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IDENTIFICATION OF BRUISED FRUITS USING SMARTPHONE

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Fruit bruising is a challenge in post-harvest handling and transportation especially in Nigeria, affecting both quality and market value. This study presents the development of an image-based bruise detection system using a smartphone camera as the imaging device. Images of tomatoes were captured and analyzed using two computational methods: Otsu's thresholding algorithm and a Random Forest Classifier (RFC). The preprocessing stage involved contrast enhancement and histogram equalization to improve feature extraction. Otsu's method calculated a global threshold value correlated with bruise severity, while RFC utilized textural features derived from Gray Level Co-occurrence Matrix (GLCM) such as entropy, contrast, correlation, energy, and homogeneity. Results demonstrated a bruise detection accuracy of 100% for the thresholding system, with RFC showing strong classification performance after training on over 3,700 labelled images. The system provides a low-cost, non-destructive, and automated method for sorting bruised fruits, offering significant potential for integration into local agricultural processing workflows.

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