Agri Lens
Your Green Guardian, Every Hour

AgriLens

Project Profile

Cultivating the Future of Agriculture

Presented by
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The Challenge

Why Smart Farming?

- Traditional farming methods often lead to inefficient resource use (water, fertilizer) and delayed disease detection, resulting in crop loss and reduced yield. Our project addresses these challenges by leveraging smart technologies.

- High-resolution images. Solution: Optimized our dataset by augmenting it and then feeding to the model resulting best results.

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Vision STATEMENT

State the project's main goal – optimizing strawberry growth, efficiency, and yield through technology.

System Overview

This diagram illustrates a "Smart Agriculture System" where Sensors collect environmental data, which is then sent to a Database for storage. An Software component analyzes this data, fetches historical information from the Database, and generates farming recommendations, AI-based disease detection, and alerts. Finally, these recommendations and alerts are sent to the Farmer, who can then input responses and implement suggestions in the field.

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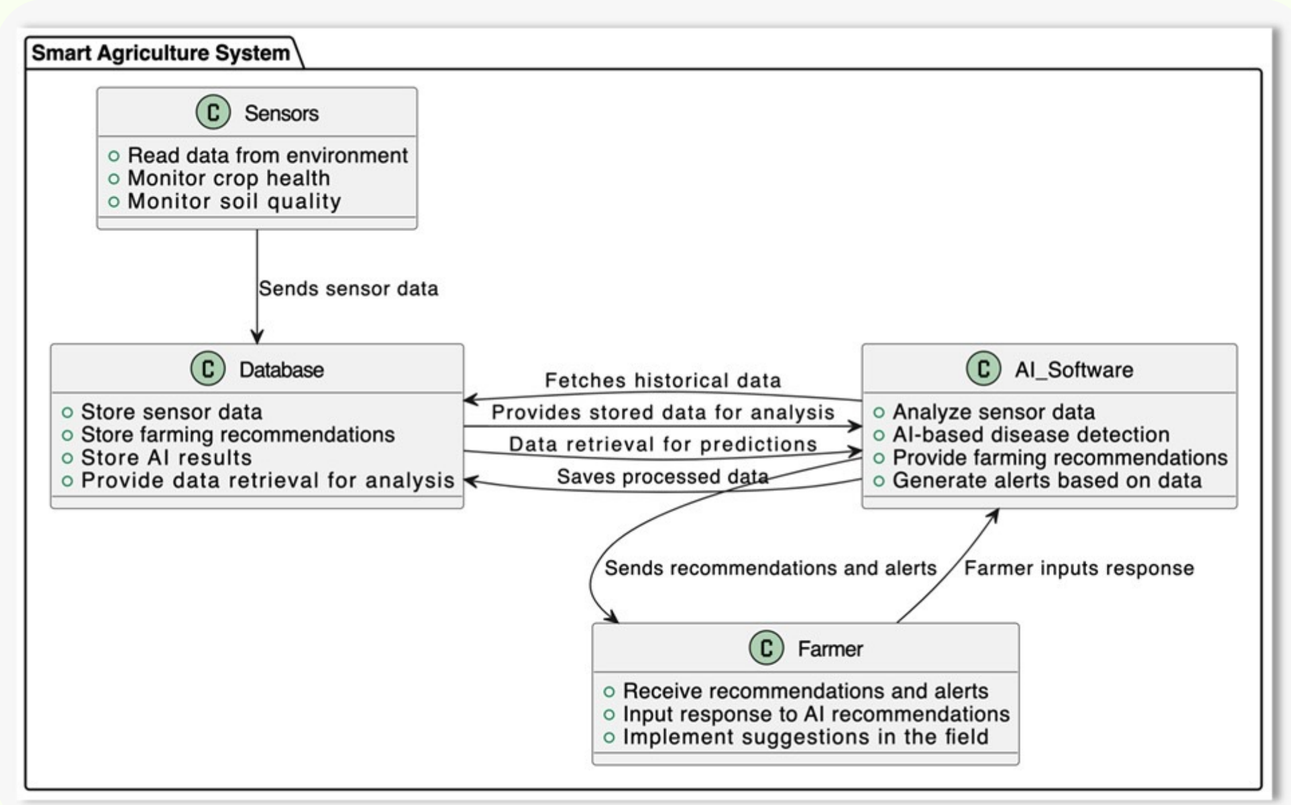
“AgriLens Architecture”

