LTS GROUP

AI Services

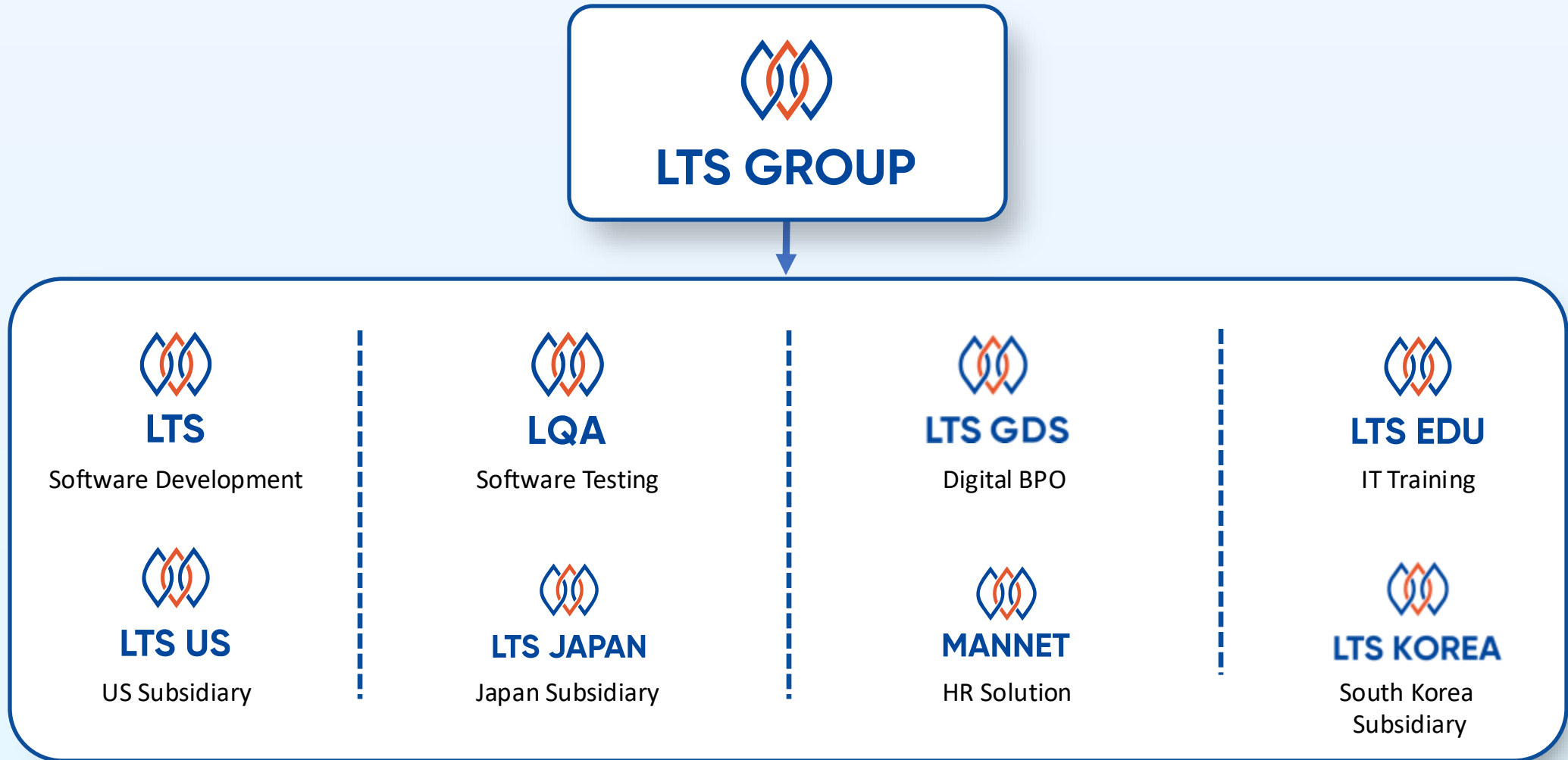# Outline

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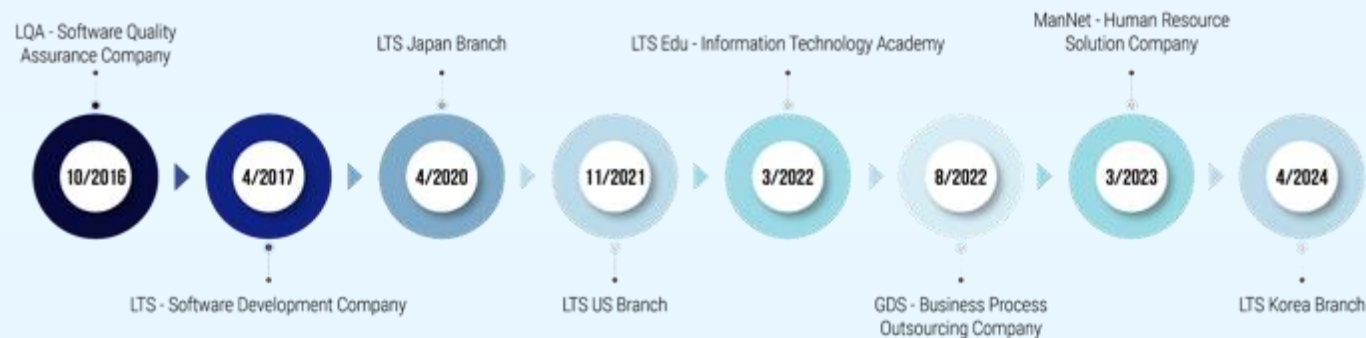
Established in 2016, LTS Group is a fast-growing IT outsourcing services provider in Vietnam. Formerly a leading Quality Assurance company in Vietnam (LQA), LTS Group has expanded our service lines and leveraged our core advantage in quality assurance and industry insights. Currently, we have subsidiaries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

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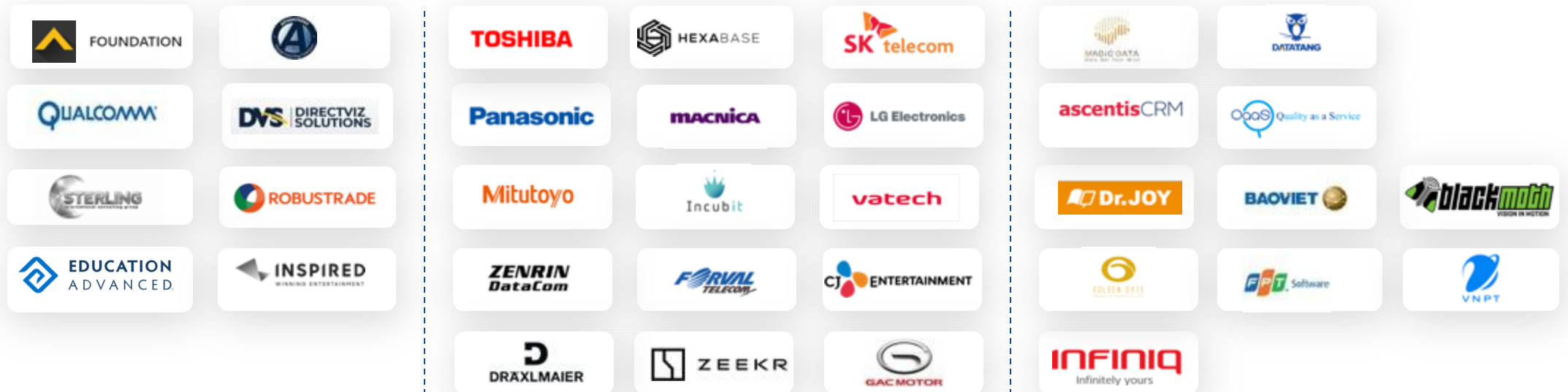- Software Testing
- Digital BPO
- HR Solution

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 GROUP

LTS
Software Development

LTS US
US Subsidiary

LQA
Software Testing

LTS JAPAN
Japan Subsidiary

LTS GDS
Digital BPO

MANNET
HR Solution

LTS EDU
IT Training

LTS KOREA
South Korea Subsidiary

Clients & Partners Portfolio Across 4 Continents

Why Adopt AI-powered Solution?

Enhanced efficiency and productivity
AI automates routine tasks, enabling faster operations and allowing employees to focus on more strategic activities.

Data-driven decision making
AI analyzes vast amounts of data quickly, providing actionable insights that help businesses make informed decisions.

Innovation and competitive advantage
AI drives innovation, supporting businesses develop new products and services, thus maintaining a competitive edge.

Personalized customer experiences
AI tailors interactions by predicting customer preferences, leading to improved satisfaction and loyalty.

Improved quality control
AI enhances quality assurance by detecting defects in real-time, ensuring consistent product and service quality.

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
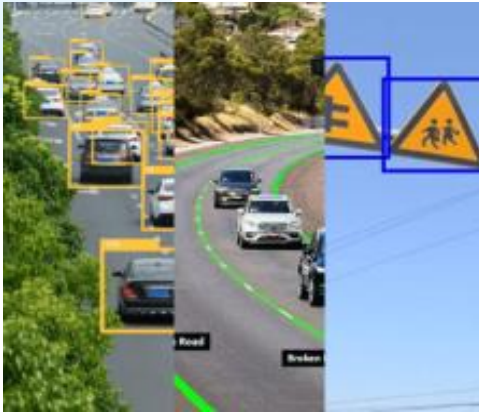
Robotic Process Automation (RPA)

- 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

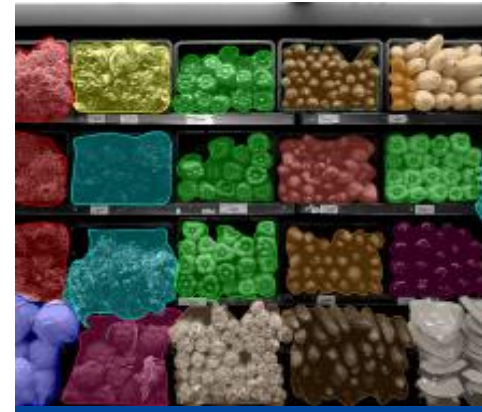# Data Collection & Preparation Service - Industries We Serve

ADAS & Transportation

Industrial Automation

Retail & E-commerce
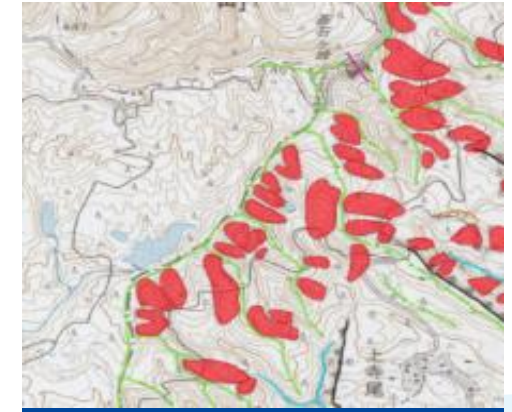
Mapping & Geospatial

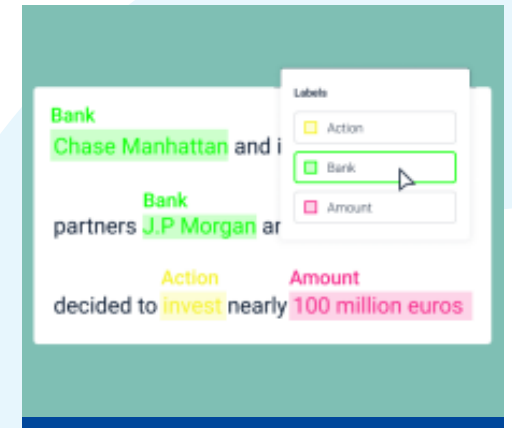**Security Monitoring**

Sports
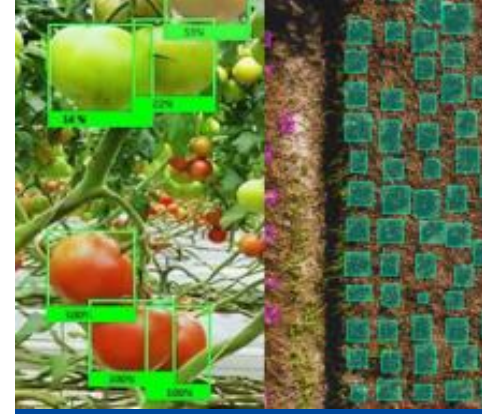
Agriculture

Finance & Banking

Our Main Services

Machine Learning - ML

Computer Vision

Natural Language Processing - NLP

Speech

Generative AI

AI-driven Business Intelligence

Data Collection & Preparation

Data Science

Our Human Resources
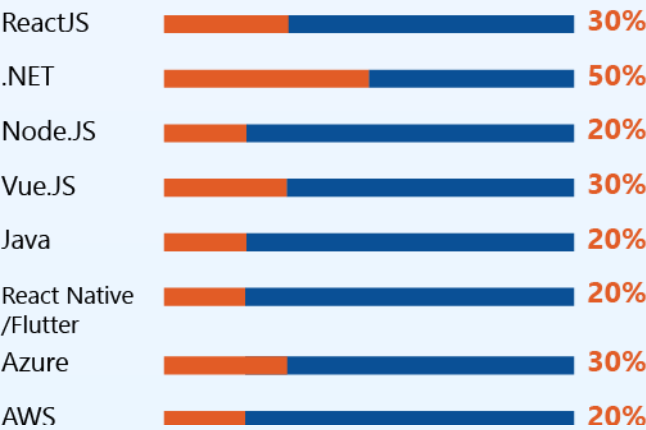
ReactJS **30%**
.NET **50%**
Node.JS **20%**
Vue.JS **30%**
Java **20%**
React Native /Flutter **20%**
Azure **30%**
AWS **20%**

All AI/Data Engineers/Developers are experienced in Python.

Development Skills

- 35% Data & Analytics
- 48% AI Engineering
- 17% Cloud & System Infra

Seniority

- 34% Junior
- 41% Middle
- 25% Senior

Language Ability

We obtain high level of language proficiency for effective communication with our clients.

87%	**26%**	**5%**
English	Japanese	Korean

A number of Employees are trilingual

Professional Certificate

Our staff can meet the international standards of both management and technical skills.

52% **10%** **5%** **36%**
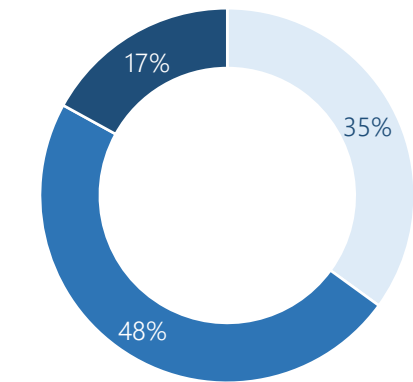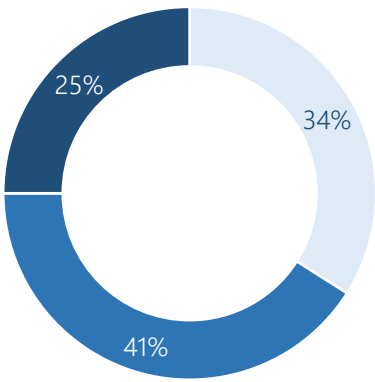
Our Human Resources

Domain Specialization Distribution
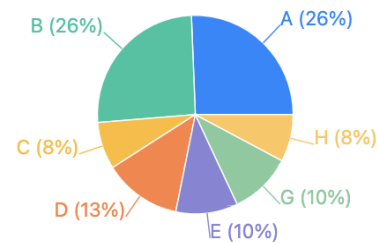
All AI/Data Engineers/Developers are experienced in Python.

Team Distribution by Domain & Seniority
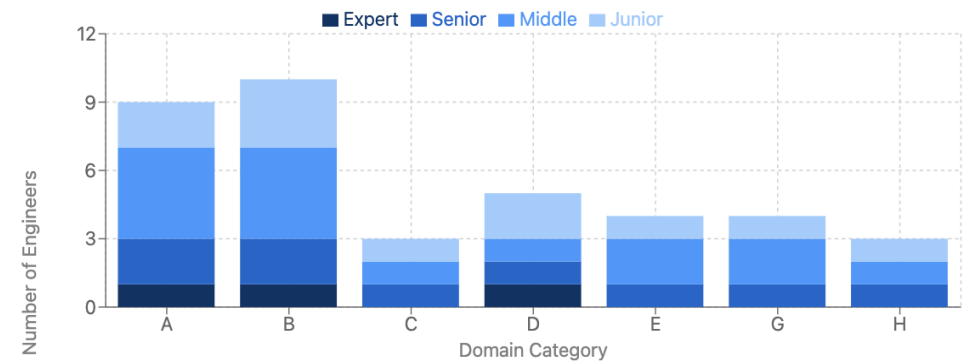
A: Natural Language Processing (10)
Generative AI & LLMs, finetuning, quantization, agentic & reasoning
`3 Jr` `4 Mid` `2 Sr` `1 Ex`

B: Computer Vision (10)
Traditional, finetuning, diffusion & generative CV
`3 Jr` `4 Mid` `2 Sr` `1 Ex`

C: Speech & Audio Processing (3)
Speech recognition, audio processing, voice synthesis
`1 Jr` `1 Mid` `1 Sr` `0 Ex`

D: Time Series Analysis (5)
Streaming, real-time & anomaly detection
`2 Jr` `1 Mid` `1 Sr` `1 Ex`

E: Recommender Systems (4)
Collaborative, content & large-scale systems
`1 Jr` `2 Mid` `1 Sr` `0 Ex`

G: MLOps & Deployment (4)
CI/CD, Docker/K8s, MLflow, Cloud Services
`1 Jr` `2 Mid` `1 Sr` `0 Ex`

H: Edge & Embedded AI (3)
TensorRT, ONNX Runtime, hardware acceleration
`1 Jr` `1 Mid` `1 Sr` `0 Ex`

Technology – AI & ML

Innovation fuels us. We constantly update new tools & technology, conduct intensive training programs and always seek for new approaches.

