

Image processing application for detecting fruit fly infestation in apple crops in agriculture

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Abstract: This study presents an image processing-based system for the automated detection of fruit fly infestations in apple crops, addressing a critical challenge in precision agriculture. The proposed method leverages digital image analysis to identify visual symptoms of infestation, such as puncture marks, discoloration, and early signs of decay on apple surfaces. A dataset of apple images captured under varying field conditions was preprocessed using noise reduction and color space transformation techniques. Feature extraction focused on texture, color, and morphological characteristics, which were then classified using a machine learning algorithm. Experimental results demonstrate that the system achieves high accuracy in distinguishing infested from healthy fruits, with a detection rate exceeding 90%. This approach offers a non-invasive, cost-effective solution for real-time monitoring, enabling early intervention to reduce crop loss and minimize pesticide use. The findings highlight the potential of integrating computer vision into smart farming practices, contributing to sustainable agricultural management and improved food quality assurance.

Keywords: Image processing, fruit fly detection, apple orchard, agricultural pest monitoring