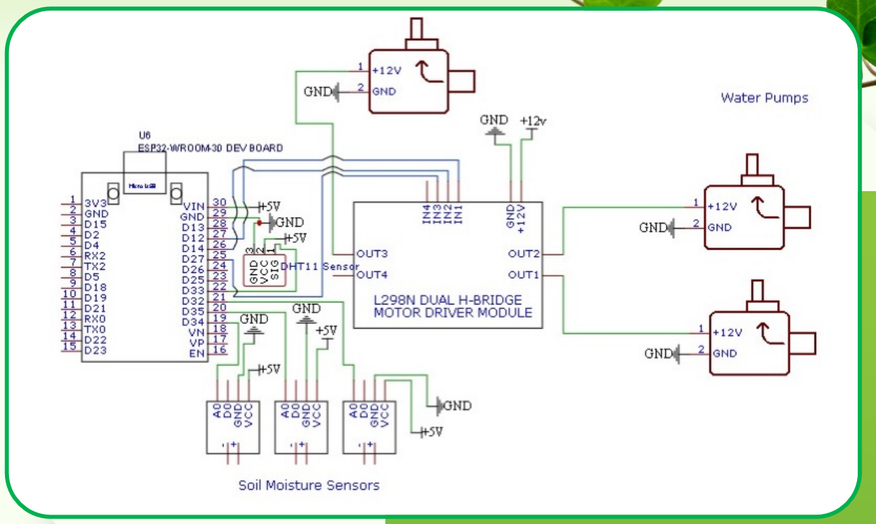


IoT Core

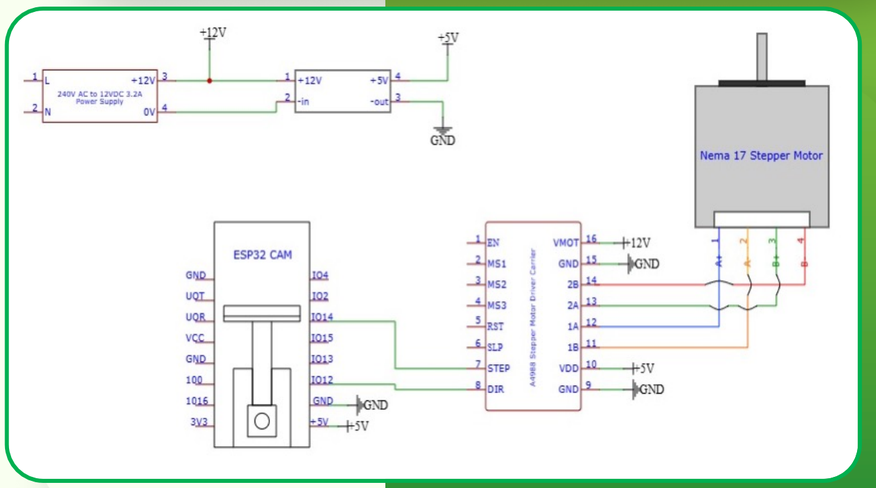
The Hardware Foundation

We utilize ESP32 microcontrollers as our intelligent hubs:

- **Figure(1) :** The ESP32-CAM handles visual monitoring and precise mechanical control, driving the Nema 17 Stepper Motor for tasks like camera positioning.



- **Figure(1) :** A separate ESP32 Development Board manages environmental sensing with Soil Moisture Sensors and the DHT11 (temperature/humidity sensor), and orchestrates automated irrigation through our Water Pumps.



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System Overview

- The ESP32 sends soil and climate sensor data to the backend, while the ESP32-CAM transmits plant images for AI analysis.
- The backend stores all data, processes disease detection via YOLO, and delivers insights to the mobile app.

