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Securing Food Security & Environmental Sustainability for Egypt 2030



PREPARED BY

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PROBLEM STATEMENT

Plants Die Every Day in Egypt

- Diseases detected too late
- Wrong treatment decisions
- Water and pesticides are wasted

THE GOAL

- Moving from Reactive loss to Predictive preservation, aligning with **Vision 2030 Goal 5 and Haya Karima.**





OUR SOLUTION



AN AUTONOMOUS AI **AGENT** THAT:

- Identifies plant type and detects diseases early
- Explains the diagnosis using XAI (Grad-CAM)
- Generates a comprehensive action plan :
 - Explains why the disease occurred
 - Recommends treatment, watering and fertilization schedules
 - Suggests nearby places to buy required treatments and resources





01 Dataset

Plant Disease Detection Dataset

Image dataset of multiple crops and their diseases for plant health monitoring



02 Model

CNN-based classifier for plant type & disease

```
Epoch 12/15
100%|██████████| 1562/1562 [02:30<00:00, 10.39it/s]
Train Acc: 93.29% | Val Acc: 97.81%
Model saved with improved validation accuracy.

Epoch 13/15
100%|██████████| 1562/1562 [02:30<00:00, 10.39it/s]
Train Acc: 93.46% | Val Acc: 97.61%

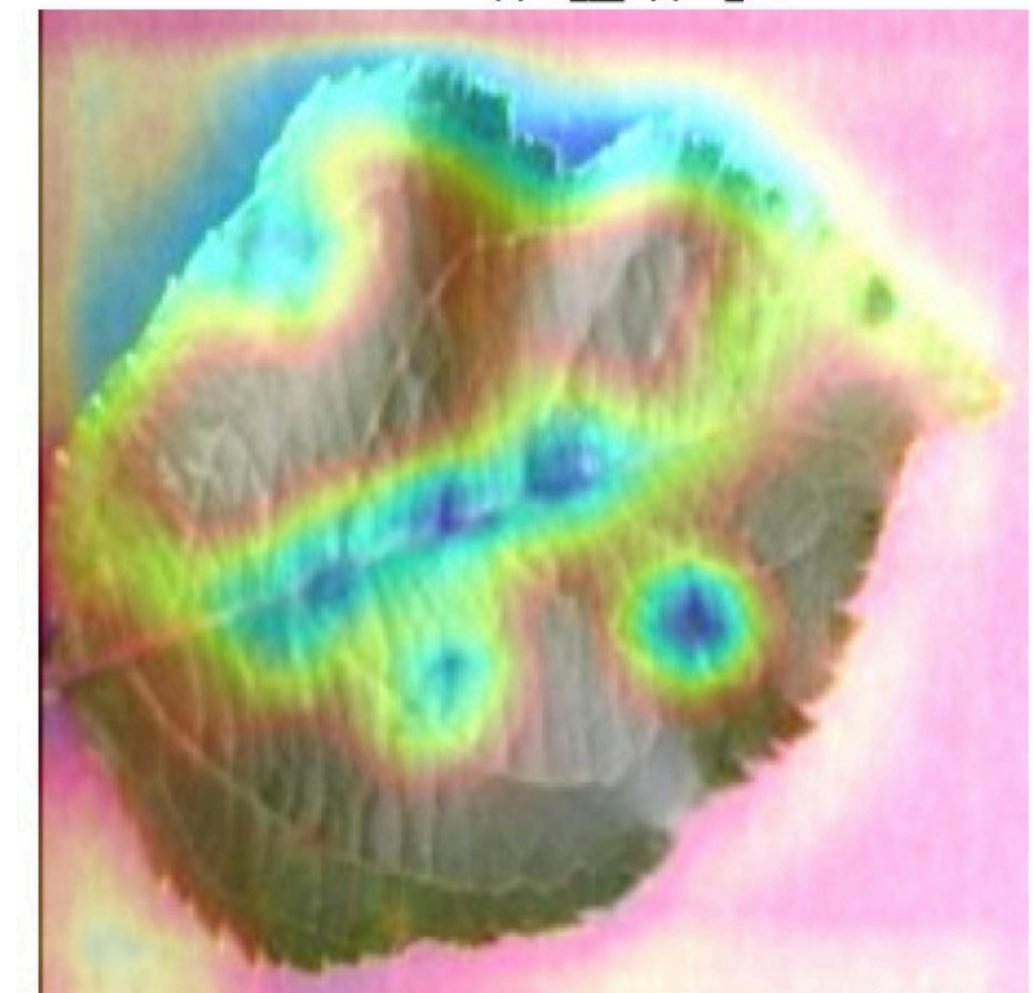
Epoch 14/15
100%|██████████| 1562/1562 [02:30<00:00, 10.38it/s]
Train Acc: 93.77% | Val Acc: 97.51%

Epoch 15/15
100%|██████████| 1562/1562 [02:30<00:00, 10.40it/s]
Train Acc: 93.53% | Val Acc: 97.61%
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03 XAI

Grad-CAM for Transparency and trust as it Provides visual reasoning for users

Grad-CAM → Apple__Apple_Scab





04

Agent

Outputs from Phase 1 (plant type, disease, Grad-CAM) are passed to Gemini

05

Generate Comprehensive Action Plan

Explains disease cause

Recommends treatment, watering & fertilization

Provides preventive guidance

06

Interactive chatbot Assistant

Users can discuss the case in detail





Deploy



Limit 200MB per file • JPG, PNG, JPEG Browse files

Apple.jpg 8.8KB X



Model Prediction

Predicted Disease

Apple__Apple_Scab

Confidence

70.62%



Top 3 Predictions:

Apple__Apple_Scab: 70.62%

Tomato__Bacterial_Spot: 8.54%

Potato__Late_Blight: 3.68%

Ask follow-up questions about the diagnosis... >



BUSINESS MODEL CANVAS TABLE

KEY PARTNERS	KEY ACTIVITIES	VALUE PROPOSITIONS	CUSTOMER RELATIONSHIPS	CUSTOMER SEGMENTS
