

ABSTRACT

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CLASSIFICATION OF BANANA FRUIT RIPENESS USING CONVOLUTIONAL NEURAL NETWORK (CNN) ALGORITHM

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Bananas are a common fruit encountered in daily life and play a crucial role in fulfilling the nutritional needs of society. Indonesia, as one of the major banana producers, has around 200 types of bananas spread across the archipelago. Banana farmers typically classify the ripeness of bananas manually. The fatigue of these farmers can lead to less accurate classifications, as this process is performed subjectively. In the era of rapid technological advancements, particularly with the progress in artificial intelligence, there has been a significant transformation in various fields, including agriculture and education. One of the artificial intelligence algorithms that has demonstrated high performance in this task is the Convolutional Neural Network (CNN), due to its ability to automatically recognize visual patterns and handle complex image variations, such as the shape and color of bananas at different ripeness levels, which is the focus of this program. Based on this description, this research aims to apply the Convolutional Neural Network (CNN) algorithm in the classification of banana ripeness from images. This study not only aims to prove the effectiveness of CNN in object classification but also to facilitate fruit distributors in inspecting the freshness of bananas, thereby ensuring that only fully ripe bananas reach consumers. This research uses a dataset from the internet and Kaggle consisting of 309 banana images divided into three categories: unripe, ripe, and rotten. The process includes preprocessing, followed by augmentation and data generator preparation. The training is conducted using a model. The testing results, after splitting the dataset with a ratio of 80:20, achieved an accuracy rate of 84% and a loss of 16%. Testing was performed using 63 test data, resulting in an accuracy of 85%, with average precision, recall, and F1-score values of 84%.

References (2019-2024)