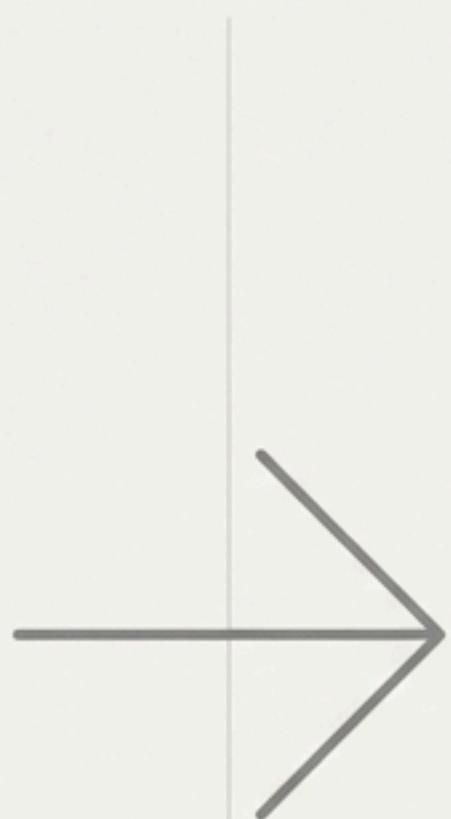
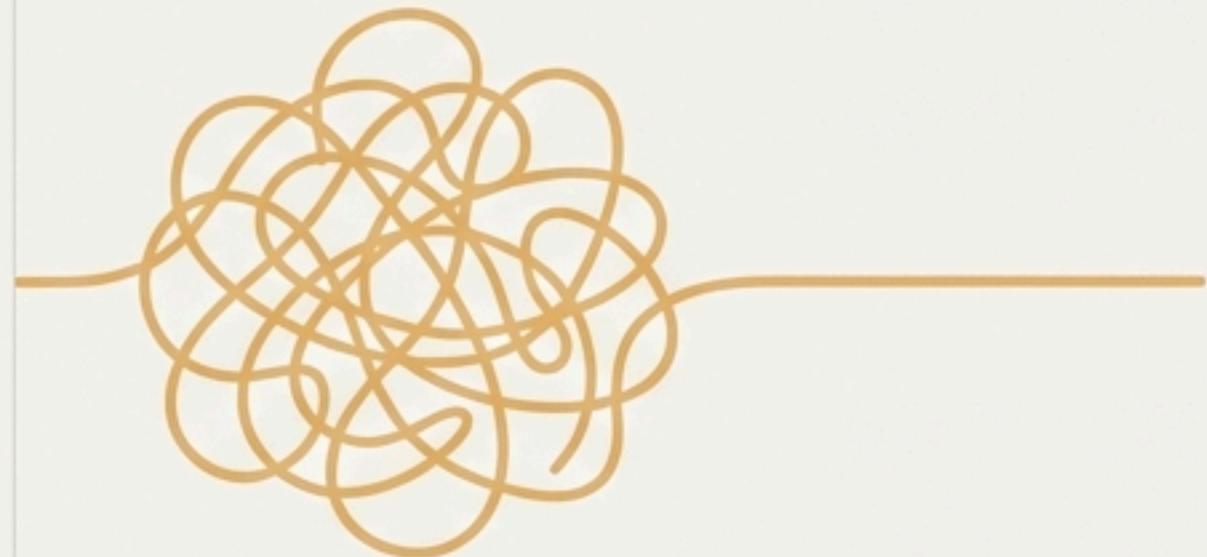


Business Co-pilot

A Multi-Agent System for Strategic Idea Analysis

From High Uncertainty to Strategic Insight



The Challenge

The Uncertainty of a New Venture

Entrepreneurs must rapidly assess market context, competition, and potential risks. This process is complex and time-consuming.

The Vision

An Analytical Co-pilot

Transform a single business idea, expressed in natural language, into a comprehensive feasibility analysis and risk assessment.

The Technology Powering the Pipeline

UI



Streamlit

Orchestration



LangChain

Local LLMs



Ollama

Gemma3:4b for extraction,
Llama 3.2 for analysis

Data & Search



ChromaDB



Sentence-
Transformers



DuckDuckGo
Search

Visualization



Streamlit-Elements (Nivo)

The Journey of an Idea: A 5-Agent Pipeline

A user's idea is processed sequentially through five specialized agents, each refining the analysis before passing it to the next.



