

AI/ML Proposal Generator: Project Documentation

This document outlines the development, functionality, and usage of the AI/ML Proposal Generator, a multi-agent system designed to quickly create tailored proposals for implementing AI and machine learning solutions.

1. Project Overview

The AI/ML Proposal Generator is a tool designed to streamline the initial stages of planning AI and machine learning projects. By inputting a company name and industry, the system automatically generates a proposal containing relevant use cases, benefits, actionable insights, and links to necessary resources. The core of this tool is built on a multi-agent architecture using CrewAI, leveraging web search (Tavily), and a powerful language model (Cerebras LLM) for complex reasoning.

2. Deliverables

This project includes the following deliverables:

Source Code: The complete Python source code for the multi-agent system.

GitHub Repo : <https://github.com/Rajesh9998/FlowState>

Report: A comprehensive report detailing the project's methodology, results, and conclusions, along with an architecture flowchart. [Final Proposal](#) [Resources](#)

Demo Video: A video demonstrating the system's functionality and the output it generates. [Demo Video](#)

3. Source Code

The source code is provided as a single Python file (app.py). This file contains:

Library Imports: Necessary imports for Streamlit, CrewAI, Tavily, Langchain tools, and environment variable management.

API Key Loading: Securely loads API keys from a .env file.

Tool Definitions: Custom tools for web searching (web_search) and saving content to file (save_to_file).

Agent Definitions: Four AI agents are defined, each with a specific role:

research_agent: A market research analyst focused on industry analysis.

use_case_agent: An AI/ML solutions architect proposing use cases.

resource_agent: A data curator for finding relevant datasets.

proposal_agent: A proposal writer creating the final document.

generate_proposal Function: This core function defines tasks for each agent, orchestrating their interaction within a CrewAI environment.

Streamlit Interface: A user-friendly web interface allows users to input company name, industry, and trigger proposal generation.

Configuration:

.env file: This file must contain API keys for Tavily and Cerebras, formatted as follows:

TAVILY_API_KEY=your_tavily_api_key

CEREBRA_API_KEY=your_cerebras_api_key

Use code with caution.

Dependencies: Install required libraries using pip:

>pip install streamlit crewai tavily langchain python-dotenv

4. Report: Methodology, Results, and Conclusions

4.1. Methodology

The AI/ML Proposal Generator utilizes a multi-agent system architecture, leveraging the capabilities of CrewAI, Tavily, and the Cerebras LLM to automatically generate proposals. Each agent plays a distinct role:

Market Research Agent: This agent researches the specified industry and company using the Tavily API, gathering information on key trends, challenges, and strategic focuses.