Process

Stage 2: System Design and Architecture

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

Stage 4: AI Model Development

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

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

1 2 3 4 5 6 7

Stage 1: Requirements

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

Stage 3: Data Collection & Preparation

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

Stage 5: Software Development & Integration

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

Stage 7: Deployment, Monitoring & Maintenance

• Deploy AI-integrated software system to production environments
• Monitor system performance, manage updates, ensure scalability
• Backup and Disaster Recovery
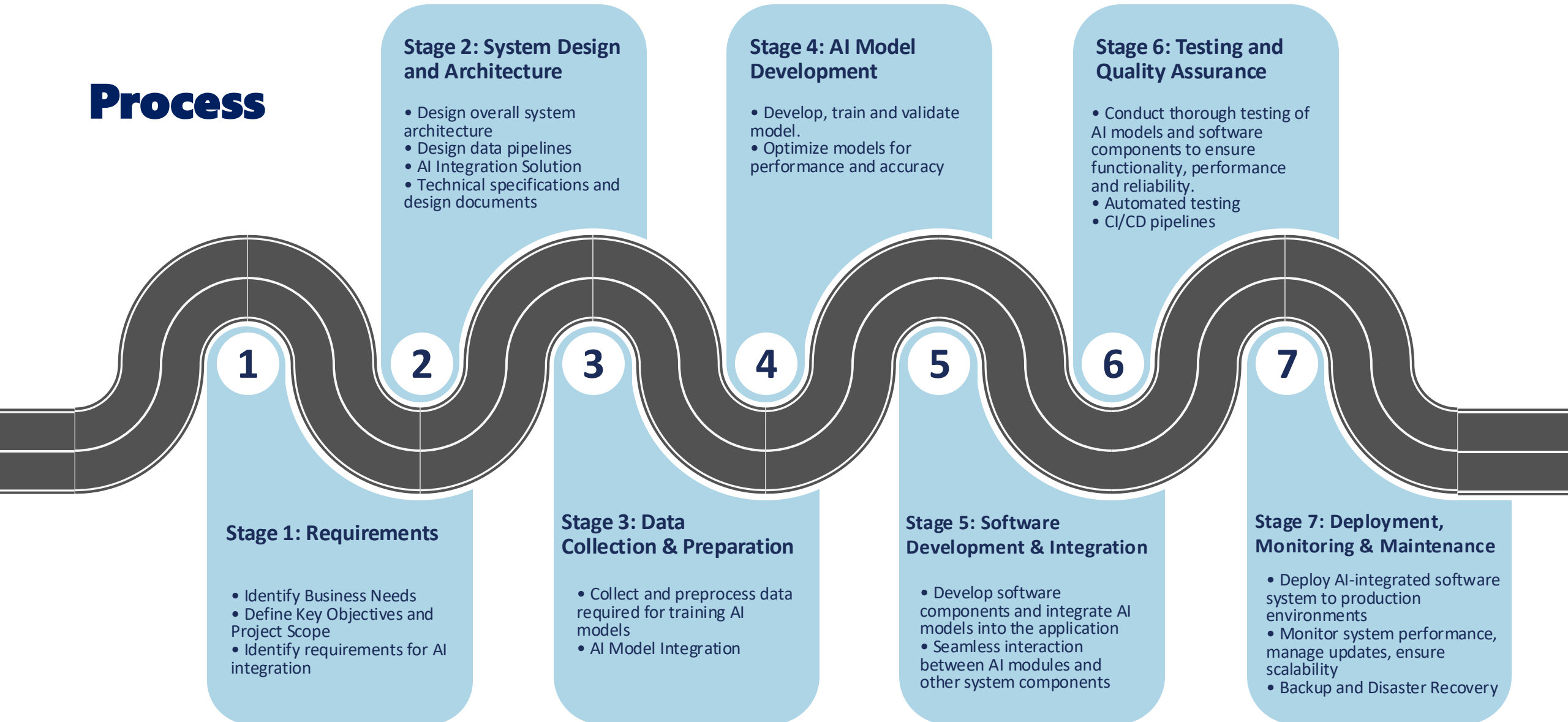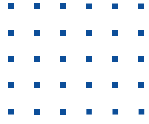
Our Domains & Featured Portfolio

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

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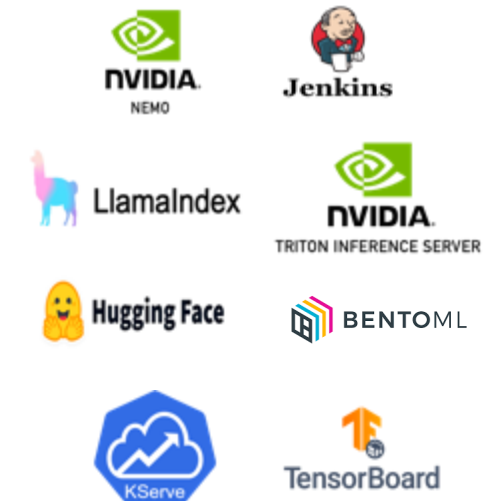- Speech AI technology for language learning and translation
- AI-powered virtual assistants for vocabulary practice, interactive conversations, and instant feedback

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
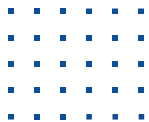
Why Choose LTS Group?

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
Python 3

ML Model
GPT 4 turbo
Multi-output regression model

Framework
VueJS

Database
SQL Server

Cloud
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
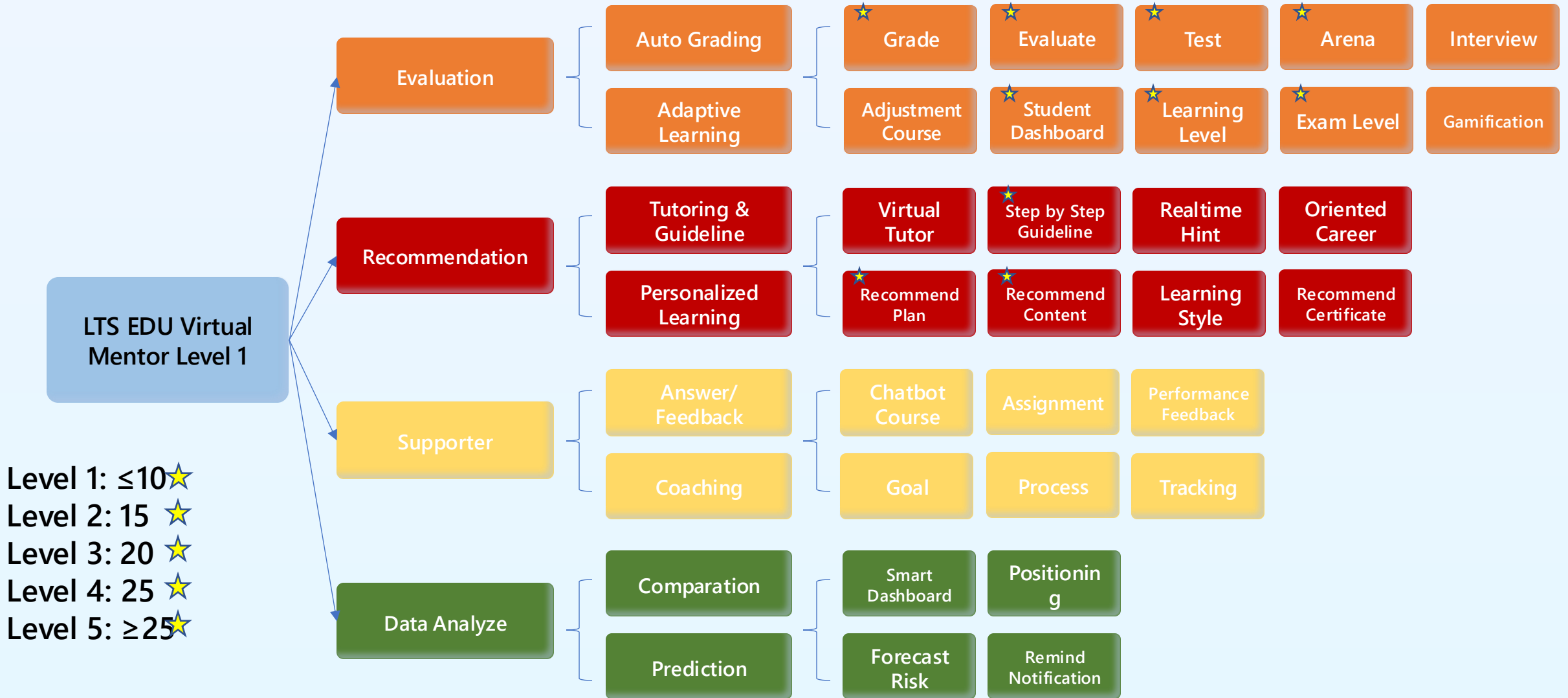
Advanced Analytics

- 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

Data sources collected from LTS Edu

A1. Distribution of student video learning time

D1. Class login times

A2. Timing and distribution of assignment submissions

Attendance and Time Management

Learning Management System (LMS) logs

Assignment and Task Management

A3. Distribution of on-time course completion

A4. Distribution of assignment submissions

G1. Task completion rate on assigned work

G4. Support rate in project tasks

Extracurricular and Development Activities

Participation in Competitions and Interviews

F1. Amount of participations in competitions

F3. Amount of participations in interviews

Academic Performance Records

Assignment Quality and Grades

B1. Quality of assignment grades

B4. Ratio of content-related inquiries to educational content

H1. Distribution of exam scores

Student Queries and Engagement

B3. Number of questions directed to teaching assistants

B2. Distribution and number of chatbot inquiries

B5. Number of board inquiries about educational content

Student Interaction and Engagement Metrics

Social Media and External Interaction

C1. Amount of interactions with professional or subject specific system posts

E1. Amount of student interaction on social media

LTS GROUP

Model Serving

Push Commits

Trigger

mlflow

MLFlow Tracking

Model Registry

Model Packaging

Save serialized version

Batch Learning

Model

API End-point

Data Base

DVC

Versioning Data

Versioning Control

New Data

LTS EDU

Scrape Metrics

Model Output Storage

Monitoring

Display

Prometheus

Admin

Send Alert

Alert

Grafana

Save current's batch output

Model Performance Evaluation & Monitoring

Output results

24

Results and Impacts – Edu Insight

- **85%++**
reduction in time spent on grading assignments

- **70%**
decrease in time required to create new coding assignments and challenges

- **5x faster**
to create tailored learning plans for each student

- **25%**
increase in overall teaching capacity as predictive analytics helped optimize class sizes and instructor assignments

- **90%++**
Common student queries are handled by AI-powered chatbot, freeing up instructor time for more complex and personal issues

- **Streamlined administrative tasks for both educators and teaching assistants.**

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.

9 Members
6 Months
8 Features
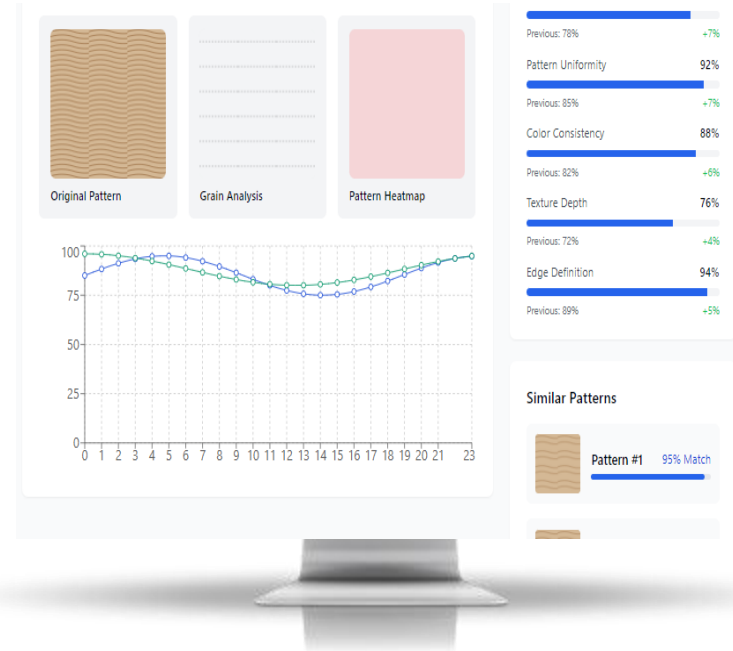
Scope of work

- 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
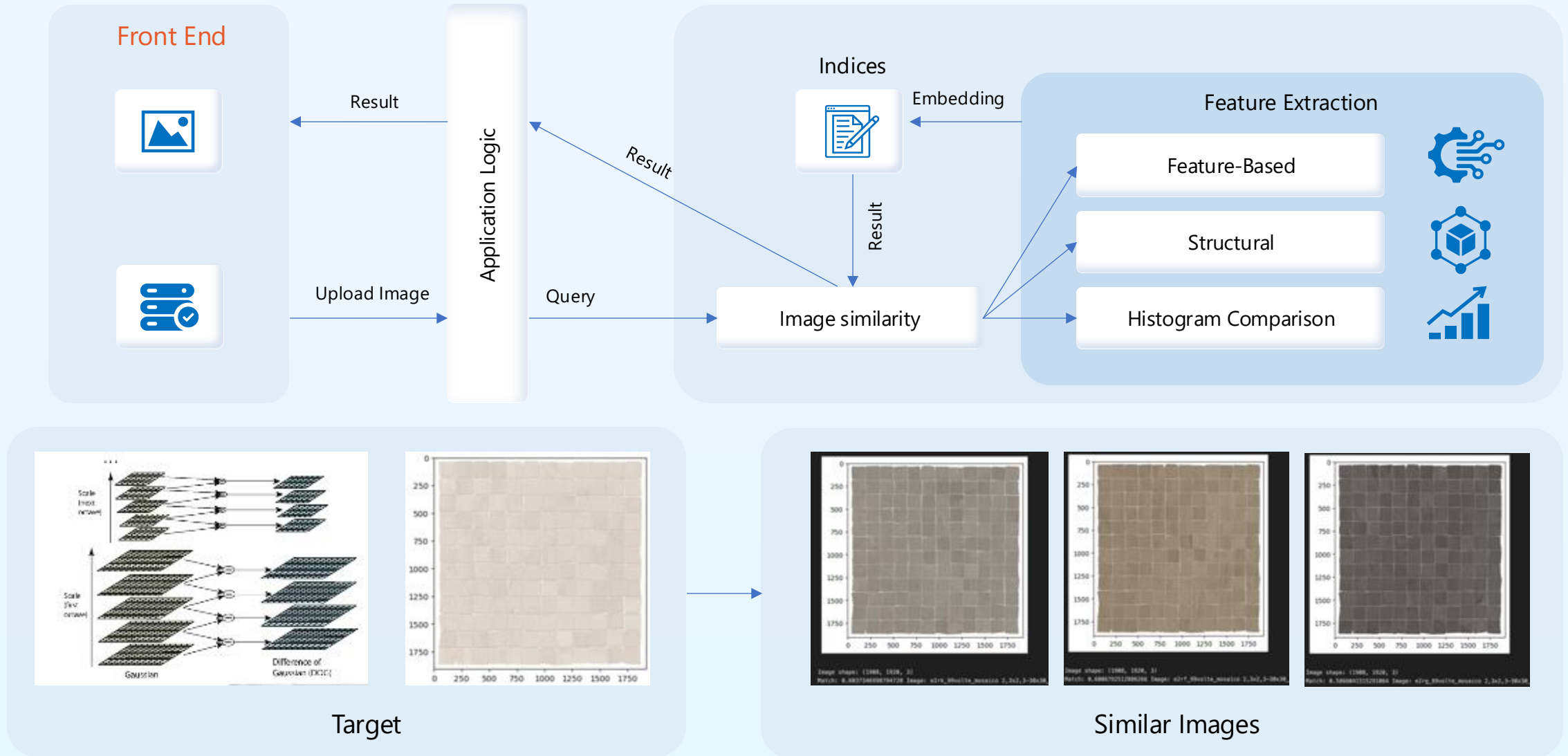
Results and Impacts – Architectural Pattern

- **45%**
Time and effort reduction for designers searching for matching wood patterns

- **25%**
Increase in customer satisfaction ratings for interior design projects

- **35%**
Decrease in material waste thanks to more accurate pattern matching

- **200%**
Growth in the catalog indexed wood patterns within 6 months of deployment

- **95%**
Accuracy in identifying and matching similar wood patterns (compared to manual)

- **Market Differentiation**
Positioned the company as a tech-forward leader in the architectural design industry
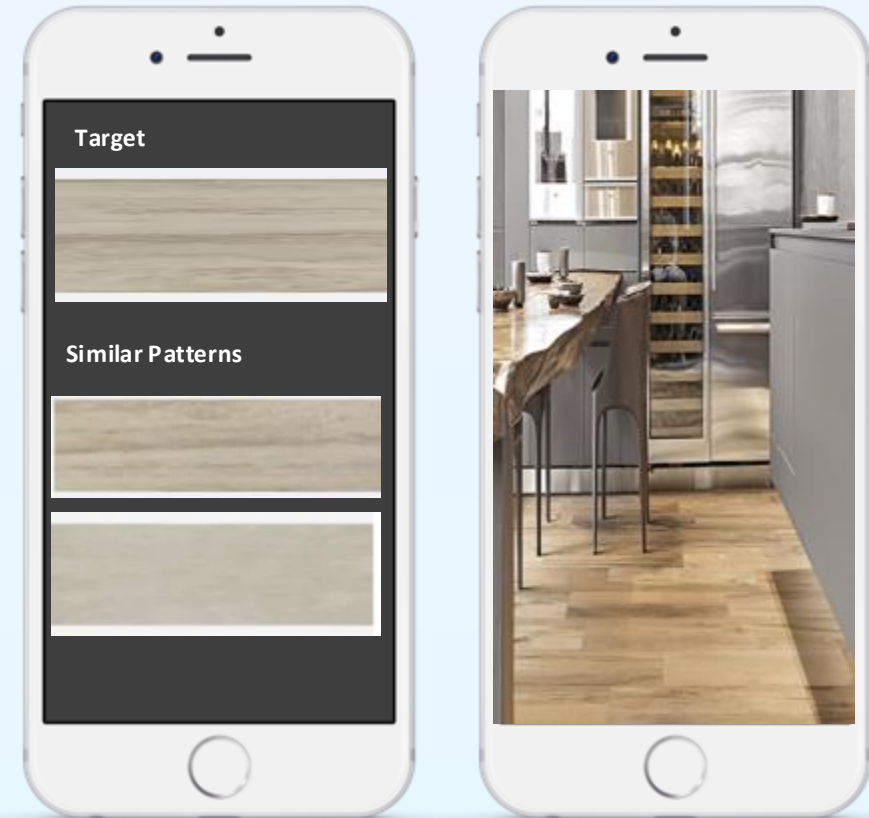
End-to-End Automated Image Captioning System

