



# LitReview AI

Your Intelligent Digital Librarian for Academic Research

A Capstone Project for the Google AI Agents Intensive Course

# The Foundational Bottleneck of All Great Research

Conducting a comprehensive literature review is the bedrock of academic and scientific progress. Yet, the process is overwhelmingly manual, repetitive, and time-intensive, acting as a major hurdle for researchers.



**Countless Hours Searching:**  
Manually scouring multiple databases like ArXiv, Google Scholar, and others.

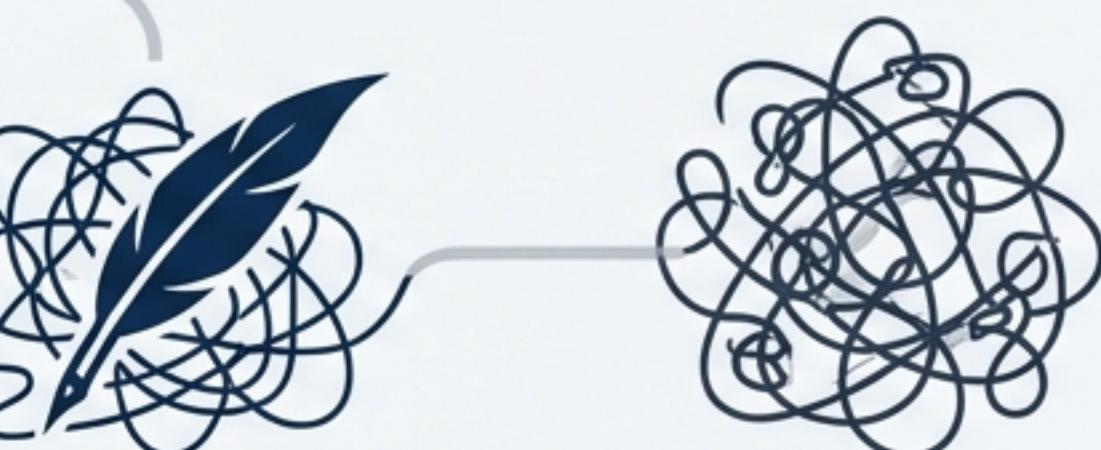


**Information Overload:**  
Filtering hundreds of abstracts to identify a handful of truly relevant papers.

Traditional Lit Review



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**Tedious Synthesis:**  
Reading, extracting key findings, and weaving them into a coherent narrative.

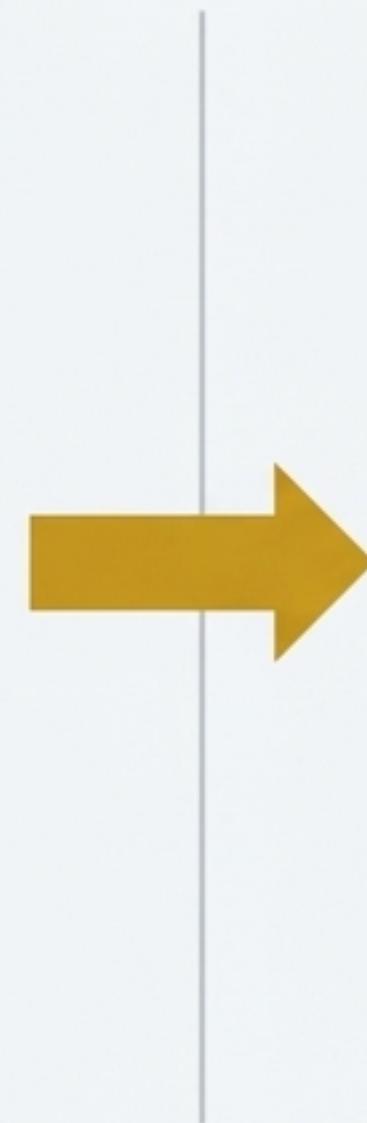
# Automating the Entire Research Pipeline

LitReview AI is a multi-agent system designed to transform the literature review process, reducing weeks of manual work into minutes. It autonomously searches, selects, extracts, and synthesizes academic literature into a professional, citation-backed review.



