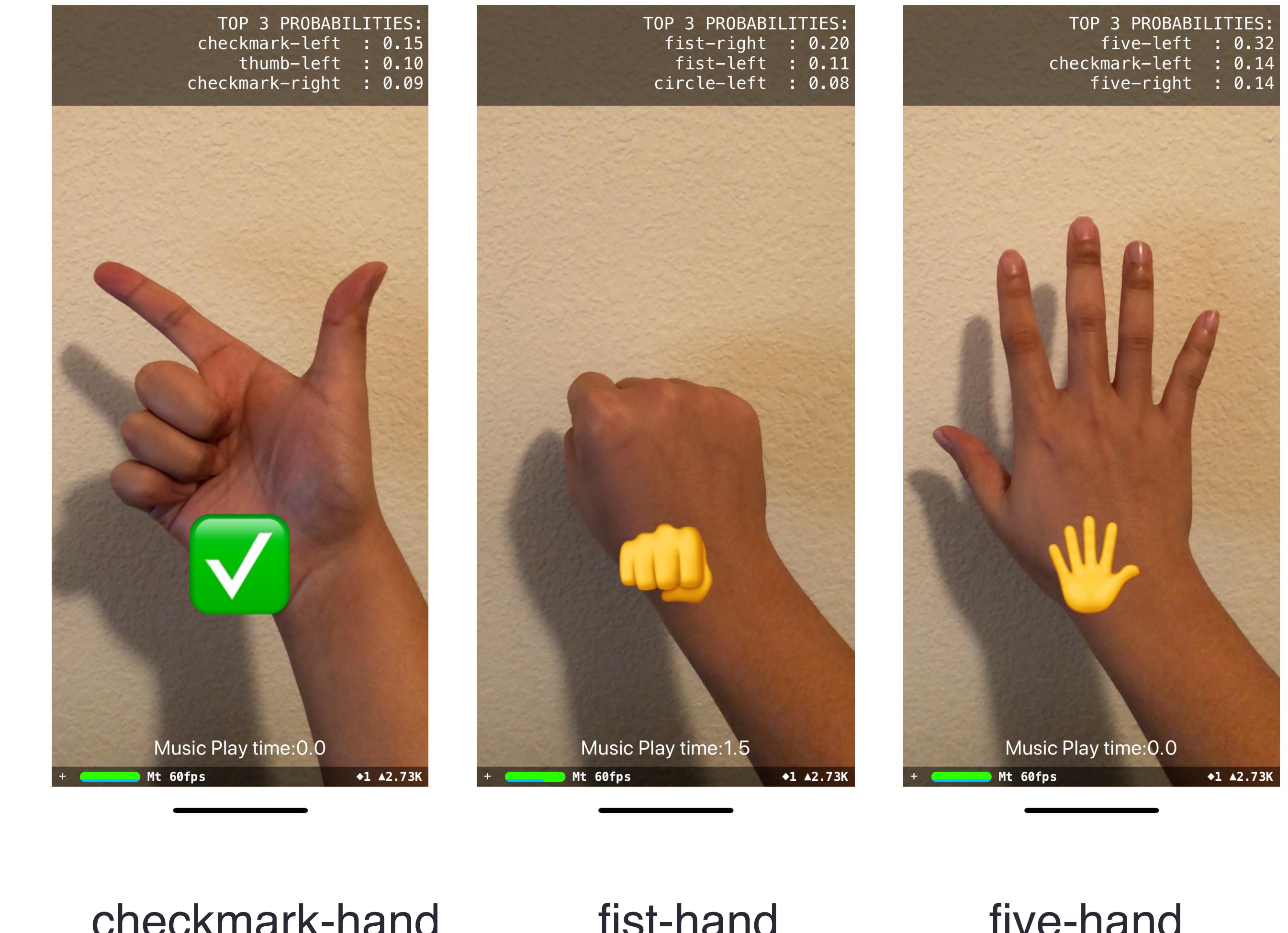
Training Data Set[2]

RESULTS

- The app can recognize several hand gestures in real time.
- These results can control the app to play, pause and stop the music.

