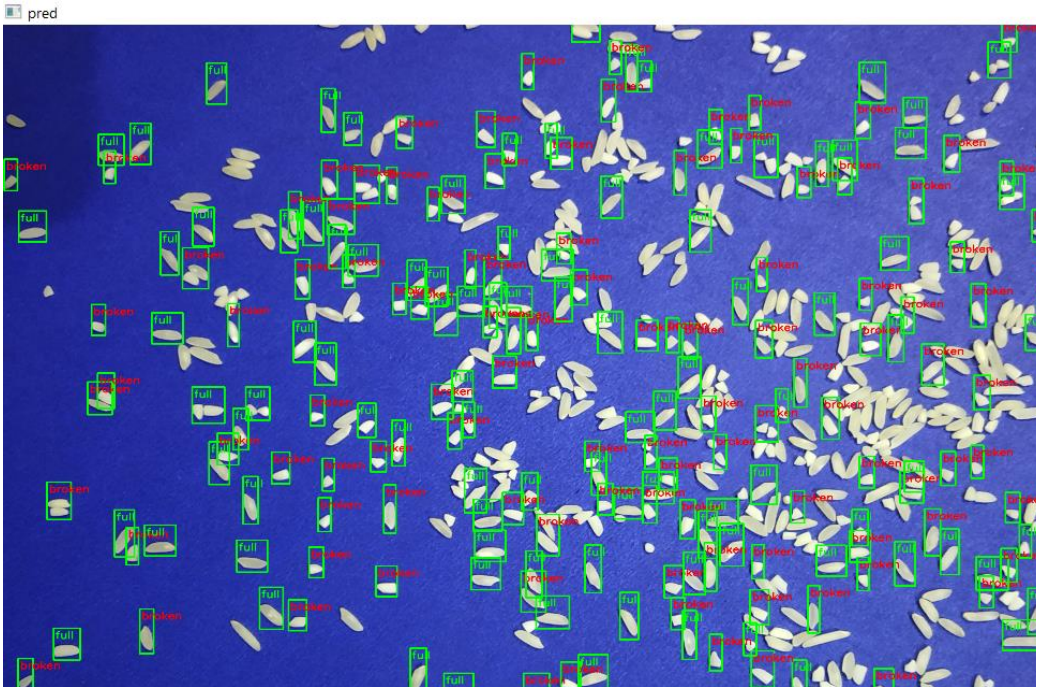
Computer Vision Assignment

Objective 1: Count the number of rice grains in the Image.

Objective 2: Find the number of broken grains in the image.

Sample Image:

You can assume the following in the image:

