Plant Doctor

(powered by AI and ML)

Nancy Goyal

Plant Care for Every Farmer

What

Image Models, RAG

Instant, on-demand diagnosis of plant diseases

Actionable management recommendations

Why

Agents

Solve crop losses due to services and experts

Immediate, cost-effective, accurate advice

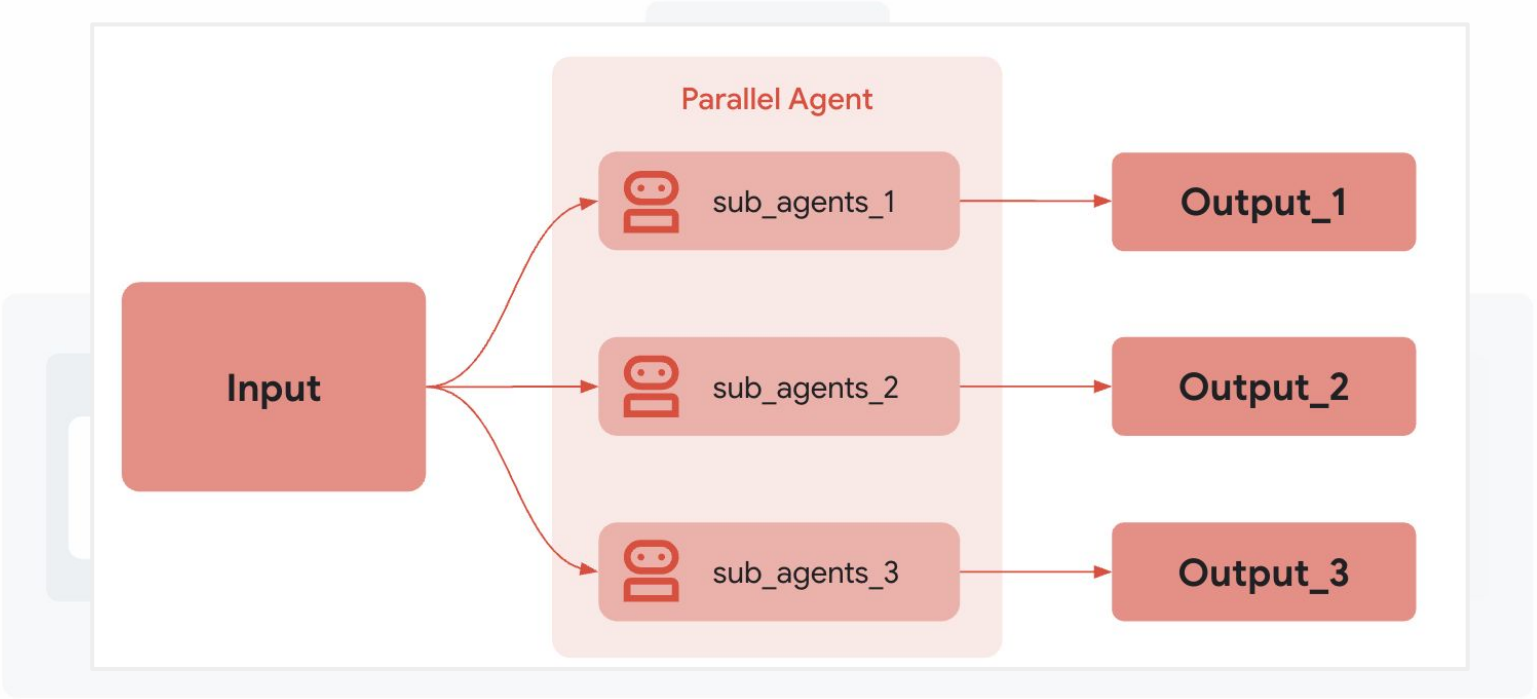
Impact

Plant Doctor AI

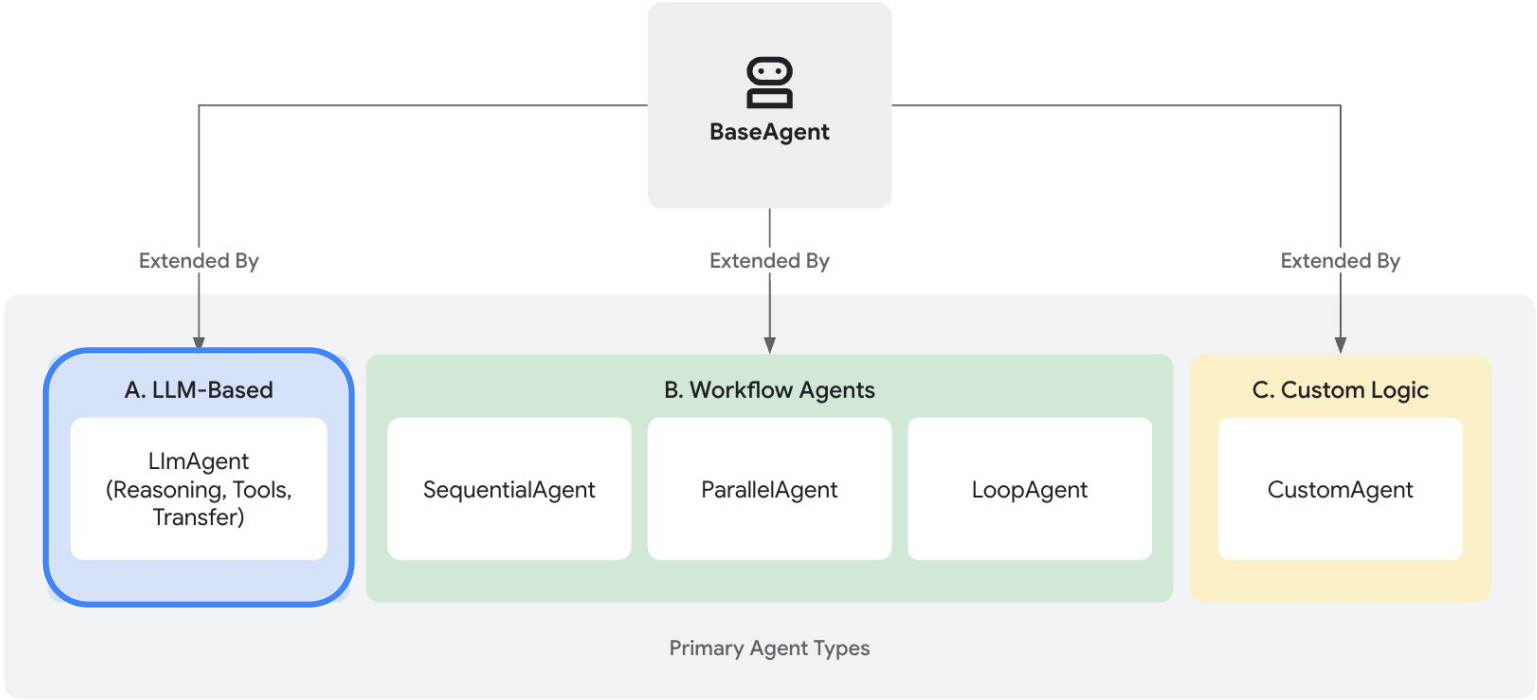
Rapid, precise, and accessible solution

Reduce crop loss, increase yields, and improve food security

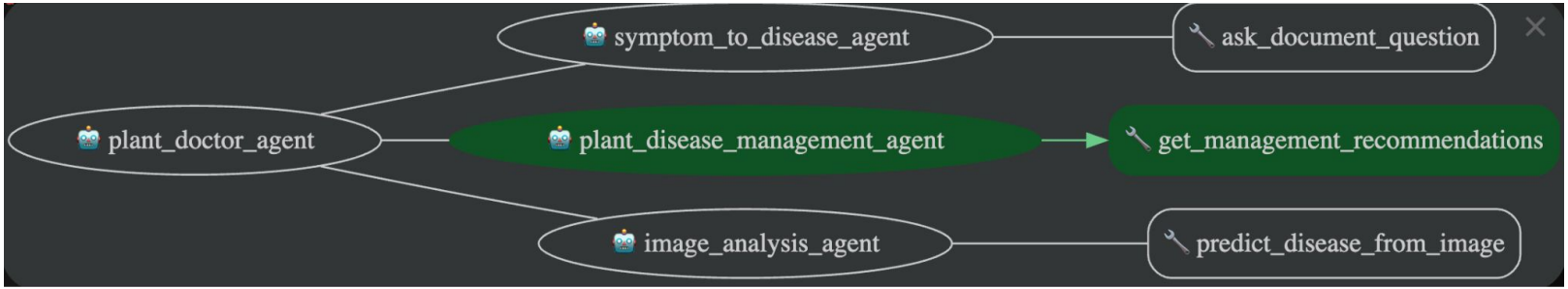
Agent


Parallel Agent
Input
sub_agents_1
sub_agents_2
sub_agents_3
Output_1
Output_2
Output_3

ADK Concepts



Agent Graph

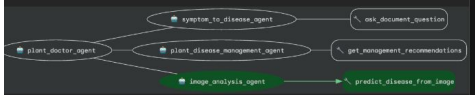

symptom_to_disease_agent
ask_document_question
plant_doctor_agent
plant_disease_management_agent
get_management_recommendations
image_analysis_agent
predict_disease_from_image

Tooling & Experience

Langchain Options Landscape

Module	Tooling
Agents	RAG Multi tool agents (retrievers + Image visualization models, ADK)
Image Models	CNN base model on 80000 images (224x224) InceptionV3 - Custom trained MobileNetV2 - Transfer learning
Retrievers	Document search (chroma db)
Document Compressors	Contextual Compression Retriever
Generators	Text Generation Models Chat Models