RESULTS

iOS Device Recognition Results

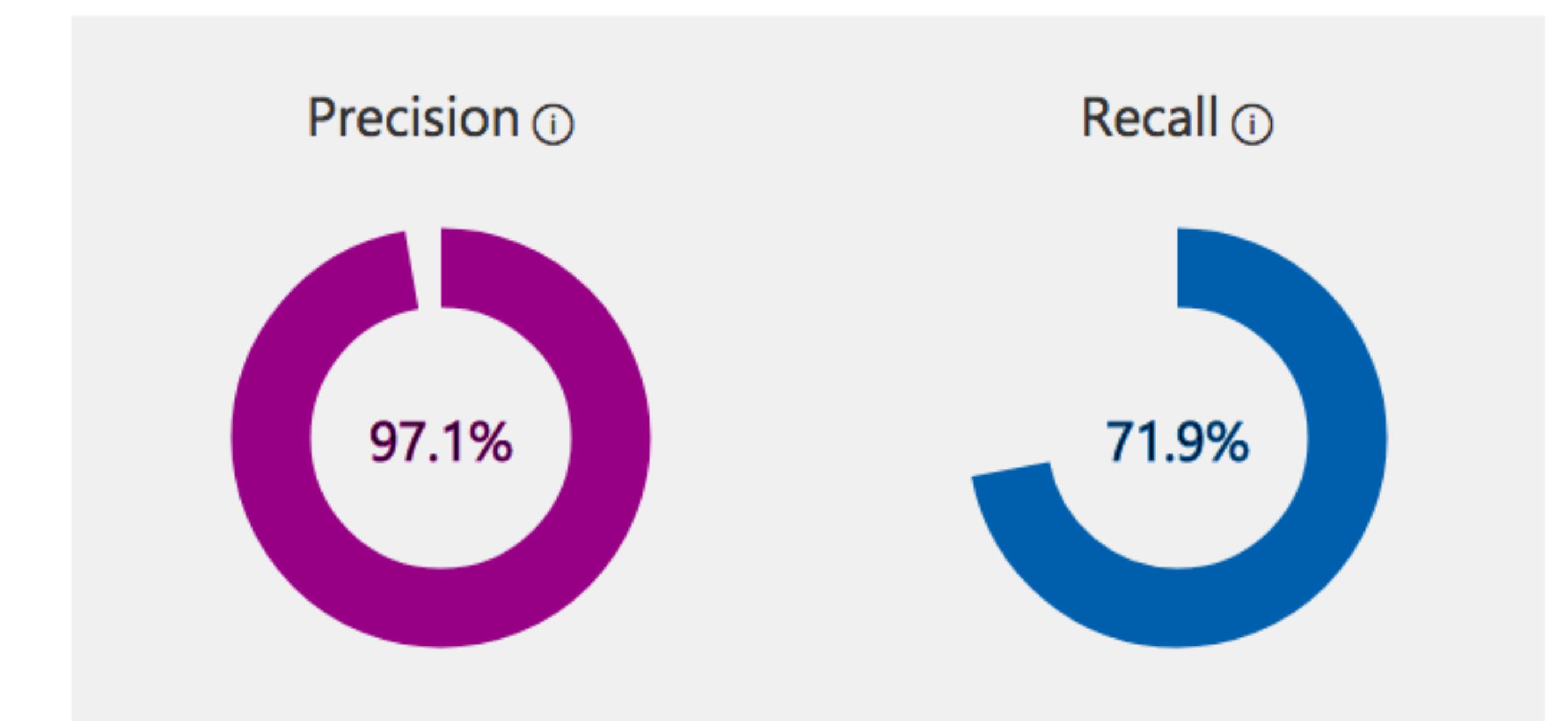


checkmark-hand

fist-hand

five-hand

Deep Learning Performance:



Performance Per Tag

Tag	Precision	Recall
checkmark-hand	95.0%	61.2%
circle-hand	100.0%	70.4%
fist-hand	100.0%	71.2%
five-hand	100.0%	94.1%
index-hand	91.7%	74.9%
thumb-hand	97.2%	59.2%

[1]. This pipeline is from Hunter Ward in medium.com