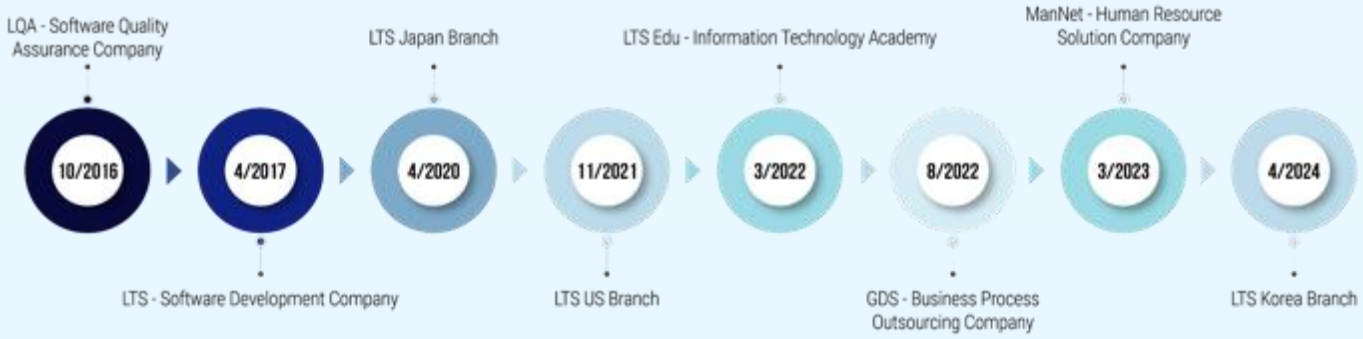
LTS GROUP

LTS GROUP

AI Services

About Us

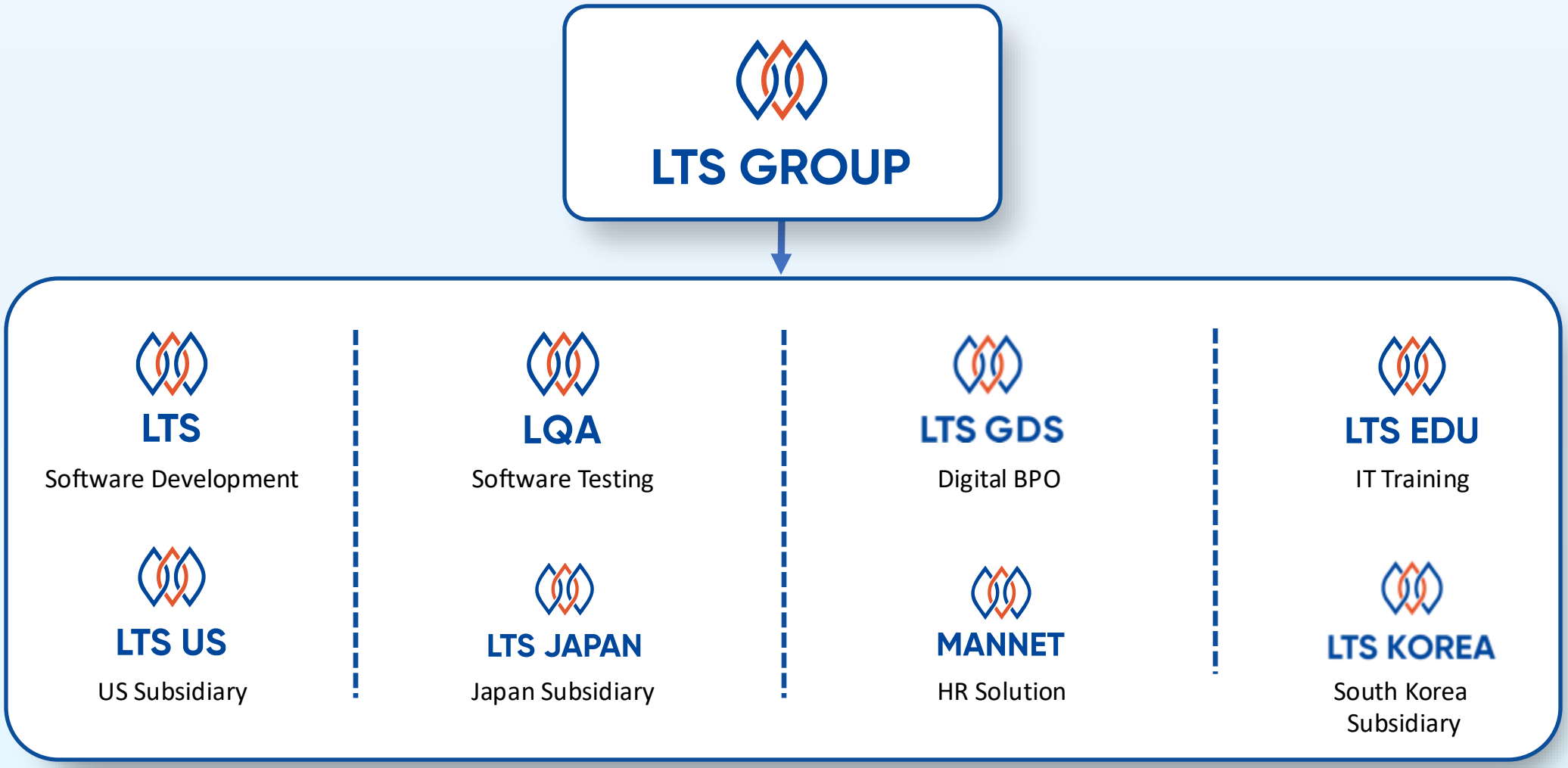


Established in 2016, LTS Group is a fast-growing IT outsourcing services provider in Vietnam. Formerly a leading Quality Assurance company in Vietnam (LQA), LTS Group has expanded our service lines and leveraged our core advantage in quality assurance and industry insights. Currently, we have subsidiaries in Japan & the United States and a diverse ecosystem of end-to-end technology services and human resource solutions (HR Solutions), including:

- Software Development
- Software Testing
- Digital BPO
- HR Solution

During the years of operation, LTS Group has developed our experience towards industry specialization with the aim of best supporting the growth of our clients. Thanks to the relentless efforts of our passionate and talented team throughout the years, we have earned trust from clients in the most demanding markets of the USA, Japan, Korea and more.

Entity Ecosystem



LTS AI Service Overview

Data Collection & Preparation Service

AI Integration & Software Development Service

Data Collection & Preparation Service

Data Processing Service

- AI Data Annotation
- Data Collection
- Data Entry
- Data Moderation
- DataConversion
- Document Digitalization

Robotic Process Automation (RPA)

- Web/App Automation
- AI-OCR Integration
- Cloud System
- Integration
- Data Analytics & Reporting
- Compliance & Audit

Business Support Service

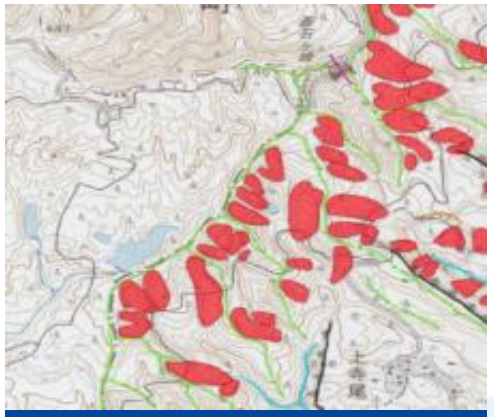
- IT Support
- Customer Service Support
- Data Analysis Service
- Staff Augmentation
- BOT Service

Data Collection & Preparation Service - Industries We Serve

ADAS & Transportation

Industrial Automation

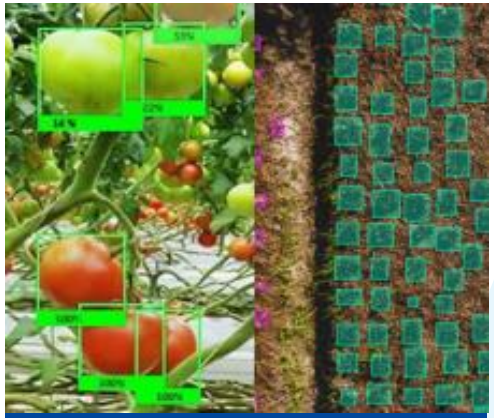
Retail & E-commerce



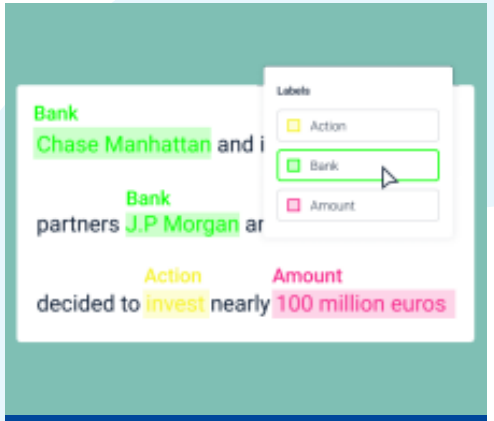
Mapping & Geospatial

Security Monitoring

Sports



Agriculture



Finance & Banking

Technologies of AI that We Cover

Machine Learning - ML

Computer Vision

Natural Language Processing - NLP

Speech

Generative AI

AI-driven Business Intelligence

Data Collection & Preparation

Data Science

Tech Stack

Framework & Libraries



Computer Vision

Detectron


YOLO

Vit-Transformers

NLP

HF Transformers

spaCy

Speech

Whisper

DeepSpeech

Wav2vec

Stable Audio Open

Business Intelligence




Database





GraphDB

Neptune

MLOps


Toolkits

NEMO

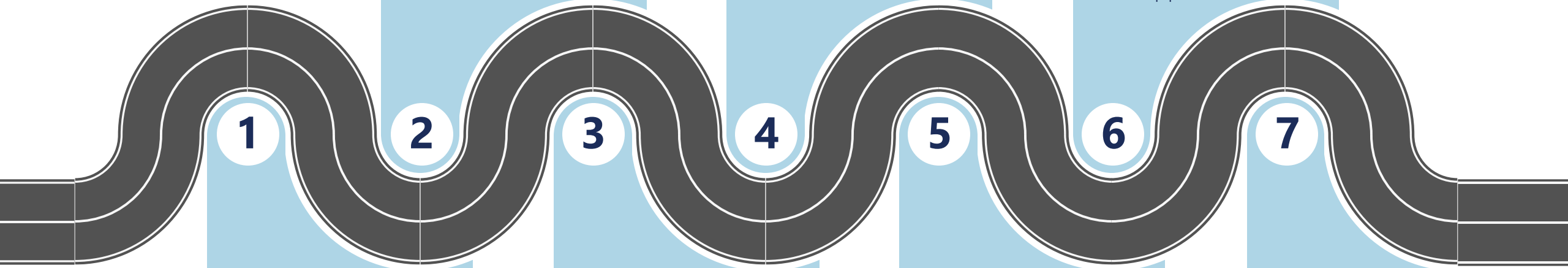
TRITON INFERENCE SERVER

KServe

Cloud Platforms



Process



1

Stage 1: Requirements

- Identify Business Needs
- Define Key Objectives and Project Scope
- Identify requirements for AI integration

2

Stage 2: System Design and Architecture

- Design overall system architecture
- Design data pipelines
- AI Integration Solution
- Technical specifications and design documents

3

Stage 3: Data Collection & Preparation

- Collect and preprocess data required for training AI models
- AI Model Integration

4

Stage 4: AI Model Development

- Develop, train and validate model.
- Optimize models for performance and accuracy

5

Stage 5: Software Development & Integration

- Develop software components and integrate AI models into the application
- Seamless interaction between AI modules and other system components

6

Stage 6: Testing and Quality Assurance

- Conduct thorough testing of AI models and software components to ensure functionality, performance and reliability.
- Automated testing
- CI/CD pipelines

7

Stage 7: Deployment, Monitoring & Maintenance

- Deploy AI-integrated software system to production environments
- Monitor system performance, manage updates, ensure scalability
- Backup and Disaster Recovery

Our Domains & Featured Portfolio

eCommerce

- AI chatbots & virtual assistant
- Advanced visual search and personalized product recommendation
- Inventory management with predictive analytics

Education

- Personalized educational content
- Speech AI technology for language learning and translation
- AI-powered virtual assistants for vocabulary practice, interactive conversations, and instant feedback

Finance

- AI chatbots for simplifying banking tasks
- Advanced AI-driven business intelligence solutions
- ETL pipelines.