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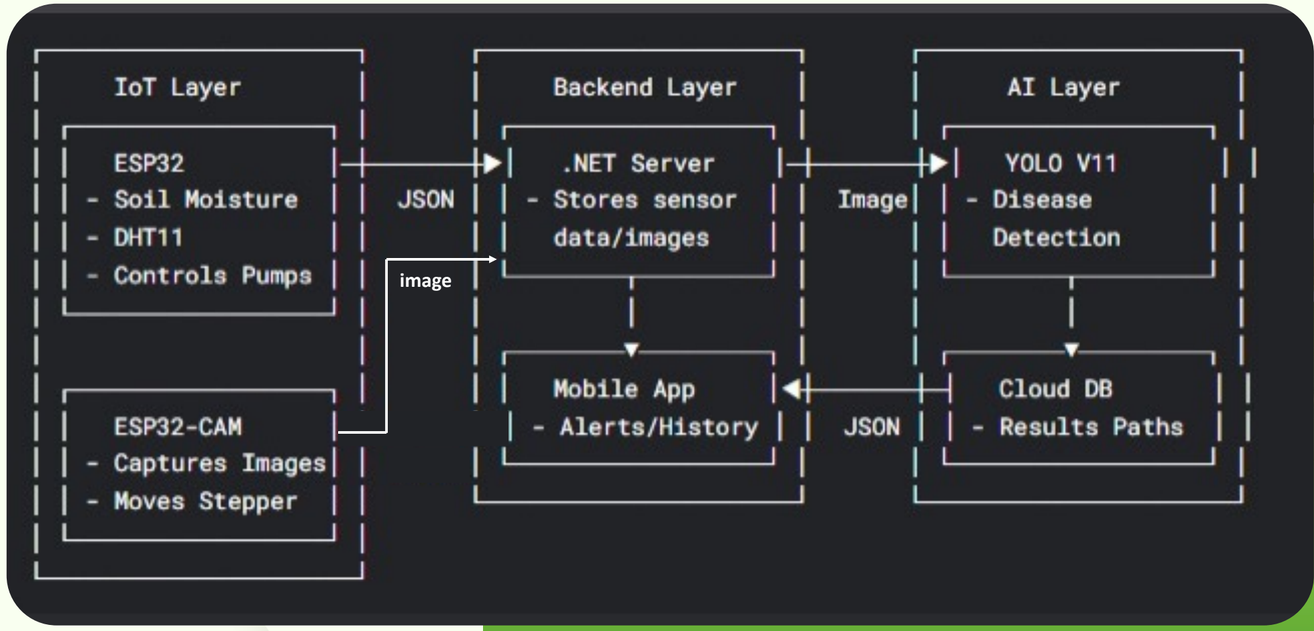
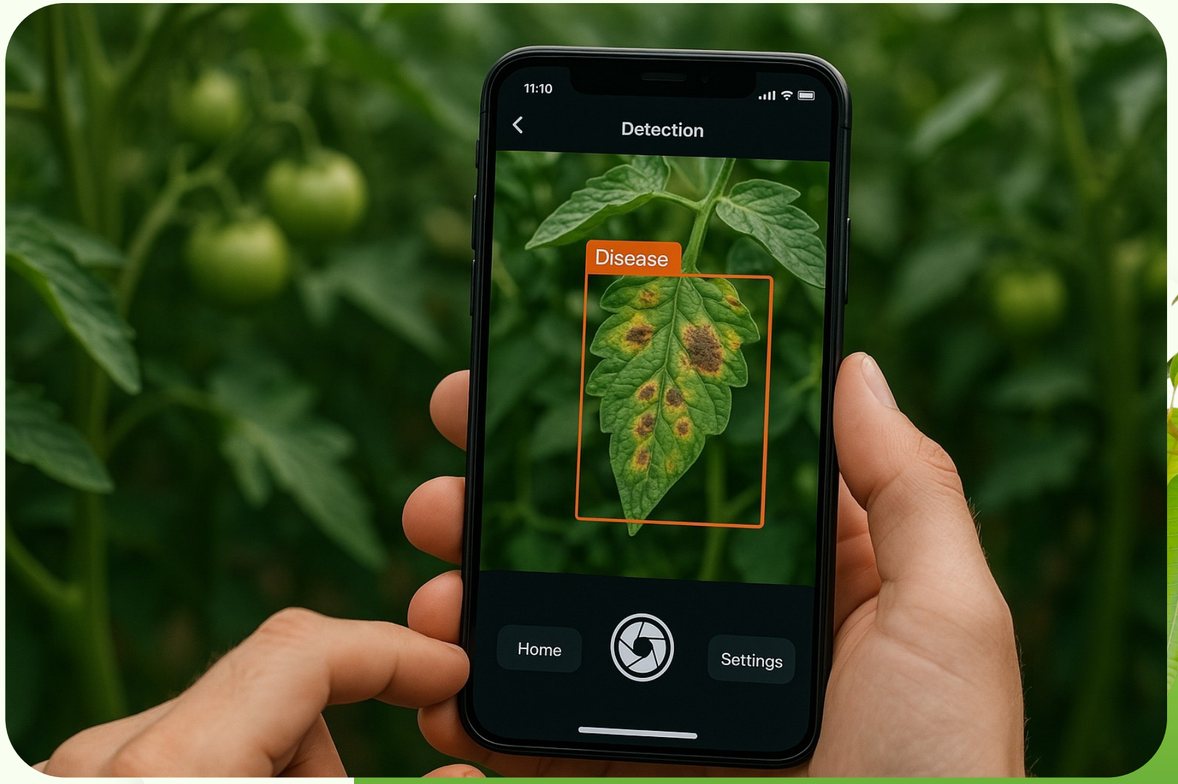
"Data flow diagram for system"