Step 1: Deconstructing the Idea

Translates the user's natural language input into a structured, machine-readable JSON format.

Natural Language Input

Source Serif Pro

*I want to open a gourmet
pizzeria in Rome.*

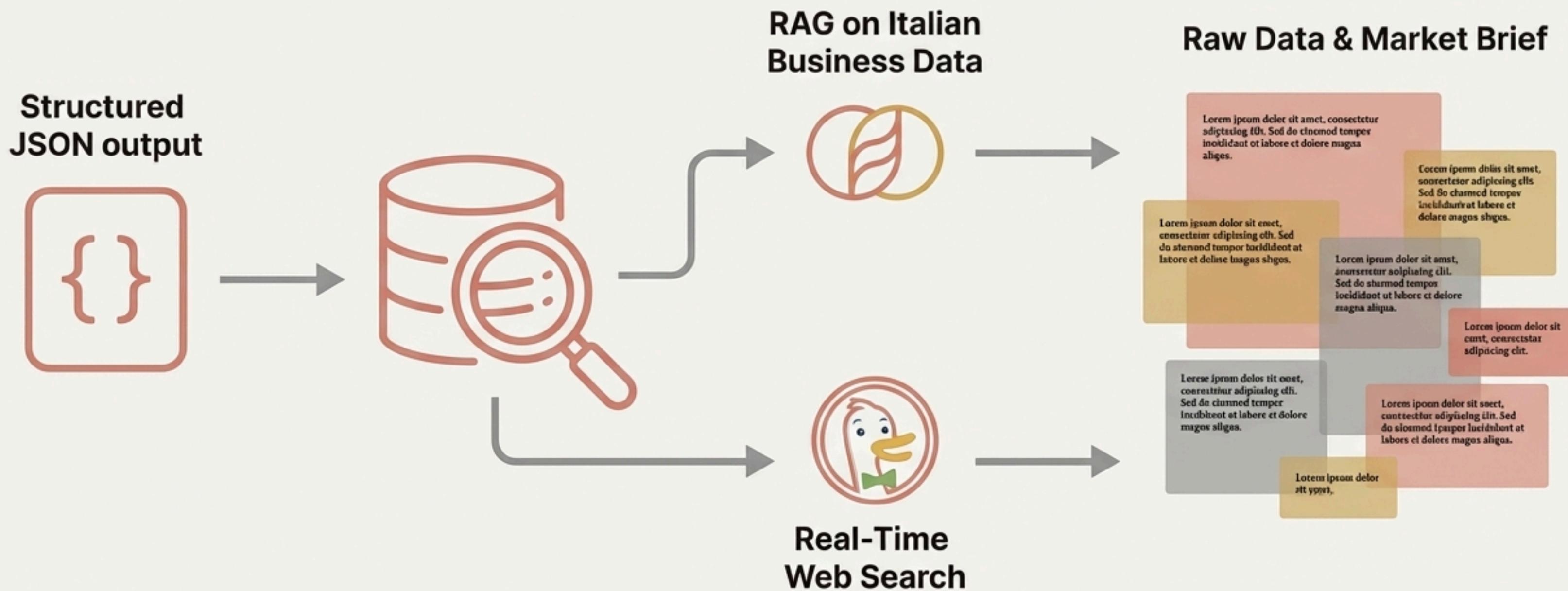


Structured JSON

```
{  
  "settore": "ristorazione",  
  "tipo_business": "pizzeria gourmet",  
  "dimensione_geografica": "Roma",  
  ...  
}
```

Step 2: Gathering Intelligence

Queries internal databases and the live web to gather raw market, competitor, and contextual data.



Step 3: Structuring the Data for Visualization

Parses raw, unstructured text from the previous step into clean JSON lists, ready for charting.

