

Market Research & Use Case Generation Agent

1. Introduction

In today's rapidly evolving business landscape, leveraging artificial intelligence (AI) for market research is essential for maintaining a competitive edge. This report details the development and implementation of an AI-powered system designed to conduct comprehensive market research and generate actionable AI/ML use cases for a specified company. The system harnesses the capabilities of specialized AI agents orchestrated using the crewai framework and utilizes the SerperDevTool for enhanced data retrieval.

2. Methodology

My methodology involves a systematic approach that integrates multiple AI agents, each with specific roles and tasks, to collaboratively execute the market research process. The primary components and steps of our methodology are outlined below.

2.1. Overview of CrewAI

CrewAI is an AI orchestration framework that facilitates the creation and management of AI agents, enabling them to work together to accomplish complex tasks. Key features of CrewAI include:

- **Agent-Based Architecture:** Allows for the definition of multiple agents with distinct roles and goals.
- **Task Management:** Supports the assignment of tasks to agents, including task dependencies and execution order.
- **Process Control:** Offers control over the execution flow, such as sequential or parallel processing.
- **Memory and Delegation:** Enables agents to maintain memory of previous interactions and delegate tasks to other agents when necessary.

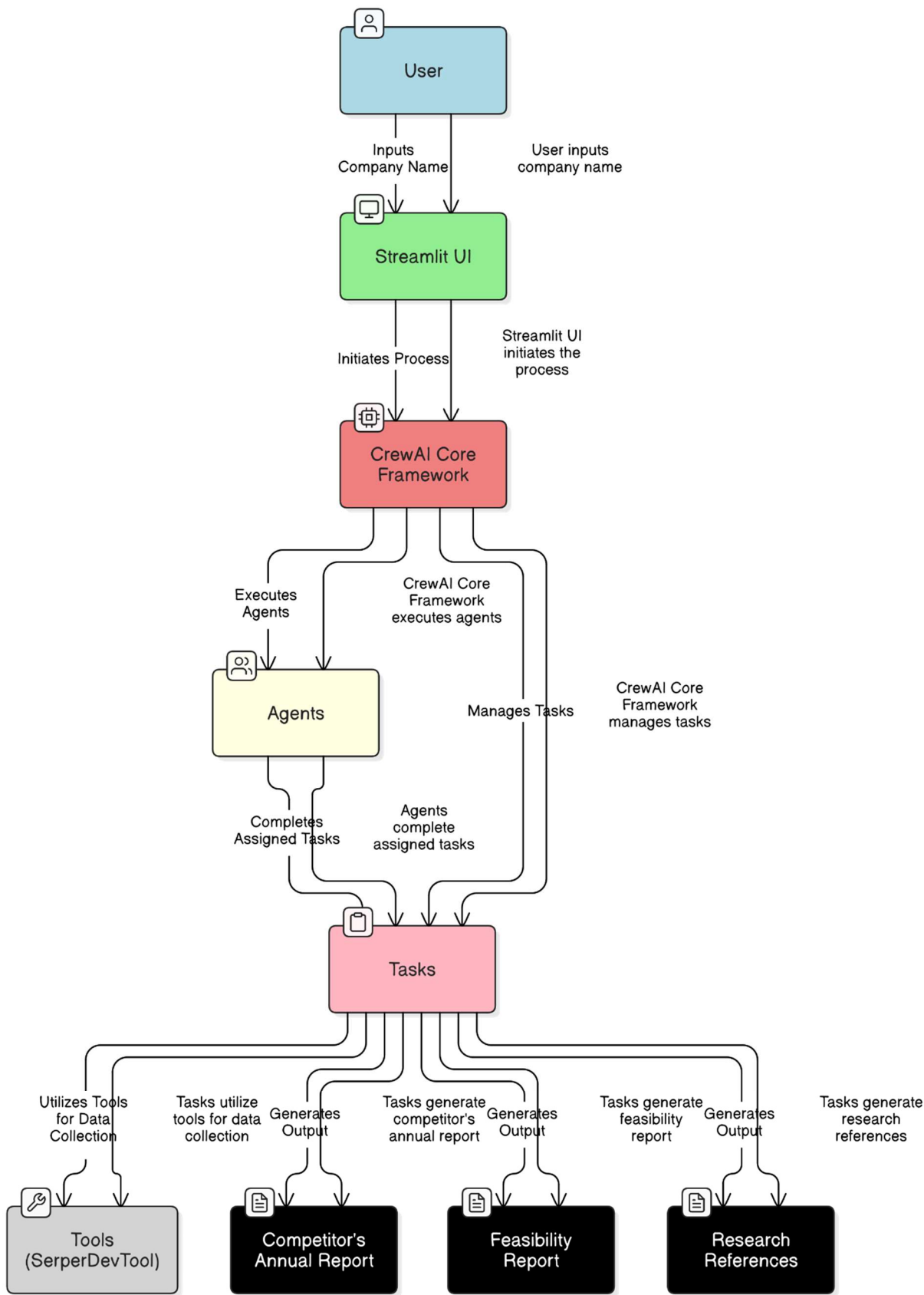
2.2. Web Search Using SerperDev Tool

The SerperDevTool is a crucial component that equips agents with data retrieval capabilities. It interfaces with the SerpAPI to perform live web searches, providing agents with access to real-time information. Benefits of using SerperDevTool include:

- **Real-Time Data Access:** Retrieves the most recent information from the web.
- **Enhanced Research Abilities:** Augments agents' capacity to gather extensive data.
- **Ease of Use:** Integrates seamlessly with agents without adding complexity to the workflow.

2.3. System Architecture

CrewAI Process Flowchart



2.4. Agents and Their Roles

Agents are instantiated from the Agent class in crewai, each configured with specific attributes:

- **Role:** Defines the function of the agent within the system.
- **Goal:** Specifies the objectives the agent aims to achieve.
