

Figure (4): Confusion Matrix of Efficientnet-B0 Model.

was unable to achieve good results; It resulted in a 71.1% accuracy rate and required 57 minutes of total training time. conversely, It is attainable to point out that the achievements of the experiments carried out on the first and second models, to some extent, be comparable with one another in regard to the accuracy of the test. ResNet50, on the other hand, takes a longer time to be trained, which it

needs remarkably more potent memory as well as constitutes processing resources for a prolonged period. This is entirely at odds with direct, which aims at obtaining the highest accuracy rate at the lowest possible cost in terms of the quantity of time required to attain improvement (Figure 7 gives samples for prediction output).

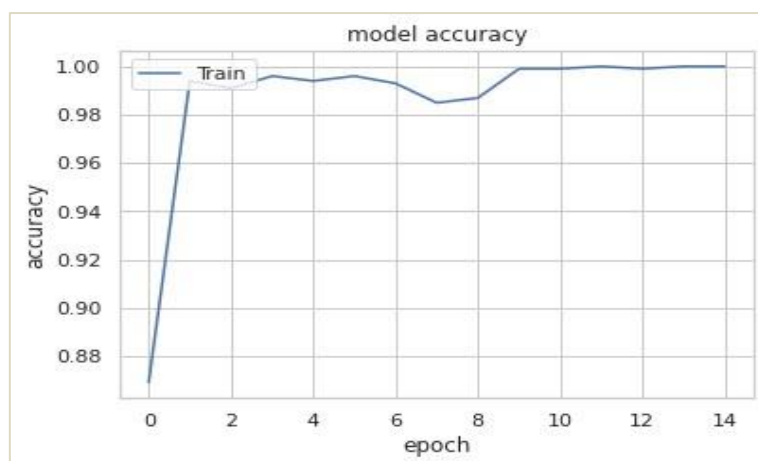


Figure (5): Accuracy Plot for Learning Epochs.

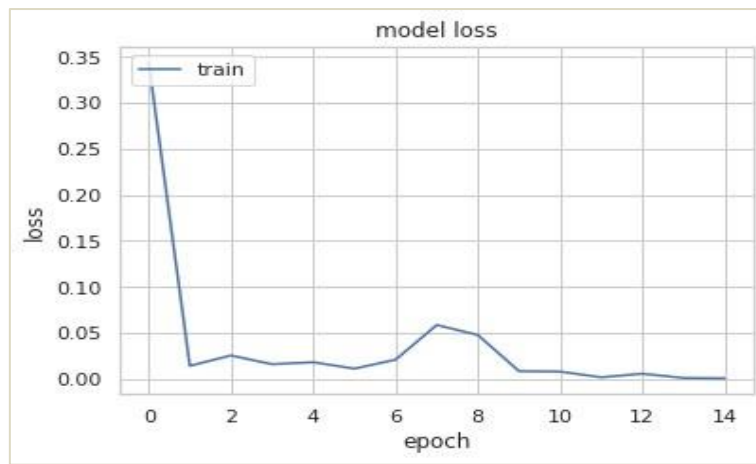


Figure (6): Loss Plot for Learning Epochs.

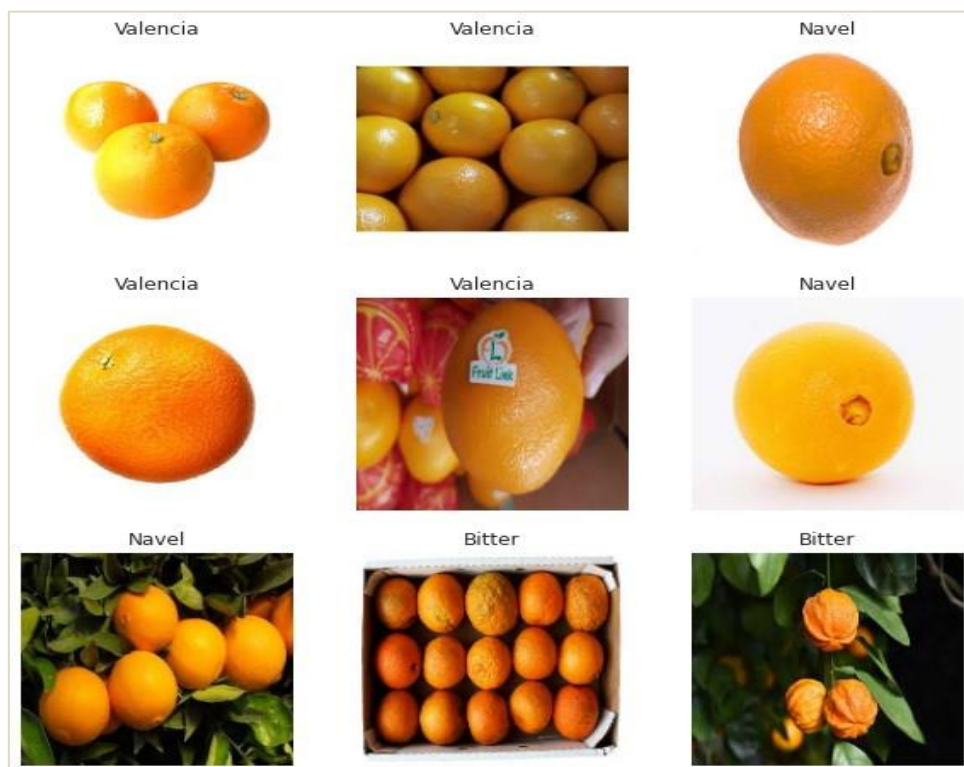


Figure (7): Prediction Output of Orange Fruit.

Conclusion

In this work, we proposed a low-cost deep learning-based machine vision technique to classify orange fruits based on their morphological characteristics. The classification was facilitated by embracing well-defined classifiers developed

from neural networks, and the scheme’s ability was substantiated by using a real-world data set consisting of orange fruits. The research results of the experiments indicate that the EfficientNetB0 use of the data set that was being analyzed did lead to a significant improvement in the accuracy of the

overall prediction. We drove actions to ensure that transfer learning is appropriate to the classification of orange fruits. We intend to include further images of other versions of this fruit in the near future. In addition, we highly advise classifying fruits according to their weight as a prospective work by creating an opportunity to do so initially. To develop a precise forecast of the actual weight of this fruit in order to ensure that the model would be economically viable in the processes involved in the selling of the crop harvested from orange orchards.

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