V6.0 Unified Specification: Teach by Doing (TbD)

Status: Ready for Build

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Previous Version: V5.0 (Native Insight - Execution Finalization)

Part 1: Strategic & Functional Requirements (SRS)

1.1 Core Goal: Technical Debt Resolution

The primary goal of V6.0 is to resolve the remaining technical debt accumulated during the V4/V5 rollout, namely the persistent TensorFlow dependency conflict, and activate all high-value features currently running on placeholders or stubs.

FR ID	Requirement	Strategic Rationale
FR-01	**Temporal Encoder Activation:** The V4 Temporal Encoder (Service C) MUST be fully stable and running. The final deployment **MUST NOT** include the DISABLE_V4_ENCODER environment variable.	Restores the core V4 functionality (512D Vector) required by downstream Risk Agents.
FR-02	**Pixel Accuracy Activation:** The Object Detector Microservice (Service D) MUST be updated to run the final, trained $\text{YOLO}$ model weights. The Worker MUST receive accurate, non-zero $\text{ui\_region}$ coordinates.	Finalizes the system's pixel-accurate data capture capability (FR-07 fulfillment).

FR-03	**Live Audio Integration:** The Worker MUST successfully integrate with and execute a live **Speech-to-Text (STT) API** call to process the extracted audio transcript.	Finalizes the Multimodal Audio Fusion (FR-06 fulfillment).
FR-04	**IoT Bridge Integration:** The Worker MUST include client code to securely call an external $\text{IoT}$ Telemetry API and populate the $\text{telemetry\_context}$ field.	Completes the PAD v0.5 data contract (FR-09 fulfillment).

Part 2: Technical Design Document (TDD)

2.1 Service C Stabilization (Keras Fix)

The V6 deployment **MUST** include a new build of the **Temporal Encoder Microservice (Service C)** that permanently resolves the keras.src.legacy crash.

- **Action:** The deployment pipeline must ensure the **Keras Architecture Rebuild logic** and the **CPU-optimized base image** are correctly used, and the final lstm_model.h5 model file is loaded successfully on startup.

2.2 Service D Implementation (Pixel Accuracy)

The Object Detector Microservice is transitioned from a placeholder endpoint to a real inference service.

- **Asset:** The final, optimized $\text{YOLO}$ model weights (model_yolo.h5) must be available in the Service D deployment context.
- **Action:** The detect_coordinates function in Service D must be updated to load the $\text{YOLO}$ model and perform the inference, replacing the placeholder logic (_stub_detection). The deployment script must be verified to correctly upload the model asset.

2.3 Worker Service (Service B) Integration and Final Code

The Worker needs a final update to activate the new services and remove the temporary bypass.

- **Audio Logic Activation:** The _transcribe_audio function must be updated to use the full **Google Cloud Speech-to-Text API** service, replacing the mock string return.
- **V4 Re-enablement:** The DISABLE_V4_ENCODER environment variable MUST be removed from the Worker deployment command line.
- **New Dependencies:** The Worker must include client code (e.g., Python requests calls) to fetch data from the external IoT API (FR-04).

2.4 Final Deployment Orchestration

The V6 deployment is a **full, sequential redeployment** of all services and the execution of the final client code integrations to activate the system.