



AI-DRIVEN

Adverse Event Detection System for Healthcare Providers



The Challenge

Healthcare organizations face mounting pressure to accurately detect and report adverse events—a process that is traditionally slow, error-prone, and resource-intensive.

Key challenges included:

- **Delayed Detection:** Manual reporting caused long lags in identifying adverse events.
- **Regulatory Compliance:** Strict reporting standards required high-accuracy classification.
- **Data Volume & Complexity:** Hundreds of patient call recordings daily with diverse medical terminology.
- **Labor-Intensive Workflows:** Manual extraction of clinical relevance limited the ability to scale and react fast.

The Solution

We developed and deployed an AI-powered Adverse Event Detection System leveraging machine learning and NLP pipelines. The solution included:

- **Data Integration & Preprocessing:** Real-time ingestion of patient call recordings, transformed via audio-to-text pipelines.
- **PII Removal & Compliance:** Automated identification and redaction of personally identifiable information to ensure HIPAA compliance.
- **Clinical Entity Extraction:** Extracted key medical concepts using NLP, mapped to standardized MedDRA ontologies for regulatory alignment.
- **Predictive ML Modeling:** Built custom classification models to determine the likelihood of each interaction representing an adverse event—prioritized based on context and urgency.

Results & Impact

The AI-driven pipeline delivered measurable improvements across compliance, cost, and operational KPIs:

Metric	Impact
Detection Time	Reduced from hours/days to minutes (up to 90% faster)
Detection Rate	Identified 30% more adverse events vs. baseline
Cost Savings	Reduced processing costs by up to 15%
Compliance Accuracy	Achieved ~90% compliance with regulatory requirements
Compliance Accuracy	Improved resource utilization by 20%, enabling better staff focus

Technologies & Tools

Stack Element	Tools & Platforms
Speech-to-Text	Audio to Text, ASR Engines
NLP / Ontology	Clinical Entity Recognition, MedDRA Mapping
NLP / Ontology ML Frameworks	Custom Adverse Event Classifiers
Infrastructure	Azure Blob Storage, SQL Audit Trails, NoSQL DBs, REST APIs
DevOps & Delivery	CI/CD Pipelines, Docker, Kafka, Secure VPN