

Local AI-Driven Workshop Data Assistant

Research Project



Atelier Intelligent AI

Pose une question en langage naturel sur l'atelier (machines, paramètres, outils, quantités).

Ta question :
What are the parameters of the Ultimaker S3?

Show SQL generated Show result table

SQL

```
SELECT * FROM v_machine_params WHERE LOWER(machine_name) = 'ultimaker s3' LIMIT 10
```

Answer

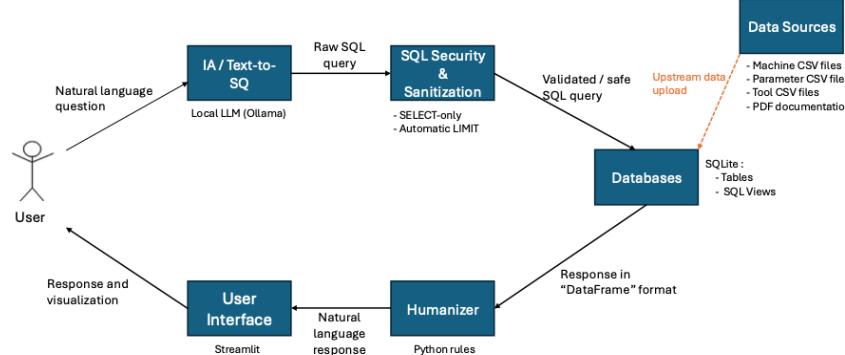
Here are the parameters:

- max_power: 350.0 W
- bed_width: 230.0 mm
- bed_depth: 190.0 mm
- precision: 0.02 mm

Result table

machine_id	machine_name	param_name	value	unit
	ultimaker s3	max_power	350.0	W
	ultimaker s3	bed_width	230.0	mm
	ultimaker s3	bed_depth	190.0	mm
	ultimaker s3	precision	0.02	mm

Local Text-to-SQL Execution with Streamlit Interface



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

TECHNICAL STACK & DELIVERABLES

TOOLS USED	CONCRETE DELIVERABLES	SAMPLE QUERY
PYTHON (PANDAS/NUMPY) OLLAMA (LOCAL LLM EXECUTION)	STRUCTURED SQLITE DATABASE AUTOMATED TEXT-TO-SQL PIPELINE FUNCTIONAL STREAMLIT DASHBOARD	<p>USER ASKS "WHAT ARE THE PARAMETERS OF UTMIMAKER 3?"</p> <p>→ SYSTEM GENERATES SQL</p> <p>→ RETURNS MAX POWER (350W) AND PRECISION (0.02mm).</p>

SKILLS & PROFESSIONAL VALUE

END-TO-END OWNERSHIP	AI SAFETY & REASONING
DEMONSTRATING FULL PROJECT LIFECYCLE FROM RAW DATA COLLECTION TO A DEPLOYED AI-DRIVEN INTERFACE.	PRIORITIZING LOCAL DATA PRIVACY AND DETERMINISTIC SAFETY LAYERS (LIMITING SQL COMMANDS) OVER "BLACK BOX" CLOUD SOLUTIONS.

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.