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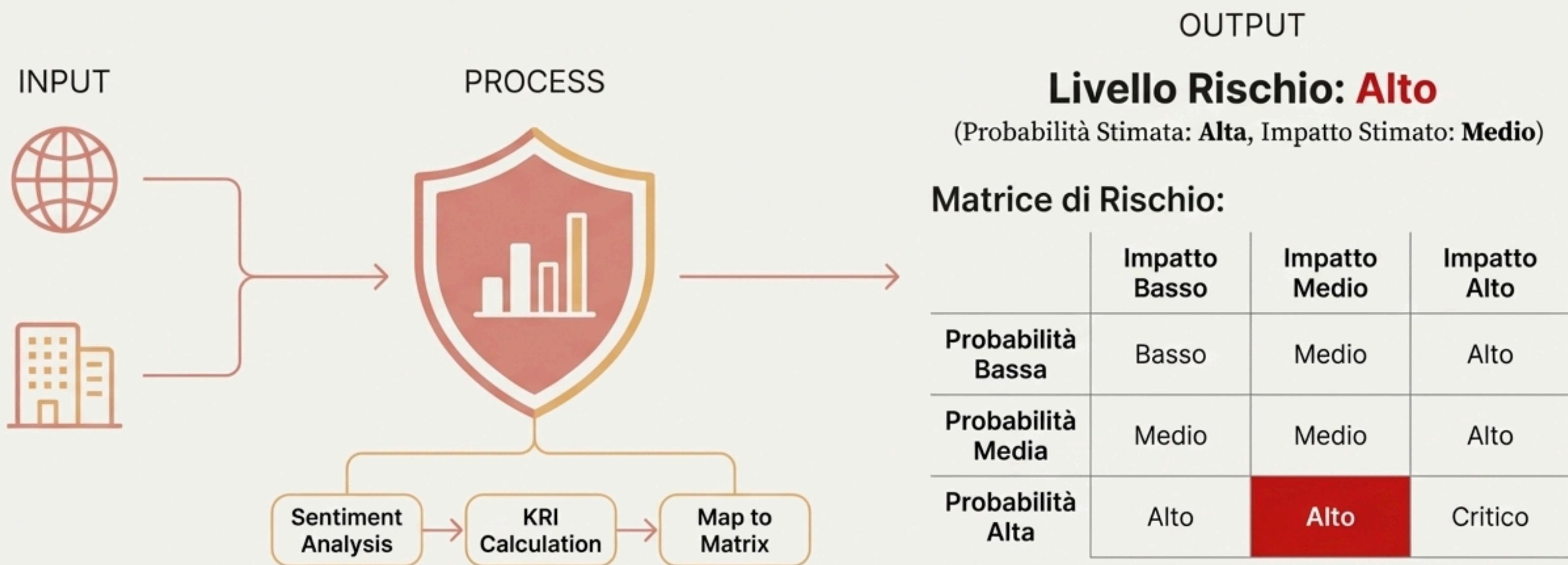
Visualization-Ready JSON