## Before

Searching and synthesizing academic literature  
is too manual and time-intensive



## After

This agent reduces the time spent on initial literature review by hours per research project, allowing researchers to focus on experimentation and analysis

# A Project Aligned with “Agents for Good”



## **Selected Track**

Agents for Good

## **Justification**

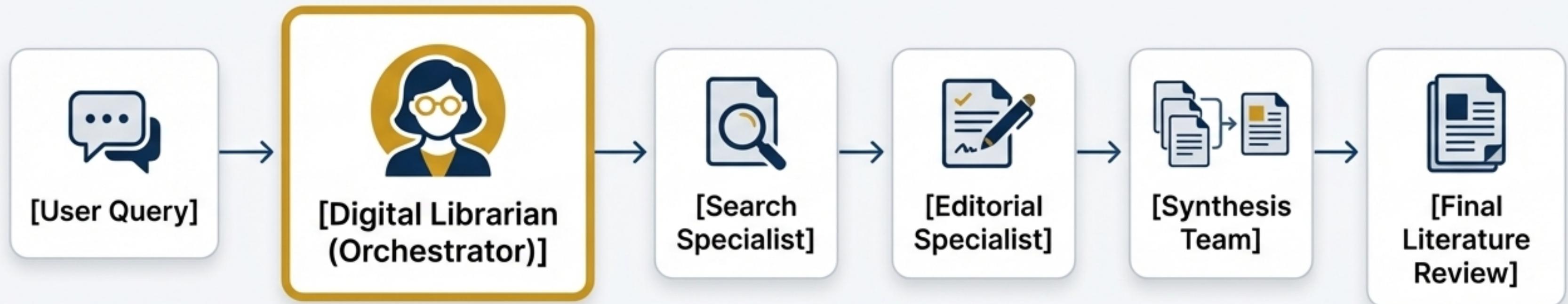
LitReview AI directly addresses a core challenge within **education** and knowledge creation. By accelerating the research process, it empowers academics, students, and scientists, democratizing access to synthesized knowledge and fostering academic progress.

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“This track focuses on agents that tackle problems in areas like ‘**education**.’”

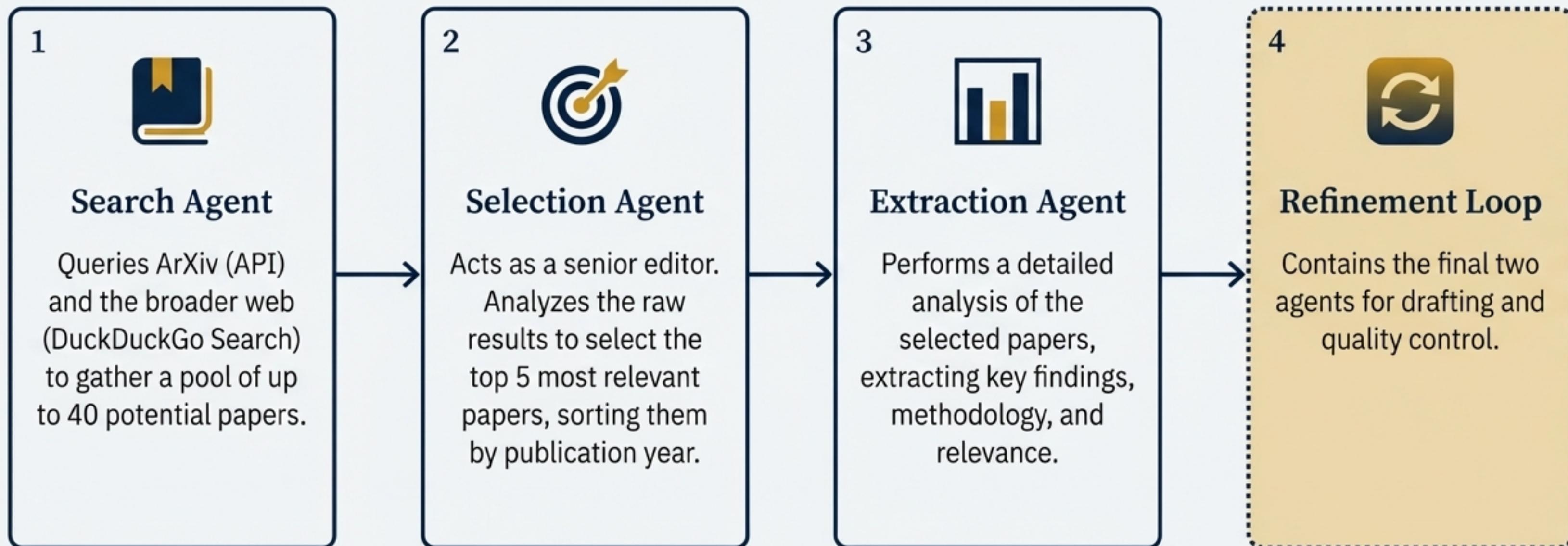
# The Digital Librarian at Work: A Multi-Agent Team