Manufacturing

- Machine learning algorithms for proactive maintenance.
- Computer vision solutions

Healthcare

- AI chatbots
- Computer vision technology for precise medical image analysis

Why Choose LTS Group?

Cutting-Edge Innovation

We consistently adopt and integrate the latest, state-of-the-art AI technologies to develop game-changing solutions.

Superior Technical Expertise

Our team of AI specialists possesses extensive knowledge and experience in integrating a wide range of advanced AI technologies.

Comprehensive and Dedicated Support

We provide comprehensive support, from initial strategy and development to implementation and ongoing maintenance.

Dedication to Responsible AI

LTS Group is committed to providing AI solutions that uphold the highest standards of ethics, transparency, and regulatory compliance.

Industry Specialization

During the years of operation, we've honed our experience across various industries, from eCommerce, education, and finance to manufacturing, healthcare and so on.

Cost-effectiveness

We capitalize on the cost advantages of the Vietnam outsourcing market to offer you high-quality solutions at optimal prices.

Our Work Process

Strategy & Planning

- Analyze requirements
- Define goals
- Create customized Roadmap

Tailored Recruitment & Onboarding

- Devise sourcing strategies
- Assess candidate's technical expertise & experience
- Evaluate candidate's cultural fit
- Provide training sessions

IT Infrastructure & Operation

- Design, implement and manage secure IT infrastructure
- Set up communication channels
- Establish progress tracking methods & metrics
- Formulate risk mitigation strategies
- Transfer knowledge and fortify team's capability

Ongoing Support & Management

- Monitor and optimize team's performance with regular review
- Map out strategic plan for team scaling

Our Success Stories

Teaching Assistant and Students' Evaluation in Edu Insight

Overview

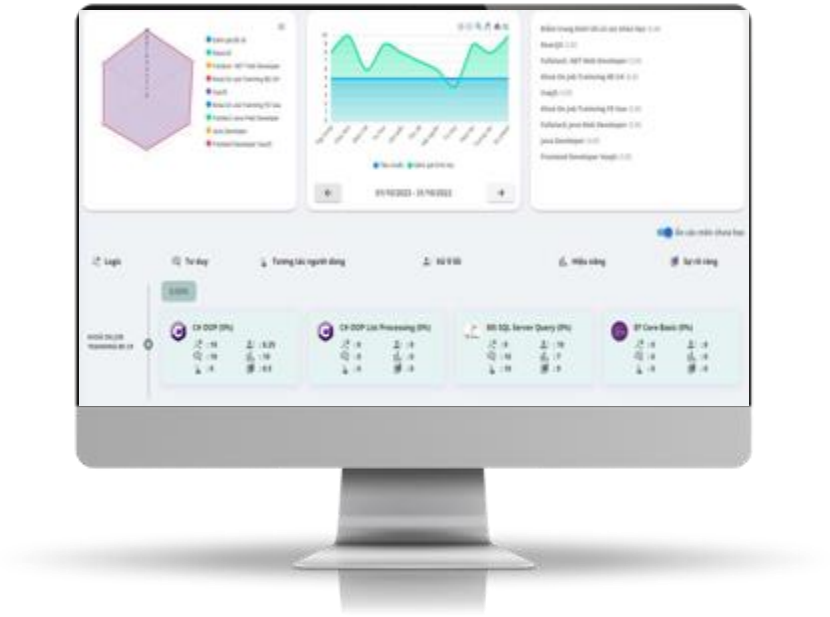
LTS group's Edu Insight system applies AI in supporting students and evaluating students' progress in the courses. The LTS program developed AI-powered system using Gen-AI and Machine Learning, currently being used by all the students in the Edu academy.

- Country: Vietnam
- Domain: Education
- AI expertise: Gen-AI, Machine Learning, NLP, Predictive Analytics
- Development process: Scrum

8 Members

10 Months

6 Features



Scope of work

- AI Integration
- Gen-AI
- Machine Learning Model Development & Integration

AI Solution

- **Teaching Assistant**: Assists students by providing feedback on completed work and automatically grading assignments. Development involved teaching experts who evaluated the quality of the AI-generated feedback.
- **Student Evaluation**: Utilize 25 criteria proposed by education experts in the field of programming to evaluate students based on 7 different learning skills

Language	ML Model	Framework	Database	Cloud
Python 3	GPT 4 turbo Multi-output regression model	VueJS	SQL Server	Azure

AI Solution and Strategies – Edu Insight

AI-powered Teaching Assistant

- Provides automated feedback on student's completed coding work
- Grades assignments using AI
- Developed with input from teaching experts to ensure quality

GenAI Application

- Creates coding assignments and challenges
- Generates IQ tests
- Conducts automated technical interviews
- Facilitates co-op coding challenges

Student Evaluation System

- Utilizes 25 criteria proposed by education experts
- Evaluates students based on 7 different learning skills
- Implements machine learning models for performance prediction

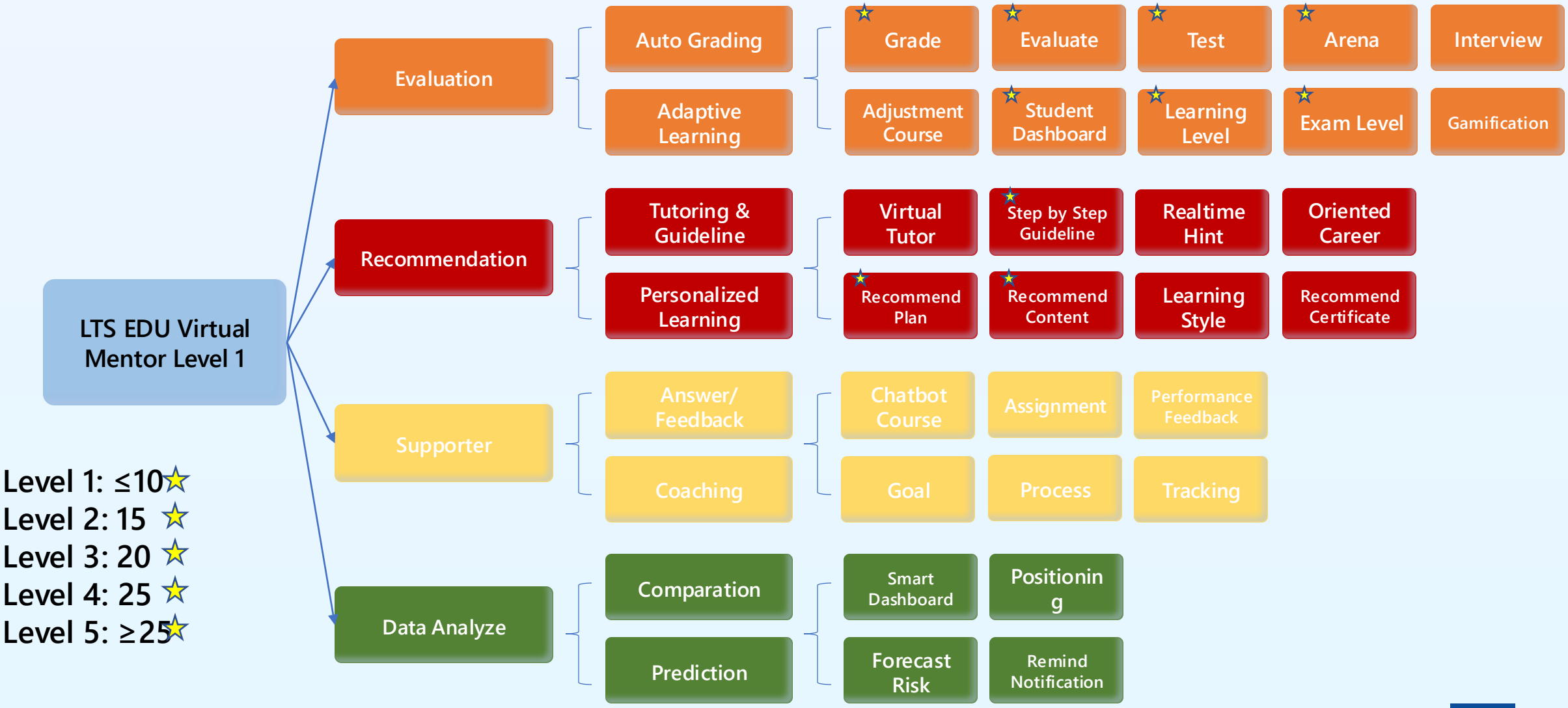
Advanced Analytics

- Analyzes various metrics including video learning time, assignment submissions, and exam scores
- Tracks extracurricular activities and social media interactions

Comprehensive Learning Management System

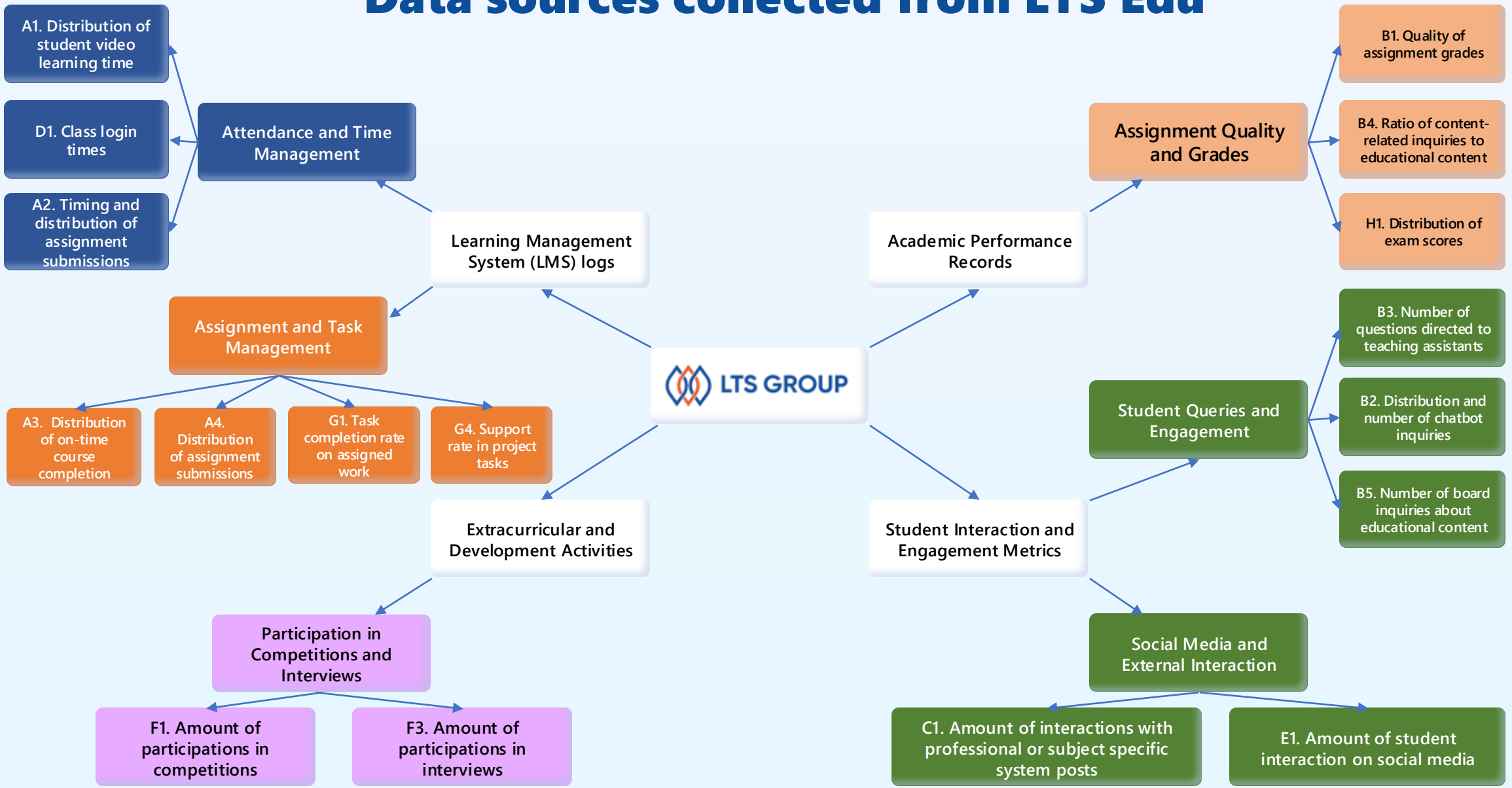
- Tracks attendance and time management
- Manages assignments and tasks
- Records academic performance
- Monitors student engagement and interaction