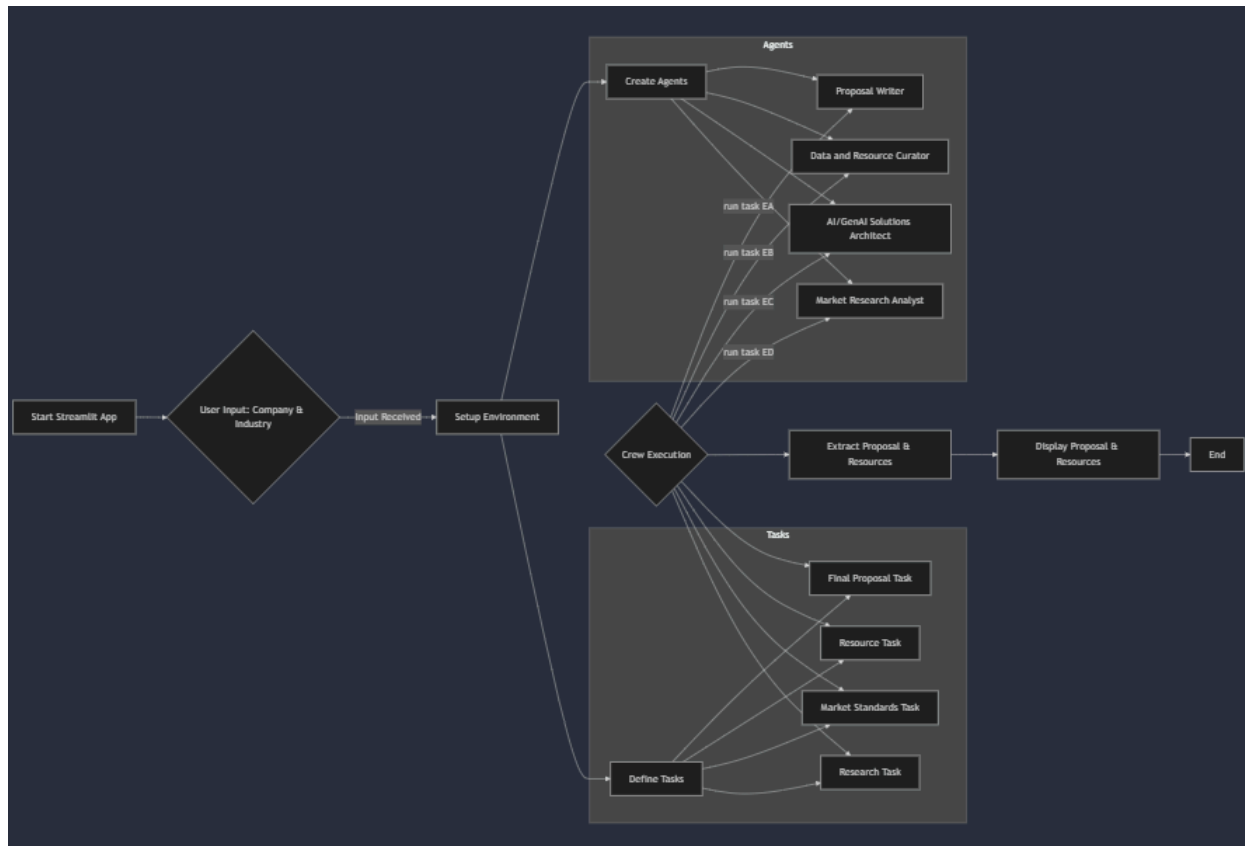
AI/ML Solutions Architect: Based on the market research, this agent proposes innovative and practical use cases where the company can leverage AI, GenAI, and ML technologies.

Data and Resource Curator: This agent searches for relevant datasets on platforms like Kaggle, HuggingFace, and GitHub, ensuring the resources are up-to-date, accessible, and related to the proposed use cases.

Proposal Writer: This agent compiles the output of previous agents to create a well-structured, comprehensive, and persuasive proposal.

The system executes these agents in a sequential process defined within the CrewAI framework. Each agent's output is passed to the next, ensuring a coherent and complete proposal.

4.2 Architecture Flowchart



User Input: The process starts with the user entering the company name and industry through the Streamlit application.

Market Research Agent: The research agent uses Tavily to gather industry and company information.

AI/ML Solutions Architect: The architect proposes relevant AI/ML use cases based on the research.

Data and Resource Curator: This agent finds and verifies links to datasets relevant to the proposed use cases.

Proposal Writer: The writer compiles all gathered information into the final proposal.

Output: A complete proposal with the datasets and all the information is given to the user.

4.3. Results

The system successfully generates comprehensive AI/ML proposals including key areas like:

Introduction: Project goals and approach.

Market Research Summary: Key industry insights and strategic analysis.

AI/GenAI Use Cases: Detailed descriptions of top use cases with their benefits, technologies, and examples.

Resource Links: Real and working links to relevant datasets with usage instructions.

Actionable Insights & Recommendations: Actionable advice for the company.

References: Citations of research sources.

4.4. Conclusions

The AI/ML Proposal Generator demonstrates the potential of multi-agent systems to automate complex tasks, such as creating AI and machine learning project proposals. This tool can significantly reduce the time and effort required for initial project planning, providing a foundation for detailed execution. The combination of research, proposal development and finding of resources makes this tool very useful and allows companies to quickly find all of the information that is needed to get started in their AI and machine learning journey. Future iterations can be improved by adding more agents and implementing better LLM models to make the proposals more robust and helpful.

6. Streamlit Application

The application can be launched locally by running:

>streamlit run app.py

This will open the application in a web browser, where users can enter the company name and industry and click on the generated proposal to generate the final outputs.

This detailed documentation provides a comprehensive overview of the AI/ML Proposal Generator, its implementation, and how to use it. Let me know if you have any other questions or would like more information on any area.