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

5 Members

2 Months

10 Features

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

Frameworks
| Python 3 | FastAPI |

Machine Learning
| Vision Transformer | Vision Encoder Decoder |

Cloud
| Google Kubernetes Engine | Google Compute Engine |

Monitoring
| Prometheus | Grafana |

End-to-end Image Captioning System Architecture

Request

Google Kubernetes Engine

Ingress controller
Nginx-ingress

Monitoring

Monitoring SVC

UI

Grafana SVC

Prometheus SVC

metrics

Model-serving

Nodeport SVC

Img-caption-pod-1

HFVT model VED model

Img-caption-pod-2

HFVT model VED model

Deployment: spec.replica=2

Google Compute Engine

Configured via Ansible

Jenkins

Docker Image

New changes

30
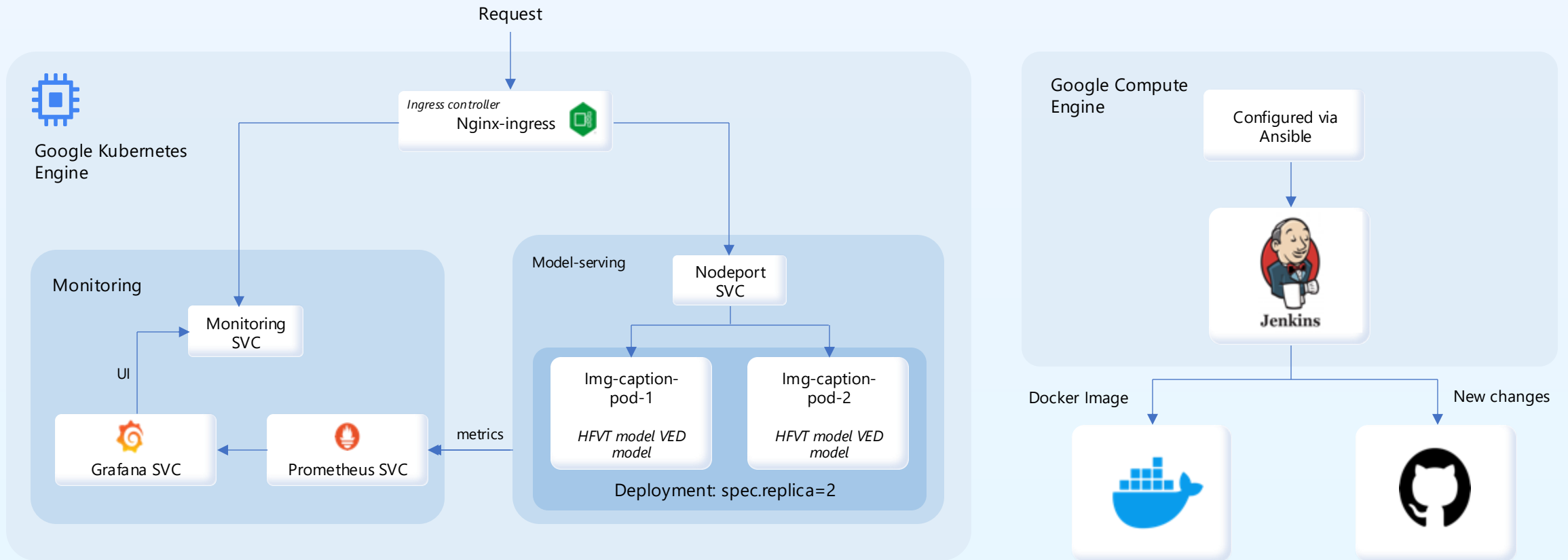
LLM customed RAG Question-and-Answer System for Healthcare domain

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

5 Members

3 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	Vector Database	Cloud		Query and Retrieval		Monitoring	
Retrieval Augmented Generation	Weaviate	Google Cloud Storage	Google Kubernetes Engine	Nginx-ingress	llamaIndex	Prometheus	Grafana
LLM						ELK Stack	
Mistral 7B							

Retrieval Augmented Generation QA System – Healthcare Domain

LTS GROUP

Centralized Database
Google Cloud Storage

User

Indexing SVC
- Json raw data → Ingest → Chunking → Bi-encoder Model

Request

GKE — **RAG pipeline**

Nginx-ingress controller

Scrape Metrics

Semantic Search

Monitoring SVC

Scrape Metrics

GKE — **Vector SVC**

Weaviate
Vector Database

Similar Data + Rerank

Prompt

Call LLM Server

Bi-encoder Model

Query

Scrape Metrics

Query Catching

Redis

vLLM
Vistral-7B

GPU Server

Scrape Metrics

ELK Stack

Elastic Search

Logstash

Kibana

API Logs

32

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
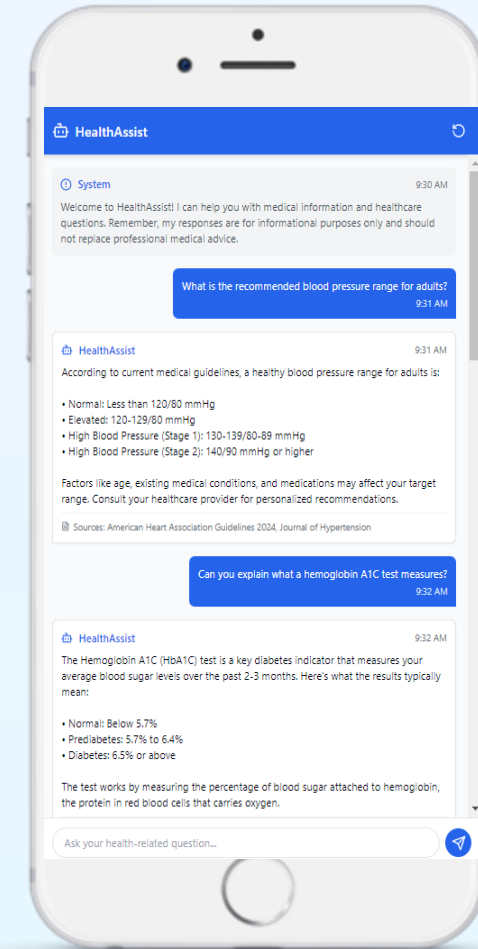
Resume Enhancement

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

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.

Development
Node.js | Redis | React | PostgreSQL

AI Services
GPT-4 API | Translation Pipeline

Cloud & Infrastructure
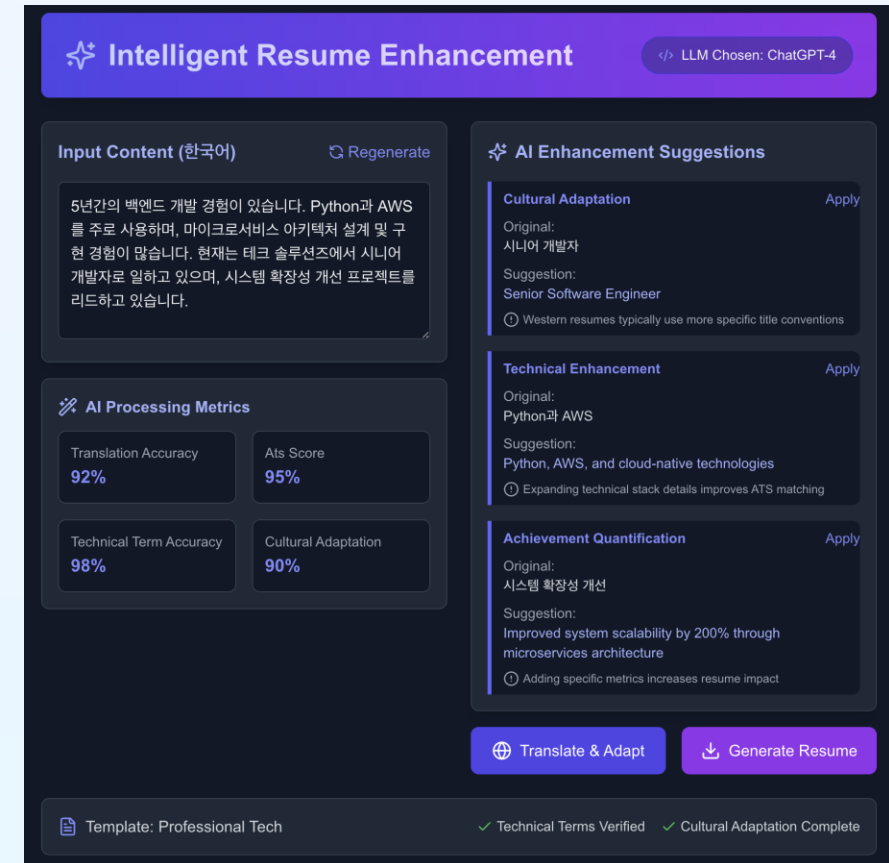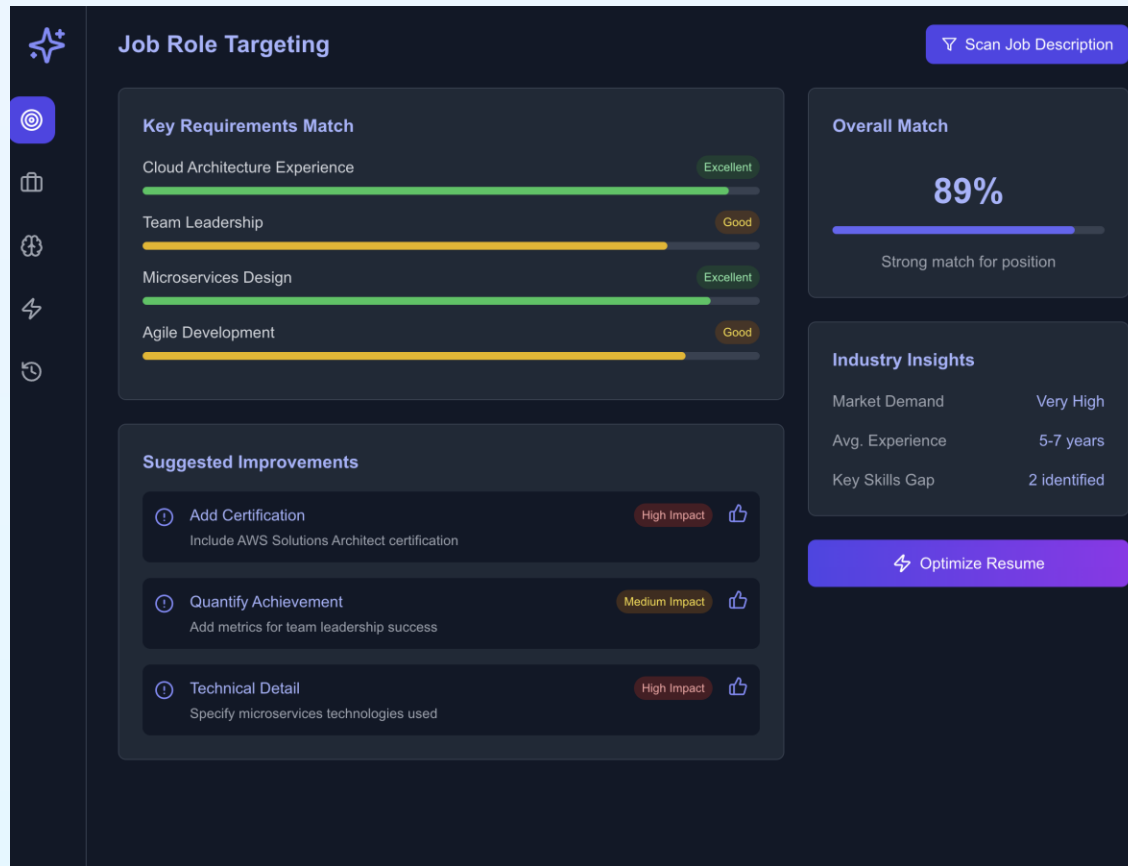AWS ECS | AWS S3

Monitoring
CloudWatch

API response: <1s
Concurrent generation: 10 resumes
System uptime: 99.9%

Intelligent Resume Enhancement
LLM Chosen: ChatGPT-4

Input Content (한국어)   Regenerate

5년간의 백엔드 개발 경험이 있습니다. Python과 AWS를 주로 사용하며, 마이크로서비스 아키텍처 설계 및 구현 경험이 많습니다. 현재는 테크 솔루션즈에서 시니어 개발자로 일하고 있으며, 시스템 확장성 개선 프로젝트를 리드하고 있습니다.

AI Enhancement Suggestions

Cultural Adaptation   Apply
Original:
시니어 개발자
Suggestion:
Senior Software Engineer
ⓘ Western resumes typically use more specific title conventions

Technical Enhancement   Apply
Original:
Python과 AWS
Suggestion:
Python, AWS, and cloud-native technologies
ⓘ Expanding technical stack details improves ATS matching

Achievement Quantification   Apply
Original:
시스템 확장성 개선
Suggestion:
Improved system scalability by 200% through microservices architecture
ⓘ Adding specific metrics increases resume impact

AI Processing Metrics

Translation Accuracy   Ats Score
92%   95%

Technical Term Accuracy   Cultural Adaptation
98%   90%

🌐 Translate & Adapt   ⬇ Generate Resume

📄 Template: Professional Tech   ✓ Technical Terms Verified   ✓ Cultural Adaptation Complete

Job Role Targeting

Scan Job Description

Key Requirements Match

Cloud Architecture Experience   Excellent

Team Leadership   Good

Microservices Design   Excellent

Agile Development   Good

Suggested Improvements

Add Certification   High Impact 👍
Include AWS Solutions Architect certification

Quantify Achievement   Medium Impact 👍
Add metrics for team leadership success

Technical Detail   High Impact 👍
Specify microservices technologies used

Overall Match

89%

Strong match for position

Industry Insights

Market Demand   Very High
Avg. Experience   5-7 years
Key Skills Gap   2 identified

⚡ Optimize Resume

Translation accuracy: 92%
Generation time: avg 3 minutes
Daily throughput: 20-35 resumes

35

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

4 Members

3 Months

Scope of work

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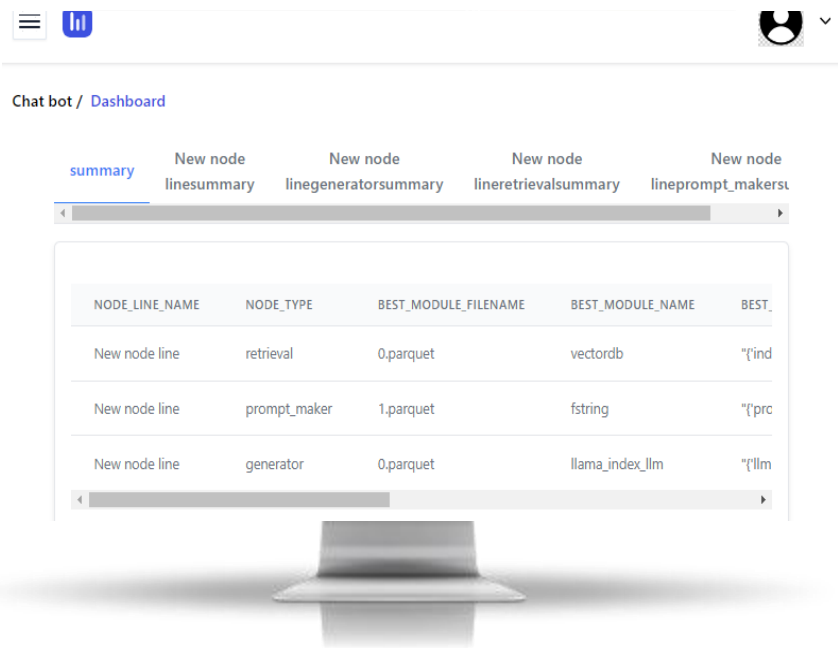- Auto-deployment to chat

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
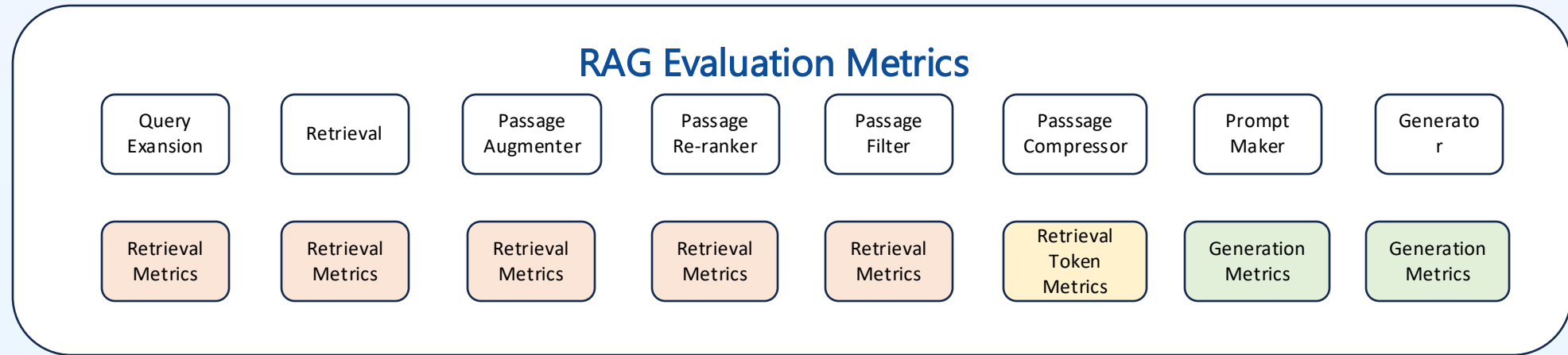- Implemented auto-deployment of the best-performing RAG pipeline to a chatbot interface