AI Features Roadmap for LTS Edu



Level 1: ≤10☆
Level 2: 15 ☆
Level 3: 20 ☆
Level 4: 25 ☆
Level 5: ≥25☆

Data sources collected from LTS Edu

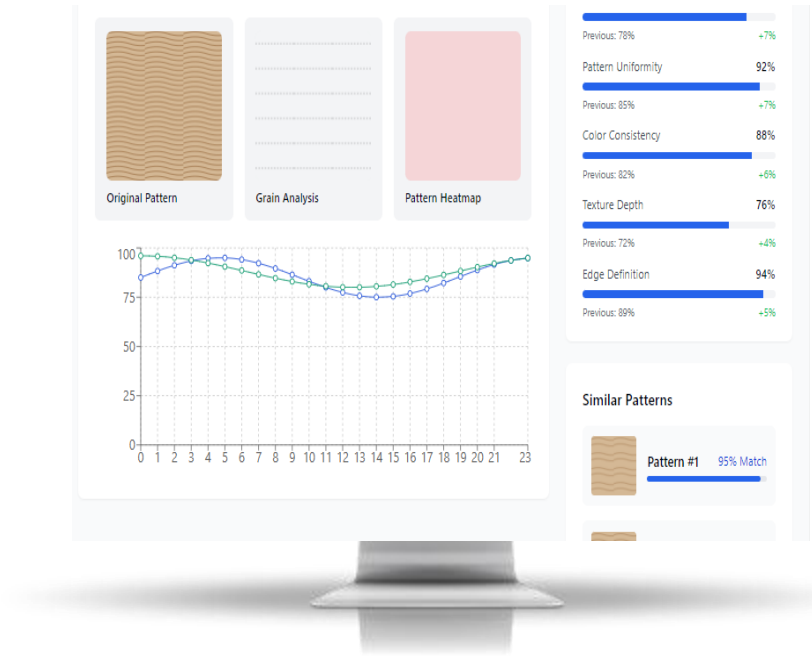


Architectural Pattern Recognition

Overview

The customer is a business working in architecture. They hired LTS Group to build an app to help support their customers better in the product search process.

- **Country: Hong Kong**
- **Domain:** Architecture
- **Development process:** Scrum
- **Language:** Python 3, C++
- **ML technique:** image similarity, image segmentation, feature extraction
- **Framework:** VueJS
- **Cloud:** Azure



Business Challenge

Our client wanted to build an architectural pattern recognition app to detect the wood patterns on architectural designs and then query the user's image to find similar patterns.

Scope of work

- UI Design
- Image similarity, Image Segmentation

AI Field

- Computer Vision
- Image Segmentation
- Feature Extraction
- Image Similarity Search
- Vision Transformers

Solutions & Strategies:

Image Processing Pipeline:

- Utilized several feature extraction techniques.
- Implemented algorithms for additional feature detection and matching
- Employed image segmentation techniques to isolate wood patterns from complex architectural images

End-to-End Automated Image Captioning System

Overview

Our client is a dynamic digital media company that specializes in providing a platform for photojournalists and photographers. They need an efficient solution to manage large volumes of image metadata and improve search functionality.

Our Automated Image Captioning System addresses these challenges by using advanced AI to automatically generate precise and relevant captions

- Country: US
- Domain: Digital Media
- AI expertise: Computer Vision

Scope of work

- Model Integration
- API Development
- Containerization and Deployment

AI Solution

- Utilize Vision Transformer model to extracts comprehensive features and then uses Vision Encoder Decoder model to generate descriptive text based on visual content.
- Assists in manage large volumes of digital media
- Automating caption generation for images uploaded to social media

5	2	10
Members	Months	Features

Frameworks		Machine Learning		Cloud		Monitoring	
Python 3	FastAPI	Vision Transformer	Vision Encoder Decoder	Google Kubernetes Engine	Google Compute Engine	Prometheus	Grafana

LLM customed RAG Question-and-Answer System for Healthcare domain

Overview

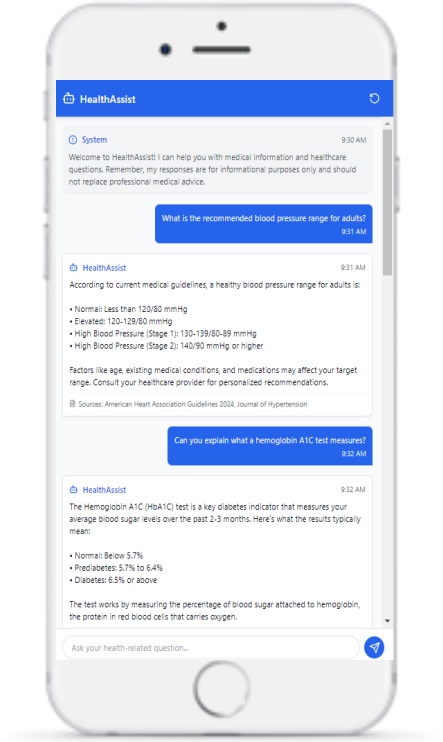
Our client is a healthcare provider who wants to build a custom chatbot using existing model on their own database. The aim of this project is to deploy a custom RAG model on Mistral-7B using the Healthcare Provider's data to serve as a virtual assistant to the customers to provide quick advices.

This project incorporates the development of RAG, the integration of LLM model and the deployment of container to API services.

- Country: Singapore
- Domain: Healthcare
- AI expertise: RAG, LLM, Vector Database, Semantic Search

Members

Months



Scope of work

- RAG pipeline development
- LLM Integration
- Containerization and Deployment

AI Solution

- Developing a RAG pipeline to customize and fact-check the output of the LLM model. Incorperating the use of semantic search on the vector database, rerank the result and generate a prompt for the LLM model.
- Handling data ingestion for raw Json data via indexing pipeline for embedded chunks to be stored in the Database
- Using ELK stack to handle and monitor API requests.
- HIPAA Compliant

AI/ML

Retrieval Augmented Generation | LLM | Mistral 7B

Vector Database

Weaviate

Cloud

Google Cloud Storage | Google Kubernetes Engine

Query and Retrieval

Nginx-ingress | llamaIndex

Monitoring

Prometheus | Grafana | ELK Stack

Results and Impacts – RAG QA System

- **24/7**
availability of the virtual assistant, reducing wait times by 80%

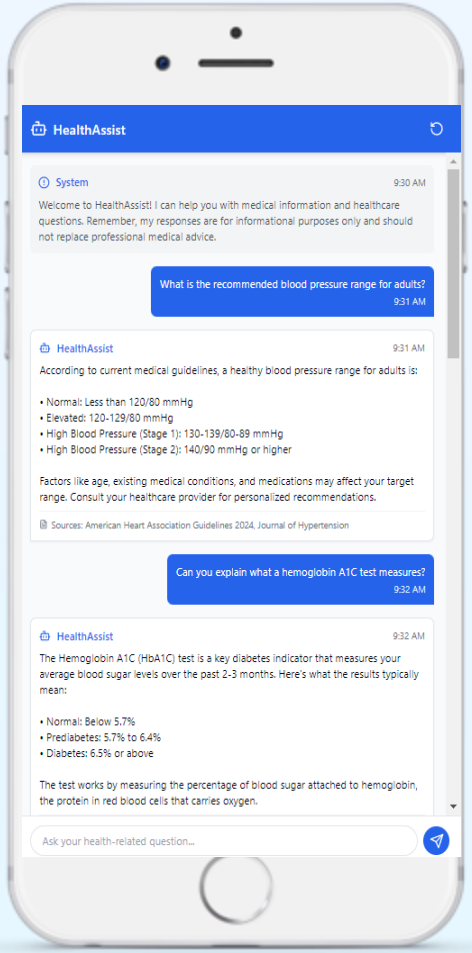
- **95%**
accuracy in providing healthcare-related information, a 30% improvement over previous systems

- **Handle 10,000+ concurrent users**
without performance degradation

- **40%**
increase in patient engagement with the healthcare information

- **35%**
reduction in customer support costs

- **20%**
decrease in unnecessary appointments thanks to improved information dissemination

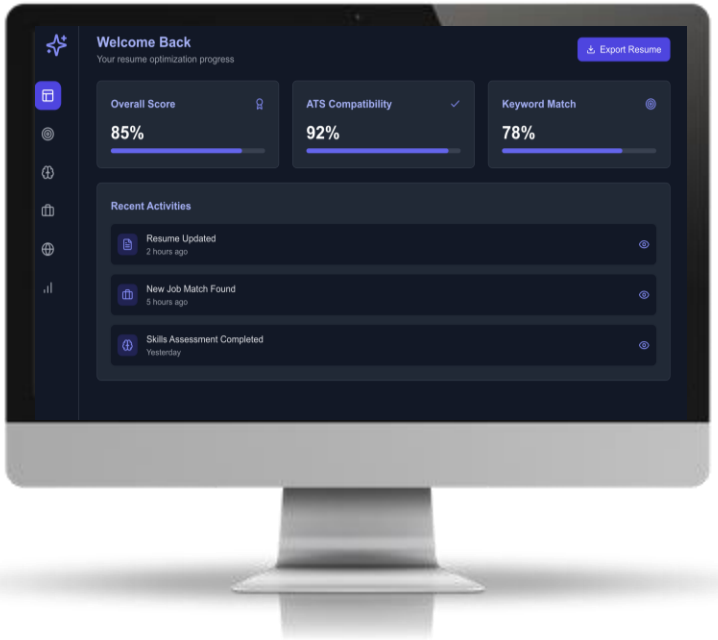


Resume Enhancement

Overview

Our client, a global tech talent platform connecting Korean developers with international opportunities, needed an intelligent system to standardize and localize professional profiles across markets. The goal was to develop an AI-powered solution that could bridge the gap between Korean and Western resume standards while preserving technical accuracy and cultural nuances.

- Country: Korea
- Domain: Professional Career Services
- AI expertise: LLM, Document Analysis



4
Members

2
Months

Development

Node.js
Redis
React
PostgreSQL

AI Services

GPT-4 API
Translation Pipeline

Cloud & Infrastructure

AWS ECS
AWS S3

Monitoring

CloudWatch

Scope of Work

- The project encompasses development of a comprehensive template standardization system with cultural adaptation and ATS optimization.
- Implementation of an LLM-powered content generation pipeline with translation capabilities and quality controls.
- Development of a integrated document generation system handling multiple output formats and quality verification.

