TokaPilot

Introduction

Built for Tokamak experiment analysis, TokaPilot brings experimental data, analysis programs, diagnostic tools, and shared knowledge into a single entry point. Researchers use natural language to query shots, retrieve data, plot, analyze, summarize, and review anomalies.Hand repetitive data retrieval, script hunting, and figure stitching to the system—people only verify results and make physics judgments. Single-shot waveforms, discharge summaries, threshold adjustment, and anomaly detection can all be delegated to it, with results returned as plots, tables, and reports. Web and Feishu data stay in sync, so you can start an analysis anytime.

Features

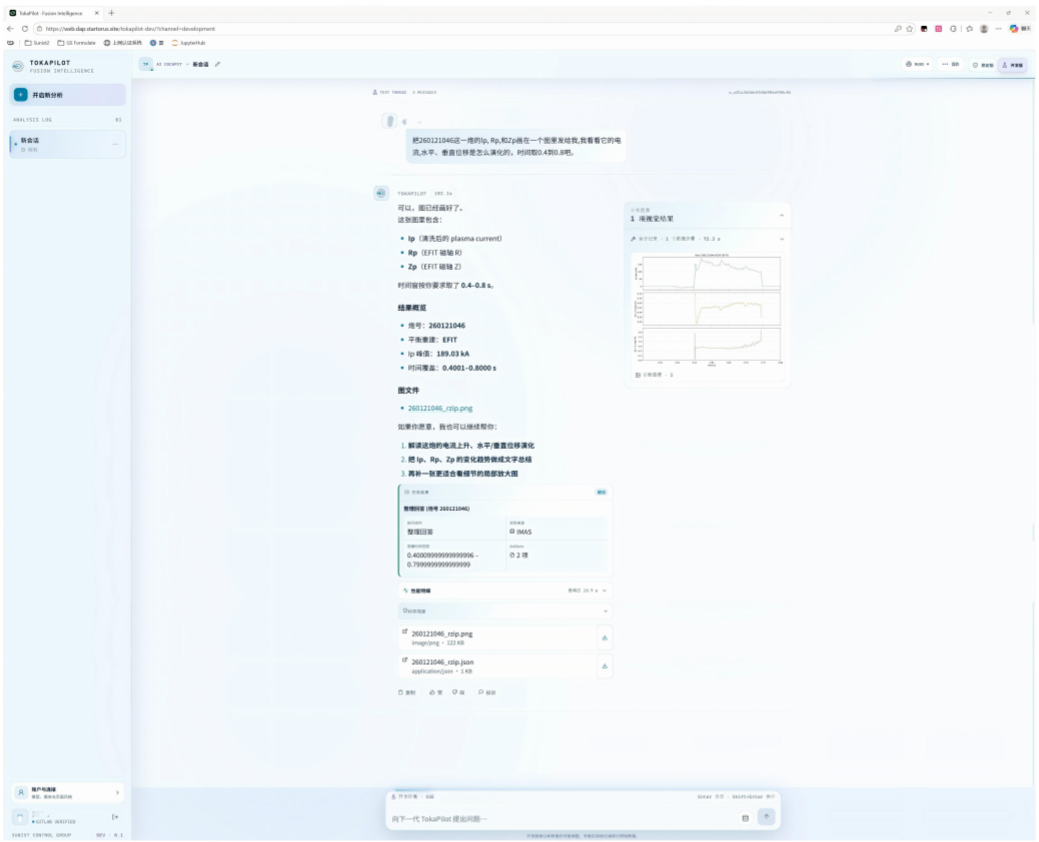
1. Natural-language driven: one sentence is enough to query shots, generate waveforms, and review anomalies—no need to hunt for scripts or stitch figures.
2. Unified entry: Web and Feishu share the same data, sessions, and tools—pick up on either side where you left off.
3. Multi-model support: OpenAI, Anthropic, and other models are plug-and-play—bring your own key and switch freely.
4. Experience distillation: dozens of ready-made Skills are built in; once a conversation exceeds 5 turns, SkillHub automatically builds new Skills by importance and shares them with everyone.
5. Safe and controlled: data is read-only and never persisted; tool calls are gated by authorization, and operations outside the capability registry are rejected.