Chat bot / Dashboard

summary	New node linesummary	New node linegeneratorsummary	New node lineretrievalsummary	New node lineprompt_makersu

NODE_LINE_NAME	NODE_TYPE	BEST_MODULE_FILENAME	BEST_MODULE_NAME	BEST_
New node line	retrieval	0.parquet	vectordb	"['ind
New node line	prompt_maker	1.parquet	fstring	"['pro
New node line	generator	0.parquet	llama_index_llm	"['llm

Development

Python 3 ReactJS

AI

RAG Pipelines

RAG evaluation

Frameworks

TailAdmin

Deployment

Docker

AWS Codepipeline

Cloud Services

AWS Bedrock AWS Neptune

OpenSearch

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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

Evaluate best RAG pipeline

Auto-deploy to Chat

RAG Evaluation

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**

4 Members

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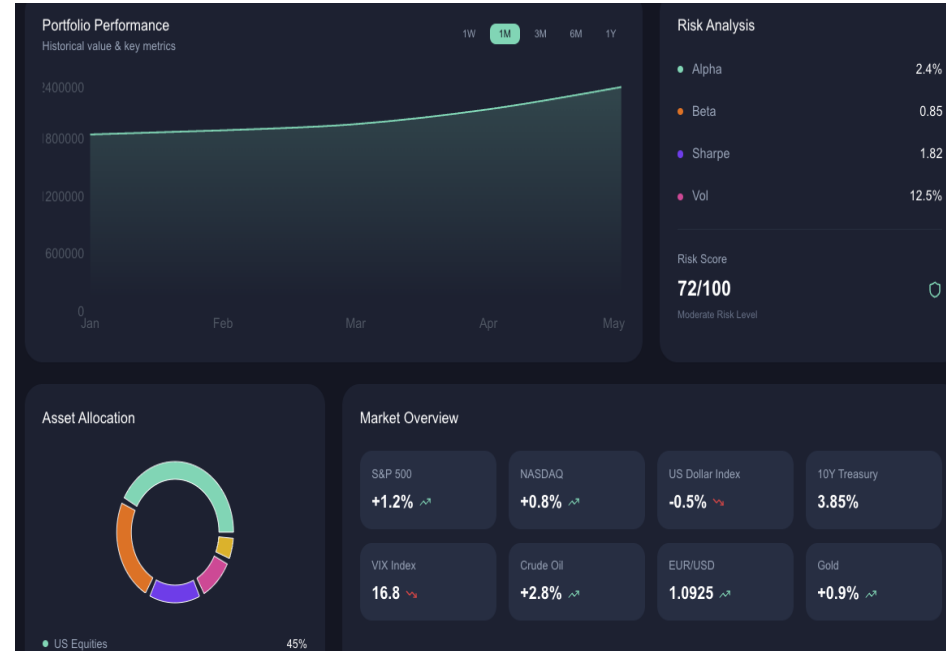
To uphold our commitment to data privacy and client confidentiality, all data presented in this case study are entirely fictional and created for illustrative purposes only.

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

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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

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

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

Monitoring & Security

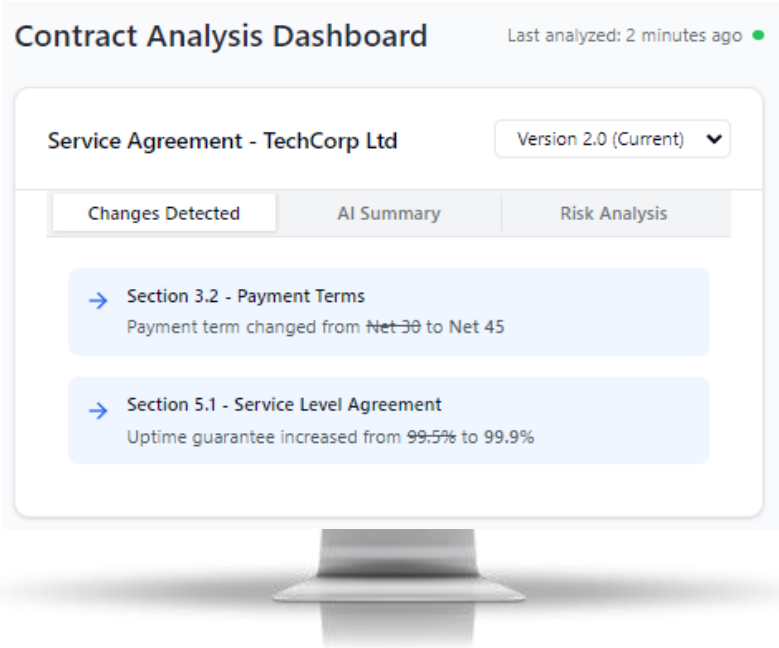| Prometheus	ELK
AWS SNS	AWS KMS

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
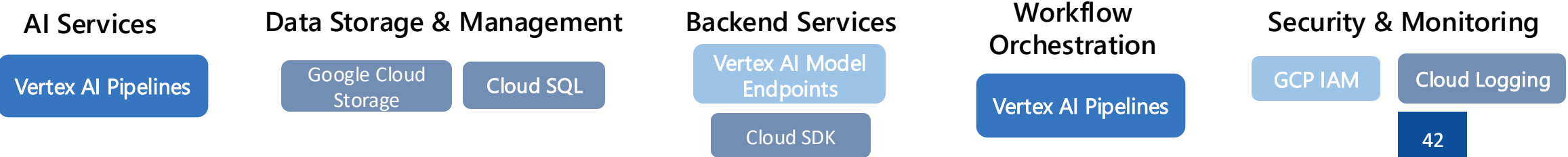- Advanced reporting and analytics dashboard

Contract Analysis Dashboard

Last analyzed: 2 minutes ago ●

Service Agreement - TechCorp Ltd   Version 2.0 (Current) ⌄

| Changes Detected | AI Summary | Risk Analysis |

→ Section 3.2 - Payment Terms
Payment term changed from Net 30 to Net 45

→ Section 5.1 - Service Level Agreement
Uptime guarantee increased from 99.5% to 99.9%

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	Data Storage & Management	Backend Services	Workflow Orchestration	Security & Monitoring
Vertex AI Pipelines	Google Cloud Storage Cloud SQL	Vertex AI Model Endpoints Cloud SDK	Vertex AI Pipelines	GCP IAM Cloud Logging

Smart Investment Contract Management System

Current Challenges:

Time-Intensive Review Process
Manual document review consuming valuable team resources

Risk of Missing Critical Information
Human error in reviewing complex documents

Version Control Issues
Difficulty tracking document changes and versions

How We Help

Document Processing & Analysis
- Automated analysis of investment agreements & term sheets
- Key term extraction and risk flagging
- Intelligent version comparison

Due Diligence Acceleration
- Automated document categorization
- Summary report generation
- Complete audit trail maintenance

Practical Example

Before

4-5 hours to review a 100-page investment agreement

After

15-20 minutes for initial AI analysis and key point extraction

Result

80% of time reduction in document review process

Smart Investment Contract Management System

How It Helps Business

- Automates due diligence process by analyzing contracts and documents, reducing manual review time by 70%
- Identifies risks and key terms across all investment documents, ensuring nothing is missed
- Enables real-time collaboration between teams during M&A processes
- Tracks document versions and historical changes, providing a clear audit trail for compliance and decision-making.

Business Impact

- Faster deal execution through automated document processing
- Reduced risk through comprehensive document analysis
- Enhanced team collaboration and efficiency

Key Benefits

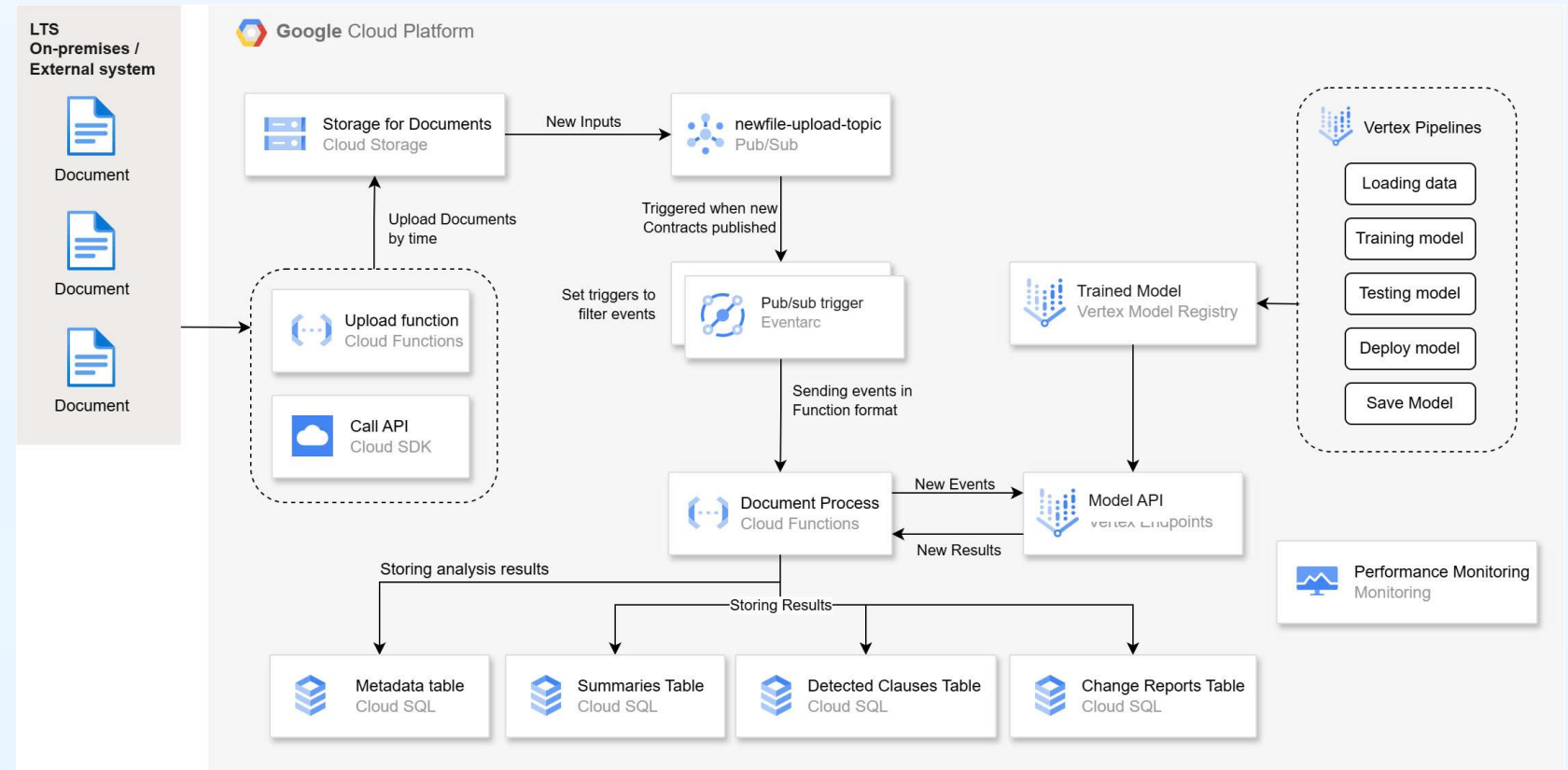|	
70% Time saved	**85%** Accuracy Rate
60% Cost Reduction	**99%** Compliance (Company' rules)

The Smart Investment Contract Management System empowers teams to:

- Automate repetitive tasks.
- Minimize human errors.
- Gain actionable insights.
- Optimize collaboration across stakeholders.

Smart Investment Contract Management System

Analysis Module

Analysis Status

AI Processing	✓
Risk Assessment	✓
Change Detection	✓
Legal Review Required	✗

Processing History

Version 2.0 analyzed	2 mins ago
Version 1.0 analyzed	2 days ago
Contract uploaded	2 days ago
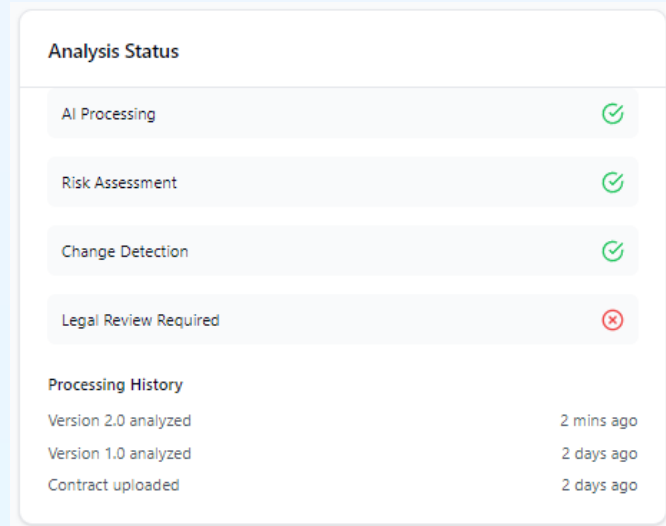
System Architecture on Google Cloud Platform

LTS On-premises / External system

- Document
- Document
- Document

Google Cloud Platform

- Storage for Documents — Cloud Storage
- newfile-upload-topic — Pub/Sub
- Upload function — Cloud Functions
- Call API — Cloud SDK
- Pub/sub trigger — Eventarc
- Trained Model — Vertex Model Registry
- Document Process — Cloud Functions
- Model API — Vertex Endpoints
- Metadata table — Cloud SQL
- Summaries Table — Cloud SQL
- Detected Clauses Table — Cloud SQL
- Change Reports Table — Cloud SQL
- Performance Monitoring — Monitoring

Vertex Pipelines

- Loading data
- Training model
- Testing model
- Deploy model
- Save Model

Flow labels:
- New Inputs
- Upload Documents by time
- Triggered when new Contracts published
- Set triggers to filter events
- Sending events in Function format
- New Events
- New Results
- Storing analysis results
- Storing Results

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
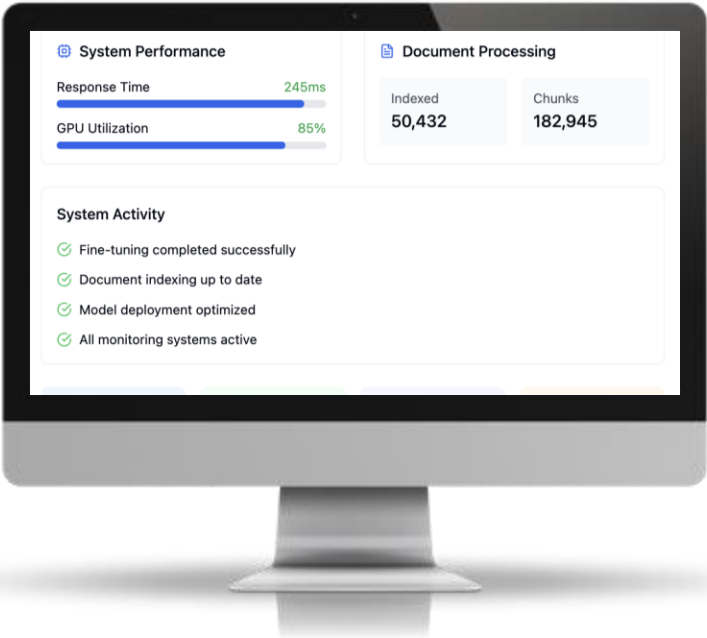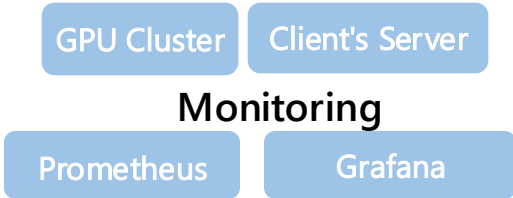- Development process: Scrum

4 Members

3 Months

System Performance
Response Time — 245ms
GPU Utilization — 85%

Document Processing
Indexed — 50,432
Chunks — 182,945

System Activity
- Fine-tuning completed successfully
- Document indexing up to date
- Model deployment optimized
- All monitoring systems active

Scope of work

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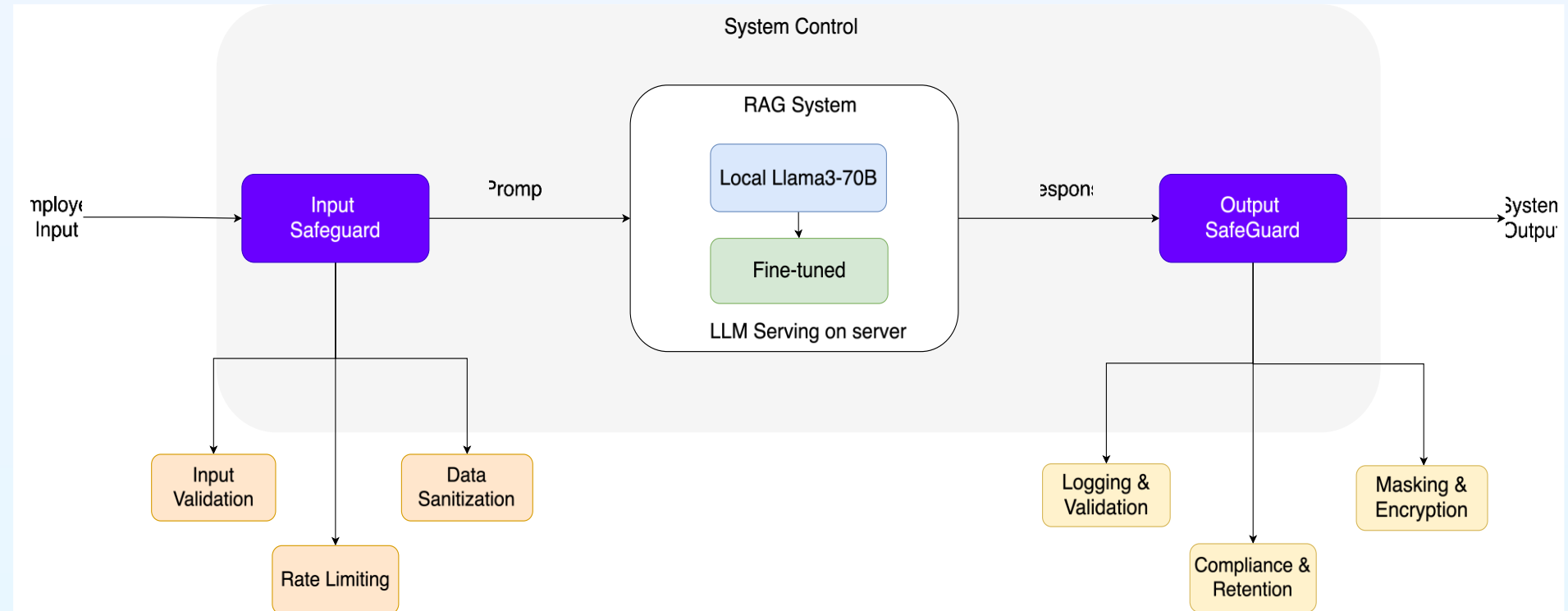- Performance Optimization

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.