AI Solution

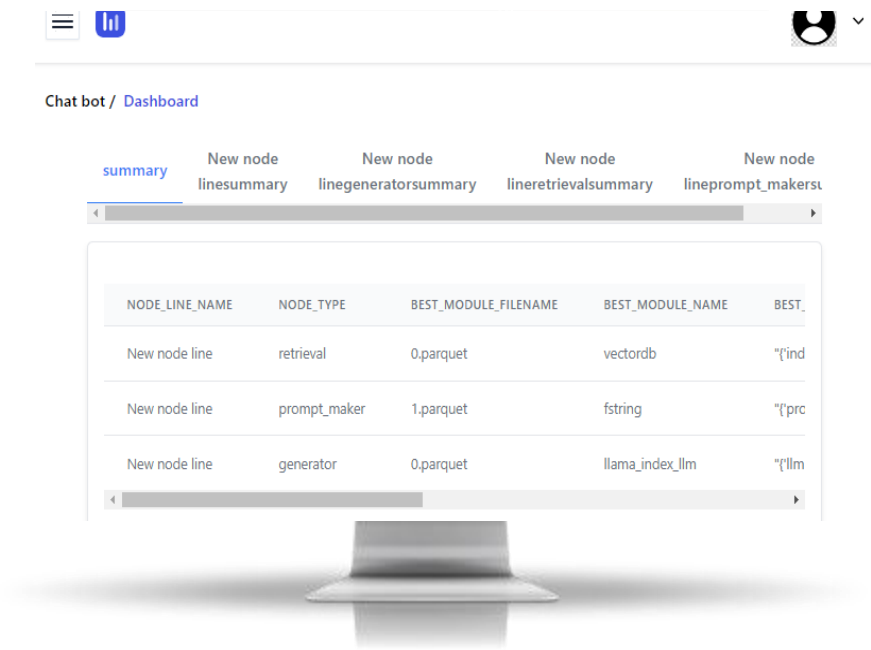
- The intelligent template manager provides market-specific formats with dynamic cultural adaptation and format optimization.
- Advanced natural language processor using different LLM (currently used as GPT-4) drives content enhancement with multilingual translation capabilities.
- High-performance document generator delivers professional outputs across multiple formats with automated quality assurance.

RAG Pipeline Evaluation System

Overview

Our client, whose expertise is in the field of LLM, needed a system to evaluate and optimize Retrieval-Augmented Generation (RAG) pipelines for their specific data and use cases. The goal was to automate the process of testing various RAG modules and configurations to find the optimal pipeline for their unique requirements.

- Country: Korea
- Domain: Technology Services
- AI expertise: LLM
- Development process: Scrum



Scope of work

- RAG Pipeline Evaluation
- Modular RAG Components
- Automated Testing
- Cloud Integration
- Performance Metrics
- Auto-deployment to chat

AI Solution

- Created a modular RAG pipeline architecture supporting various components
- Implemented comprehensive evaluation metrics for RAG performance
- Developed an automated system to test multiple RAG configurations
- Built a dashboard for visualizing evaluation results and comparisons
- Integrated the system with cloud services for data storage and processing
- Implemented auto-deployment of the best-performing RAG pipeline to a chatbot interface

Development

Python 3

ReactJS

AI

RAG Pipelines

RAG evaluation

Frameworks

TailAdmin

Deployment

Docker

AWS Codepipeline

Cloud Services

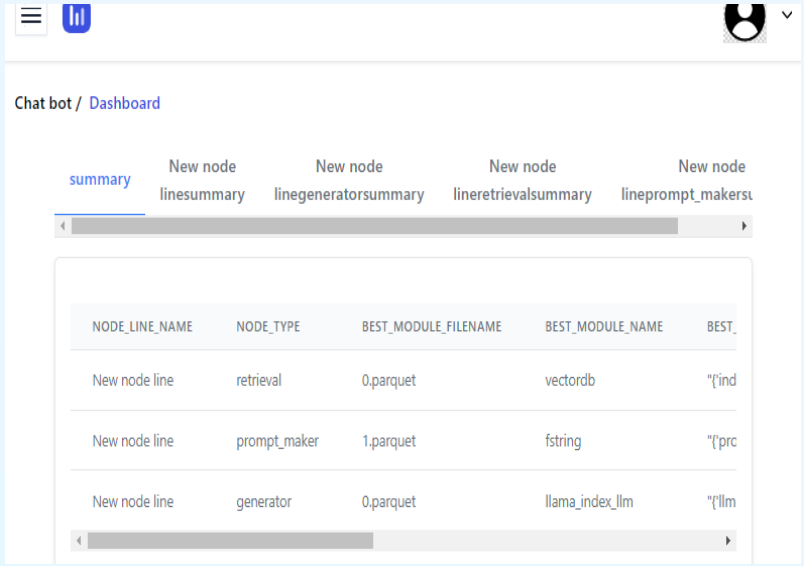
AWS Bedrock

AWS Neptune

OpenSearch

RAG Evaluation Metrics

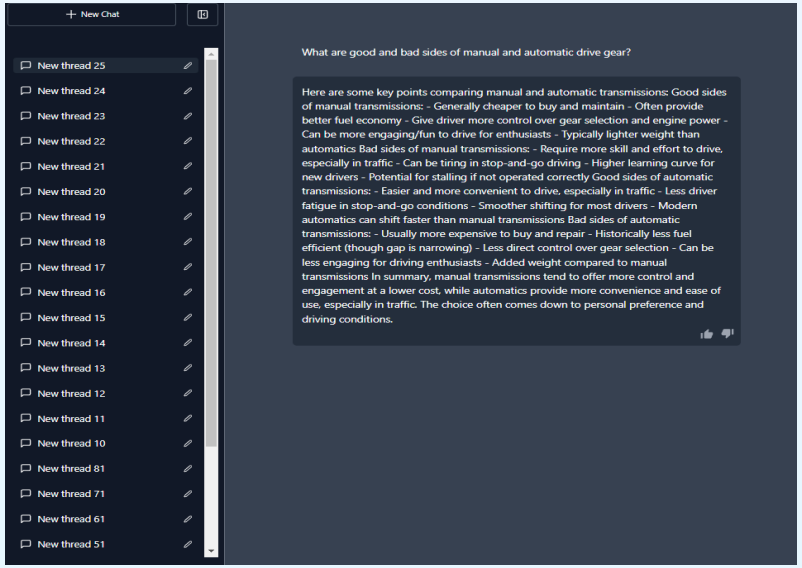
Query Exansion	Retrieval	Passage Augmenter	Passage Re-ranker	Passage Filter	Passsage Compressor	Prompt Maker	Generator
Retrieval Metrics	Retrieval Metrics	Retrieval Metrics	Retrieval Metrics	Retrieval Metrics	Retrieval Token Metrics	Generation Metrics	Generation Metrics



RAG Evaluation

Evaluate best RAG pipeline

Auto-deploy to Chat



RAG chatbot

Investment Portfolio Analytics

Overview

Our client is an investment advisory firm that needed a comprehensive dashboard solution for managing their client portfolios, financial data, and investment analytics. They required a scalable platform to handle real-time market data and provide investment portfolio analysis tools for the client to also able to view their portfolio performance.

- Country: US
- Domain: **Financial Services**
- Development process: Investment Management

To uphold our commitment to data privacy and client confidentiality, all data presented in this case study are entirely fictional and created for illustrative purposes only.

4 **Members**

3 **Months**

Scope of work

- **Dashboard UI Development**
- **Market Data** Integration
- **Analytics Engine Implementation**
- **Performance Reporting System**

Core Features

• Portfolio Analytics:
- Basic Performance Metrics
- Asset Allocation Views
- Historical Performance

• Investment Monitoring:
- Position Tracking
- Asset Class Breakdown
- Market Value Updates

• Client Reporting:
- Performance Reports
- Portfolio Statements & Asset Summaries

Development

TimescaleDB

Websocket Protocol

NodeJS

React

Data Processing

Time Series Processing

Event Streaming

Integration

Bloomberg

MSCI

Deployment

AKS with Availability Zones

Cloud Services

Azure Event Hubs

Azure DFPostGreSQL - HA

Azure Monitor

Azure Front Door

Financial Data Mapping Platform

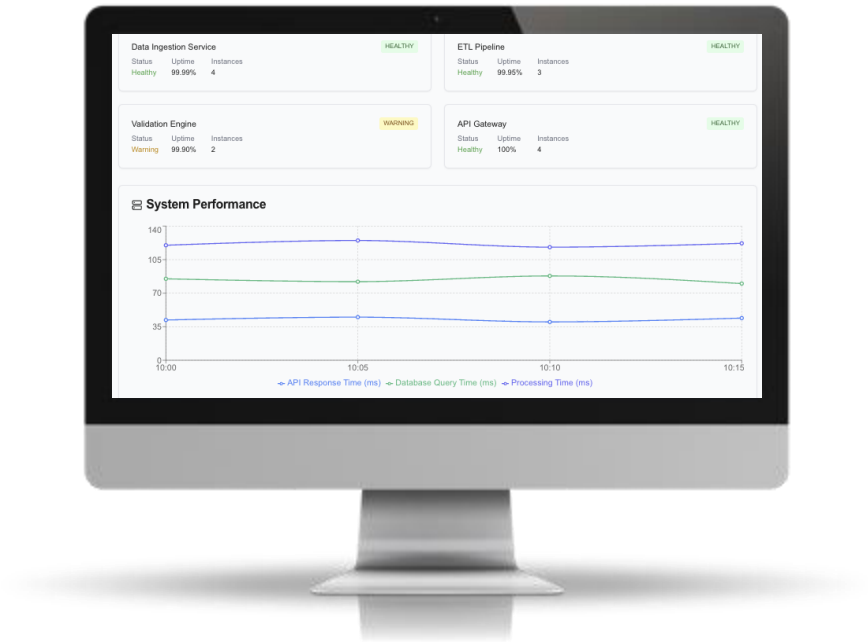
Overview

Our client, a financial solution firm needed a centralized platform to aggregate and process banking data from multiple institutions. The solution required real-time data processing, automated reconciliation, and secure API integration with various banking systems.

- Country: US
- Domain: Financial Services
- Vertical: Financial Management

5
Members

4
Months



Scope of work

- Bank API Integration System
- Real-time Data Processing ETL Pipeline
- Data Lake Architecture
- Analytics Infrastructure

Core Features

- Data Integration:
  - Multi-bank Connectivity
  - Real-time Data Streaming
  - Automated Data Validation

- Processing Engine:
  - Data Transformation Pipeline
  - Schema Standardization
  - Data Quality Monitoring

- Analytics Platform:
  - Custom SQL Querying
  - Data Visualization
  - Automated Reporting

Data Processing Layer

Apache Kafka
Apache Spark
Custom Bank Data Mapping
Apache Flink

Storage

AWS S3
AWS Redshift
AWS RDS PostGreSQL

Mapping & Transformation

Spark SQL
Schema Registry

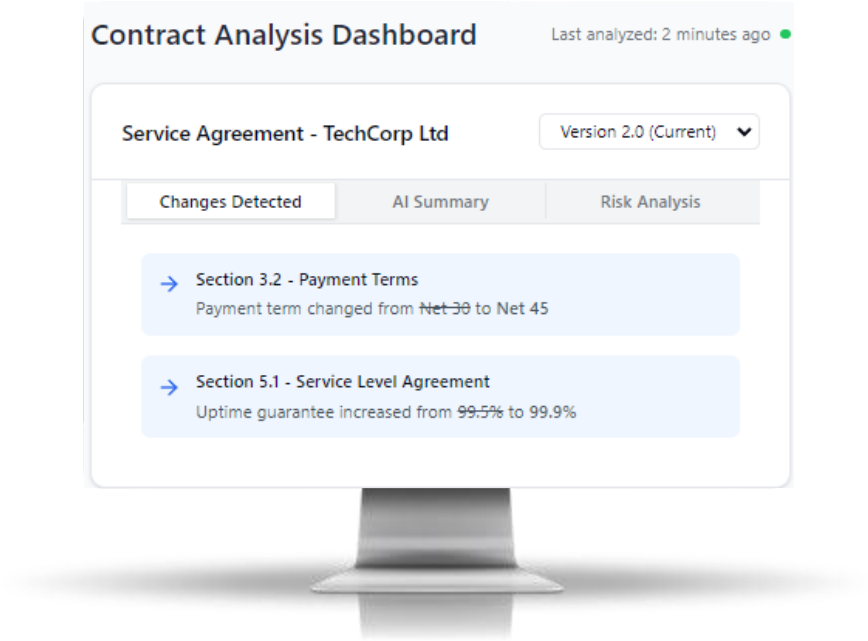
Monitoring & Security

Prometheus
ELK
AWS SNS
AWS KMS

Smart Investment Contract Management System

Overview

An AI-powered solution that automates the analysis of investment agreements and M&A documents, reducing manual review time by 70%. The platform automatically detects risks, tracks changes across document versions, and streamlines due diligence by extracting key terms and conditions from complex investment documents.



