Chapter 4
Innovative Approaches to Tomato Leaf Disease Detection Bridging Tradition and Technology

Ahmed Imtiaz
https://orcid.org/0009-0001-6267-2035
American International University, Bangladesh

Sk Muktadir Hossain
https://orcid.org/0009-0006-9073-9264
American International University, Bangladesh

Rahat Rihan
https://orcid.org/0009-0008-6856-7552
American International University, Bangladesh

Dipta Justin Gomes
https://orcid.org/0000-0003-3019-6051
American International University, Bangladesh

ABSTRACT

This study explores the transformative potential of integrating Artificial Intelligence (AI) with precision agriculture to address key challenges in farming, such as disease detection, resource optimization, and yield improvement. By leveraging the Real-Time Detection Transformer (RT-DETR) framework, the study combines high-resolution imaging, hyperspectral scanners, and real-time data processing to enable efficient and accurate detection of tomato leaf diseases. A robotic system, equipped with autonomous navigation and non-invasive diagnostic tools, was developed to classify

DOI: 10.4018/979-8-3373-0020-7.ch004