Development
FastAPI
PostgreSQL
Redis
MinIO

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

Deployment
GPU Cluster
Client's Server

Monitoring
Prometheus
Grafana

Document Mangement System

Privacy-First System Architecture

- Input Validation & Sanitization prevents malicious data entry
- Rate limiting protection against abuse
- Comprehensive data masking and encryption
- Complete audit trail with retention policies

Document Mangement System

System Benefits:

- Complete data sovereignty with local processing
- Enterprise-grade security compliance
- Employee-level access control

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

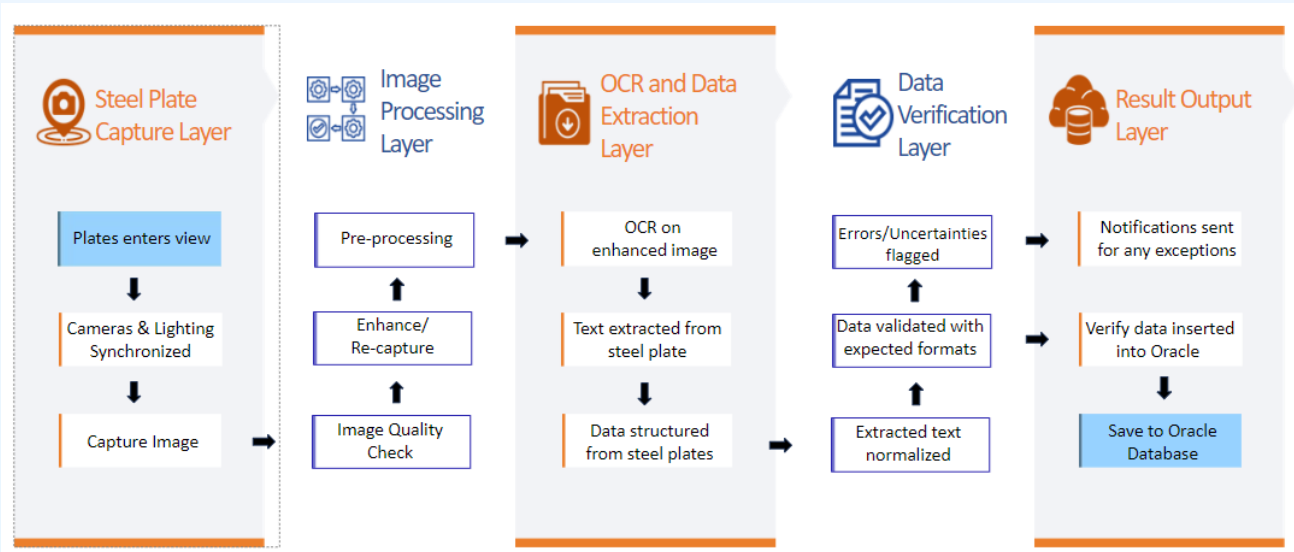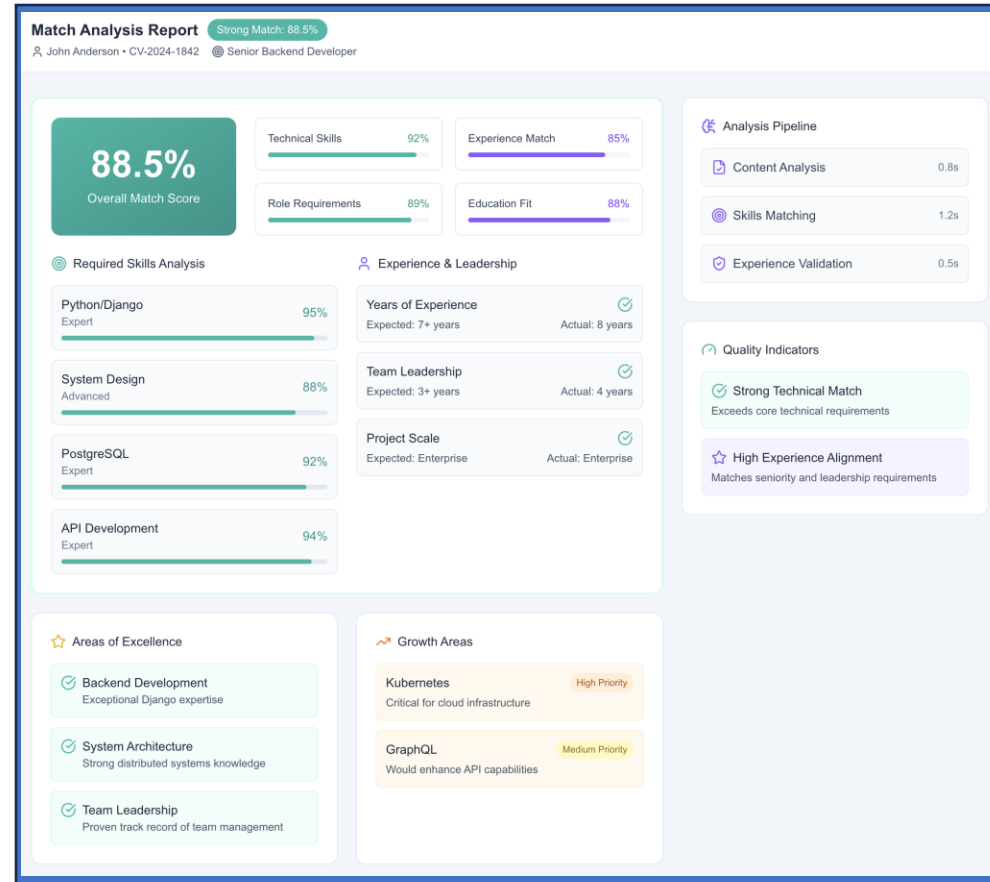### Hardware
| Industrial High-Resolution cameras | Adaptive Lighting Systems |

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

5 Members

3 Months

Match Analysis Report — Strong Match: 88.5%
John Anderson • CV-2024-1842 — Senior Backend Developer

88.5% Overall Match Score

Technical Skills 92%
Experience Match 85%
Role Requirements 89%
Education Fit 88%

Required Skills Analysis
- Python/Django Expert 95%
- System Design Advanced 88%
- PostgreSQL Expert 92%
- API Development Expert 94%

Experience & Leadership
- Years of Experience — Expected: 7+ years — Actual: 8 years
- Team Leadership — Expected: 3+ years — Actual: 4 years
- Project Scale — Expected: Enterprise — Actual: Enterprise

Analysis Pipeline
- Content Analysis 0.8s
- Skills Matching 1.2s
- Experience Validation 0.5s

Quality Indicators
- Strong Technical Match — Exceeds core technical requirements
- High Experience Alignment — Matches seniority and leadership requirements

Areas of Excellence
- Backend Development — Exceptional Django expertise
- System Architecture — Strong distributed systems knowledge
- Team Leadership — Proven track record of team management

Growth Areas
- Kubernetes — High Priority — Critical for cloud infrastructure
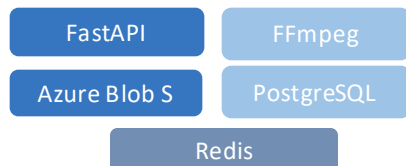- GraphQL — Medium Priority — Would enhance API capabilities

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
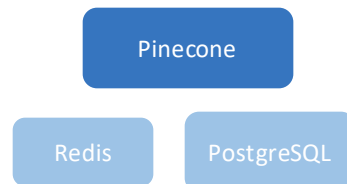 - Cache implementation
  - API development

AI Solution

1. Document Processing System
- Apache Tika for extraction
- Custom parsers for structure
- Technical term standardization

2. Embedding System
- OpenAI text-embedding-3-large
- Batch processing (32 docs)
- Pinecone for vector storage

3. Matching Engine
- Custom scoring algorithm
- Technical skill matcher
- Experience level analyzer

Core Services
- FastAPI
- FFmpeg
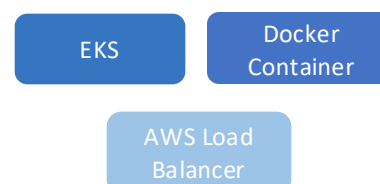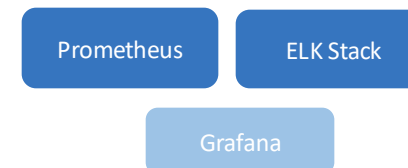- Azure Blob S
- PostgreSQL
- Redis

Storage
- Pinecone
- Redis
- PostgreSQL

Infrastructure
- EKS
- Docker Container
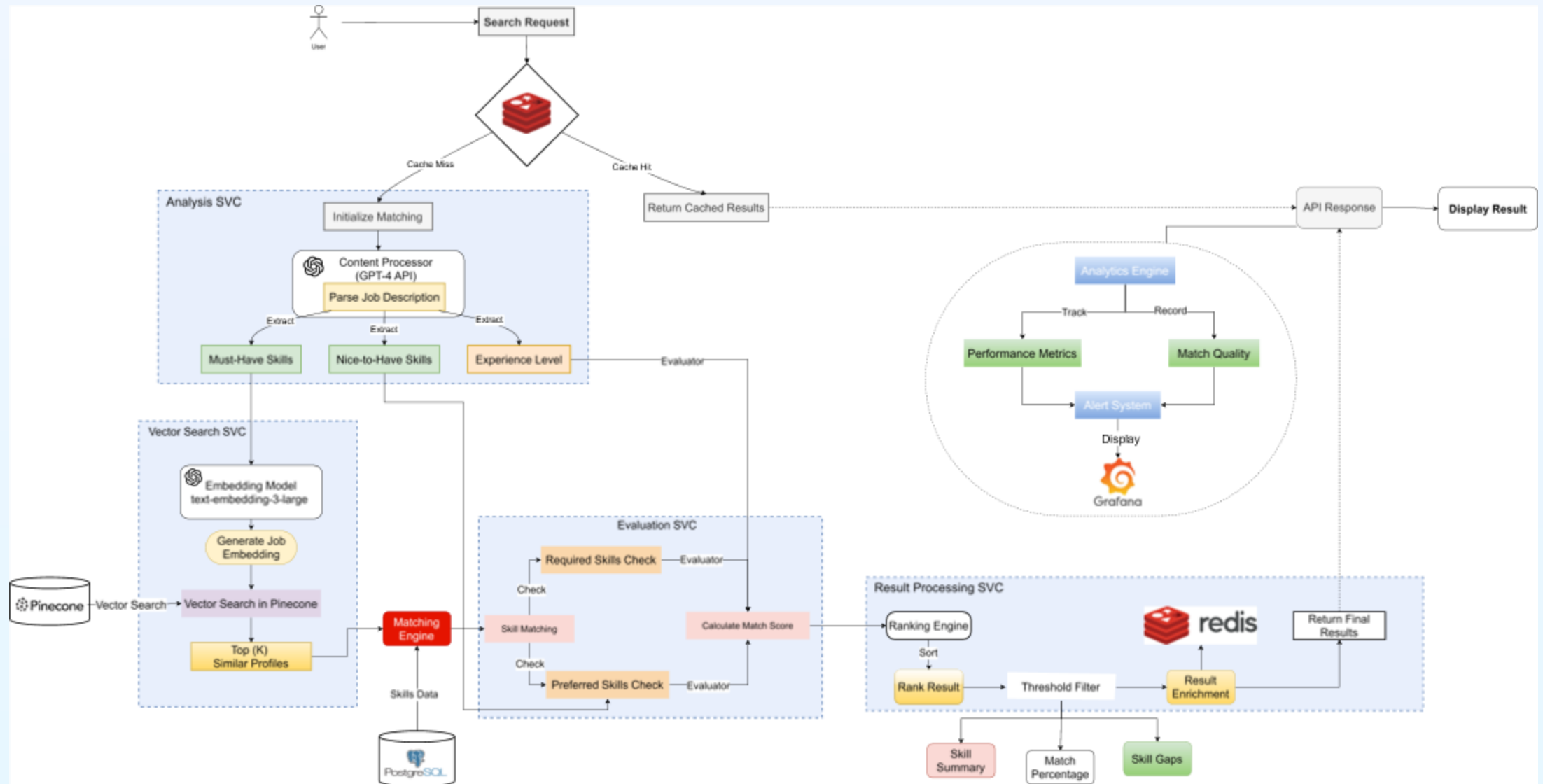- AWS Load Balancer
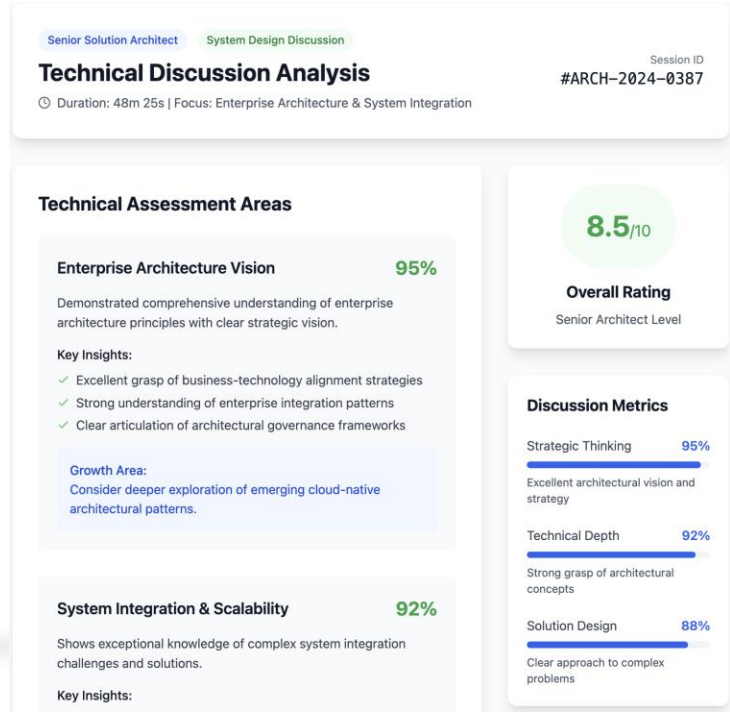
Monitoring
- Prometheus
- ELK Stack
- Grafana

System Architecture for Job Matching System

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

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

Senior Solution Architect   **System Design Discussion**

Technical Discussion Analysis   Session ID #ARCH−2024−0387

Duration: 48m 25s | Focus: Enterprise Architecture & System Integration

Technical Assessment Areas

Enterprise Architecture Vision   95%

Demonstrated comprehensive understanding of enterprise architecture principles with clear strategic vision.

Key Insights:
- ✓ Excellent grasp of business-technology alignment strategies
- ✓ Strong understanding of enterprise integration patterns
- ✓ Clear articulation of architectural governance frameworks

Growth Area:
Consider deeper exploration of emerging cloud-native architectural patterns.

System Integration & Scalability   92%

Shows exceptional knowledge of complex system integration challenges and solutions.