System capabilities

- Multi-format document support (PDF, Word, Excel)
- Automated term extraction and classification
- Custom template creation and management
- Advanced reporting and analytics dashboard

Technology Highlights

- Cloud-based architecture
- Enterprise-grade security
- API integrations
- Custom workflow engine

AI Solution

- **Contract Change Tracking**: Automatically compare and track revisions between contract versions to provide a clear audit trail of changes
- **Contract Summarization**: Generate concise summaries of key contract points to enable faster reviews by legal teams
- **Toxin Clause Detection**: Identify and flag potentially harmful or risky clauses

AI Services

Vertex AI Pipelines

Data Storage & Management

Google Cloud Storage

Cloud SQL

Backend Services

Vertex AI Model Endpoints

Cloud SDK

Workflow Orchestration

Vertex AI Pipelines

Security & Monitoring

GCP IAM

Cloud Logging

Banking Document Mangement System

Overview

Our client is developing an internal Q&A system requiring local AI model hosting for data privacy and performance. The system will use Llama 3 70B fine-tuned model to process technical documentation and provide accurate responses to user queries while maintaining all data within their local server.

- Country: Vietnam
- Domain: Banking/Finance
- AI expertise: LLM with data privacy protection
- Development process: Scrum

4 Members

3 Months

Development

FastAPI | PostgreSQL | Redis | MinIO

AI

Fine-tuned Llama 3-70B | VLLM | RAG & Langchain

Deployment

GPU Cluster | Client's Server

Monitoring

Prometheus | Grafana

Scope of work

- Model Fine-tuning Development
- RAG System Integration
- Performance Optimization

Core Features

- Implemented local hosting for Llama 3 70B with optimized inference. Fine-tuned Llama 3 70B on client's proprietary data on LORA.
- Created streaming chat interface with context management
- Developed document processing pipeline with chunking optimization. Implemented a system to track document updates.
- Built comprehensive monitoring system for performance metrics
- Integrated security controls for bank compliance
- Implemented auto-scaling for resource management.

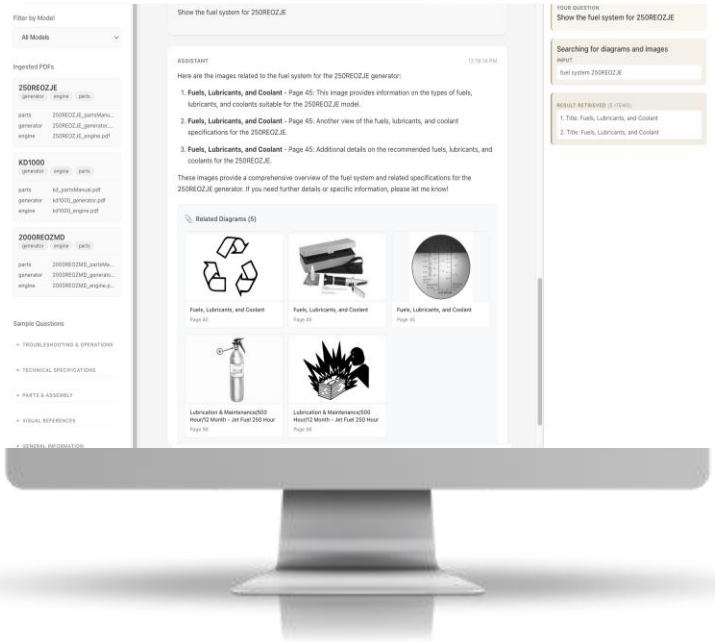
Note: Display shows simulated performance metrics and system statistics as this is an ongoing project. Actual production metrics, document counts, and system activities contain client-sensitive information and are subject to confidentiality agreements.

Generator Manual AI Assistant

Overview

Our client is building an internal AI assistant to give technicians faster, more accurate answers and parts lookups from generator manuals, directly inside Microsoft Teams. The system ingests complete generator, engine, and parts manuals, combines semantic search with structured parts data, and returns source-grounded answers with auditable citations and API-ready outputs.

- Country: US
- Domain: Industrial equipment service
- AI expertise: Agentic Hybrid RAG
- Development process: Agile



6 Members

4 Months

Development

FastAPI | Typescript | Azure VM | CosmosDB

AI

OpenAI LLM | Tool Calling | Agent Orchestration

Deployment

Kubernetes | Azure SQL DB

Monitoring

RAG Metrics | System Metrics

Scope of work

- Manual & parts catalog ingestion pipeline
- RAG + tools-based generator manual assistant
- Microsoft Teams integration and quality evaluation

Core Features

- Engineered an ingestion pipeline for engine, generator, and parts manuals with automatic tagging, page-level vector index, and normalized SQL parts tables.
- Delivered a conversational Q&A assistant for troubleshooting, operations, and specifications with source-linked citations and a robust no-answer fallback.
- Built structured parts lookup for precise part numbers, assembly breakdowns, and cross-model compatibility with table-ready outputs.
- Designed an agentic orchestration layer that routes between semantic search and SQL tools and consolidates results across data sources.
- Integrated the assistant into Microsoft Teams so technicians can access manuals and parts information within their existing workflow.
- Established an initial evaluation framework to measure retrieval quality and guide further optimization.

Steel Plates Image-to-text System

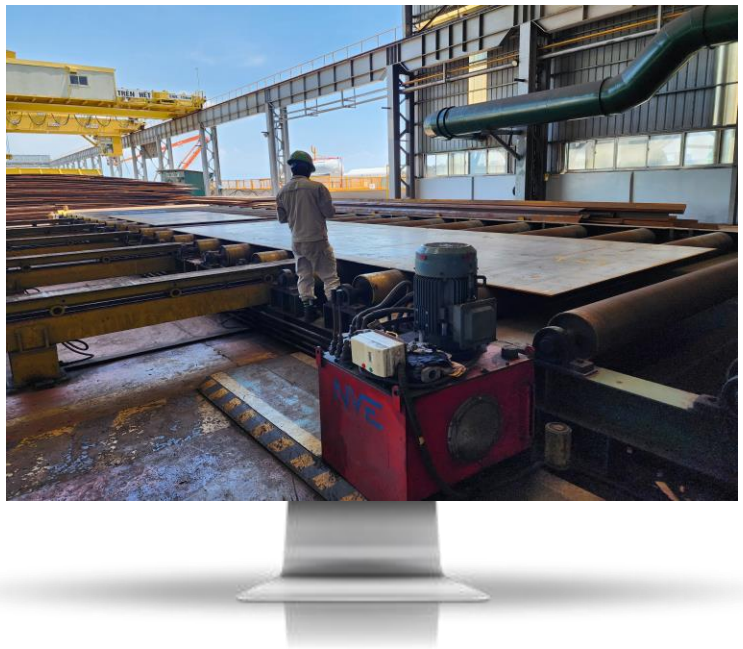
Overview

Our client, a steel processing facility, aimed to automate their steel plate identification and data logging process. The project's goal was to replace manual verification and logging with an automated system using cameras and OCR technology, integrating with their existing Oracle database.

- **Country: Korea**
- **Domain: Technology**
- **AI expertise: CV**
- **Development process:** Scrum

4 Members

5 Months



Scope of work

- Hardware setup: Installation of industrial-grade cameras and lighting systems
- Software development: OCR integration and database connectivity
- Data processing: Automated verification and logging of captured data

AI Solution

- Developed an end-to-end system for automated steel plate text capture and processing
- Implemented OCR technology to extract text from captured images of steel plates
- Created a synchronized software solution to control cameras and lighting for optimal image capture
- Integrated real-time data verification and error handling mechanisms
- Automated data input into the existing Oracle database system