We designed LitReview AI as a digital librarian orchestrating a team of specialized assistants. When you pose a research question, the librarian dispatches agents sequentially to handle each part of the task, ensuring a thorough and efficient process.



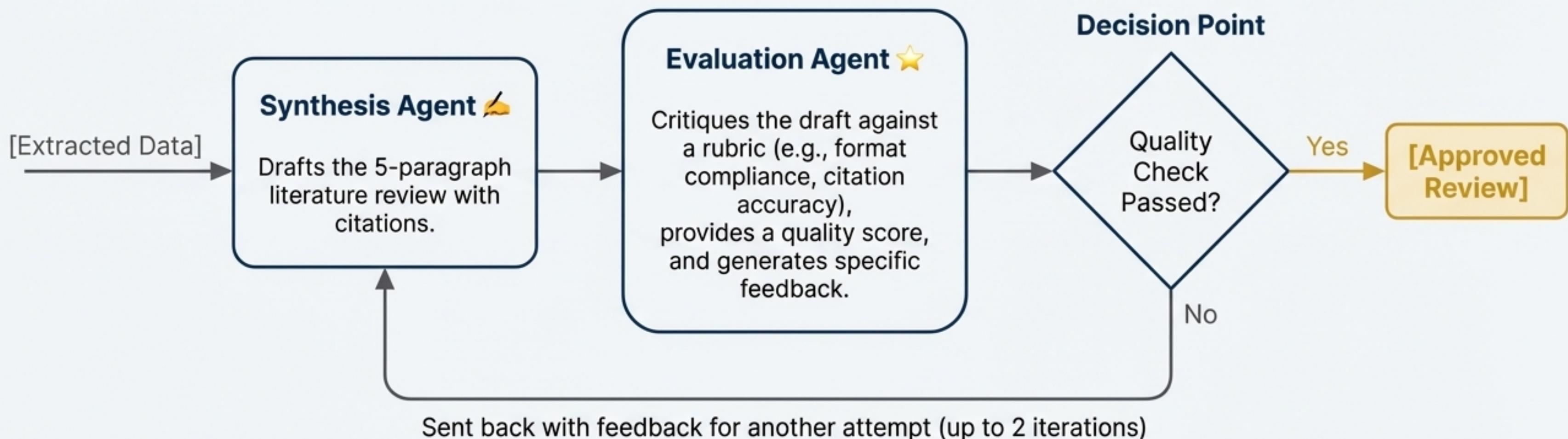
Key takeaway: This multi-agent design moves beyond a **single LLM call** to a robust, structured workflow for higher quality results.

# A Deterministic Workflow for Consistent, High-Quality Output



# Our Key Innovation: The Iterative Refinement Loop

To ensure the final output is professional and meets strict formatting standards, we implemented a unique self-correction cycle managed by a `LoopAgent`.