Key Insights:

8.5/10
Overall Rating
Senior Architect Level

Discussion Metrics

Strategic Thinking   95%
Excellent architectural vision and strategy

Technical Depth   92%
Strong grasp of architectural concepts

Solution Design   88%
Clear approach to complex problems

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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
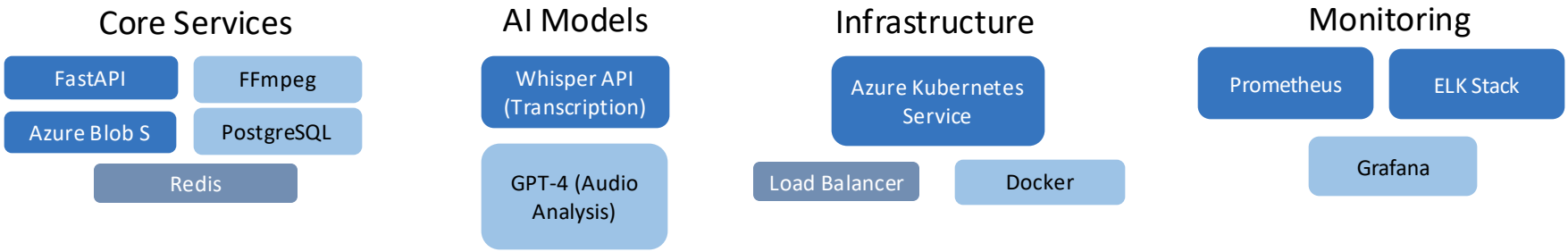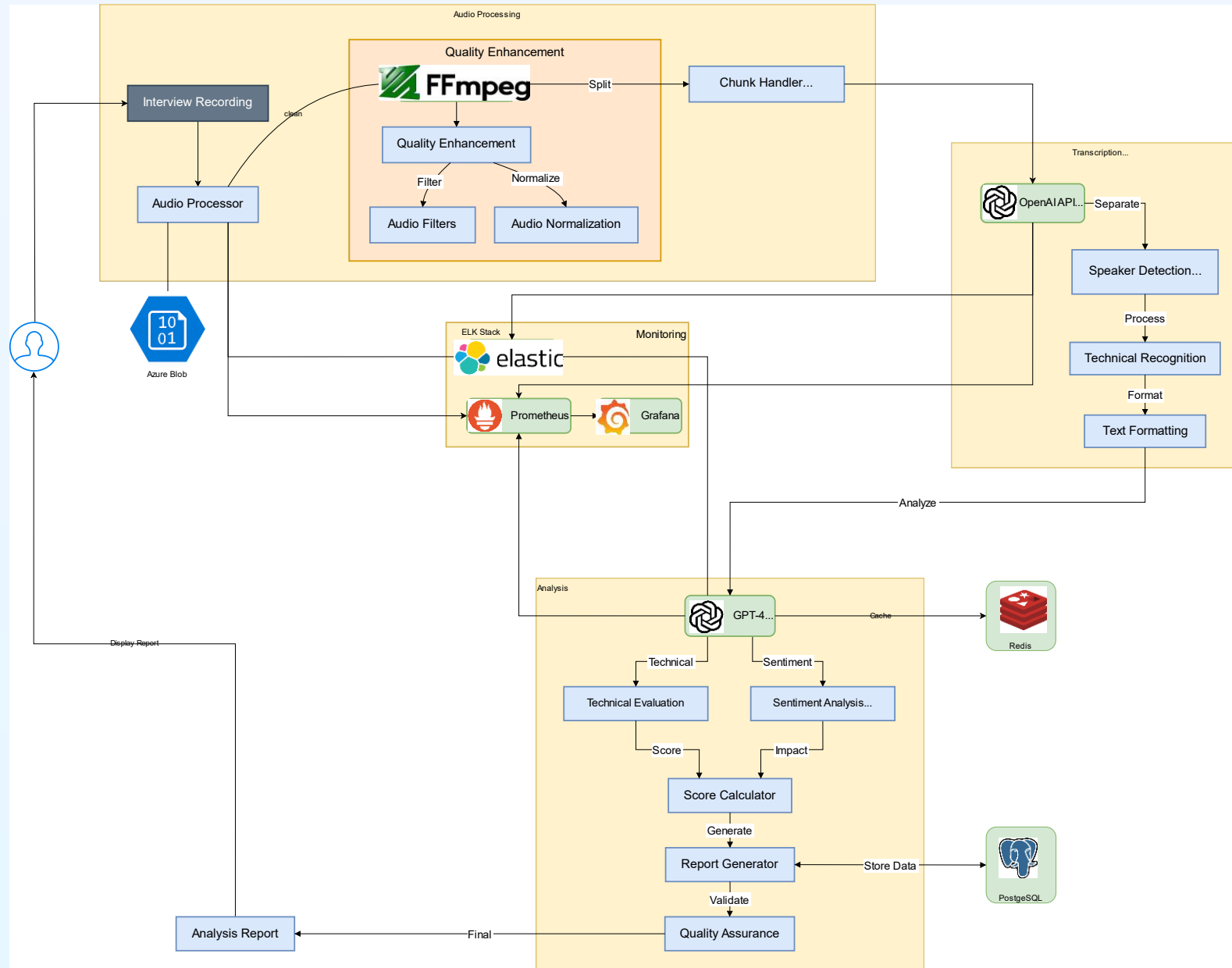
System Architecture for Interview Analysis

Interview Analysis System for Technical Recruitment

Efficiency Improvements

Metrics	Before	After
Interview Analysis Time	1-2 hours/interview	15 minutes
Daily Processing Capacity	8 interviews	30+ interviews
Evaluation Consistency (inter-rater)	65%	95%
First-pass Assessment Accuracy	70%	92%
Interviewer Productivity	3 interviews/day	6 interviews/day
Hiring Process Duration (whole cycle)	21 days	14 days

Key Achievements

Operational Excellence
- 87.5% reduction in analysis time
- 95% evaluation consistency
- 100% increase in interviewer productivity

Quality Improvements
- Standardized evaluation criteria
- Comprehensive technical assessment
- Objective scoring system
- Detailed feedback generation

System Performance

Transcription Accuracy: 98% for clear audio
Analysis Generation: 5-7 minutes per interview
System Uptime: 99.9%

Business Impact

- Faster hiring decisions
- Improved candidate experience
- Reduced recruitment costs
- Scalable interview process

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

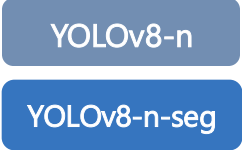**4** Members

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	ML Model	ML Technique	Framework	Cloud
Python 3	YOLOv8-n	Object Tracking	VueJS	Azure
C++	YOLOv8-n-seg	Object Detection		
		Style Classification		

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	ML model	Facial Recognition	Database	Development	Platform
Python	Eigenfaces	Dlib	PostgreSQL	React.js	Web
		Elasticsearch		Django / React native	iOS / Android

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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

4 Members

3 Months

5 Features
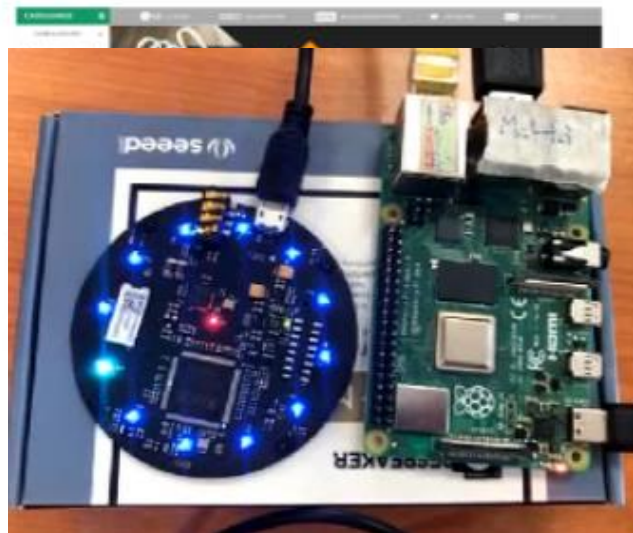
Scope of work

- 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.

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

Support teams are inundated with repetitive queries and manual requests, leaving them with less time for complex issues and strategic support.

Inconsistent Information Access

Organizations of all sizes face inconsistent information delivery across departments, leading to operational inefficiencies and compliance risks.
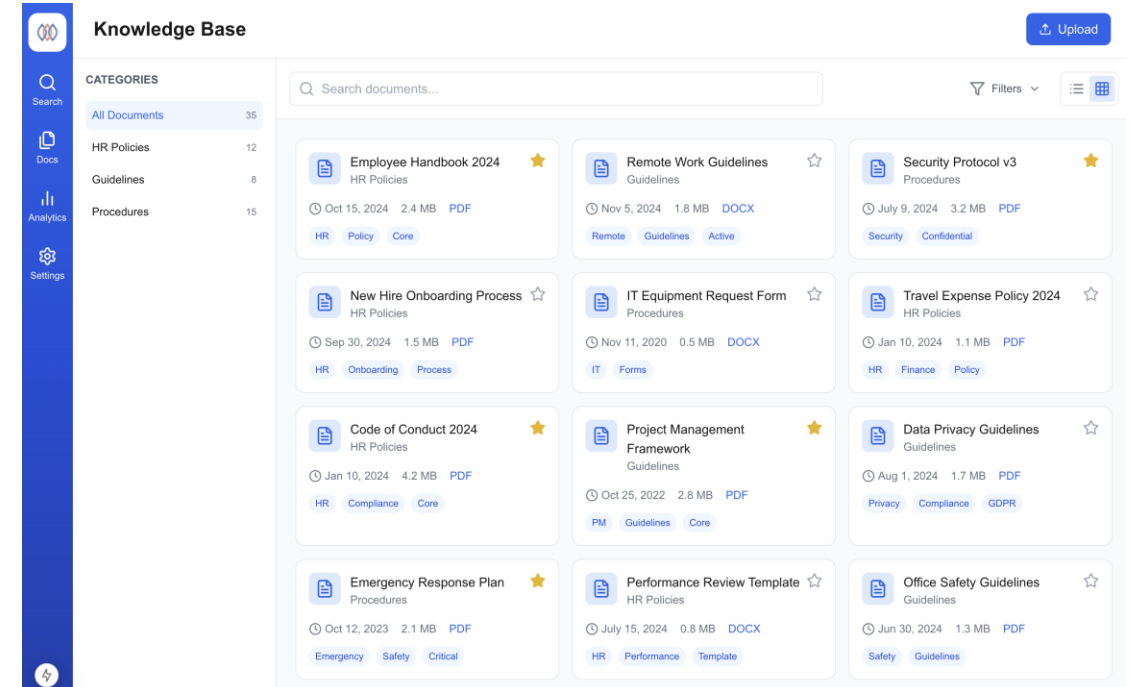
Intuitive & User-friendly Interface

Easy Document Management
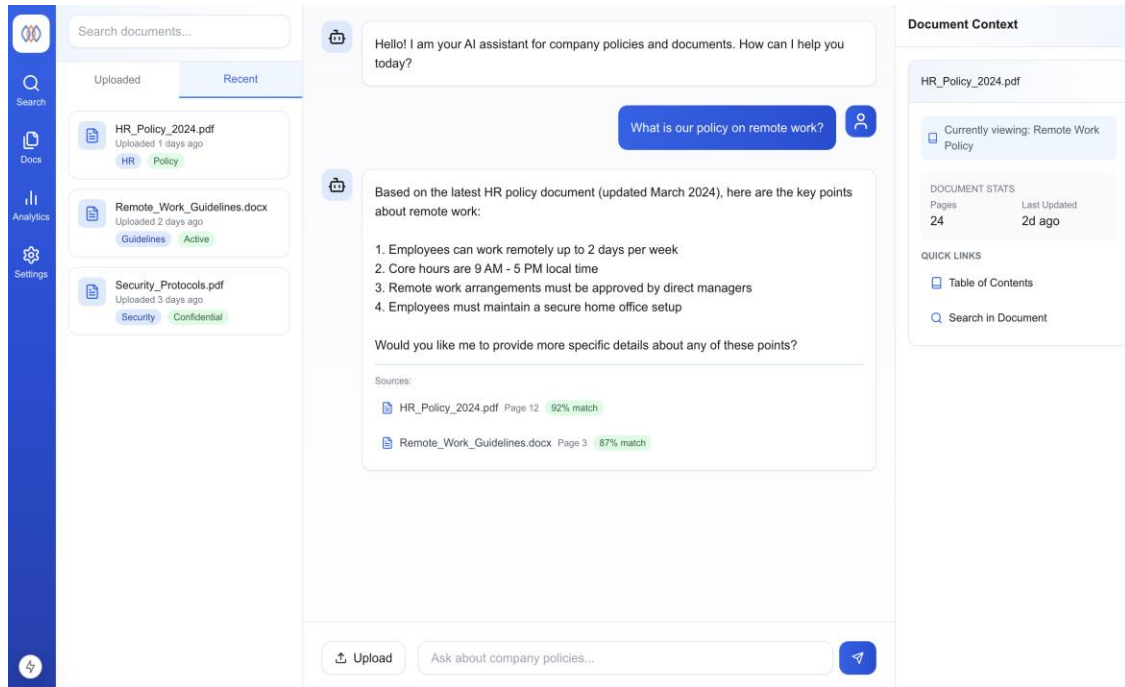
Natural conversation with context-aware responses

Instant document search and citation

Organized document categories and tags

Secure document access controls

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

Monitoring Dashboard

Active Users
245
↑ +12% from last month

Documents Processed
1,432
↑ +23% from last month

Avg Response Time
1.2s
↓ -8% from last month

Success Rate
94.8%
↑ +2% from last month

Top Queries

1	**Remote work policy** HR	156 queries
2	**Expense claims process** Finance	142 queries
3	**IT security guidelines** IT	128 queries
4	**Employee benefits** HR	115 queries
5	**Leave application** HR	98 queries

Document Activity

Employee Handbook 2024
245 views   189 queries

Remote Work Guidelines
198 views   156 queries

IT Security Protocol
167 views   134 queries

Travel Policy
145 views   98 queries

Benefits Overview
134 views   87 queries

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

scratch 0.62

scratch 0.77

scratch 0.82

Plate ID: 8HZH1JFN FN1 23
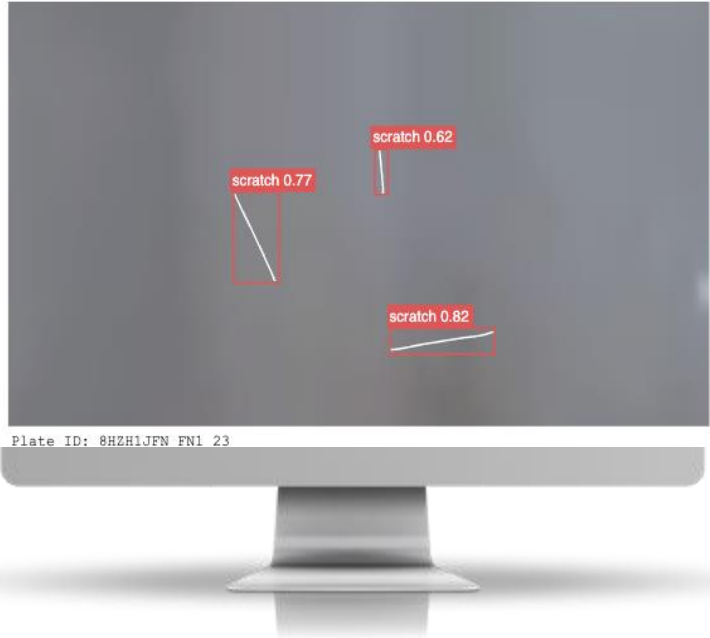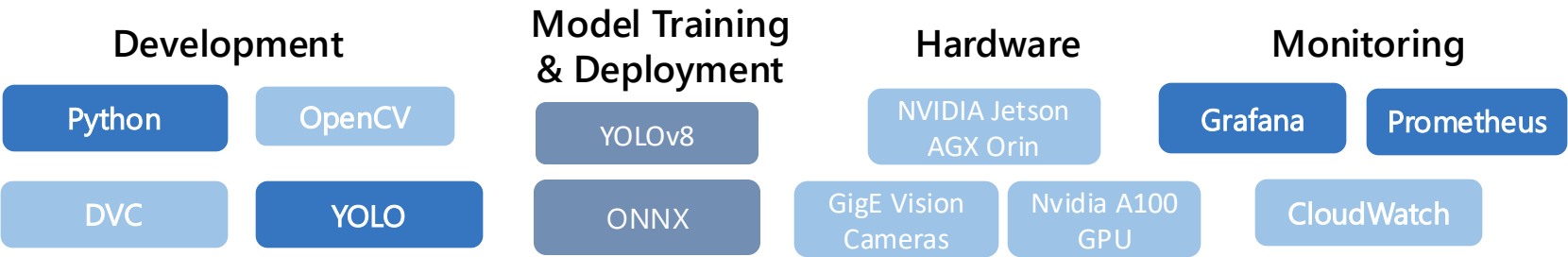
Scope of Work

- 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.

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 |

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

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Project Lifecycle

Data Preprocessing

Cleaning and transforming raw images for feature enhancement (CLAHE, noise reduction, augmentation).
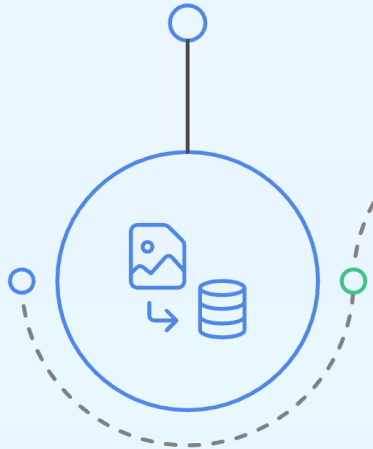
Model Evaluation

Validating model performance using mAP, Precision, Recall, and F1 score on the test dataset.

Model Registration

Versioning and storing the ONNX model in a central model registry for deployment readiness.
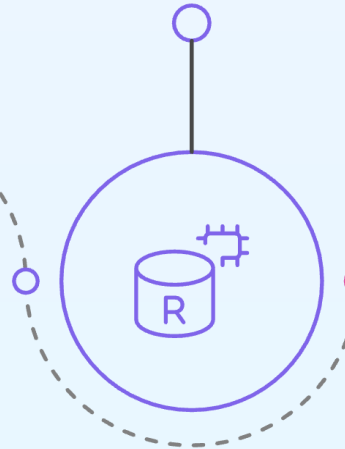
Feedback Loop & Retraining

Capturing low-confidence predictions and integrating new data for periodic retraining
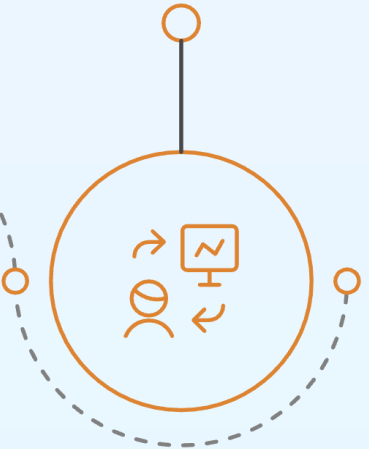
Model Training

Training YOLOv8 model using PyTorch with optimized hyperparameters on NVIDIA A100 GPUs.
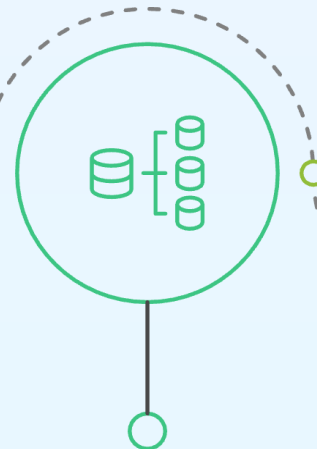
Export to ONNX

Converting the trained model to ONNX format for edge deployment and performance optimization.
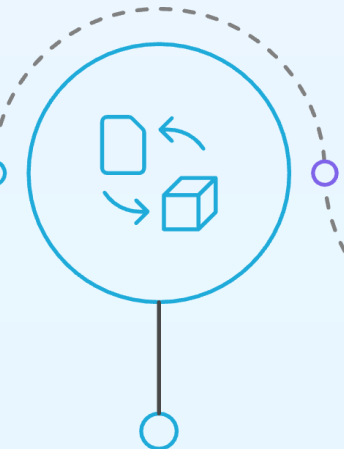
Model Deployment

Deploying the model to NVIDIA Jetson AGX Orin for real-time inference on the factory floor.