Hardware

Industrial High-Resolution cameras

Adaptive Lighting Systems

ML Technique

Custom OCR AI model

Data Mangement

Oracle Database

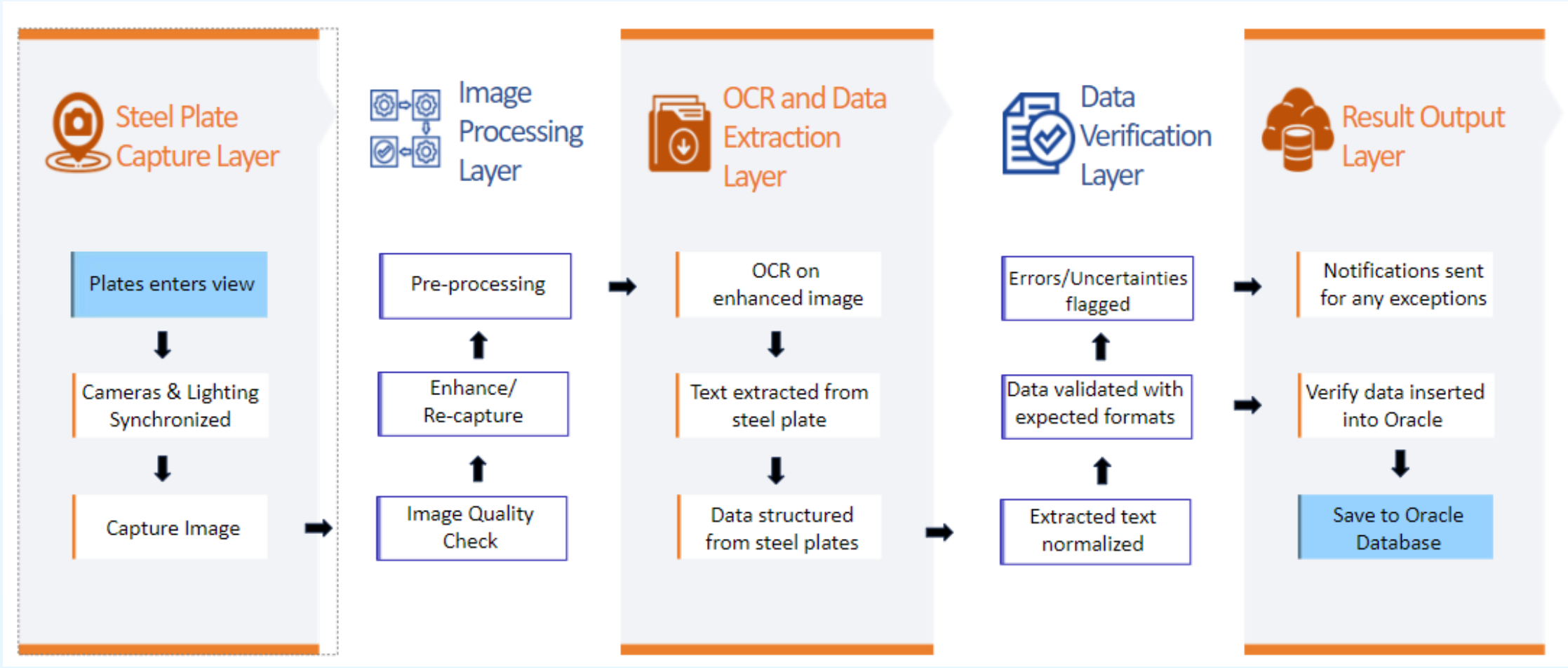
System Integration

Flask

Monitoring

ELK Stack

Image-to-Text Multi-layered Architecture

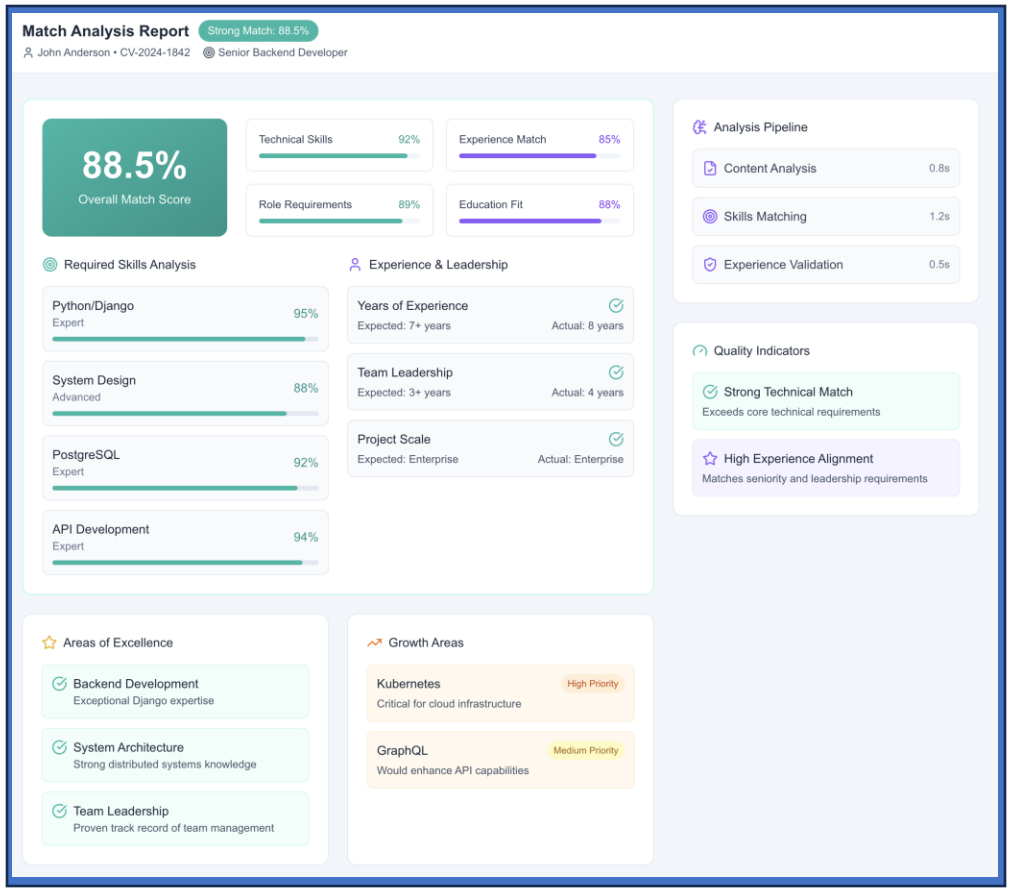


Intelligent Job Matching Platform for IT Recruitment Agency

Overview

Our client is a specialized IT recruitment agency processing 5,000-7,000 technical CVs monthly. This project aims to deploy a custom job matching system using text-embedding-3-large model for semantic search and matching.

- Country: Hong Kong
- Domain: HR
- AI expertise: GenAI, Speech-to-text
- Development process: Scrum



Scope of Work

- CV & Job Description Processing
  - Document parsing and standardization
  - Technical skill extraction
  - Format normalization
- Embedding Pipeline Development
  - Integration with OpenAI's API
  - Vector search implementation
  - Batch processing system
- Matching System Development
  - Scoring algorithm development
  - Cache implementation
  - API development

AI Solution

- Document Processing System
  - Apache Tika for extraction
  - Custom parsers for structure
  - Technical term standardization
- Embedding System
  - OpenAI text-embedding-3-large
  - Batch processing (32 docs)
  - Pinecone for vector storage
- Matching Engine
  - Custom scoring algorithm
  - Technical skill matcher
  - Experience level analyzer

Core Services

FastAPI | FFmpeg | Azure Blob S | PostgreSQL | Redis

Storage

Pinecone | Redis | PostgreSQL

Infrastructure

EKS | Docker Container | AWS Load Balancer

Monitoring

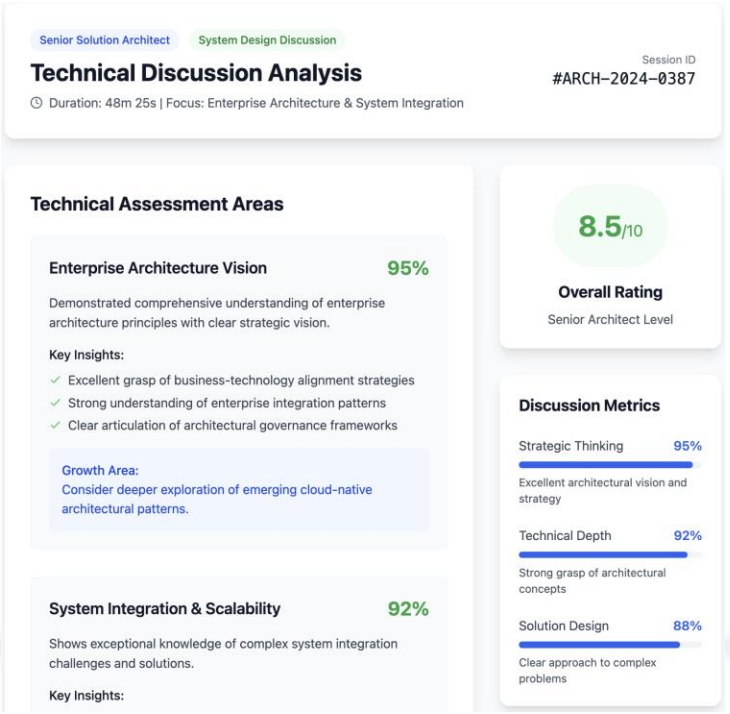
Prometheus | ELK Stack | Grafana

Interview Analysis System for Technical Recruitment

Overview

Our client is a technical recruitment firm conducting over 150 technical interviews monthly. They want to build a custom interview analysis system using existing LLM models. The goal is to automate the transcription and analysis of technical interviews to provide consistent evaluation and reduce manual effort for the interviewer to easier assess the candidates

- Country: Vietnam
- Domain: HR
- AI expertise: GenAI, Speech-to-text
- Development process: Scrum



3 Members

2 Months

4 Features

Scope of Work

- Audio Processing Development
- AI Integration
- Analysis & Reporting

Core Features

Transcription Pipeline

1. Processing and chunking audio files
2. Technical terminology recognition
3. Speaker separation for Q&A tracking

Analysis System

1. Technical content evaluation
2. Communication clarity assessment
3. Problem-solving methodology analysis

Report Generation

1. Structured feedback creation
2. Technical competency scoring
3. Interview summary generation
4. Key highlight extraction

Core Services

FastAPI | FFmpeg | Azure Blob S | PostgreSQL | Redis

AI Models

Whisper API (Transcription) | GPT-4 (Audio Analysis)

Infrastructure

Azure Kubernetes Service | Load Balancer | Docker

Monitoring

Prometheus | ELK Stack | Grafana

Customer 360 Platform

Overview

Our client is a bank in Vietnam with a need to synchronize data and integrate related systems. This system helps to centralize, and consolidate all customer data, and manage and store comprehensive, multi-dimensional, and in-depth information about each customer.

- Country: Vietnam
- Domain: Banking
- AI expertise: Data processing | ML
- Development process: Scrum

System Feature

- Daily planner for sales
- Manage KPI activities
- Business planning tool
- Planning to exploit customers
- Control Statistics and Reporting

System Functionality

- Synchronized customer data from Data Warehouse
- Integrated Core Banking T24, AML (Anti-Money Laundering System), LOS (process of individual customer's loan), Document rotation (process of business loan)
- Managed customer information, needs, and sales opportunities
- Did task and work management
- Reporting

2	8	8
Members	Months	Features

Language

Python | Spark | Java 1.8.x | Hive/PL/SQL | JS/HTML/CSS

Framework

Angular JS | Spring Boot | ETL | JSF Spring | Hibernate 4.x

Database

ER-Oracle | Apache Solr | Hadoop

Big data processing

Kafka | Spark | Hadoop

ML Techniques

Random forest | Neural network | Gradient Boosting | Support Vector Machine

Fire and Smoke Detection

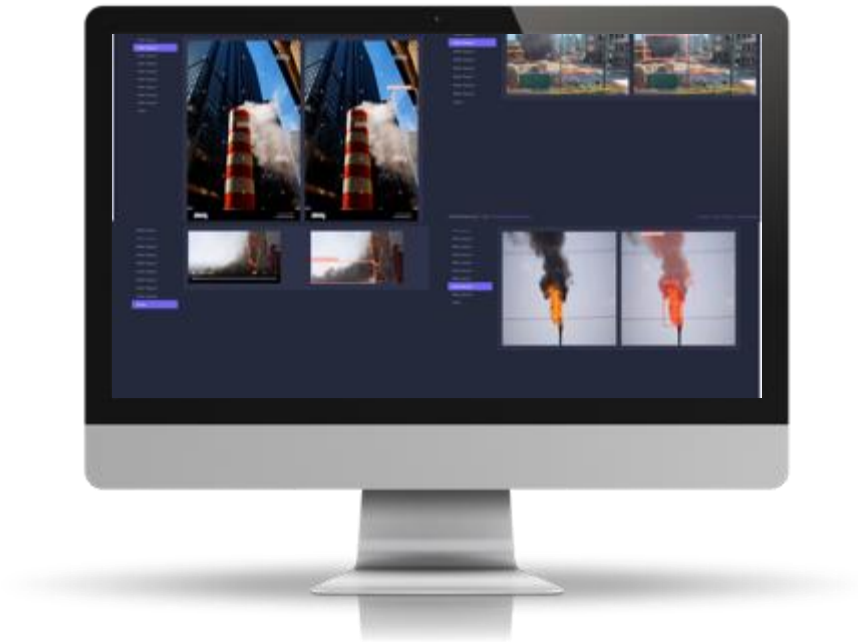
Overview

Our client wanted to build a smoke and fire recognition prototype system at construction sites to provide timely warnings.

- Country: U.S.
- Domain: Enterprise
- AI expertise: Computer vision
- Development process: Scrum

4 Members

5 Months



Scope of work

- Development

AI Solution

- **Collecting fire and smoke image dataset:** The fire and smoke dataset for object detection includes 700 images. There are 1000 fire and smoke images for segmentation.
- **Selection of the suitable model:** We used two models YOLOv8-n for fire and smoke detection and YOLOv8-n-seg for fire and smoke segmentation. Fine-tuned model on 25GB smoke-fire dataset.

Language

Python 3 | C++

ML Model

YOLOv8-n | YOLOv8-n-seg

ML Technique

Object Tracking | Object Detection | Style Classification

Framework

VueJS

Cloud

Azure

Banking Customer Register Application

Overview

Our client wanted to enhance their bank's customer onboarding process by implementing mobile eKYC technology and face matching module.

- **Country:** Vietnam
- **Domain:** Banking
- **AI expertise:** Computer vision | Facial recognition
- **Development process:** Scrum

3 Members

3 Months

7 Features

App Benefit

- Enhanced Security
- Fraud Prevention
- Improved Customer Experience
- Operational Efficiency
- Regulatory Compliance

System Functionality

- Document Capture & OCR
- Data Extraction and Validation
- Customer Photo Database
- Real-time Face Matching
- Facial Recognition Algorithms
- Confidence Threshold
- Alert Generation

Language
Python

ML model
Eigenfaces

Facial Recognition
Dlib
Elasticsearch

Database
PostgreSQL

Development
React.js
Django
React native

Platform
Web
iOS
Android

Real-Time Voice Assistant on an Omnidirectional Microphone Array

Overview

A US–Vietnam partnership required a low-latency Speech-to-Text (STT) system that captures multidirectional voice input and displays accurate real-time subtitles in English and Vietnamese. The client's application environment posed a high-noise challenge, demanding an optimized neural model and embedded noise suppression techniques for transparent speech capture.

