

ICRAMCS 2026

THE EIGHTH EDITION OF THE INTERNATIONAL CONFERENCE ON
RESEARCH IN APPLIED MATHEMATICS AND COMPUTER SCIENCE

April 23-24-25, 2026 | Marrakech, Morocco



On-Device Deep Learning for Tomato Disease Detection with case study

Communication Info

Authors:

MAAINIA Mohamed Naiym
AMOUCHE Mohamed
Belaid Bouikhalene

¹ UCD, El Jadida, Maroc

² UCD, El Jadida, Maroc

³ USMS Khouribga, Maroc

Keywords:

- (1) Tomato diseases
- (2) mobile application
- (3) CNN

Abstract

Plant diseases can cause substantial crop losses, making rapid in-field diagnosis important [1]. We present a cross-platform Flutter mobile application for tomato leaf screening that captures an image, applies lightweight preprocessing, and runs a compact CNN as a TensorFlow Lite model for fully offline inference, returning a predicted class and confidence [2–4]. Results are stored in an in-app history, while cloud services provide user authentication and deliver model updates (version-checked at launch) so the deployed model can be improved without reinstalling the app. The design builds on established deep-learning approaches for plant disease recognition [2–4] and leverages mobile-efficient CNN architectures suited to on-device deployment [5].

© ICRAMCS 2026 Proceedings ISSN: 2605-7700

References

- [1] E.-C. Oerke, Crop losses to pests, *The Journal of Agricultural Science*, 144, 2006, 31–43.
- [2] S.P. Mohanty, D.P. Hughes, M. Salathé, Using Deep Learning for Image-Based Plant Disease Detection, *Frontiers in Plant Science*, 7, 2016, 1419
- [3] K.P. Ferentinos, *Deep learning models for plant disease detection and diagnosis*, Computers and Electronics in Agriculture, 145, 2018, 311–318.
- [4] E.C. Too, Y. Li, S. Njuki, Y. Liu, *A comparative study of fine-tuning deep learning models for plant disease identification*, Computers and Electronics in Agriculture, 161, 2019, 272–279.
- [5] M. Sandler, A. Howard, M. Zhu, A. Zhmoginov, L.-C. Chen, MobileNetV2: Inverted Residuals and Linear Bottlenecks, *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, —, 2018, 4510–4520.