CRAFT

Ceramic Recording and Classification Team

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Problem

Image 1: Tusayan White Ware Sherds

- Archeologists often dispute sherd identifications.

- Archeologists consistently make unreliable assessments.

- Archeologists and researchers have a limited window of time to make their assessments.

- Manually classifying and recording large batches of sherds can be highly inefficient.

Solution Overview

Solving the issues plaguing archeologists when identifying sherds can be split into three parts:

- Creating a mobile app to allow sherd classification in the field

- Building a conveyor belt system to aid in rapid image capture of sherds for use as training data.

- Developing an improved deep learning image classification model for sherd classification to be used in the mobile app.

Implemented Solution

Team CRAFT's solution envisions implementation of a CRAFT developed deep learning model into two different solutions. This will allow archeologists to apply the model in the lab and the field.

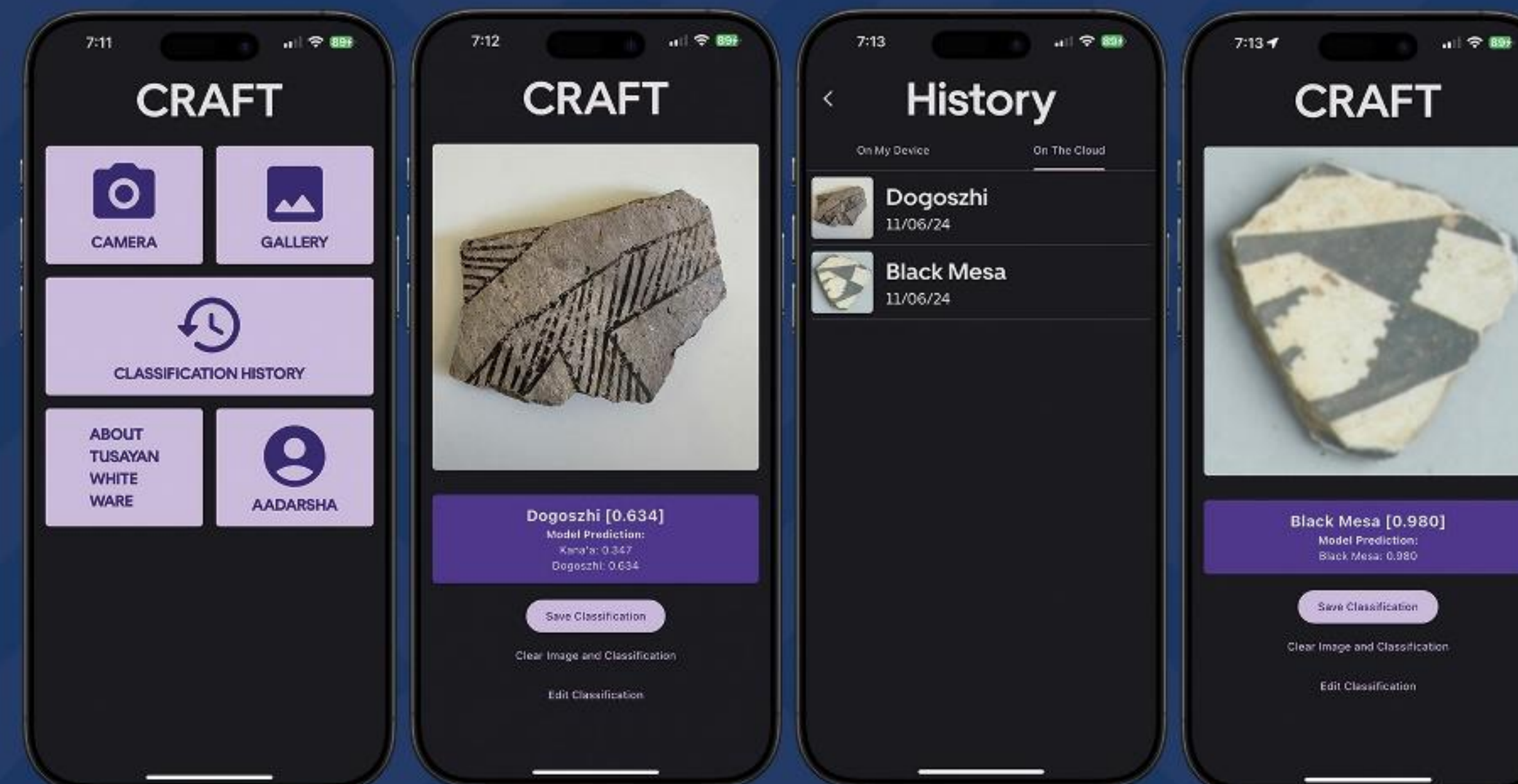Mobile app for on-the-go classification in the field