- Country: US-Vietnam
- Domain: Voice Assistant/Speech Recognition

Scope of work

- Quantizing STT model, utilizing ReSpeaker capabilities to optimize for low-latency inferencing
- Limited the STT vocabulary to **English** and **Vietnamese**. Ensured swift context switching between both languages in real time.
- Managed noise removal within the speech transmission pipeline to boost speech clarity & handled **two simultaneous speakers** by leveraging separate channels.

Techniques

- Employed **spectral subtraction** and **spatial filtering** to separate multiple voice inputs.
- Implemented real-time filtering to handle ambient noise in dynamic indoor/outdoor conditions.

4	3	5
Members	Months	Features

Libraries

ODAS | LibreSpeaker

Hardware

ReSpeaker 6-mic Circular Array Kit | Raspberry PI

Techniques

DoA | Sound source separation | Environment Noise Suppression

Embedded AI

KWS

LTS GenAI Chatbot

Your AI-Powered Document Assistant

Quick Deployment • Easy Integration • Immediate Value

Powered By

LTS Group

Built End-to-End with

AWS

Document Management Challenges are Limiting Organizational Efficiency

As organizations manage growing volumes of documents and policies, teams struggle with accessibility, consistency, and rapid response times - impacting both employee productivity and satisfaction.

Time-to-Information is Too Long

Employees spend hours searching through documents and waiting for responses, leading to delayed decisions and reduced productivity.

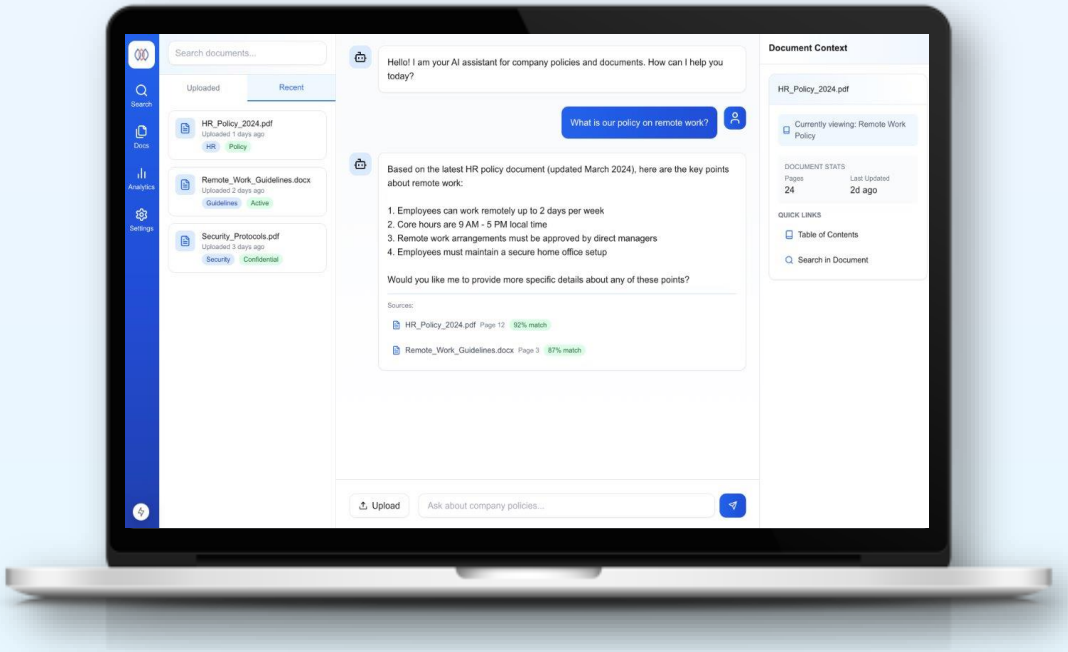
Support Teams are Overwhelmed

Employees spend hours searching through documents and waiting for responses, leading to delayed decisions and reduced productivity.

Inconsistent Information Access

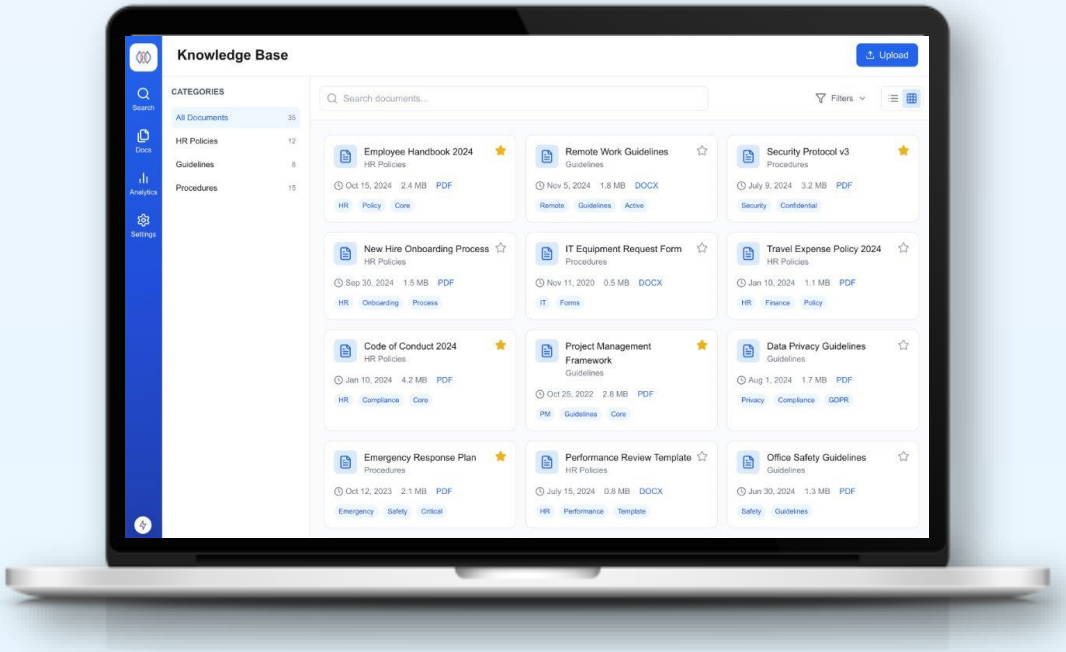
Organizations of all sizes face inconsistent information delivery across departments, leading to operational inefficiencies and compliance risks.

Intuitive & User-friendly Interface



- Natural conversation with context-aware responses
- Instant document search and citation

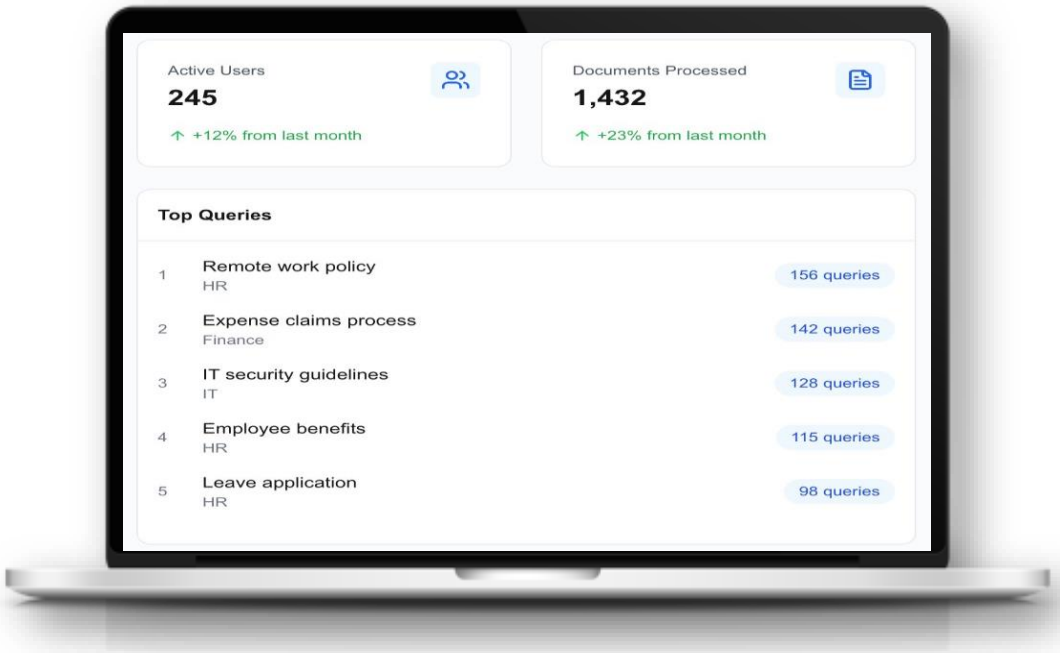
Easy Document Management

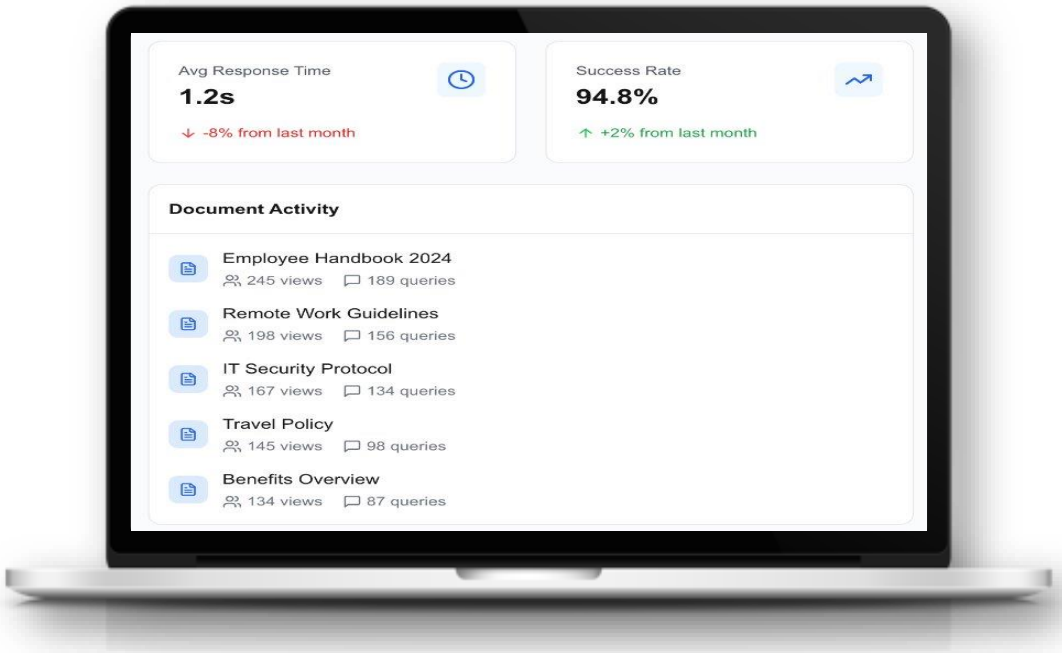


- Organized document categories and tags
- Secure document access controls

Note: All data shown is fictional and for demonstration purposes only

Monitoring Dashboard





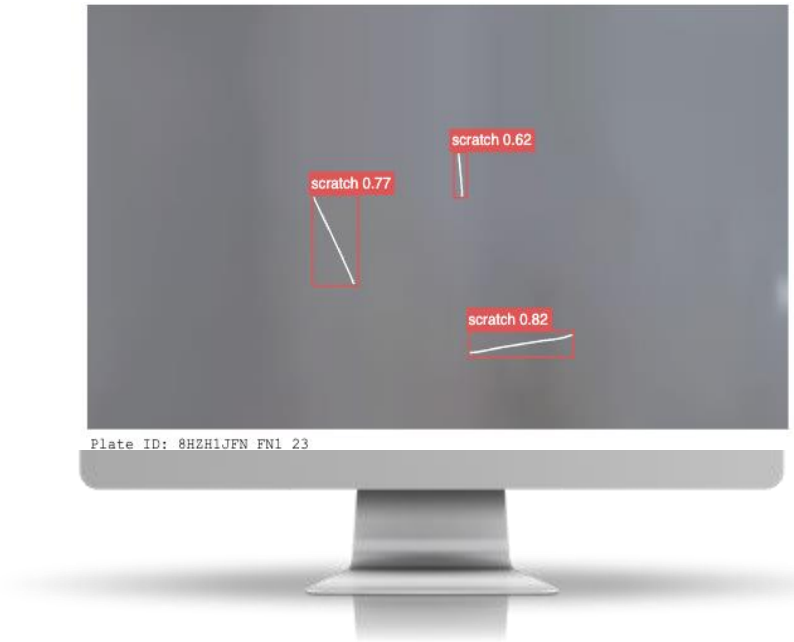
Note: All data shown is fictional and for demonstration purposes only

Automated Scratch Detection Quality Control System on Steel Plates

Overview

A global steel producer experiences frequent quality assurance failures because human inspectors often miss microscopic scratches on steel plates. The company needs a high-accuracy deep learning model that detects surface defects immediately. The main goal is to eliminate misclassifications, accelerate inspections, and reduce production costs.

