

# Apollo Pharmacy AI Project:

*A multi-agent AI system for generating pharmacy-specific AI opportunities*

## What We Built

We created a team of AI assistants that work together to help Apollo Pharmacy discover how artificial intelligence can improve their business. Think of it as a digital brainstorming team that does the research, finds opportunities, and packages everything into a ready-to-use proposal.

## The Digital Team

Our system works like a relay race with four specialized team members:

1. **The Researcher** explores what Apollo Pharmacy does and understands their industry challenges
2. **The Idea Generator** identifies specific AI opportunities that make sense for pharmacies
3. **The Resource Finder** locates actual datasets and tools to support these ideas
4. **The Proposal Writer** pulls everything together into a clear, actionable document

## How They Work Together

Each team member completes their task and passes information to the next person in a sequential workflow:

1. **First:** The researcher gathers information about Apollo's business and industry
2. **Second:** The idea generator uses this research to create specific AI use cases
3. **Third:** The resource finder locates datasets and tools to support these ideas
4. **Finally:** The proposal writer compiles everything into a polished document

Behind the scenes, all team members are powered by the same AI brain (Llama3) and two of them (the researcher and resource finder) can search the web for up-to-date information.

## Process

When we run the system, we see the team members working together:

Starting Multi-Agent Workflow...

Industry Researcher

Searching the web for "Apollo Pharmacy industry retail pharmacy key offerings"...

Analyzing Apollo Pharmacy's position in the pharmaceutical retail market...

Found: Apollo Pharmacy is India's first and largest branded pharmacy network with over 4,000 outlets...

Use Case Generator

Analyzing pharmacy industry trends...

Identifying AI/GenAI opportunities specific to Apollo Pharmacy...

Generated 3 high-impact use cases with implementation potential...

Resource Collector

Searching for datasets related to "predictive inventory management pharmacy"...

Located relevant resources on Kaggle, HuggingFace, and GitHub...

Compiled resource links in markdown format...

Proposal Writer

Compiling market research, use cases, and resources...

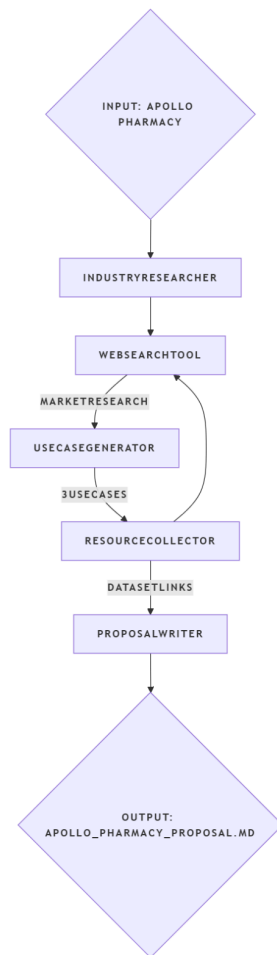
Generating executive summary, implementation timeline, and budget estimates...

Finalizing proposal with recommendations and conclusion...

Final Report saved to apollo\_pharmacy\_proposal.md

This demonstrates how the agents communicate and build upon each other's work.

## ARCHITECTURAL FLOW CHART:



# Findings

The digital team identified three promising AI opportunities for Apollo Pharmacy:

## 1. Smart Inventory Management

- Uses AI to predict which medications will be needed when
- Reduces waste and ensures patients find what they need

## 2. Personalized Patient Communication

- Creates customized health guidance for each patient
- Helps people better understand and follow their treatment plans

## 3. Pharmacy Operations Intelligence

- Analyzes data to streamline how the pharmacy runs
- Finds opportunities to reduce costs and improve service

## Sample Output

Use Case 1: Predictive Inventory Management

Apollo Pharmacy can implement an AI-powered predictive inventory management system to optimize stock levels, reduce waste, and improve patient satisfaction.

The system will analyze historical sales data, weather patterns, and seasonal trends to predict demand and adjust inventory accordingly.

\* [Kaggle Dataset](<https://www.kaggle.com/datasets/vivek468/superstore-dataset-final>):

Retail superstore dataset with time series data for demand forecasting.

\* [Kaggle Dataset](<https://www.kaggle.com/datasets/muhammetvarl/pharmaceutical-sales>):

Pharmaceutical sales data ideal for medication demand prediction.