Includes fallback Regex
parser for robustness

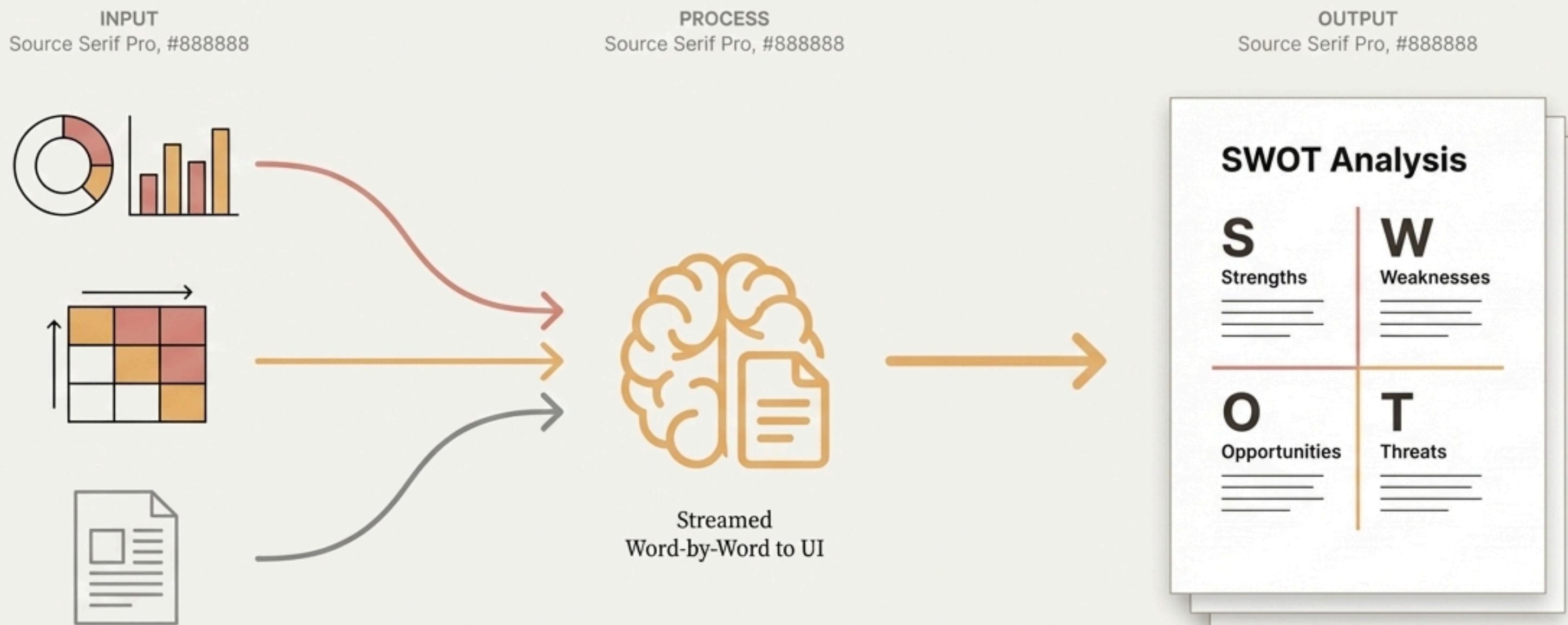
Step 4: Quantifying the Risk

Performs sentiment analysis and uses a symbolic matrix to calculate a qualitative risk level based on probability and impact.



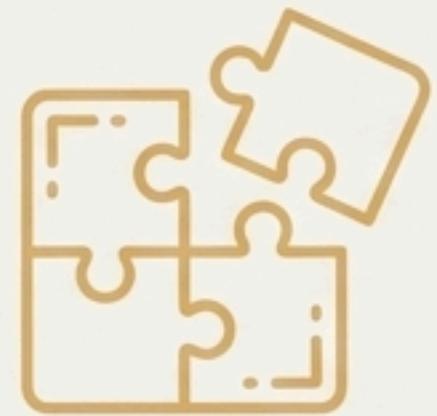
Step 5: Generating the Final Strategic Report

Synthesizes all prior analysis—context, data, charts, and risk—into a final, comprehensive report including a SWOT analysis.



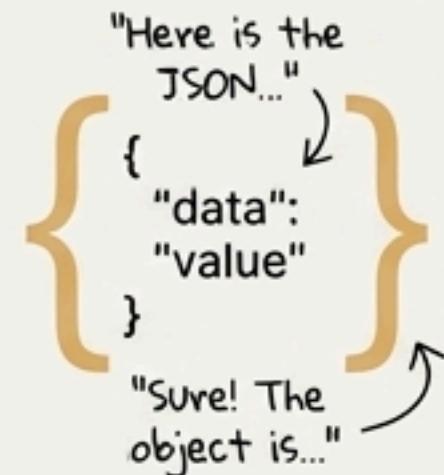
Engineering a Resilient Pipeline

CHALLENGE



Semantic Mismatch

User says 'pizzeria', but the database uses the official ATECO code 'Attività dei servizi di alloggio e di ristorazione'.



LLM Unreliability

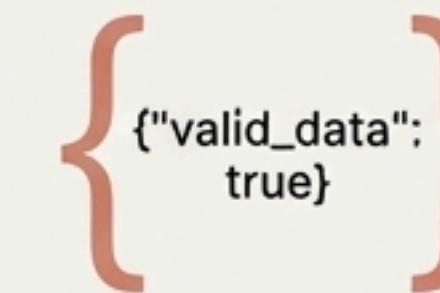
Models add conversational text (e.g., "Here is the JSON...") that breaks standard parsers.

SOLUTION



Hybrid Search

A function combines semantic search with keyword matching on the top results to ensure accurate ATECO code translation.