Event | Request | Response




```
content:
  parts:
    0:
      thoughtSignature:
      "CoQEAcu98PDazbGgOPBv_lVHXNSeDbEL5REMzOqjx4vd7FOz3_LpyzL
      ikRtv8RCMKHYDVS_hb7dnJTYQzU2G8hcS7KYqPUALEHAcRhPC7CSAKGI
      hpKhhGJ0kOwo6w7DqyR3bI6aZOzZcq0MgD6gxT5ds47dogpwdbv5PA7H
      z7VlcjqSpJqu4Le84bADcKPh0bqPdZ71C3n5yQvVCOJyFCPtW4Gk4iZe
      ReHb5VYjgbqLhRvXTkeiOFGDALDWjDfuLsLI-
      RuvUjFfNezlLLTrJWKuCCTer5wzOBUCRnNpu5eVHocklK1z8kwAMQ5Jt
      dokIJKqhAy-88aRC3y79AYLJ3DLcydRHjiqJmRvAvytyZe_U9hUdKP-
      v1OPAVJk41w4jruhClcINUAi4G0ERBwqKuqCOWijhAygepwiBZKtFTaV
      XUSJvMEJlI5hBXc6vTOpOQcldGKtzeNG2zb8olyT8i_L9N8shwSJQPM4
      BGiI8HrJz8zaQ2k9CdPFR7trVH_919N2WTzJDqGjxtvP4kzfmkdg6Ldi
      ocBDhUJ6yhQmUlZn5ZTB-
      ILiMz2v6t45_H2TdYkWdVC6Zqj5rUrULLSrnNrIM22ub0PAC6Vfvquuo
      1CjUF6WPdkbCQIXykKUALAQXWOcqDZLCVHFcYiNvnQSv9yQylyrOLpBR
      WWT9ww5BBNC6oQA3Qr6h"
    functionCall:
      id: "adk-58cf2859-5608-4def-b6cb-f03e71dd863d"
      args:
        image_path: "/Users/gnancy/work/5h1va/plant-
        doctor/test_data/TomatoHealthy1.JPG"
      name: "predict_disease_from_image"
  role: "model"
finishReason: "STOP"
usageMetadata:
  candidatesTokenCount: 35
  candidatesTokensDetails:
    0:
      modality: "TEXT"
      tokenCount: 35
  promptTokenCount: 4715
  promptTokensDetails:
    0:
      modality: "TEXT"
      tokenCount: 4715
  thoughtsTokenCount: 111
  totalTokenCount: 4861
  trafficType: "ON_DEMAND"
invocationId: "e-e2c00462-2c0a-4a3c-9d24-e7100f605e37"
author: "image_analysis_agent"
actions:
  stateDelta:
  artifactDelta:
  requestedAuthConfigs:
longRunningToolIds:
id: "d59327fc-4073-4810-8a2a-0b8846d9444f"
timestamp: 1756547028.196534
title: "functionCall:predict_disease_from_image"
```


what Circular tan spots with dark rings and yellow halos diease in pepper?

transfer_to_agent

✓ transfer_to_agent

ask_document_question

✓ ask_document_question

Cercospora Leaf Spot is likely the disease characterized by circular tan spots with dark rings and yellow halos in pepper plants.

how can i cure this

ask_document_question

✓ ask_document_question

To manage Cercospora Leaf Spot in pepper plants, consider the following recommendations:

Chemical Control:

- **Fungicides:** Use fungicide sprays during wet, humid conditions. Recommended products include:
  - **Copper hydroxide** 77 WP at a rate of 2g/liter of water.
  - **Mancozeb** at 2g/liter or **Copper oxychloride** at 2.5g/liter.
  - **Carbendazim** at 1g/liter or **Mancozeb** at 2.5g/liter. Repeat every 1 week for 2–3 applications.

Cultural Control:

- Use disease-free seeds and resistant varieties.
- Rotate crops with non-host plants for at least 3 years.
- Limit overhead irrigation and avoid handling wet foliage.
- Avoid excessive nitrogen fertilization.
- Plow under plant residue to reduce inoculum levels.

Implementing these strategies will help control the disease effectively.

what disease is this : /Users/gnancy/work/5h1va/plant-doctor/test_data/TomatoHealthy1.JPG

transfer_to_agent

✓ transfer_to_agent

predict_disease_from_image

✓ predict_disease_from_image

Tomato___healthy

Challenges

Data Scarcity: Acquiring a large, high-quality, and labeled dataset of plant diseases is a significant hurdle.

Model Fine-Tuning: Pre-trained models like MobileNet require careful fine-tuning to perform well on a new, specific domain like plant disease images.

LLM Contextualization: The effectiveness of the RAG system relies heavily on the quality and relevance of the retrieved document. The LLM may still fail to generate a correct answer if the retrieved context is insufficient or contains conflicting information.

Next Steps

User Interface (UI) Development: Productionisation of application on phone to allow farmers to easily upload images in real time

Multi-lingual Support: Expanding the system to support multiple languages to reach a wider, international audience of farmers.

Predictive Analytics: Integrating the system with weather and soil data to predict potential disease outbreaks before symptoms even appear.

Expanded Knowledge Base: Continuously adding more documents and domain-specific knowledge to improve the accuracy and coverage of the domain knowledge.

That’s a wrap