# Report on Multi-Agent System for Generative AI Use Case Generation

## Methodology

The implementation leverages a multi-agent system designed to generate industry-specific AI and Generative AI (GenAI) use cases. Each agent has a distinct role in gathering industry insights, generating actionable use cases, collecting supporting resources, and summarizing findings into a proposal.  
  
1. Agents: Each agent performs a specialized role using a large language model (LLM) from Google Generative AI, configured with a "gemini-1.5-flash" model. Key agents include:  
 - Industry Research Specialist: Gathers industry trends and analyzes the competitive landscape.  
 - Market Standards & Use Case Generator: Produces relevant AI/GenAI use cases tailored to the specified industry.  
 - Resource Collector: Collects datasets and references from sources like Kaggle, HuggingFace, and GitHub.  
 - Final Proposal Writer: Compiles insights and recommendations into a structured proposal.  
  
2. Tasks: Tasks are defined for each phase, with agents assigned specific objectives and expected outputs. For example:  
 - Industry Analysis Task: Conducts a deep-dive analysis of a specified company’s market position.  
 - Use Case Generation Task: Develops a prioritized list of use cases based on insights from industry analysis.  
 - Resource Collection Task: Gathers datasets and resources for each use case to support analysis and potential implementation.  
 - Proposal Writing Task: Compiles all findings into a cohesive proposal.  
  
3. Execution Workflow:  
 - Initialization: Agents are instantiated and configured to perform specific tasks with access to environment variables and API keys.  
 - Task Assignment: Each agent receives task objectives, tools, and expected output formats, allowing for structured task completion and hand-offs between agents.  
 - Data Flow and Collaboration: Agents delegate tasks, share intermediate data, and consolidate their outputs for a final proposal.

## Results

The multi-agent system effectively generated AI/GenAI use cases for a specified industry. The Industry Research Specialist and Use Case Generator agents provided comprehensive insights, while the Resource Collector gathered supporting datasets, enhancing proposal value. The Final Proposal Writer organized these insights into a structured report, meeting the specified requirements for detailed industry analysis and practical AI use case generation.  
  
Key Findings:  
- Agents provided actionable insights across multiple dimensions: industry trends, technological standards, use case applications, and resource gathering.  
- The system streamlined knowledge flow between agents, achieving comprehensive industry reports with prioritized AI/GenAI use cases.  
- The architecture allowed dynamic adjustments, enabling further expansion for additional industries or AI applications.

## Conclusion

The multi-agent architecture demonstrates an effective approach to automating industry-specific use case generation for AI applications. By dividing responsibilities across specialized agents, the system achieves efficiency and thoroughness in producing insights and actionable recommendations. The modular design allows scalability, accommodating additional industries, use cases, or resources as needed.

## Architecture Flowchart

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| Start/Initialize |  
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| Industry Research | | Market Standards & |  
| Specialist Agent |<------>| Use Case Generator |  
| (Industry Analysis) | | (Use Case Generation) |  
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| Resource Collector |<------>| Final Proposal Writer |  
| (Resource Gathering| | (Proposal Compilation)|  
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| Output |  
| (Final Report) |  
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