

AI Academy Team Project

# Guida Aeronautica per Autostoppisti

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Marco Diomedi  
Giulia Pisano  
Riccardo Zuanetto  
Fabio Rizzi  
Roberto Gennaro Sciarrino



The better the question. The better the answer.  
The better the world works.



# Agenda

- Meet the Project Team
- Introduction to Crewai Framework
- Flow Architecture
- Video DEMO
- Guardrails Security Measures
- Metrics Evaluation

# Meet the Project Team

## Team Composition



PM



Riccardo  
Zuanetto



Giulia  
Pisano



FrontEnd  
Developer



AI  
Engineers



Fabio  
Rizzi



Marco  
Diomedi



Roberto Gennaro  
Sciarrino

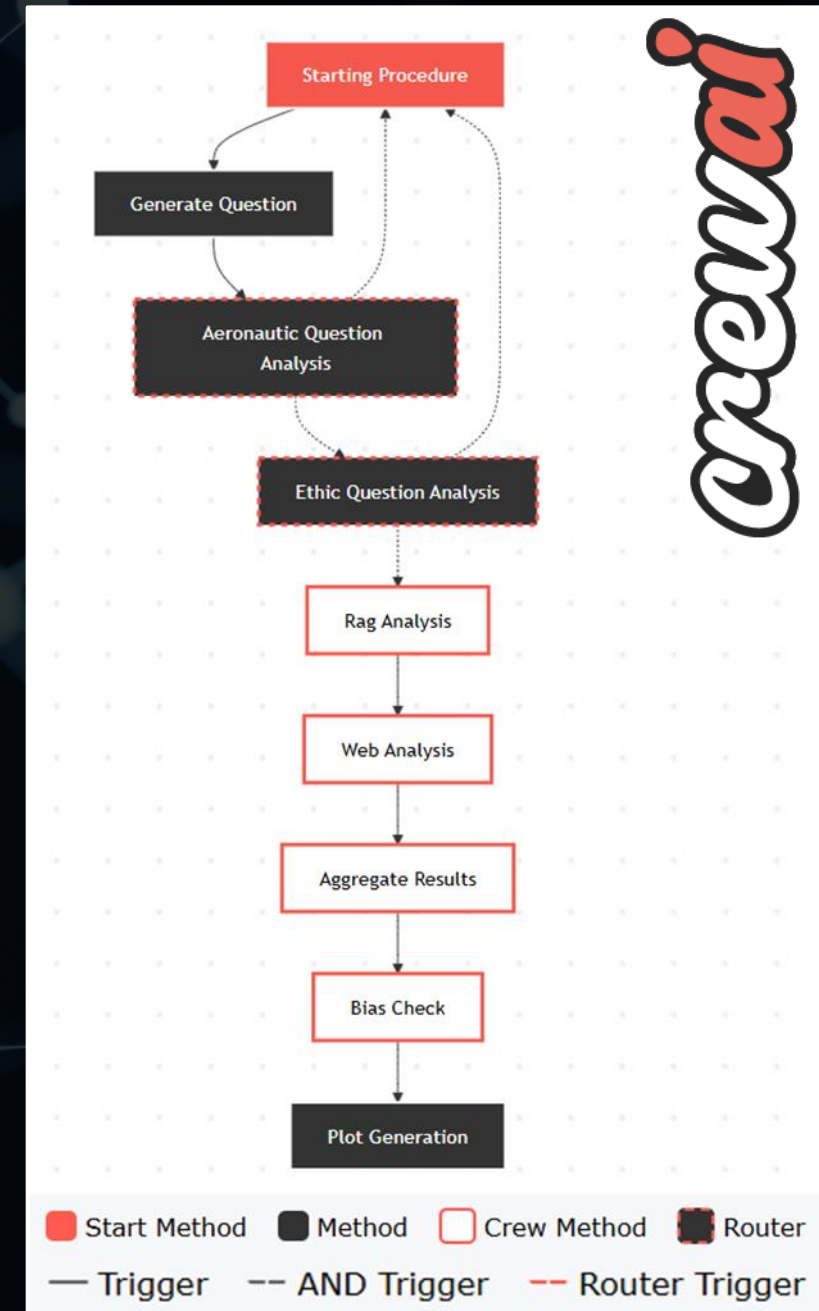
## Ecosystem



# Introduction to Crewai Framework

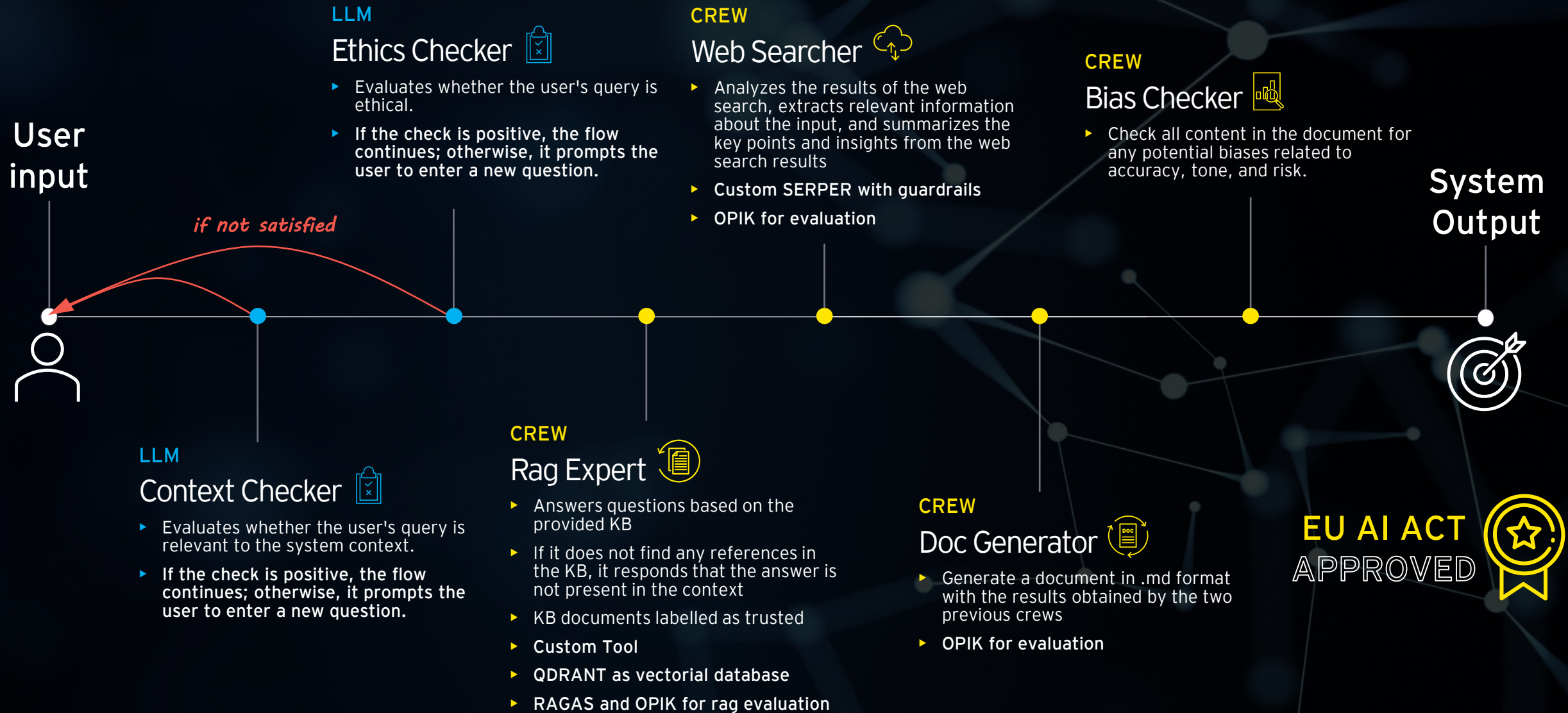
## Key Features of the CrewAI-Based Multi-Agent System

- **Smart multi-agent coordination**  
Specialized agents collaborate to process, verify, and respond to user queries.
- **Combined Search with local docs and web search**  
Uses RAG for internal documentation and triggers Serper for web-based answers when needed.
- **Ethics and bias checks**  
Built-in modules ensure ethical compliance and bias mitigation in responses.
- **Robust evaluation and documentation**  
Tracks quality via **Opik** and **RAGAS**; fully documented with **Sphinx**.