Image 2: CRAFT mobile application

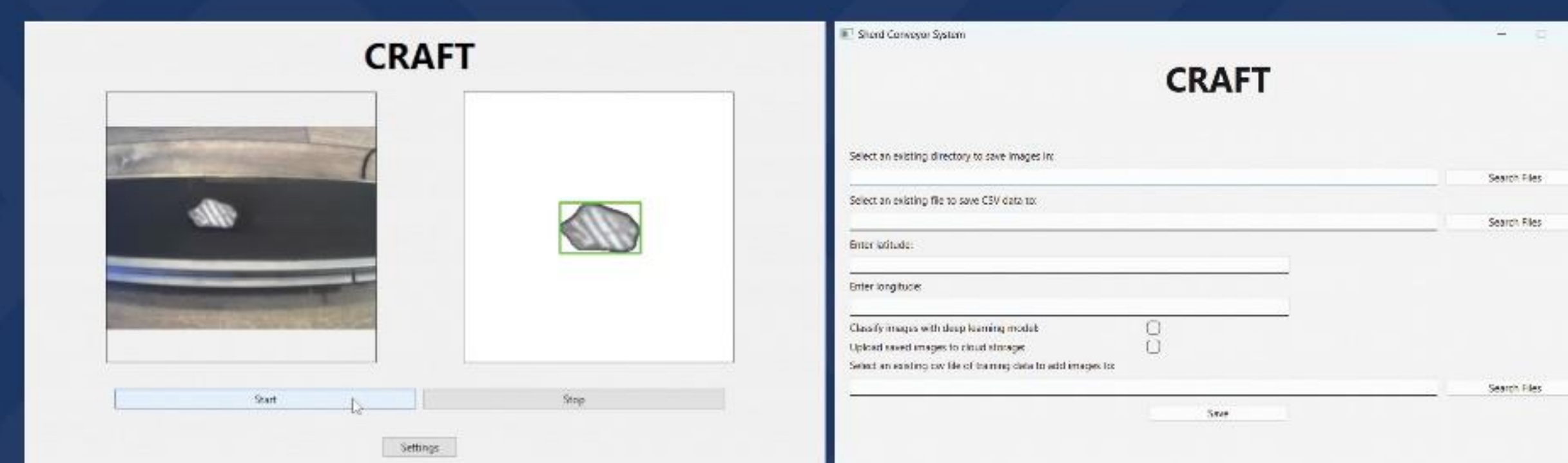Conveyor belt application for bulk data collection and classification in lab settings

Image 3: CRAFT conveyor belt application

Future Work

Despite the deep learning model's increase in performance, it is still trained on a rather small training dataset. Using the conveyor belt system, it is possible to gather images of sherds rapidly which could bolster the training dataset.
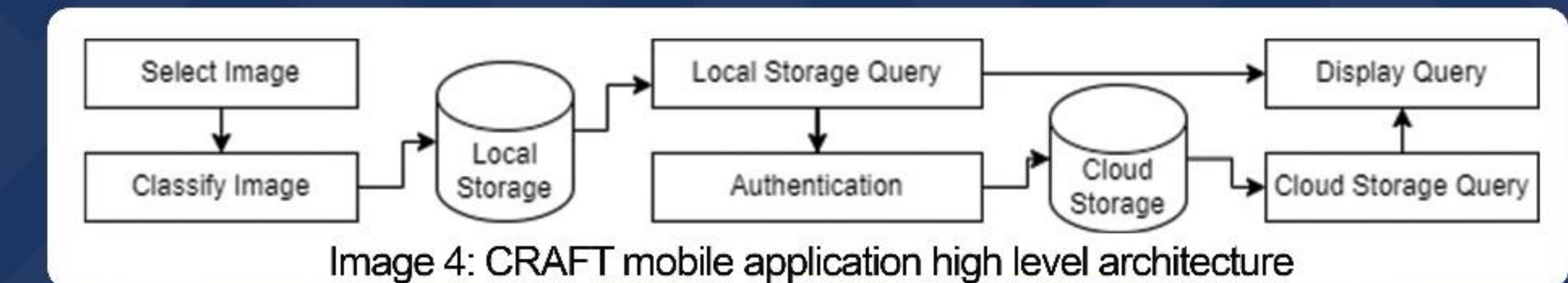
Architectural Overview

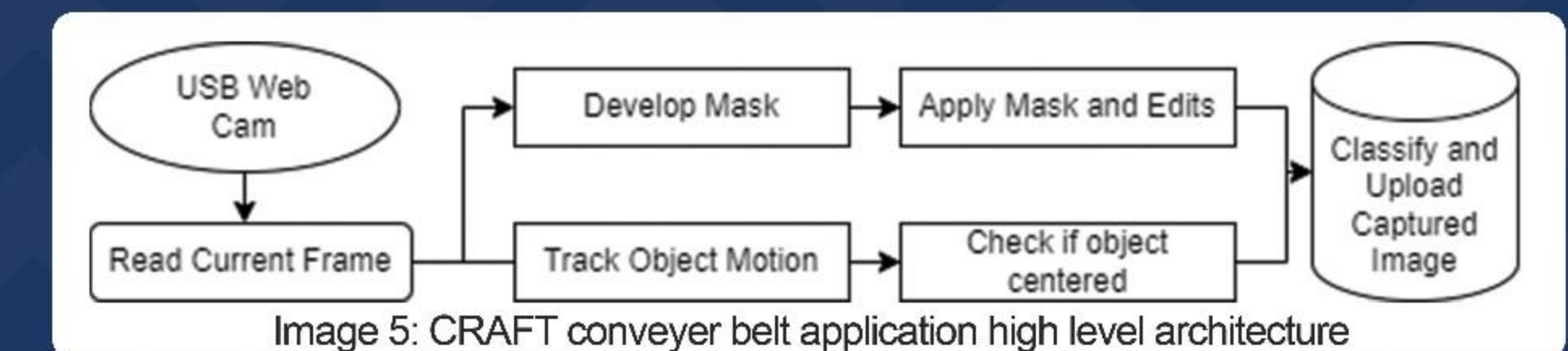Image 4: CRAFT mobile application high level architecture

Image 5: CRAFT conveyer belt application high level architecture

Challenges and Resolutions

- Our team found that best practices for deep learning models did not improve our results, so we experimented with various hyperparameter combinations which improved our results.

- The conveyor belt system's performance was affected by lighting quality. Implementing a stable lighting system improved consistency.

- The mobile app's performance was degraded on older hardware, so we optimized the AI code to alleviate the issue.

Technologies Used

Flutter · TensorFlow · K · OpenCV · Py · Python · Firebase · GitHub