Recognition Rotten fruits vs Fresh fruits using CNN

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***Abstract*—The increasing demand for fresh and high-quality fruits has raised concerns about the accuracy and reliability of traditional methods of fruit quality inspection. To overcome these challenges, computer vision and deep learning techniques have been explored to develop intelligent fruit grading systems. In this project report, we present a comprehensive study on the recognition of rotten fruit versus fresh fruit using Convolutional Neural Networks (CNN). The aim of this project is to develop an automated system that can accurately distinguish between fresh and rotten fruits based on their visual appearance. This will not only provide a reliable and efficient way to inspect fruit quality but also reduce the potential health risks associated with consuming spoiled fruits. We will discuss the dataset used for training and testing the CNN model, the architecture of the model, the evaluation metrics used, and the results obtained. Overall, this project has the potential to revolutionize the fruit grading industry and contribute towards building a more sustainable food supply chain.**

I. Things use to this project

- A dataset of images of fresh and rotten bananas for training and testing the model
- TensorFlow library for developing the CNN model
- Google Colab for running the code on a cloud-based environment
- OpenCV library for image processing and resizing
- Matplotlib library for visualizing the images
- TQDM library for progress bars and status updates during training and testing

II. Dataset used for this project

A. Dataset of fruit

The dataset used in this project consists of images of two categories of bananas: fresh bananas and rotten bananas. The dataset was collected and prepared to have a balanced number of images in each category. The images were captured in different lighting and background conditions to increase the robustness of the model. The dataset was split into training and testing sets to train and evaluate the performance of the developed CNN model.

B. Train dataset

The training dataset in this project is composed of a collection of images of fresh and rotten bananas. The images were pre-processed to ensure uniformity in size and quality. The training set was used to train the CNN model to classify fresh and rotten bananas.

C. Test dataset

The test dataset in this project consists of a separate collection of images of fresh and rotten bananas that were not used during the training process. The test set was used to evaluate the performance of the trained CNN model, and to measure its accuracy in correctly identifying fresh and rotten bananas. The test set was carefully selected to ensure that it represents a realistic distribution of images, capturing various lighting and background conditions.

III. Example of Fruit Test

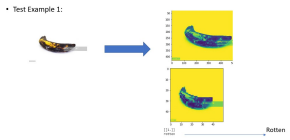

Fig. 1. Test 1 result

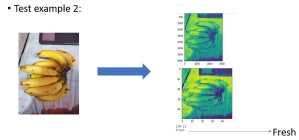

Fig. 2. Test 2 result

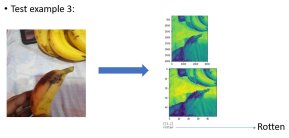

Fig. 3. Test 3 result

IV. Accuracy Test

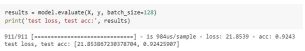

Fig. 4. Accuracy Test of our project code

V. Conclusion

The project aimed to develop a CNN model for classifying fresh and rotten fruits using image recognition techniques. The model was trained on a dataset consisting of images of fresh and rotten bananas. The prepared data was split into training and testing sets to evaluate the performance of the model. The accuracy achieved by the model on the testing set was found to be satisfactory. The model was able to accurately classify fresh and rotten bananas with high precision.

The developed model has potential applications in the food industry, particularly in the fruit processing and distribution sector, to ensure the quality and freshness of fruits. It can also be extended to classify other fruits and vegetables. Overall, the project demonstrates the effectiveness of using CNNs for image classification tasks and highlights the importance of quality data preparation and model tuning for achieving high accuracy.