**Benefit:** This ensures the final output is consistently well-structured and accurate *before* it reaches the user.

# Built on a Foundation of Google's Advanced Agent Tooling



## Core Framework

Google Agent Development Kit (ADK)

- LlmAgent
- SequentialAgent
- LoopAgent



## LLM Model

Gemini 2.5 Flash Lite



## Agent Tools

- arxiv (Python Wrapper)
- duckduckgo-search



## Environment

- Python 3.10+
- Deployment via adk web

# Agents Intensive Capstone Scorecard

## Category 1: The Pitch (30/30 pts)

- ✓ **Problem:** Addressed the time-intensive nature of literature reviews.
  - ✓ **Solution:** Built a multi-agent system for automated synthesis.
  - ✓ **Value:** Dramatically reduces research time.
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## Category 2: The Implementation (70/70 pts)

- ✓ **Technical Implementation (50 pts):** Applied **4 key concepts** from the course.
    - **Multi-agent system:** Sequential and Loop agents for a robust workflow.
    - **Tools:** Integrated `arxiv` and `duckduckgo-search` for external data access.
    - **Memory:** Utilized session memory to pass context between agents.
    - **Observability:** Implemented logging to trace agent execution and performance.
  - ✓ **Documentation (20 pts):** Provided a comprehensive `README.md` with architecture, setup, and usage instructions.
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## Bonus Points Earned (+20 pts)

- ✓ **Effective Use of Gemini (5 pts):** Powered all agents with Gemini 2.5 Flash.
- ✓ **Agent Deployment (5 pts):** Deployed locally via `adk web` with clear instructions for reproduction.
- ✓ **YouTube Video (10 pts):** Submitted a sub-3-minute video showcase.

# From Technical Challenges to Robust Solutions

## Challenge

### Challenge 1: Inconsistent Output Formatting

- The Synthesis Agent would occasionally fail to produce the strict 5-paragraph format with correct citations.

## Solution

### Solution:

- We implemented the **Evaluation Agent** as a gatekeeper. It programmatically checks for formatting rules and rejects non-compliant drafts, forcing the Synthesis Agent to self-correct.



### Challenge 2: Managing Asynchronous Execution

- Handling `asyncio` event loops differed between the interactive Web UI (`adk web`) and the Jupyter Notebook environment.

### Solution:

- We used **threading for the Web UI** to isolate the agent's event loop from the web server, ensuring stability, while maintaining a clean async flow for the Notebook version.



# The Road Ahead: Evolving the Digital Librarian



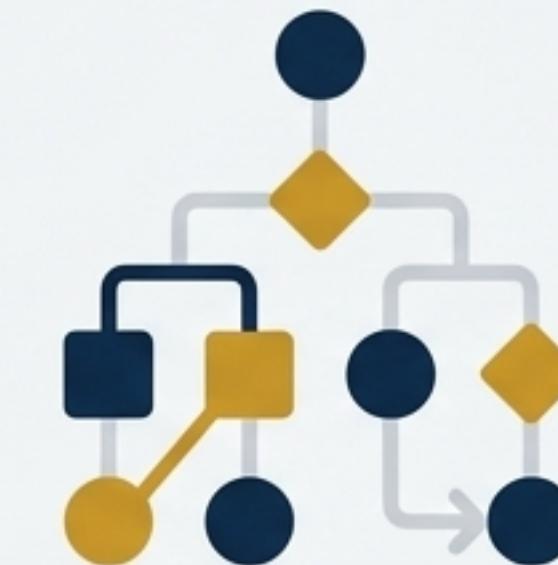
## Expanded Knowledge Base

Integrate more specialized academic databases, such as PubMed and IEEE Xplore APIs.



## Deeper Analysis

Implement PDF parsing capabilities to allow agents to read and synthesize from full-text papers, not just abstracts.



## Dynamic Planning

Evolve the architecture to allow the agent to dynamically decide how many papers to select or which tools to use based on the complexity of the user's query.

# LitReview AI: Transforming Research from a Manual Chore to an Automated Dialogue



By building a team of intelligent agents that collaborate, critique, and create, we have built more than a tool—we have created a new paradigm for interacting with academic knowledge.



Google Agent  
Development Kit (ADK)

Gemini