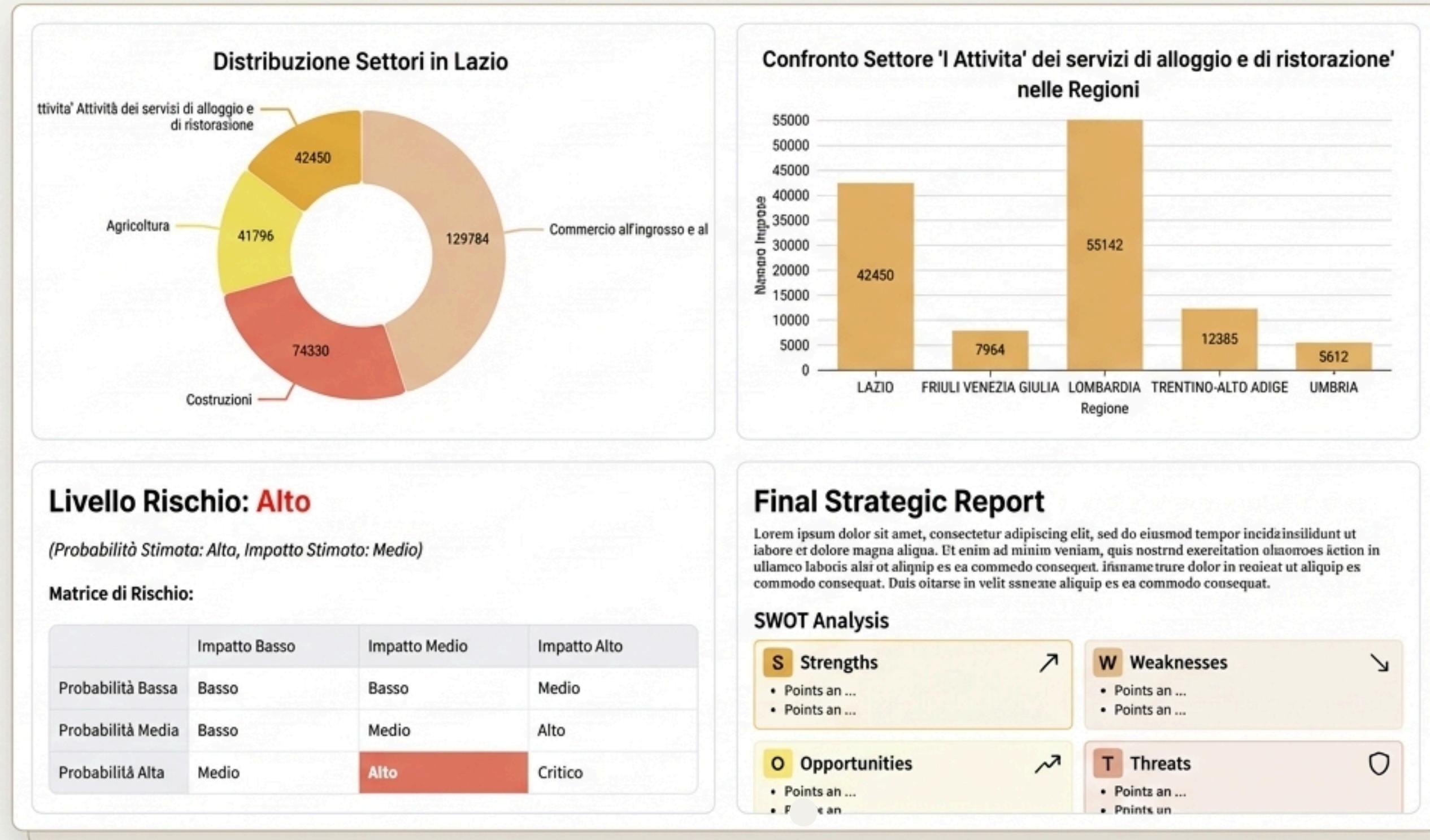


Robust JSON Extraction

A custom parser balances curly braces to extract only the first valid JSON object, ignoring all surrounding text.

The Complete Picture: A Unified Analytical Dashboard

All generated analysis—from market distribution to risk level—is presented in a clear, interactive Streamlit interface.



Key Takeaway: Architecture Enables Evolution

Core Achievement

The project successfully evolved from a descriptive tool to a powerful analytical and evaluative assistant.

Architectural Insight

The modular, multi-agent architecture provided the flexibility to solve complex problems, such as integrating the `RiskScoringAgent`, without re-engineering the entire system.

Central Success

The system effectively bridges the gap between symbolic logic (structured databases, filters) and semantic understanding (LLMs, vector embeddings).