- Country: Vietnam
- Domain: Manufacturing
- AI expertise: Computer Vision, Automation



4 Members

2 Months

Development

Python | OpenCV | DVC | YOLO

Model Training & Deployment

YOLOv8 | ONNX

Hardware

NVIDIA Jetson AGX Orin | GigE Vision Cameras | Nvidia A100 GPU

Monitoring

Grafana | Prometheus | CloudWatch

Scope of Work

- Use GigE Vision Cameras with NAS and a 10 Gbps network for real-time image storage.
- Annotate scratch defects with CVAT and manage datasets using DVC + Git for version control.
- Train with YOLOv8 on PyTorch, and export in ONNX format for deployment. Train on NVIDIA A100 GPUs and validate on Jetson AGX Orin for edge deployment.
- Automate retraining with Jenkins and Docker, incorporating low-confidence predictions.
- Deploy the model on Jetson AGX Orin and integrate with factory SCADA systems for defect reporting.

AI Solution

- High-Performance Model Training: Using YOLOv8 with PyTorch, optimized for scratch detection on steel plates
- Automated Dataset Management: Integrated with DVC and Git for dataset versioning and traceability.
- Continuous Retraining Pipeline: Automated pipeline for retraining and model versioning.
- Edge Deployment Ready: Model packaged and optimized for NVIDIA Jetson AGX Orin for real-time inference on production lines.

Note: As for privacy, all data shown is for demonstration purposes only

R&D

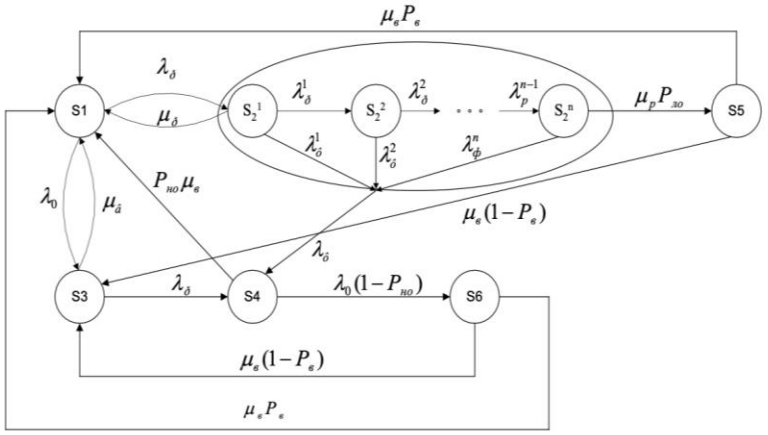
Synthesis of Functional Control Points for a Neuroprocessor-Based Automatic Control System

Research Overview

Modern **neuroprocessor systems (NPS)** are increasingly used in advanced control applications—ranging from complex industrial processes to mobile robots. To ensure **fault tolerance** and **high reliability**, these systems require built-in control and diagnostic methods. This case study outlines the development of:

- A **control machine** that integrates **functional control points** (FCPs) for the NPS.
- **Mathematical models** that describe the interaction between a **neuroprocessor system** and an **automatic control** (AC) machine.
- **Algorithms** for real-time fault detection, partitioning, and recovery within a **neuroprocessor network** controlling a mobile robot.

-> The overall goal is to maintain continuous operation under various failure flows, ensuring reliability even in challenging conditions.



Enhanced Reliability

- Reduced downtime
- Proactive maintenance
- Swift recovery from failures

Practical Applications

- Mobile robotics
- Industrial control
- Research systems

Background & Challenges

2.1 Neuroprocessor Systems (NPS)

- Hardware Reconfigurable: NPS often have adaptive hardware architectures targeting specific classes of tasks.
- Reliability Focus: Ensuring high fault tolerance is essential, as failures can disrupt mission-critical operations (e.g., mobile robots).

2.2 Automatic Control Devices (AC)

- Operating Multiprocessor Systems (MPS): Includes NPS and supporting controllers to reduce troubleshooting time and process diagnostic information rapidly.
- Key Objectives:

1. High-Speed Diagnostic Processing
2. Fault Tolerance via Real-Time Monitoring
3. Efficient System Recovery from failures

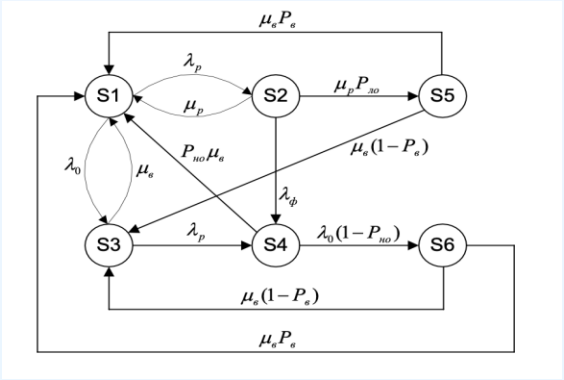
2.3 Integrated Challenge

- Need for a Unified Model: Combine NPS with an AC machine that manages diagnostic inputs and orchestrates reconfiguration or recovery.
- Ensuring Testability: Design algorithms and functional control points so that both hardware and software can be tested and monitored in real time.

Methodology & Technical Approach

Synthesis of Functional Control Points

• The system employs **functional control points (FCPs)**, which act as **information inputs** for a **control machine**.
• **Partitioning Algorithms** (half partitioning, majority, majority-dynamic) split the NPS into fragments, enabling targeted monitoring and control at each segment.



Synthesis of a mathematical model of reliability "neuroprocessor system - automatic control" with failure flow

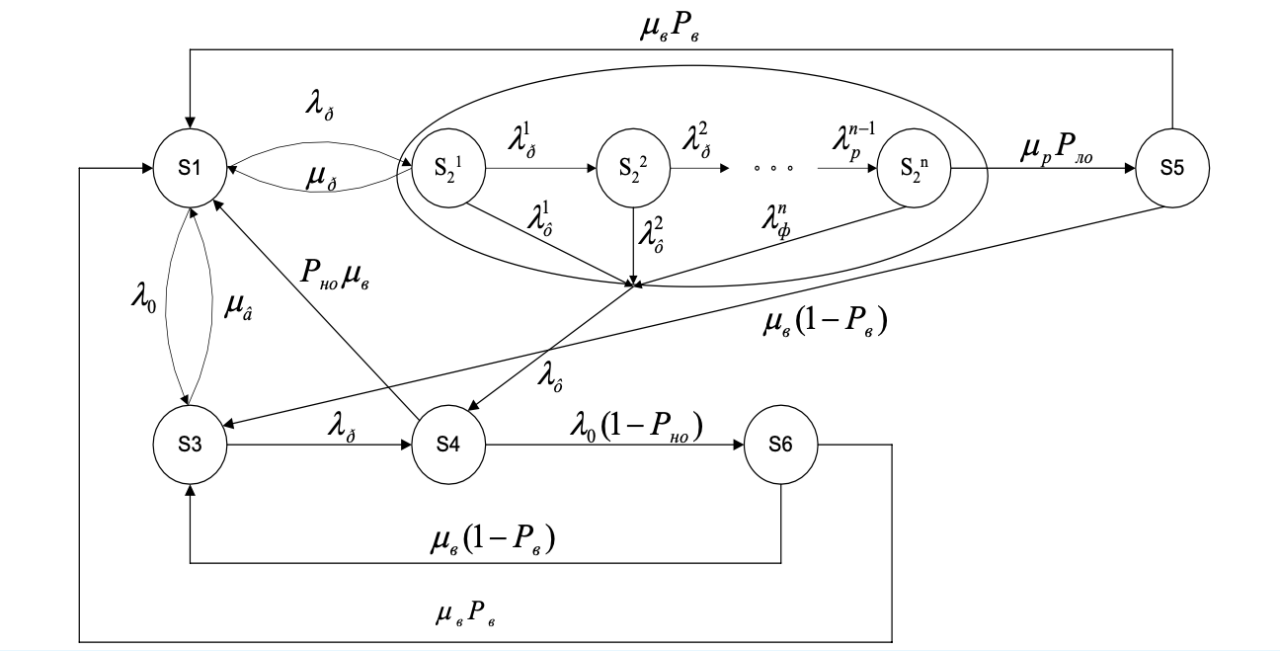
Markov Models

• **State Graphs**: Each state (S1, S2, S3, S4, etc.) represents a specific condition (e.g., operating vs. faulty, standby vs. active).
• **Transitions**: Defined by intensities such as failure rates (\lambda) and recovery rates (\mu).
• **System Availability**: A **Laplace or Laplace-Stieltjes transform** is used to calculate transition probabilities and derive the availability coefficient.
• **Extended Models**: Real-world scenarios add extra states (e.g., S5, S6) to capture partial or conditional failures and rejections by the AC machine.

Algorithms for Automatic Control

• **Real-Time Monitoring**: Continuous evaluation of each fragment of the NPS ensures immediate detection of anomalies.
• **Dynamic Reconfiguration**: On detecting a potential failure, the system can isolate faulty segments or switch to redundant paths.
• **Integrated Diagnostics**: A specialized analog-to-digital converter of the “neural network” type processes both digital and analog signals, unifying the diagnostic approach.

Implementations



Development of a mathematical model of reliability "automatic control - neuroprocessor control system"

Implementation in a Mobile Robot Control System

Built-In Monitoring Hardware & Software:
- Embedded sensors and FCPs track performance metrics.
- The system halts or re-routes signals in real time upon anomaly detection.

Neuroprocessor Configuration:
- The NPS is designed with a reconfigurable architecture to solve motion control and object detection tasks.
- Partitioning algorithms (e.g., majority-dynamic partitioning) enhance testability by isolating problem areas.

Automatic Control Integration:
- The AC machine employs the Markov-based reliability model to assess each subsystem's state.
- In standby or operational modes, failure flows are monitored, and if the main path fails, backup resources engage seamlessly.

GET IN TOUCH WITH US!

BUILDING ADDRESS

Vietnam: 17th floor, MD Complex Tower, 68 Nguyen Co Thach, Ha Noi

Japan: 2F, Industry & Trade Center, 2 Yamashita, Naka Ward, Yokohama, Kanagawa 231-0023, Japan

United States: 25787 Rawley Springs Dr, Chantilly, VA, 20152 - 5744, United States

South Korea: 12th floor of Hyeonik Building, 146, Teheran-ro, Gangnam-gu, Seoul, Korea

EMAIL

contact@ltsgroup.tech

WEBSITE

www.ltsgroup.tech

TELEPHONE

(+84) 24-6660-7474