What Makes Us Different?

Unlike conventional smart farming systems, our solution integrates advanced YOLO V11 instance segmentation for highly accurate, early-stage disease detection, combined with a user-friendly mobile interface for seamless interaction and real-time insights.



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Key Results & Benefits

Our initial work suggests a path towards enhanced efficiency and smarter insights in agriculture. We've established a foundational system that shows promising capabilities for early detection and optimized resource use, laying the groundwork for further development and real-world impact.

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Business Model

THE BUSINESS MODEL CANVAS

KEY PARTNERS

Agricultural Research Institutions:
Collaboration for testing and validation of AI models.

IoT Hardware Suppliers:
Partnerships for cost-effective sourcing of sensors and other hardware components.

Government & NGO Partnerships:
Deployment of solutions at scale to promote smart farming initiatives.

COST STRUCTURE

Manufacturing Costs:
Production of smart farming kits (approx. $200/unit).

R&D Costs:
AI model development and sensor technology enhancement.

Sales & Marketing:
Advertising, farmer outreach, and awareness campaigns.

Customer Support:
Maintenance services and training programs.

Operational Costs:
Office expenses, cloud storage for AI analytics, and payroll.

KEY RESOURCES

Intellectual Property & Technology:
Proprietary AI algorithms, data analytics platforms, and patents for sensor integration.
Human Resources:
Data scientists, agronomists, hardware engineers, and customer support.
Physical Resources:
Manufacturing facilities, inventory, and field testing sites.
Financial Resources:
Funding from investors, revenue from sales and subscriptions.
Partnerships & Networks:
Collaborations with research institutions, hardware suppliers, and governmental/NGO partners.
Digital Infrastructure:
Cloud computing for AI analytics and secure customer data management.

VALUE PROPOSITIONS

Increased Productivity:
Early disease detection and real-time monitoring lead to higher yields.

Resource Efficiency:
Save up to 50% on water and fertilizer through data-driven insights.

Cost Reduction:
Reduce operational costs with AI-driven automation and decision-making.

Sustainability:
Promote environmentally friendly practices by reducing resource waste.

CUSTOMER RELATIONSHIPS

Dedicated Account Managers:
Assigned to large-scale customers for personalized service.

Community Building:
Workshops and webinars for knowledge sharing.

24/7 Support:
Technical support hotline and chatbot for instant assistance.

CHANNELS

Direct Sales:
Through the company's website and local distributors.

Partner Networks:
Government programs, NGO collaborations, and agricultural cooperatives.

Exhibitions & Trade Shows:
Participation in agricultural expos to showcase the product.

CUSTOMER SEGMENTS

Small & Medium-Scale Farmers:
Looking for affordable automation and decision-making solutions to increase yield and reduce resource waste.
Agribusinesses:
Seeking advanced analytics for precision farming and crop monitoring.
Governments & NGOs:
Focused on sustainability and supporting agricultural development initiatives.

KEY ACTIVITIES

R&D and Product Development:
Continuous improvement of AI models, sensor hardware, and decision-making algorithms.
Pilot Projects & Field Testing:
Collaboration with farmers to test and validate the solution under real-world conditions.

REVENUE STREAMS

Hardware Sales:
- Sale of smart farming kits that include AI cameras and environmental sensors (NPK, temperature, humidity).
- **Pricing**: $450 per unit with a manufacturing cost of $200.