Parameters

Parameter	Value
Channels	Web (SSE), Feishu (WebSocket)
Model protocols	OpenAI Chat Completions / Responses / Anthropic Messages
Data sources	IMAS, MDSplus, PostgreSQL, experiment-record mirror, PCS configd, Label Studio
Tools / Skills	70+ tools; 36 skills in skills.toml (30 ready + 6 planned)
Capability registry	16 entries in capabilities.toml (data.imas.read, experiment.records.read, analysis.discharge-summary...)
Storage	PostgreSQL/SQLite + shared RWX file storage / optional S3
Security	Key AES-256-GCM, HMAC, RBAC, Capability Registry, non-root read-only containers

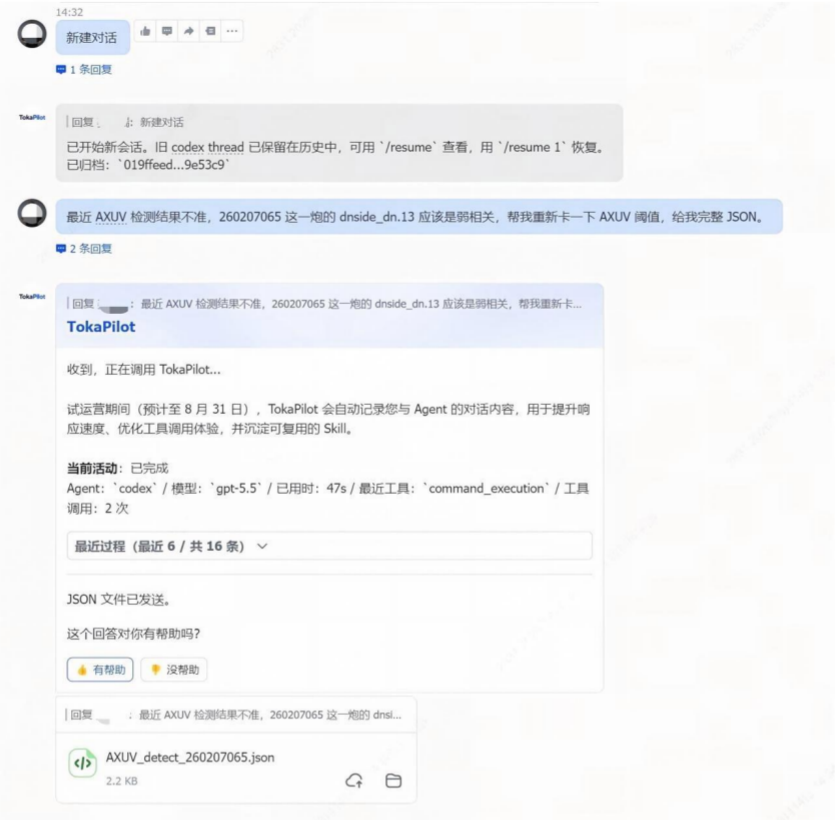
Applications

1. One-line experiment analysis



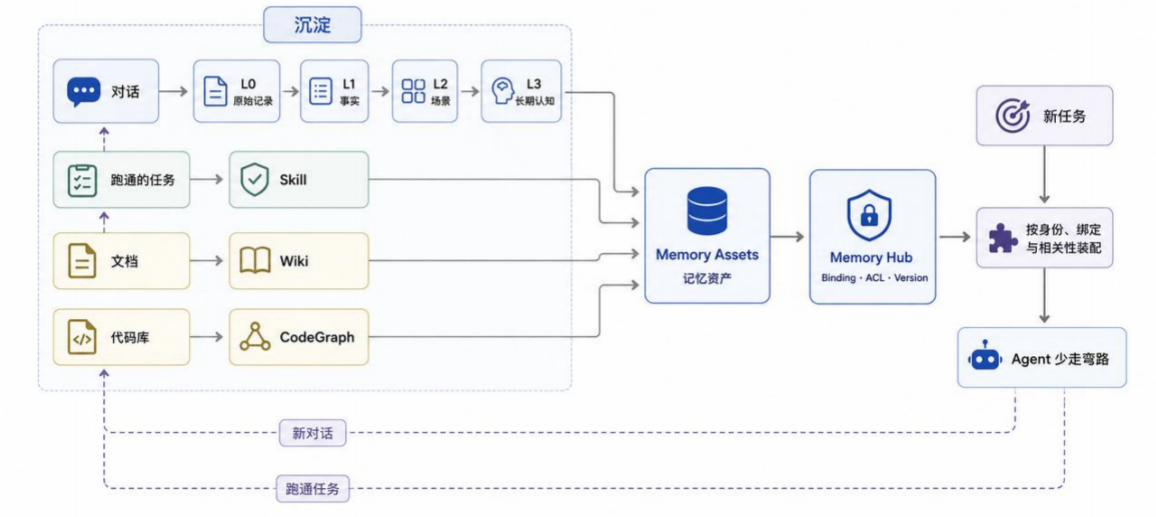
One prompt—"generate the combined Ip, Rp, Zp waveforms for shot 260121046"—retrieves data, runs the inversion, and returns results. Researchers can also ask more complex questions such as "analyze today's vacuum conditions", "analyze the startup failure", or "show me the MHD analysis for this shot".

2. Natural-language anomaly-detection threshold adjustment



Specify the shot, channel, and target, and it returns candidate thresholds automatically—the full provenance of every parameter is traceable.

3. Distilling conversations into reusable Skills



Proven workflows are distilled into Skills that colleagues reuse directly—no repeated trial and error.