- **Backstory:** Provides contextual guidance for the agent's behavior.
- **Tools:** Lists any external tools available to the agent (e.g., SerperDevTool).
- **Language Model (LLM):** Indicates the AI model powering the agent.
- **Delegation Permissions:** Determines whether the agent can delegate tasks.

2.4.1. Agents Involved

1. Industry Research Agent

- *Role:* Industry Research Specialist
- *Goal:* Conduct thorough research on the specified company and its industry.
- *Backstory:* A seasoned market research analyst with a vast database of information.
- *Tools:* SerperDevTool
- *LLM:* gemini/gemini-1.5-flash
- *Delegation:* Allowed

2. Market Standards Agent

- *Role:* AI and Automation Expert
- *Goal:* Identify industry trends and generate innovative AI/ML use cases.
- *Backstory:* A leading expert in AI, ML, and automation.
- *Tools:* SerperDevTool
- *LLM:* gemini/gemini-1.5-flash
- *Delegation:* Allowed

3. Resource Collection Agent

- *Role:* Resource Asset Collector
- *Goal:* Find relevant datasets and GenAI solutions for proposed use cases.
- *Backstory:* Expert at finding and curating resources.
- *Tools:* SerperDevTool
- *LLM:* gemini/gemini-1.5-flash
- *Delegation:* Allowed

4. Annual Report Collector Agent

- *Role:* Annual Report Collector
- *Goal:* Collect annual reports of the company's main competitors.
- *Backstory:* Skilled at locating and extracting relevant information from reports.
- *Tools:* SerperDevTool
- *LLM:* gemini/gemini-1.5-flash
- *Delegation:* Not Allowed

5. Link Collector Agent

- *Role:* Link Organizer
- *Goal:* Compile all research links into a formatted report.
- *Backstory:* Meticulous information organizer.

- *Tools*: SerperDevTool
- *LLM*: gemini/gemini-1.5-flash
- *Delegation*: Not Allowed

6. **Table Maker Agent**

- *Role*: Table Formatting Specialist
- *Goal*: Format data into clear and readable markdown tables.
- *Backstory*: Master of data presentation.
- *Tools*: SerperDevTool
- *LLM*: gemini/gemini-1.5-flash
- *Delegation*: Not Allowed

7. **Final Proposal Agent**

- *Role*: Strategic Consultant
- *Goal*: Create a prioritized list of AI/ML use cases.
- *Backstory*: Top-tier strategic consultant.
- *Tools*: SerperDevTool
- *LLM*: gemini/gemini-1.5-flash
- *Delegation*: Not Allowed

2.5. Tasks and Workflow

Tasks are defined using the Task class in crewai and specify the detailed instructions and expected outputs for agents. The system follows a sequential workflow where each task builds upon the previous ones.

