CS Capstone Design

Technical Demo Grading Sheet (100 pts)

TEAM: CRAFT

Overview: The main purpose of the "Technical Demos" is to very clearly communicate the extent to which the team has identified key challenges in the project, and has proven solutions to those challenges. Grading is based on how complete/accurate the list of challenges is, and how convincingly and completely the given demos cover the given challenges.

This template is fleshed out by the team, approved by CS mentor, and brought to demo as a grading sheet.

Risky technical challenges

Based on our requirements acquisition work and current understanding of the problem and envisioned solution, the following are the key technical challenges that we will need to overcome in implementing our solution:

C1: Mobile Application. Our mobile application should be able to use camera/gallery of the device to capture image so that the image can be used by the image classification model, once the model gives a result, the result should be editable by the user. *To demonstrate this, we show that the app can load a photo, then we also show that there is a UI to view and edit results.*

C2: Conveyor Belt Application. Our application, along with the conveyor belt, will have to capture and upload sherds autonomously and do it faster than if data was manually photographed. *To demonstrate this, we should show the app in part or in whole depending on its level of completeness.*

C3 Image Classification model. Our image classification model must have improved accuracy over the current ResNet model used by the client. *To prove our model is more accurate, we should train a ResNet and ConvNext model on the same training and testing set and compare test accuracy.*

Challenges covered by demos:

In this section, we outline the demonstrations we have prepared, and exactly which of the challenge(s) each one of them proves a solution to.

Demonstration 1: Mobile Application

Challenges addressed: How is the image loaded in app for classification? How are the results displayed? How can the results be edited?

Flight Plan: Step by step overview of demo

1. User starts the Application.
2. User uses camera/gallery to load a photo in the app.
3. App generates a dummy result.
4. User edits the dummy result.

Evaluation:

- ✓ Convincingly demo'd each of listed challenges?

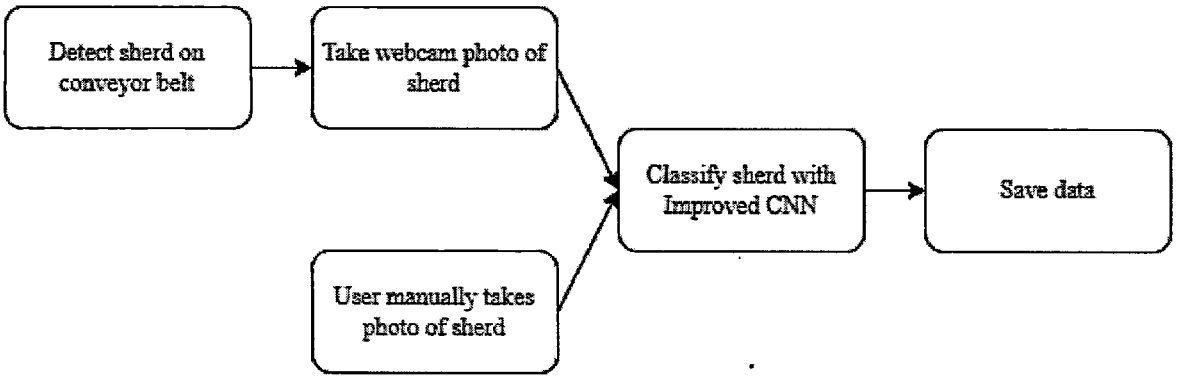
✓ Other evaluative comments:

Demonstration 2: Conveyor Belt Application

Challenges addressed: How will we detect the sherd in the image? How will we determine the sherd's edges so we can later paste it onto a white background?

Flight Plan: Step by step overview of demo

1. Show UML diagram for this application's function compared to having to capture sherds manually.



2. Enable webcam and start program.
3. Display OpenCV's video data for the mask to isolate the sherd, the result of the original webcam footage after performing a bitwise AND with the mask, and the unaltered webcam footage.
4. Place a sherd onto the conveyor belt and observe the program detect its outermost edge.

Evaluation:

✓ Convincingly demo'd each of listed challenges?

✓ Other evaluative comments:

Demonstration 3: Image Classification Model

Challenges addressed: How will we prove that the ConvNext model has better accuracy comaped to the ResNet model?

Flight Plan: Step by step overview of demo

1. The ConvNext and ResNet model will be trained on the same training and testing image set.
2. After training is complete, the final test accuracy will be compared between the two models.

Evaluation:

- ✓ Convincingly demo'd each of listed challenges?
- ✓ Other evaluative comments:

Other challenges recognized by not addressed by demo:

If there were challenges you listed earlier that were *not* covered by a demo, list here. This will hopefully be a short list…but better to be clear about where you are. If you have items here, you could list (if applicable) any pending plans to reduce these risks.

- Image Classification Model Integration
  - Both applications we plan to integrate the image classification model into are currently under development. As an example, currently the conveyor belt application inconsistently determines when to capture the sherd image. It would be an inefficient use of time to integrate the image classification model into the application before it can capture images to give to it. Aside from this the image classification model is under development as well. Since we are still updating it to a new model and improving its accuracy it would be inefficient to integrate it when it's still subject to change.

Approved for demo

[signature] 05, 03, 2024