# Flow Architecture



# Video DEMO

The screenshot displays a video demonstration of an AI application. On the left, a terminal window shows the execution of a Streamlit application. The output includes messages about OPIK configuration, the local URL (http://localhost:8502), and the network URL (http://10.100.17.49:8502). The main part of the image shows the web application interface for the 'Aeronautic RAG System'. The interface features a header with the EY logo and the tagline 'Shape the future with confidence'. The main content area is titled 'Aeronautic RAG Question Answering System' and describes it as an advanced system for answering aeronautical questions with ethical validation and bias control. It provides a brief explanation of the response generation process and a section for querying the system. The 'Query' section includes a text input field with the placeholder 'Inserisci la tua domanda aeronautica:' and a 'Execute Pipeline' button. To the right of the input field are three toggle switches under the heading 'Options': 'Show intermediate steps' (checked), 'Show RAGAS metrics' (checked), and 'Show retrieved context' (unchecked). The bottom of the interface shows the system is powered by CrewAI + Azure OpenAI + Qdrant and monitored by OpiK and RAGAS.

```
Plot saved as crewai_flow.html
OPIK: Existing OpiK clients will not use updated values for "url", "api_key", "workspace".
OPIK: Configuration completed successfully. Traces will be logged to 'Default Project' by default.
To change the destination project, see: https://www.comet.com/docs/opik/tracing/log_traces#configuring-the-project-name
Stopping...
(rag-flow) PS C:\Users\KG376DF\OneDrive - EY\Desktop\python_scripts\AI-Academy-Project\rag_flow> py
thon -m streamlit run src/rag_flow/streamlit_main_app.py --theme.primaryColor="#0d47a1"

You can now view your Streamlit app in your browser.

Local URL: http://localhost:8502
Network URL: http://10.100.17.49:8502
External URL: http://82.85.175.212:8502

OPIK: Configuration completed successfully. Traces will be logged to 'Default Project' by default.
To change the destination project, see: https://www.comet.com/docs/opik/tracing/log_traces#configuring-the-project-name
```

## Aeronautic RAG System

Sistema avanzato di risposta a domande aeronautiche con validazione etica e controllo bias.

La risposta è stata generata dall'IA, sfruttando una knowledge base locale e una ricerca online in tempo reale, potrebbe mostrare informazioni imprecise. Verifica sempre le risposte sulla documentazione originale.

Query Results History Flow Visualization

Inserisci la tua domanda aeronautica:

Execute Pipeline

### Options

- ☒ Show intermediate steps
- ☒ Show RAGAS metrics
- ☐ Show retrieved context

### Architettura Pipeline

Flow Stages:

1. Question Validation
2. Ethics Check
3. RAG Analysis (Local KB)
4. Web Analysis
5. Document Generation
6. Bias Check

### Components

- RAG Crew: GPT-4o + text-embedding-ada-002 + Qdrant
- Web Crew: SerperDev API
- Doc Crew: Markdown Generator
- Bias Crew: Content Moderator
- Monitoring: OpiK + RAGAS

Aeronautic RAG System

Powered by CrewAI + Azure OpenAI + Qdrant | Monitored by OpiK and RAGAS

# Guardrails Security Measures

Multiple security measures were considered when importing the files for the responses.

**Serper custom research tool** that defines  
A **whitelist** of 300+ websites that are allowed.

```
trusted_domains:
# Search Engines & Web Platforms
- wikipedia.org
- google.com
- google.it
- google.co.uk
- google.de
- google.fr
- google.es
- google.ca
- google.com.au
- docs.google.com
- books.google.com
- patents.google.com
- news.google.com
- trends.google.com
- scholar.google.com

# Tech Companies & Documentation
- microsoft.com
- docs.microsoft.com
- learn.microsoft.com
- technet.microsoft.com
- research.microsoft.com
- azure.microsoft.com
- github.com
- gitlab.com
- bitbucket.org
- sourceforge.net
- mozilla.org
- developer.mozilla.org
- apple.com
- developer.apple.com
- amazon.com
- aws.amazon.com
```

**Sanitization** of small text characters or text with  
same color as background in the documents that  
could represent possible prompt injection.