\* [GitHub Repository](<https://github.com/microsoft/forecasting>):

Microsoft's time series forecasting best practices and algorithms.

## Use Case 2: Personalized Patient Engagement

Apollo Pharmacy can develop a GenAI-powered patient engagement platform that personalizes interactions with patients based on their medical history and treatment plans.

\* [Kaggle Dataset](<https://www.kaggle.com/datasets/iammustafatz/diabetes-prediction-dataset>):

Diabetes prediction dataset for health condition modeling.

\* [HuggingFace

Dataset]([https://huggingface.co/datasets/medalpaca/medical\\_meadow\\_medical\\_qa](https://huggingface.co/datasets/medalpaca/medical_meadow_medical_qa)):

Medical question-answering dataset for patient communication.

\* [GitHub Repository](<https://github.com/OpenVINO-dev-contest/persona.ly>):

Personalized healthcare assistant implementation example.

## Use Case 3: AI-Powered Prescriptive Analytics for Pharmacy Operations

Apollo Pharmacy can implement an AI analytics platform to optimize operations, reduce costs, and improve service quality.

\* [Kaggle Dataset](<https://www.kaggle.com/datasets/rishidamarla/healthcare-analytics>):

Healthcare analytics dataset for operational efficiency modeling.

\* [GitHub

Repository](<https://github.com/aws-samples/amazon-sagemaker-time-series-prediction>):

Time-series prediction tools applicable to pharmacy operations.

\* [GitHub Repository](<https://github.com/microsoft/r-server-hospital-length-of-stay>):

Healthcare operations optimization examples adaptable to pharmacy.

confidence.

# Tech Stack

We built this system using:

- **CrewAI**: A framework that helps AI assistants work together
- **Llama3**: The AI brain that powers all the thinking
- **DuckDuckGo Search**: Allows the team to find current information online

The whole system runs locally on your computer – no need for external cloud services.

## Key Code Snippets

Here's how we defined our AI team members:

```
researcher = Agent(  
    role="Industry Researcher",  
    goal="Research Apollo Pharmacy's industry and key offerings.",  
    backstory="Expert in analyzing industries using web sources.",  
    tools=[web_search_tool],  
    llm=llm,  
    verbose=True  
)  
  
use_case_generator = Agent(  
    role="Use Case Generator",  
    goal="Propose AI/GenAI use cases for Apollo Pharmacy.",  
    backstory="Skilled in identifying AI-driven opportunities.",  
    llm=llm,  
    verbose=True  
)  
  
resource_collector = Agent(  
    role="Resource Collector",  
    goal="Collect datasets for proposed use cases.",  
    backstory="Specialist in sourcing open datasets.",  
    tools=[web_search_tool],  
    llm=llm,  
    verbose=True  
)  
  
proposal_writer = Agent(  
    role="Proposal Writer",  
    goal="Compile a final proposal for Apollo Pharmacy.",  
    backstory="Experienced in creating actionable reports.",  
    llm=llm
```

And here's how we connected them into a workflow:

```
crew = Crew(  
    agents=[researcher, use_case_generator, resource_collector, proposal_writer],  
    tasks=[task1, task2, task3, task4],  
    process=Process.sequential,  
    verbose=True  
)
```

## What Makes This Special

Unlike typical AI applications that do just one thing, our approach:

- Breaks complex work into specialized roles
- Creates a natural workflow where each step builds on the previous one
- Produces not just ideas but an actionable plan with real resources
- Combines AI thinking with real-world data from the web

## Try It Yourself

Want to run the system? Here's how to get started:

```
# Install required packages  
pip install crewai duckduckgo-search
```

```
# Make sure you have Ollama running locally with Llama3  
# Then run the script  
python apollo_pharmacy_agents.py
```

## What's Next

This approach could be enhanced by:

- Adding a feedback loop where humans can guide the process
- Creating a simple web interface for easier interaction

- Expanding the team with specialists for financial analysis or implementation planning

The entire system can be adapted for any industry – not just pharmacy – by simply changing the initial research focus:

This is all you'd need to change to focus on a different industry

```
task1 = Task(  
    description="Search the web for Apollo Pharmacy's industry (Retail Pharmacy) and key offerings.",  
    agent=researcher,  
    expected_output="A summary of Apollo Pharmacy's industry segment and strategic focus."  
)
```