2.5.1. Task Definitions

1. **Industry Research Task**

- *Description*: Analyze the company to determine industry details, key offerings, strategic focus, vision, competitors, and collect research links.
- *Agent*: Industry Research Agent
- *Expected Output*: Structured information including company name, industry, segment, offerings, focus areas, vision, competitors, and links.

2. **Annual Report Collection Task**

- *Description*: Collect annual reports of identified competitors.
- *Agent*: Annual Report Collector Agent
- *Expected Output*: Compiled annual reports.

3. **Market Standards Task**

- *Description*: Research industry trends in AI, ML, automation, and generate use cases.
- *Agent*: Market Standards Agent
- *Expected Output*: List of relevant AI/ML use cases with descriptions and benefits.

4. **Resource Collection Task**

- *Description*: Find datasets and GenAI solutions for each use case.
- *Agent*: Resource Collection Agent
- *Expected Output*: Datasets and solutions mapped to use cases.

5. **Final Proposal Task**

- *Description*: Create a final prioritized list of use cases.

- *Agent*: Final Proposal Agent
 - *Expected Output*: Actionable proposal with prioritized use cases.
6. **Link Collection Task**
 - *Description*: Collect and organize all research links.
 - *Agent*: Link Collector Agent
 - *Expected Output*: Well-formatted markdown report of all URLs.
 7. **Table Formatting Task**
 - *Description*: Format data into markdown tables.
 - *Agent*: Table Maker Agent
 - *Expected Output*: Readable tables presenting the information.

2.5.2. Workflow Execution Steps

1. **User Input and Initialization**
 - The user inputs the company name via the Streamlit interface.
 - The system initializes a Crew with the agents and defines the tasks to be executed sequentially.
2. **Task Execution**
 - **Industry Research Agent** performs initial research, providing foundational data.
 - **Annual Report Collector Agent** gathers competitors' annual reports based on the identified competitors.
 - **Market Standards Agent** analyzes industry trends and generates tailored AI/ML use cases.
 - **Resource Collection Agent** searches for datasets and GenAI solutions relevant to the use cases.
 - **Final Proposal Agent** synthesizes the data into a prioritized list.
 - **Link Collector Agent** compiles all research links for reference.
 - **Table Maker Agent** formats the collected data into structured tables.
3. **Data Utilization**
 - Agents utilize the SerperDevTool for web searches and data gathering.
 - Agents may access outputs from previous tasks as needed.
4. **Output Generation**
 - The outputs are compiled into markdown reports.
 - Users are provided with options to download the reports and view them within the application.

3. Results

The system successfully automates the market research process and generates comprehensive outputs, which include:

1. **Competitors' Annual Reports**
 - Provides insights into competitors' performance and strategies.
 - Essential for benchmarking and strategic planning.
2. **Feasibility Report**
 - Contains in-depth analysis of the company.
 - Proposes AI/ML use cases with detailed descriptions, benefits, and implementation suggestions.
3. **Research References**
 - A compiled list of all URLs and resources used during research.
 - Enhances transparency and facilitates further exploration.

4. Conclusions

The developed AI-powered system demonstrates a robust methodology for conducting detailed market research and generating AI/ML use cases. By leveraging crewai and SerperDevTool, the system efficiently automates complex tasks that traditionally require significant human effort.

4.1. Key Advantages

- **Efficiency**
 - Speeds up the research process through automation.
 - Reduces the manual workload on analysts.
- **Comprehensiveness**
 - Covers multiple aspects of the company and industry.
 - Provides a holistic view necessary for informed decision-making.
- **Actionability**
 - Delivers practical AI/ML use cases ready for implementation.
 - Prioritizes use cases based on strategic importance.
- **Scalability**
 - The modular design allows for easy adaptation to other companies or industries.
 - Additional agents and tasks can be incorporated as needed.
- **Transparency**
 - Includes detailed references and sources for all information.
 - Enhances credibility and trust in the generated reports.