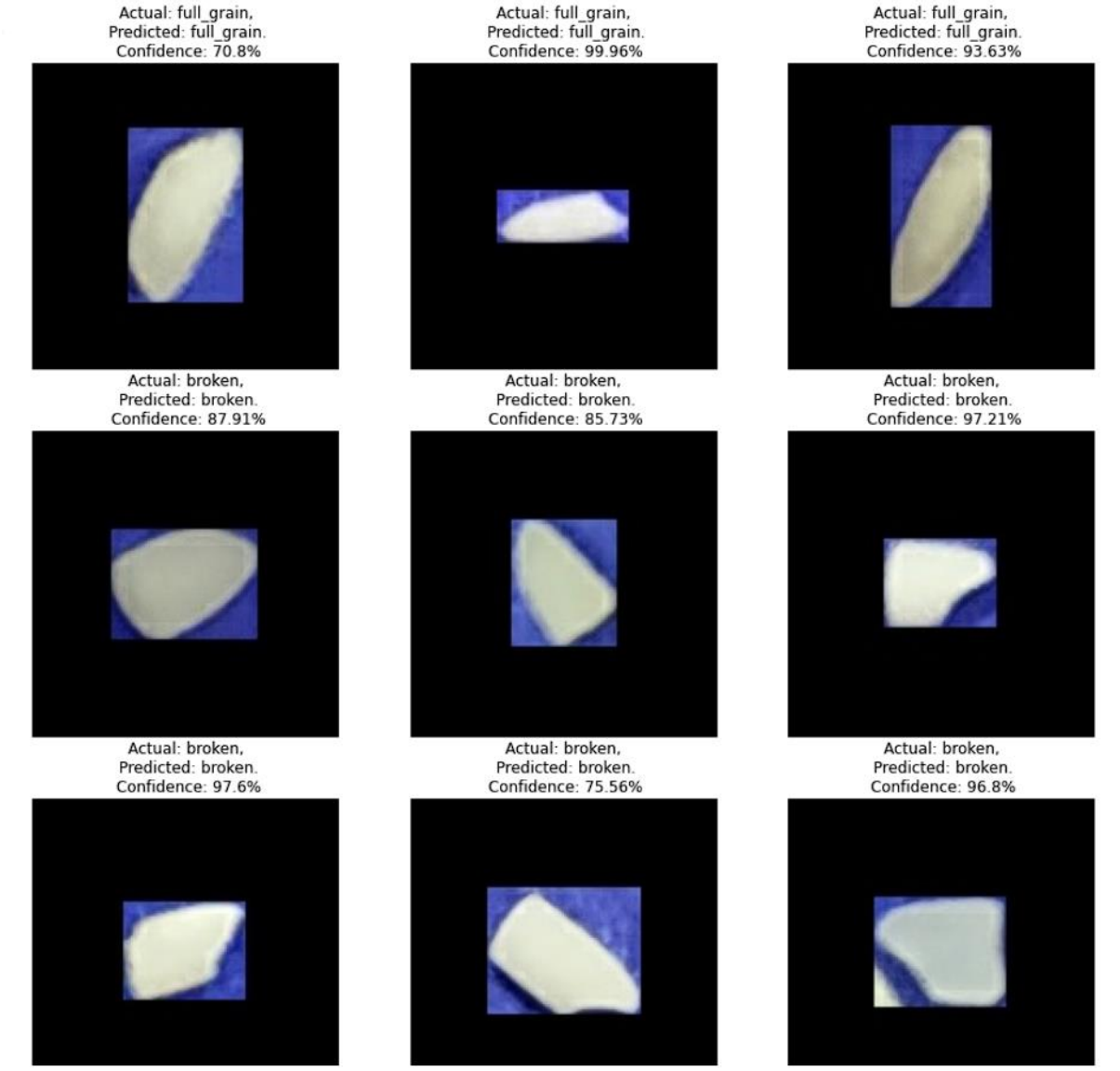


- The background will always be blue.
- There will be a mix of broken and non-broken rice grains.
- The grains will not overlap but can touch each other.

In this computer vision assignment, the objective was to count the number of rice grains in an image and find the number of broken grains in the image. The sample image provided had a blue background and contained a mix of broken and non-broken rice grains. The grains were not overlapping, but they could touch each other.

To solve this problem, I used a combination of OpenCV techniques and neural network-based approaches to segmentation and classification. First, I used OpenCV to locate and crop the images of rice grains from the original images. I then saved these images in separate folders for broken rice and non-broken rice.

Next, I used TensorFlow and a convolutional neural network (CNN) to train a binary classification model. The model was trained to distinguish between broken and non-broken rice grains using the images that were previously cropped and saved. The model was trained using a split of train and test data, and after the training was completed, the model was saved.



Finally, I used OpenCV to visualize the results of the model and count the number of rice grains and broken rice grains in the test images. I then saved these results in a CSV file in the format specified in the submission instructions.

One limitation of this approach is that it only works well with images that have a clear blue background and well-separated rice grains. In cases where the background or the grains are not clearly visible, the performance of the model may be affected. To improve the algorithm, one could consider using more advanced image processing techniques or incorporating external data to improve the accuracy of the model. Additionally, it would be beneficial to test the model on a larger dataset to increase the robustness of the model.

Overall, the approach used in this project was able to successfully count the number of rice grains and broken rice grains in the provided test images. The results were saved in a CSV file and can be used for further analysis or tracking.