Subscription Plans:
- AI-powered analytics for crop disease detection, soil monitoring, and precision farming recommendations.
- **Pricing:** Monthly or annual plans based on the number of sensors and farm size (e.g., $15/month per farm).

Consulting & Training Services:
- Expert consultancy for farmers on adopting smart agriculture techniques.
- Training workshops on hardware setup, data analytics, and AI-driven decision-making.

Government & NGO Partnerships:
- Large-scale contracts for deploying smart farming solutions to promote sustainable agriculture.
- Collaboration on pilot projects aimed at supporting small and medium-scale farmers.

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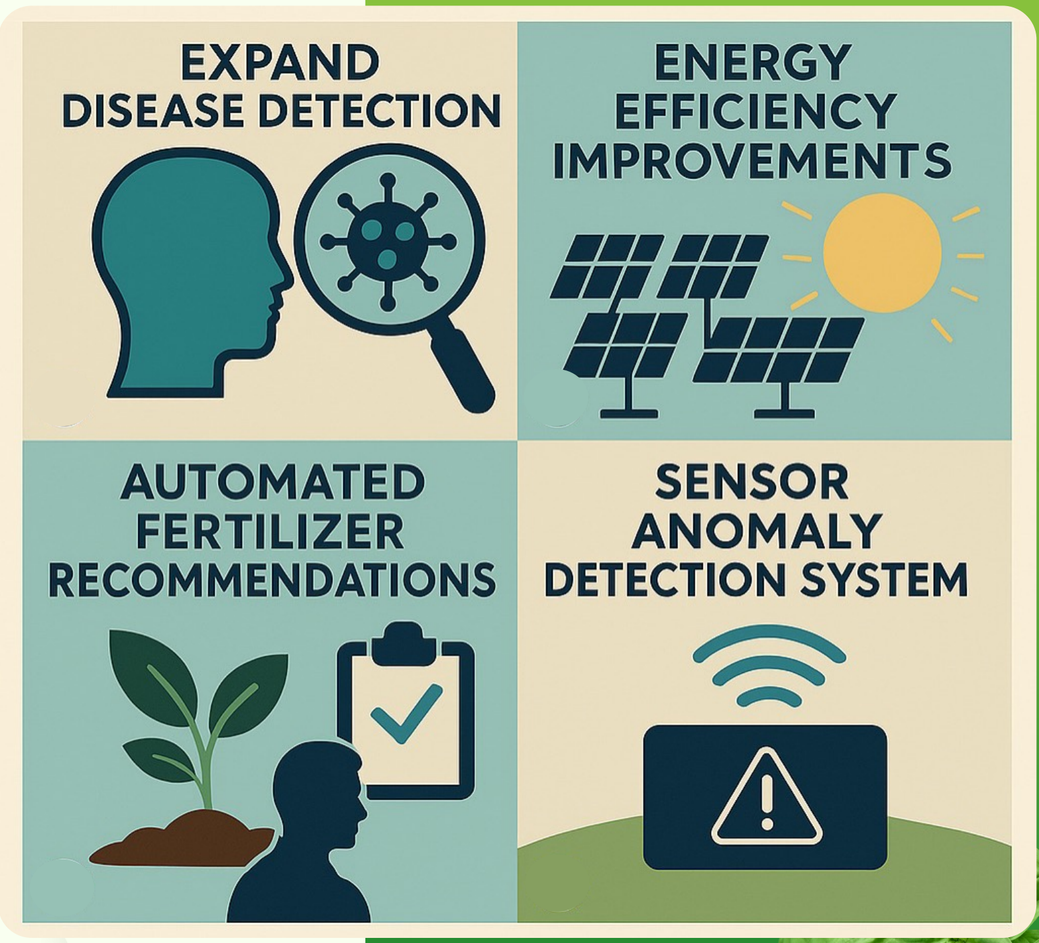
Future Work & Scalability

Feature 1
Expand Disease Detection

Feature 2
Energy Efficiency Improvements | solar panels

Feature 3
Automated Fertilizer Recommendations

Feature 4
Sensor Anomaly Detection System



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Conclusion

This project demonstrates the potential of integrating modern technologies such as IoT, AI, and smart monitoring systems into agriculture to support small farmers and hobbyists. By developing an affordable, modular, and user-friendly solution, we aim to empower farmers with real-time insights into their crop health, soil conditions, and irrigation needs, enabling them to make data-driven decisions that optimize productivity and sustainability.

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