

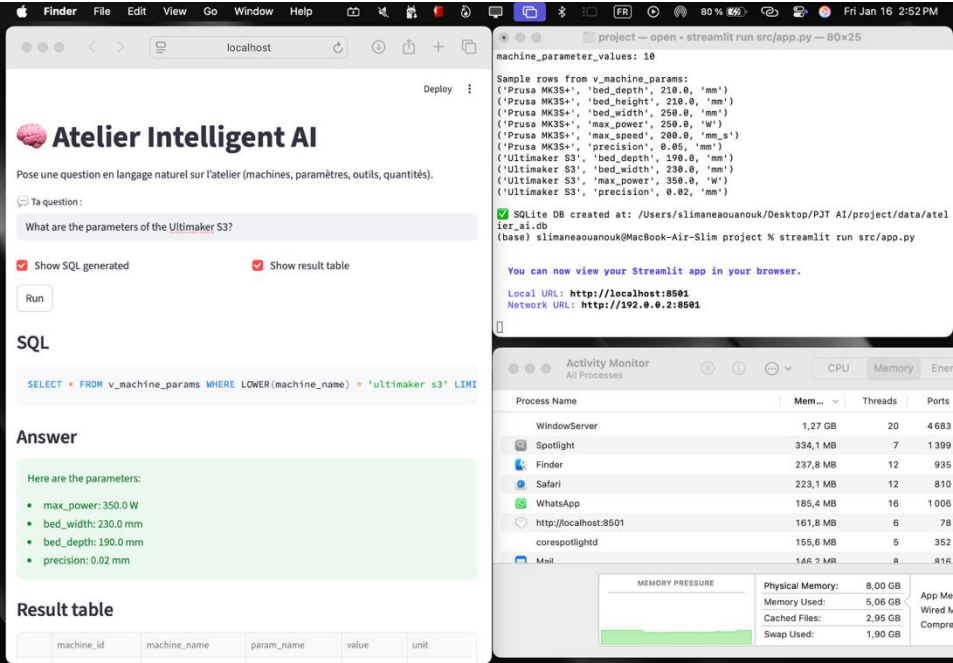
Local AI-Driven Workshop Data Assistant

Research Project

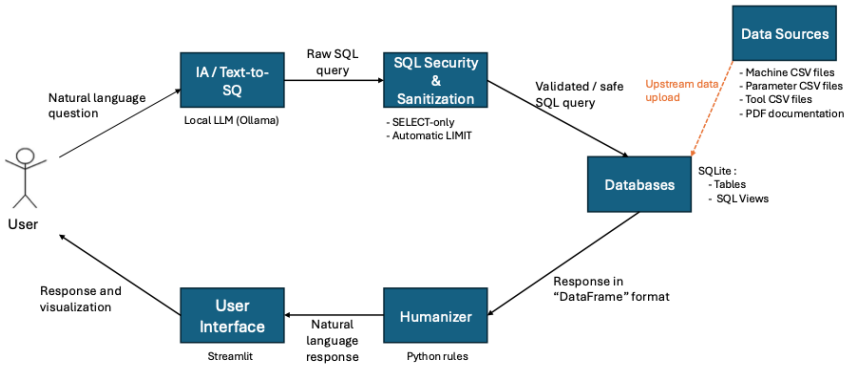
Objective :
Design a local, secure AI system to query structured workshop data (FabLab context) using natural language, without relying on external cloud services.

- Built a local end-to-end data pipeline (CSV → SQLite) using Python & pandas.
- Developed a Text-to-SQL system powered by a locally deployed LLM (Ollama).
- Designed SQL views and enforced safe query execution (read-only, LIMIT).
- Explored and validated data in Jupyter Notebook.
- Delivered an interactive Streamlit interface:

Natural language → SQL → database → human-readable answer.



Local Text-to-SQL Execution with Streamlit Interface



System Architecture of the Local AI-Driven Text-to-SQL Pipeline

TECHNICAL STACK & DELIVERABLES

TOOLS USED

PYTHON (PANDAS/NUMPY)

SQLITE (RELATIONAL STORAGE)

OLLAMA (LOCAL LLM EXECUTION)

STREAMLIT (UI)

CONCRETE DELIVERABLES

STRUCTURED SQLITE DATABASE

AUTOMATED TEXT-TO-SQL PIPELINE

FUNCTIONAL STREAMLIT DASHBOARD

SAMPLE QUERY

USER ASKS "WHAT ARE THE PARAMETERS OF ULTIMAKER 3?"

→ SYSTEM GENERATES SQL

→ RETURNS MAX POWER (350W) AND PRECISION (0.02mm).

SKILLS & PROFESSIONAL VALUE

END-TO-END OWNERSHIP
DEMONSTRATING FULL PROJECT LIFECYCLE FROM RAW DATA COLLECTION TO A DEPLOYED AI-DRIVEN INTERFACE.

AI SAFETY & REASONING
PRIORITIZING LOCAL DATA PRIVACY AND DETERMINISTIC SAFETY LAYERS (LIMITING SQL COMMANDS) OVER "BLACK BOX" CLOUD SOLUTIONS.