A **label** is then assigned to documents to  
mark them as Trusted or Untrusted.





# Metrics Evaluation

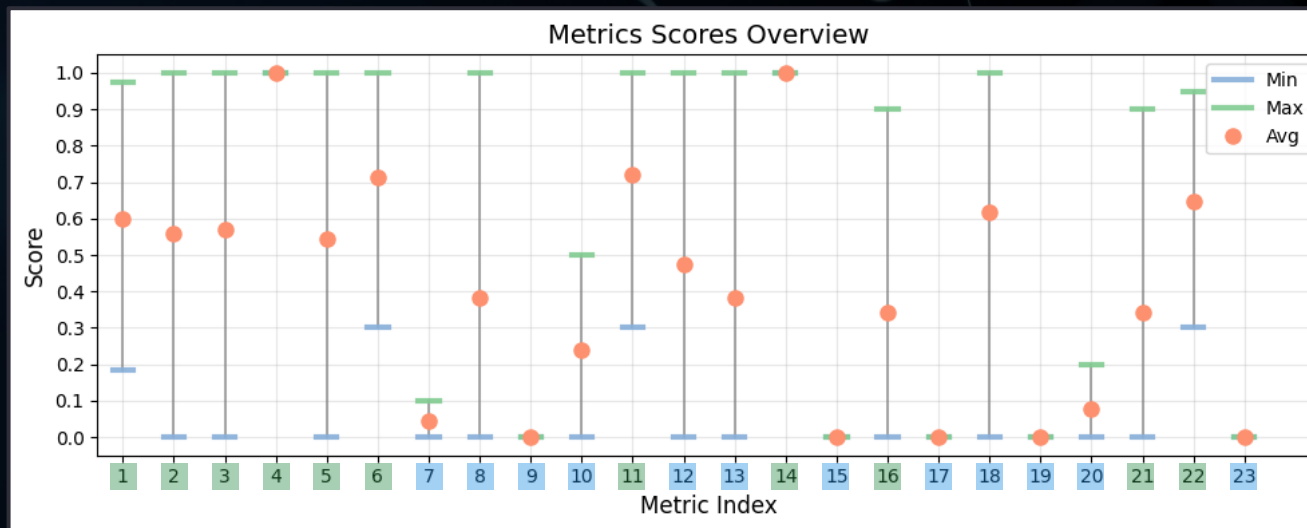


RAGAS



OPIK

ID	Metric
1	answer_correctness
2	answer_relevancy
3	context_precision
4	context_recall
5	faithfulness
6	bias_result_answer_relevance
7	bias_result_hallucination
8	bias_result_moderation
9	bias_result_toxicity 🛠️
10	cross_agent_consistency 🛠️
11	doc_result_answer_relevance
12	doc_result_hallucination
13	doc_result_moderation
14	doc_result_readability_score 🛠️
15	doc_result_toxicity 🛠️
16	rag_analysis_answer_relevance
17	rag_analysis_moderation
18	rag_analysis_rule_hallucination
19	rag_analysis_toxicity 🛠️
20	web_analysis_answer_moderation
21	web_analysis_answer_relevance
22	web_analysis_search_query_quality 🛠️
23	web_analysis_toxicity 🛠️





# Useful Links

**Repository:** [marco-diomedey/Al-Academy-Project: Repository for AI Academy Final Project](#)

**Opik metrics Prompts:** [Al-Academy-Project/rag\\_flow/metriche\\_opik.xlsx at main · marco-diomedey/Al-Academy-Project](#)

**EU AI ACT Documentation:** [https://github.com/marco-diomedey/Al-Academy-Project/tree/main/rag\\_flow/eu\\_ai\\_act\\_docs](https://github.com/marco-diomedey/Al-Academy-Project/tree/main/rag_flow/eu_ai_act_docs)

**THANK YOU!**