

FEATURED PROJECT · SHIPPED PRODUCT · ONE-PAGE SUMMARY

Teach-by-Doing V6: Pathways-as-Data Engine

TbD V6 turns expert doing into executable, machine-readable Pathways for humans, AI agents, and robots. It is the production ingestion and understanding engine behind FreeFuse's Pathways-as-Data ecosystem, matured across six shipped versions to include AS9100-style traceability hooks: the compliance discipline aerospace and defense manufacturing runs on.

Role: Systems Architect · ML Engineer · Product Co-Designer

Stack: GCP · Python · OpenCV · Optical Flow / SSIM · LLMs (Gemini / GPT) · Temporal Encoder (LSTM-style) · GCS / Pub/Sub · JSON / PAD Schema

Links: github.com/burnsgregm/TbD-V6 · tbd-v6.streamlit.app

WHAT IT IS

A cloud-native pipeline that ingests video of an expert doing real work, detects meaningful changes, enriches them with semantics and temporal context, and exports a single Pathway.json artifact any downstream system can consume: human documentation, agent training data, or a semantic script for embodied systems.

VERSION MATURITY (THE ENTERPRISE STORY)

- **V1 Local MVP:** video ingestion, scene detection, pathway.json export. Proved the concept.
- **V2 GCP fan-out:** GCS, Pub/Sub, per-segment processing; long videos became feasible.
- **V3 Semantic enrichment:** LLM-driven captions and step descriptions.
- **V4 Temporal grounding:** LSTM-style encoder capturing sequence, dependencies, and multi-step context.
- **V5 Compliance & metadata:** depth perception plus hooks for AS9100-style traceability.
- **V6 Unified engine:** stable PAD schema, temporal embeddings, one API powering demo and downstream systems.

KEY OUTCOMES

6 versions

Shipped, iterative product maturity

Pathway.json

One artifact for humans, agents, robots

Live

Public demo and repository

BUSINESS IMPACT

Critical know-how is trapped in video and tribal knowledge. TbD converts it into a standard, machine-readable unit of work, closing the data gap for agent training and the documentation gap for the people doing the job. The traceability hooks point the same engine at regulated aerospace and defense manufacturing workflows.