

AI-assisted Plant Health Monitor

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Plant Health Monitor

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| | |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Photo health stress (78.6% sure) | Light too much light Current: 36.3 lux |
| Temperature good temperature Current: 23.8 °C | Moisture too wet Current: 1.695 V Relative level: 0.996 (7-day V range: 0.921–1.698) |

Latest photo



Sensor history (last ~7 days)

Light (lux)



Problem Statement and Motivation

- Houseplants often suffer from silent stress (light, temperature, or watering issues)
- Task: create an automated IoT AI-assisted plant health monitor using deep learning techniques and a Raspberry Pi
- Low-cost Raspberry Pi system that can:
 - Track environmental conditions (light, temperature, moisture)
 - Use a camera and an AI model to detect leaf stress from images

Approach/Methodology

- Hardware Setup:
 - Raspberry Pi 4 model B with a Pi camera module 3
 - Light sensor, temperature sensor, moisture sensor
- Data Collection:
 - Readings every 5 minutes, logged to CSV files with 7 days of history
- Dashboard:
 - Flask web app running on the Pi
 - Live indicators and graphs for light, temperature, and moisture



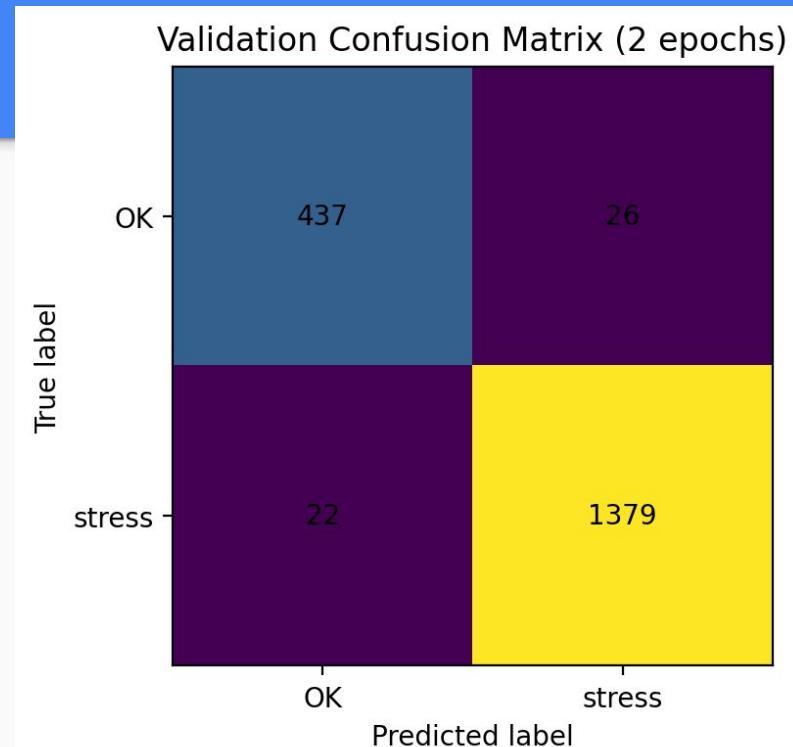
Approach/Methodology

- Training
 - MobileNetV3-Small model trained on the Plant Pathology 2021 dataset
- AI leaf stress detection
 - External inference server on laptop using the trained weights
 - Pi captures a photo, sends it to the server, and receives the predicted probability of stress



Results

- Trained the model for only 2 epochs



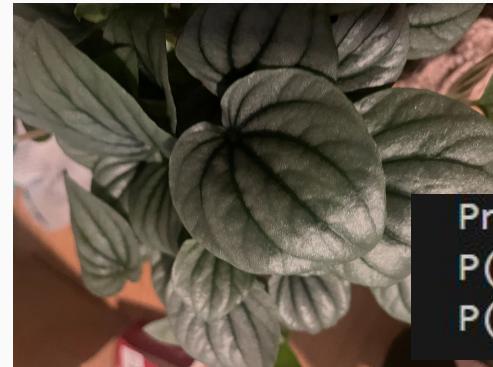
Predicted class: stress
P(OK): 0.043
P(stress): 0.957



Predicted class: stress
P(OK): 0.145
P(stress): 0.855



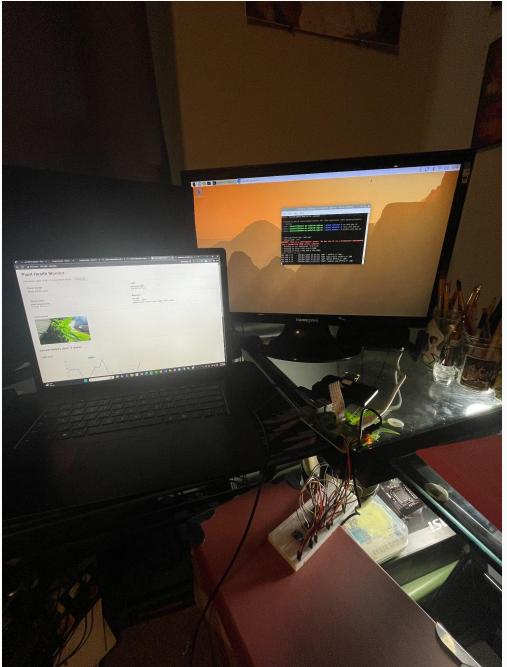
Predicted class: stress
P(OK): 0.403
P(stress): 0.597



Predicted class: stress
P(OK): 0.133
P(stress): 0.867



Predicted class: OK
P(OK): 0.511
P(stress): 0.489



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stress (78.6% sure)

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Limitations and Future Work

- Limitations:
 - Limited dataset
 - Inference currently runs on a laptop
 - Only one Pi and camera
- Future Work:
 - Collect more data for better training
 - Add capability for multiple plants
 - Improve UI