LTS GROUP

System Architecture

Virtual Assistant Digital Signage

Overview

LTS Group developed an innovative Virtual Assistant Digital Signage system designed as an interactive information display for public spaces (education settings). The digital assistant operates as a standalone information kiosk that can help visitors navigate facilities, answer common questions, and provide relevant information without human staff intervention.

- **Country: Hong Kong**
- **Domain: Education**
- **AI expertise: Speech-to-text, LLM, Text-to-Speech**

5 Members

5 Months

Key Challenges

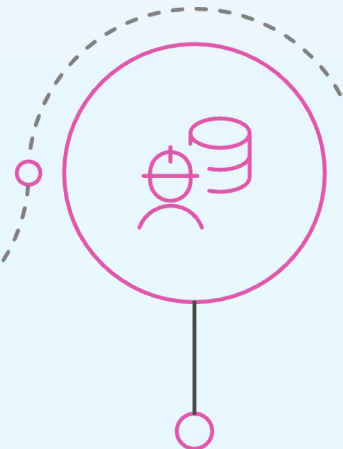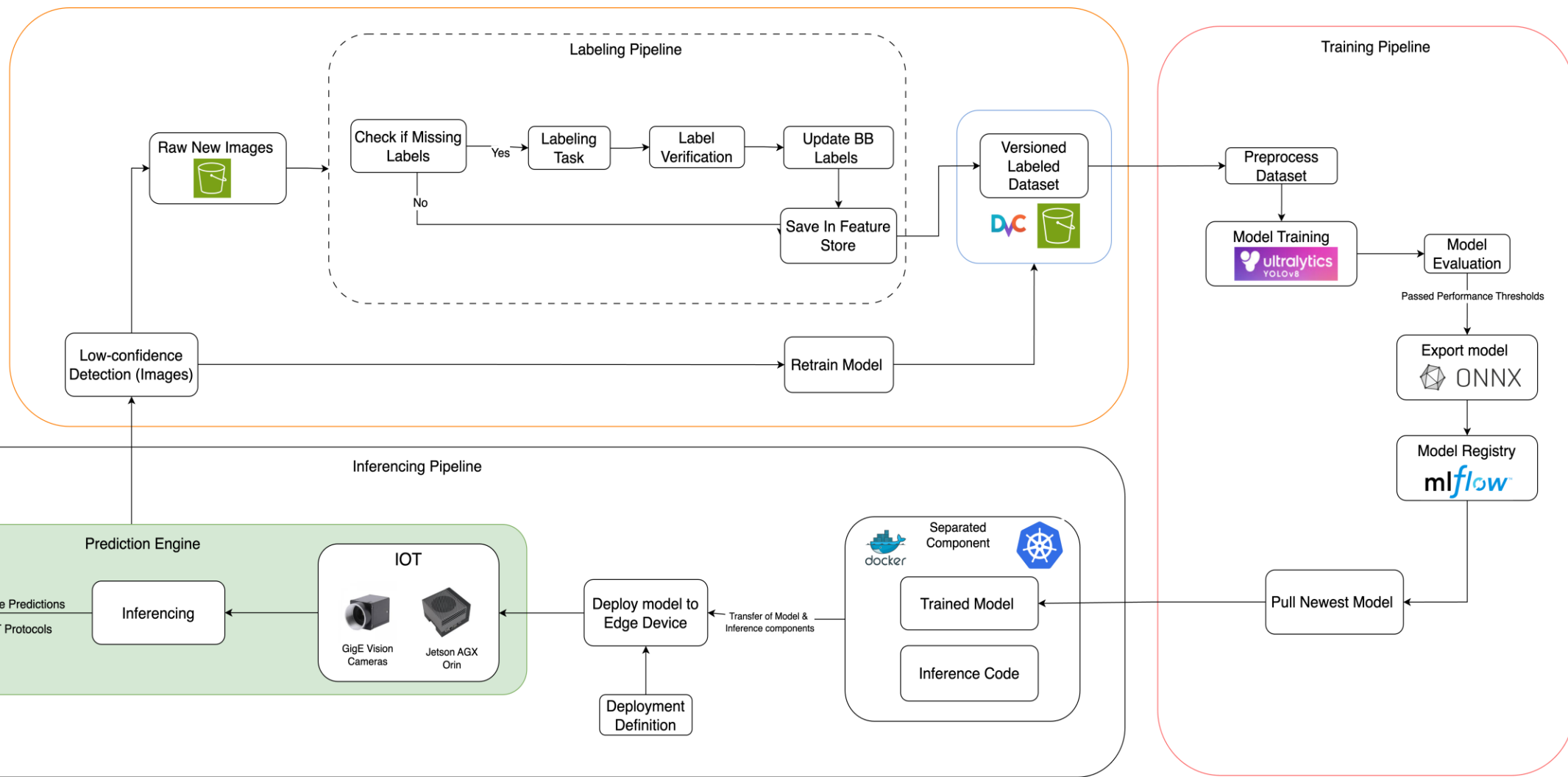The project faced key challenges, including multilingual language understanding for accurate responses across three languages ((English, Mandarin Chinese, and Cantonese), real-time speech processing with minimal latency, and seamless avatar animation synchronization. Additionally, it required an easy-to-update knowledge base, efficient hardware optimization, and seamless session management for smooth user interactions.

Scope of Work

- Core System Development: Implemented AI models (Llama-3-8B-Instruct, Faster-Whisper, Coqui TTS), built a frontend with avatar animation, developed a backend for session management, and designed a document processing pipeline for knowledge management.
- Conducted comprehensive testing, optimized performance, ensured stability, supported system deployment to be suitable in education settings
- Project Management: Managed requirements, maintained clear communication, documented processes, and handled risk management throughout development.
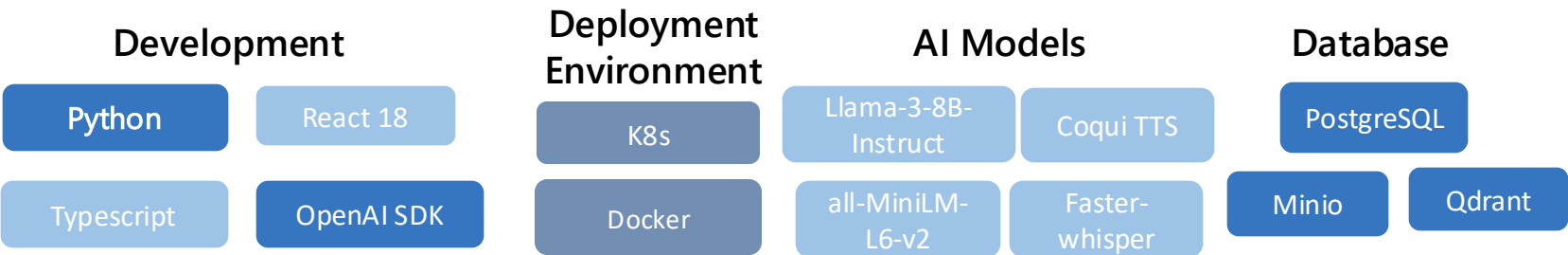
Development

Python	React 18
Typescript	OpenAI SDK

Deployment Environment

K8s
Docker

AI Models

Llama-3-8B-Instruct	Coqui TTS
all-MiniLM-L6-v2	Faster-whisper

Database

PostgreSQL	
Minio	Qdrant

Note: As for privacy, all data shown is for demonstration purposes only
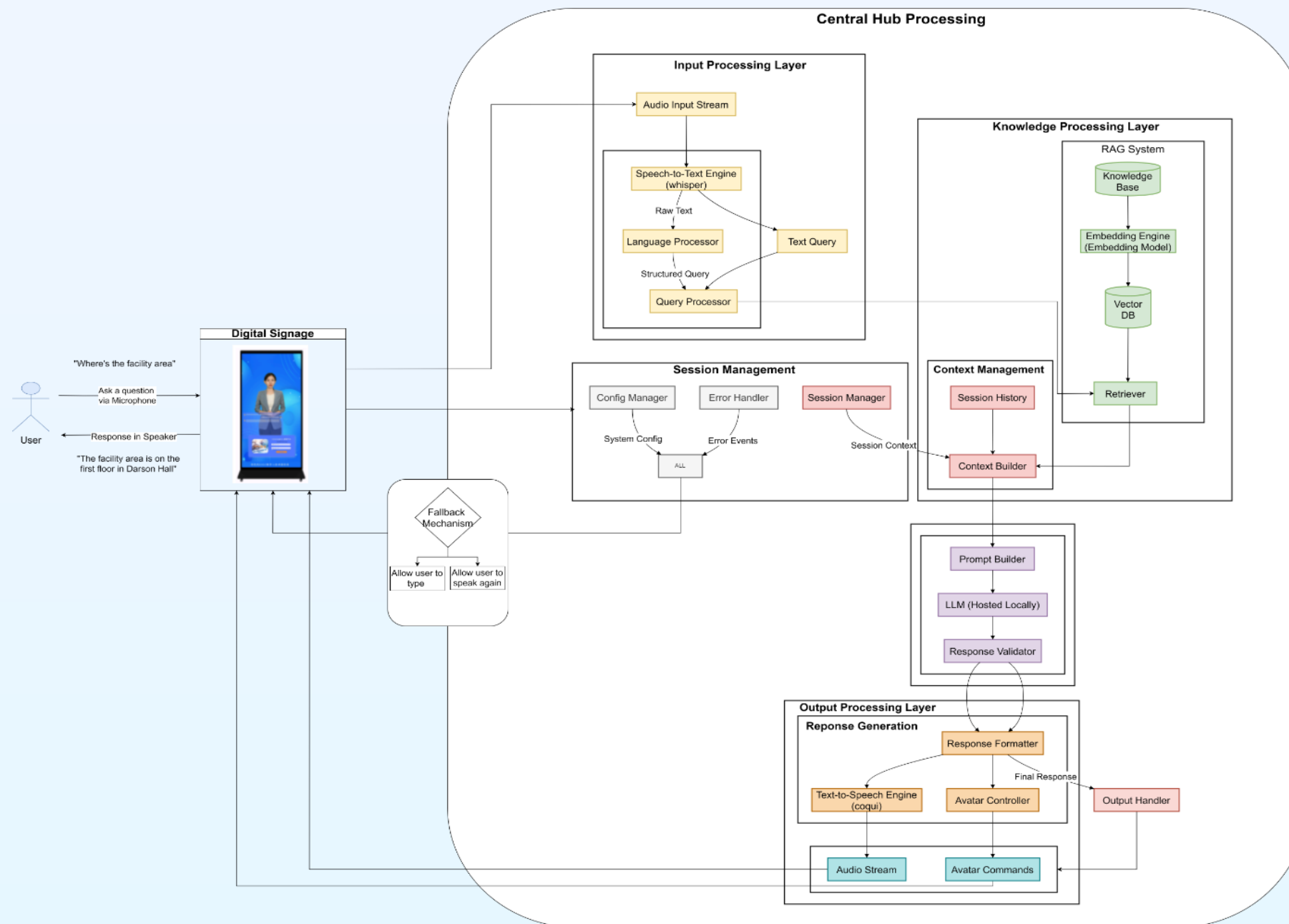
System Architecture for Interview Analysis

DraftIPO - Multi-agent System for Contract Drafting

Overview

LTS Group partnered with a Hong Kong Investment Firm to develop an AI-powered solution to streamline the complex and time-consuming process of drafting Initial Public Offering (IPO) documents for companies planning to list on major exchanges such as HKEX and Nasdaq.

- Country: HongKong
- Domain: Investment Banking
- AI expertise: Multi-agent Systems

3 Members

3.5 Months

Development

Python | CrewAI
Langchain | OpenAI SDK

Deployment Environment

K8s
Docker

LLM Integration

Azure OpenAI (GPT-4o),
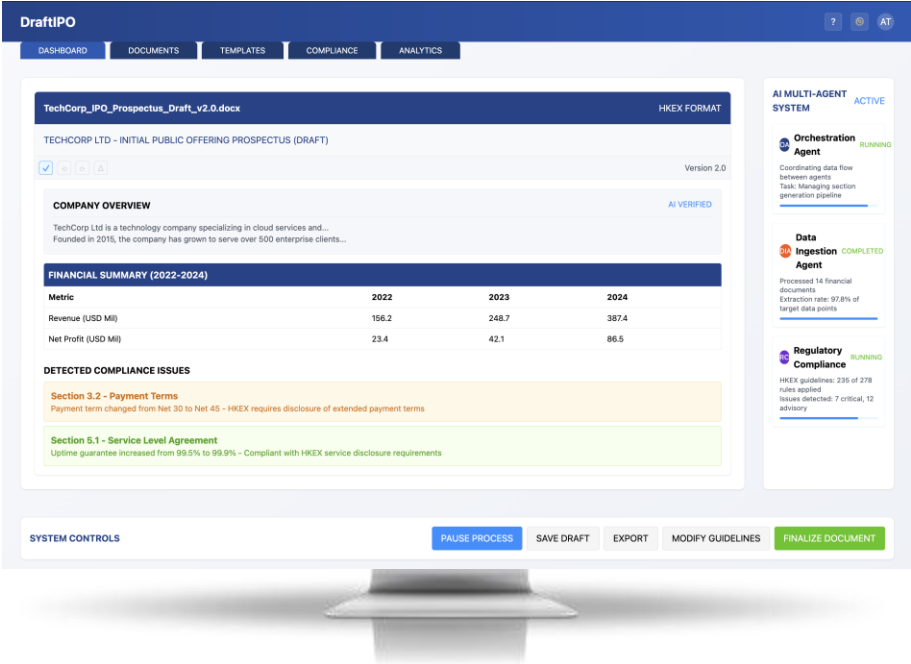OpenRouter (Llama 3.1) | Gemini 1.5

Database

PostgreSQL
Qdrant

DraftIPO

DASHBOARD | DOCUMENTS | TEMPLATES | COMPLIANCE | ANALYTICS

TechCorp_IPO_Prospectus_Draft_v2.0.docx — HKEX FORMAT

TECHCORP LTD - INITIAL PUBLIC OFFERING PROSPECTUS (DRAFT)

Version 2.0 — AI VERIFIED

COMPANY OVERVIEW

TechCorp Ltd is a technology company specializing in cloud services and...
Founded in 2015, the company has grown to serve over 500 enterprise clients...

FINANCIAL SUMMARY (2022-2024)

Metric	2022	2023	2024
Revenue (USD Mil)	156.2	248.7	387.4
Net Profit (USD Mil)	23.4	42.1	86.5

DETECTED COMPLIANCE ISSUES

Section 3.2 - Payment Terms
Payment term changed from Net 30 to Net 45 - HKEX requires disclosure of extended payment terms

Section 5.1 - Service Level Agreement
Uptime guarantee increased from 99.5% to 99.9% - Compliant with HKEX service disclosure requirements

SYSTEM CONTROLS — PAUSE PROCESS | SAVE DRAFT | EXPORT | MODIFY GUIDELINES | FINALIZE DOCUMENT

AI MULTI-AGENT SYSTEM ACTIVE

Orchestration Agent — RUNNING
Coordinating data flow between agents
Task: Managing section generation pipeline

Data Ingestion Agent — COMPLETED
Processed 14 financial documents
Extraction rate: 97.8% of target data points

Regulatory Compliance Agent — RUNNING
HKEX guidelines: 235 of 278 rules applied
Issues detected: 7 critical, 12 advisory

Key Challenges

Creating IPO documentation is a complex and time-intensive process, traditionally requiring hundreds of hours from legal and financial experts. Key challenges include ensuring regulatory compliance (HKEX/Nasdaq), managing bilingual content, processing large volumes of financial data, and maintaining consistency across document versions.
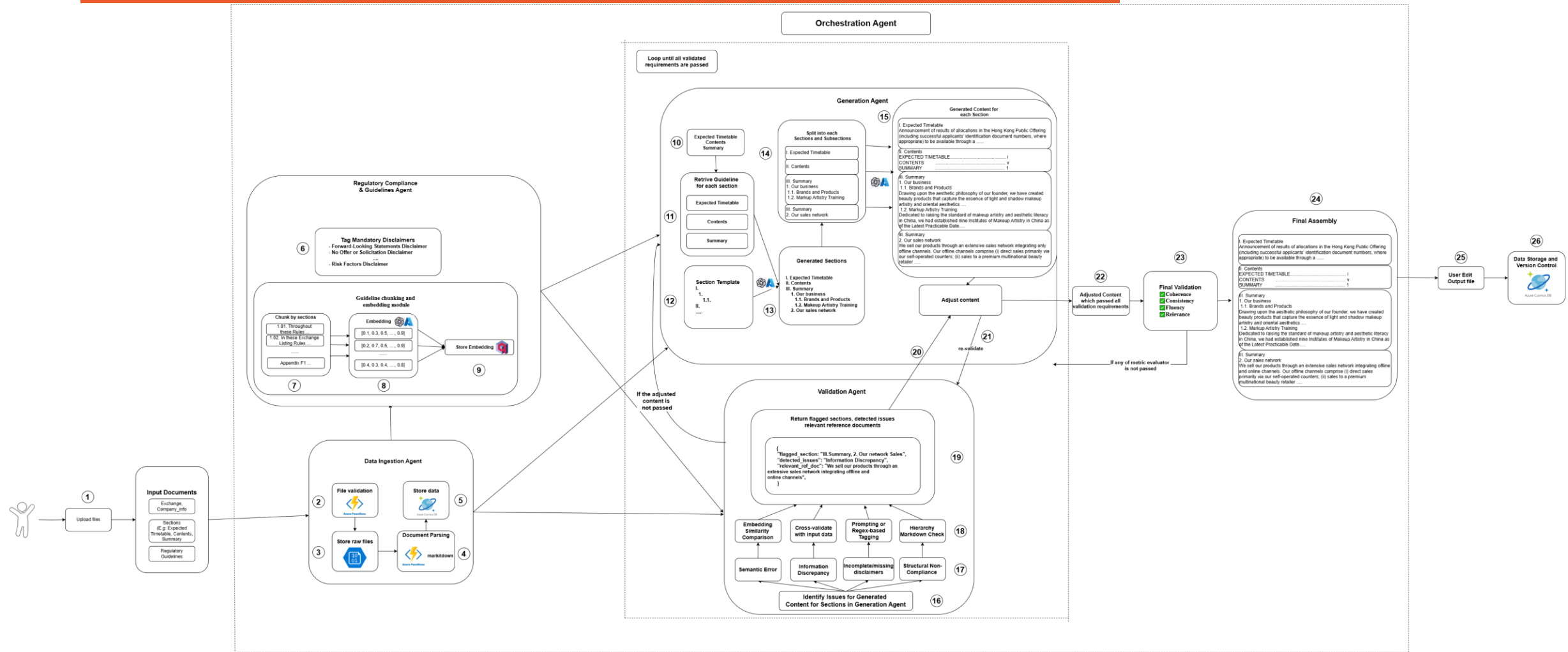
Scope of Work

DraftIPO, developed by LTS Group, is a multi-agent AI system that automates the complex and time-consuming process of IPO documentation.