	<ul style="list-style-type: none">• AGRICULTURAL COOPERATIVES & EXTENSION SERVICES• AI & CLOUD SERVICE PROVIDERS (E.G., GEMINI API)• LOCAL FARMERS & PILOT USERS• ENVIRONMENTAL & SUSTAINABILITY ORGANIZATIONS	<ul style="list-style-type: none">• DISEASE DETECTION & IMAGE ANALYSIS• GENERATING TREATMENT & IRRIGATION PLANS• MONITORING PLANT HEALTH & SENDING ALERTS• USER SUPPORT, TRAINING & COMMUNITY ENGAGEMENT	<ul style="list-style-type: none">• EARLY DISEASE DETECTION FOR CROPS AND PLANTS• PERSONALIZED TREATMENT AND IRRIGATION PLANS• OPTIMIZED USE OF WATER, FERTILIZERS, AND PESTICIDES• REAL-TIME ALERTS AND ACTIONABLE RECOMMENDATIONS• ACCESSIBLE AI GUIDANCE FOR FARMERS AND GARDENERS• BOOST CROP YIELD, REDUCE LOSSES, AND PROMOTE SUSTAINABLE AGRICULTURE	<ul style="list-style-type: none">• PERSONALIZED AI SUPPORT• COMMUNITY ENGAGEMENT & FORUMS• TRAINING & WORKSHOPS• REAL-TIME ALERTS & NOTIFICATIONS
	KEY RESOURCES		CHANNEL	
	<ul style="list-style-type: none">• AI & COMPUTER VISION MODELS• MOBILE & WEB PLATFORM• PLANT DISEASE DATASETS• DEVELOPMENT TEAM & AGRICULTURAL EXPERTS		<ul style="list-style-type: none">• MOBILE & WEB APP• SOCIAL MEDIA & ONLINE COMMUNITY• AGRICULTURAL EXTENSION SERVICES• WORKSHOPS & SEMINARS	<ul style="list-style-type: none">• SMALL-SCALE & RURAL FARMERS• AGRICULTURAL COOPERATIVES• URBAN GARDENERS & HOBBYISTS• AGRICULTURAL CONSULTANTS
COST STRUCTURE	REVENUE STREAMS			
<ul style="list-style-type: none">• PLATFORM DEVELOPMENT & MAINTENANCE (WEB & MOBILE)• AI MODEL TRAINING & CLOUD SERVICES• MARKETING & COMMUNITY ENGAGEMENT• TRAINING WORKSHOPS & SUPPORT SERVICES• PARTNERSHIPS WITH AGRICULTURAL ORGANIZATIONS	<ul style="list-style-type: none">• SUBSCRIPTION PLANS FOR FARMERS & COOPERATIVES• PAY-PER-USE SERVICES FOR PLANT ANALYSIS• LICENSING AI TECHNOLOGY TO AGRICULTURAL CONSULTANTS• WORKSHOPS, TRAINING, AND PREMIUM ADVISORY SERVICES			



From Mansoura, the first seed of
green was planted,
where every plant is understood,
every drop of water is valued,
And technology helps nature thrive.

**ONE SEED. ONE CITY. A GREENER
WORLD.**





Future Work

01

Add predictive alerts before disease appears

02

Deploy smart cameras in fields for real-time plant monitoring



Conclusion

Khadrawy transforms plant care from guesswork into intelligence. By combining agentic AI, deep learning, and explainable AI, our system

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THANK YOU

Seeded in Mansoura, designed for Egypt, scalable to the world.



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