DraftIPO employs five specialized AI agents working in concert:
- Orchestration Agent: Coordinates workflow and manages the overall document generation process
- Data Ingestion Agent: Processes and normalizes input documents (financial reports, corporate information)
- Regulatory Compliance Agent: Ensures adherence to exchange-specific requirements
- Generation Agent: Creates coherent, compliant document sections based on inputs
- Validation Agent: Performs final quality and compliance checks

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

System Architecture Diagram

High resolution

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.*
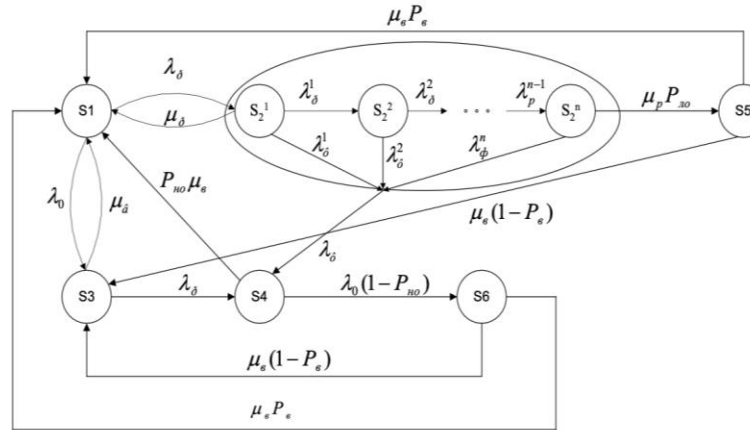
Enhanced Reliability

• 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.
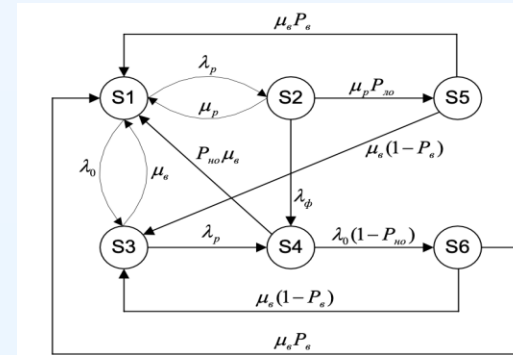
Methodology & Technical Approach

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 (λ) and recovery rates (μ).
• **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.
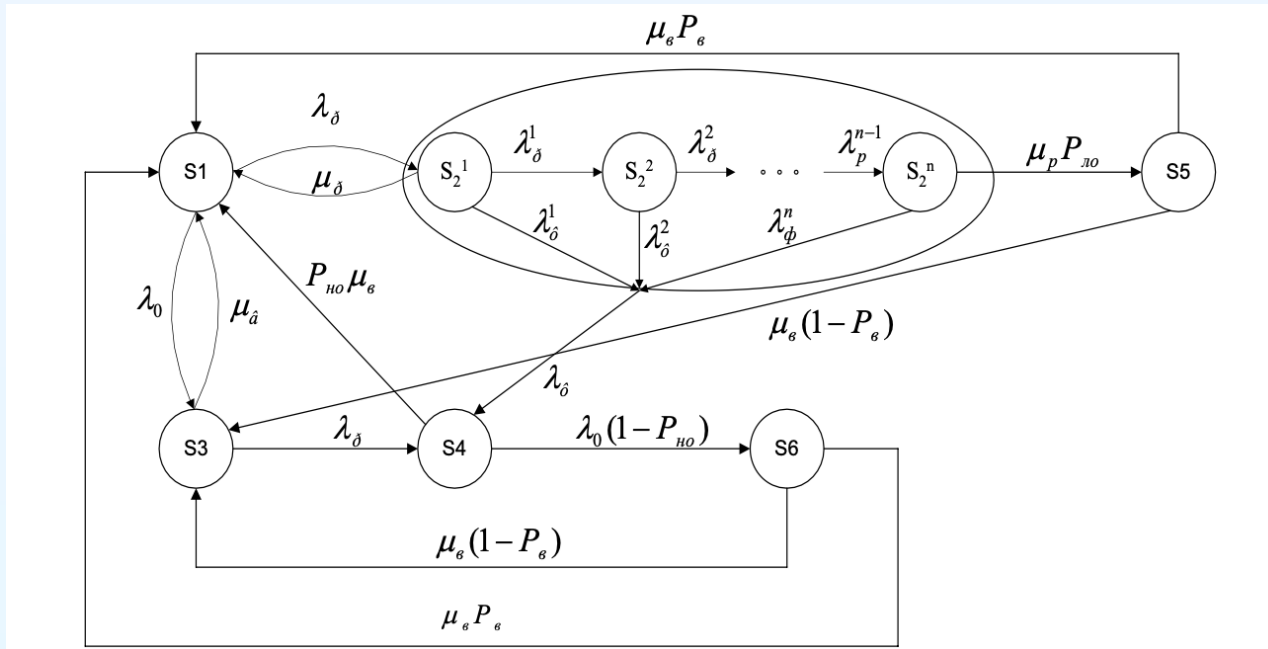
Development of a mathematical model of reliability "automatic control - neuroprocessor control system"

Implementation **in a Mobile Robot Control System**

1. **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.
2. **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.
3. **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

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contact@ltsgroup.tech

WEBSITE
www.ltsgroup.tech

TELEPHONE
(+84) 24-6660-7474

Appendix

Tech Stack

Framework & Libraries

Computer Vision
- Detectron
- YOLO
- Vit-Transformers

NLP
- HF Transformers
- spaCy

Speech
- Whisper
- DeepSpeech
- Wav2vec
- Stable Audio Open

Business Intelligence

Database
- SQL
- Neptune
- GraphDB

MLOps
- mlflow

Toolkits
- NVIDIA NEMO
- NVIDIA TRITON INFERENCE SERVER
- KServe

Cloud Platforms
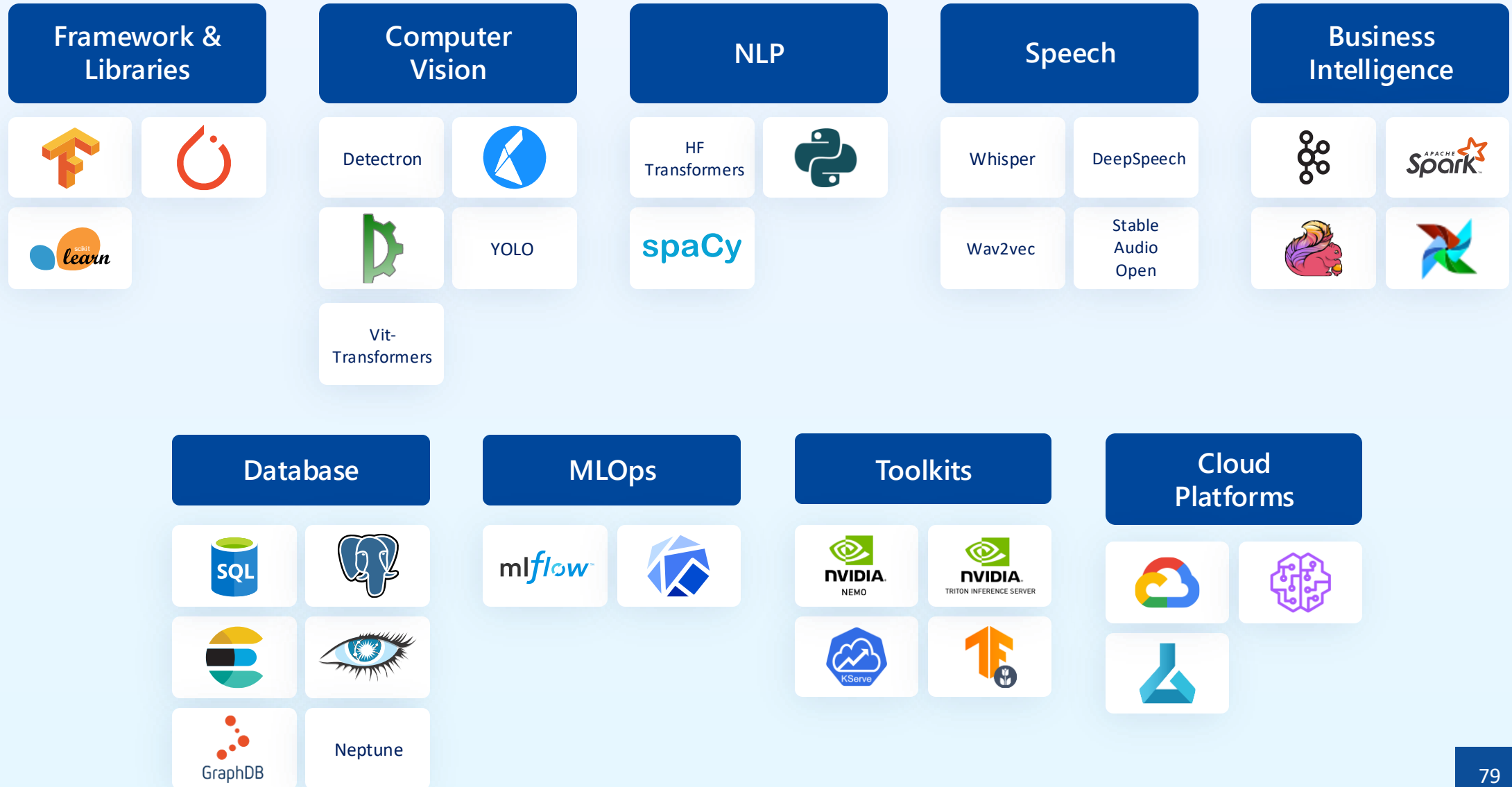
Annotation For Forklift & Human In Industrial Zones

Overview

Our client is a crowdsourcing company from South Korea. They wanted to find an outsourced vendor to annotate forklifts & humans in industrial zones.

- **Country:** Vietnam
- **Domain:** Services

15 Members

50,000 Objects

2 Features

Project Detail

- **Class to annotate:** Forklift and human in industrial zones
- **Type:** Bounding box

Tech Stack

| LabelImg | Excel | Slack |

Our Human Resources
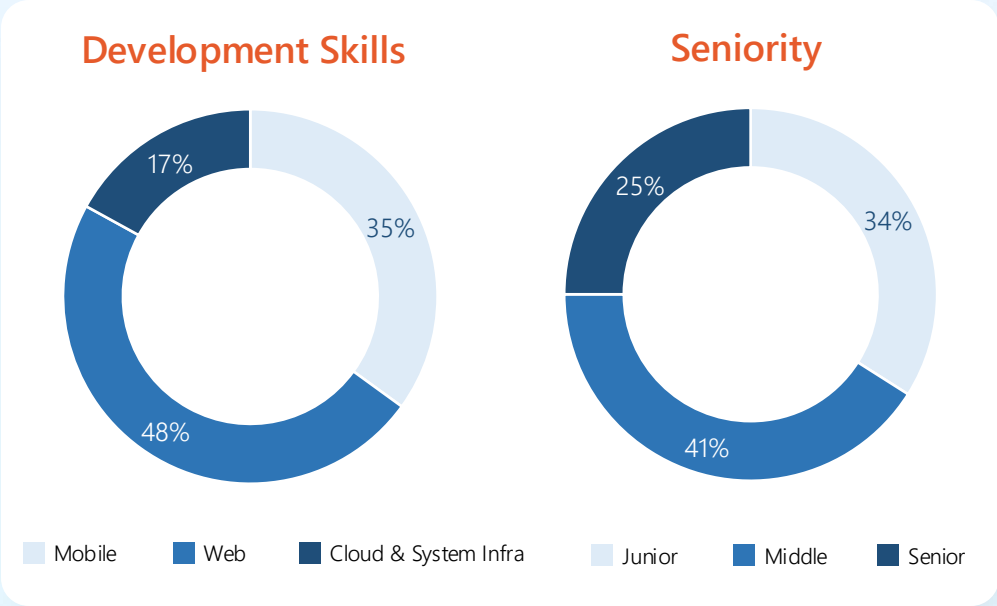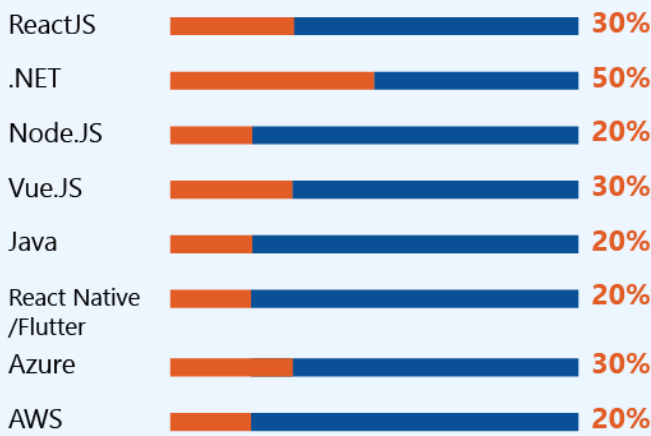
ReactJS **30%**
.NET **50%**
Node.JS **20%**
Vue.JS **30%**
Java **20%**
React Native /Flutter **20%**
Azure **30%**
AWS **20%**

Development Skills
- 35%
- 17%
- 48%

Legend: Mobile, Web, Cloud & System Infra

Seniority
- 34%
- 25%
- 41%

Legend: Junior, Middle, Senior

Language Ability

We obtain high level of language proficiency for effective communication with our clients.

85% English **25%** Japanese **5%** Korean

Professional Certificate

Our staff can meet the international standards of both management and technical skills.

52% ISTQB Certified Tester Foundation Level

10% ISTQB Certified Tester Advanced Level Test Manager

5% PMI PMP

36% PSM Professional Scrum Master

LTS GROUP
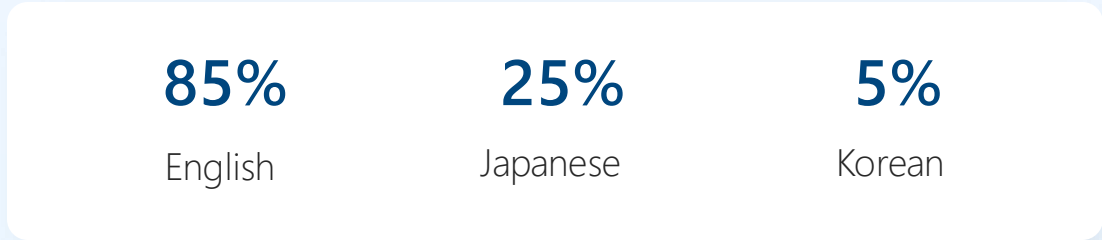
Our Achievements

We are dedicated to constantly improving our competencies through the achievements and certificates in multiple fields. With solid figures proving our experience, you are well-assured of high-quality services and products.

97%
Satisfaction

275
Projects

10
Countries

61+
Clients

Security & Compliance

Physical Security Layers

- CCTV system with modern surveillance cameras is set up within office areas.

- Safe Guards: Separate office zones with high security are a.

- Fingerprint: Biometric scanners are at entrances to allow access to facilities.

- ODC: We set up private centers with highly secured layers as required.

Legal Confidentiality

- NDA is signed between two parties of LTS Group and the client, clearly stating the terms concerning the security matter and confidentiality.

- Staff Confidentiality: Employees are trained with security policies to know the dos and don'ts. We also have an ISMS team for this.

Network Security

- VPN: We set up a Virtual Private Network for a private & protected network connection when communicating with clients.

- Data Leak Prevention: An internal system of data management and authorization is set up to prevent data leakage.

- Continuous monitoring from developer team and QA team detect risk issues.

Onboarding Timeline

LTS → **Submit CVs for scan** → CLIENT → **Interview** → PROJECTS
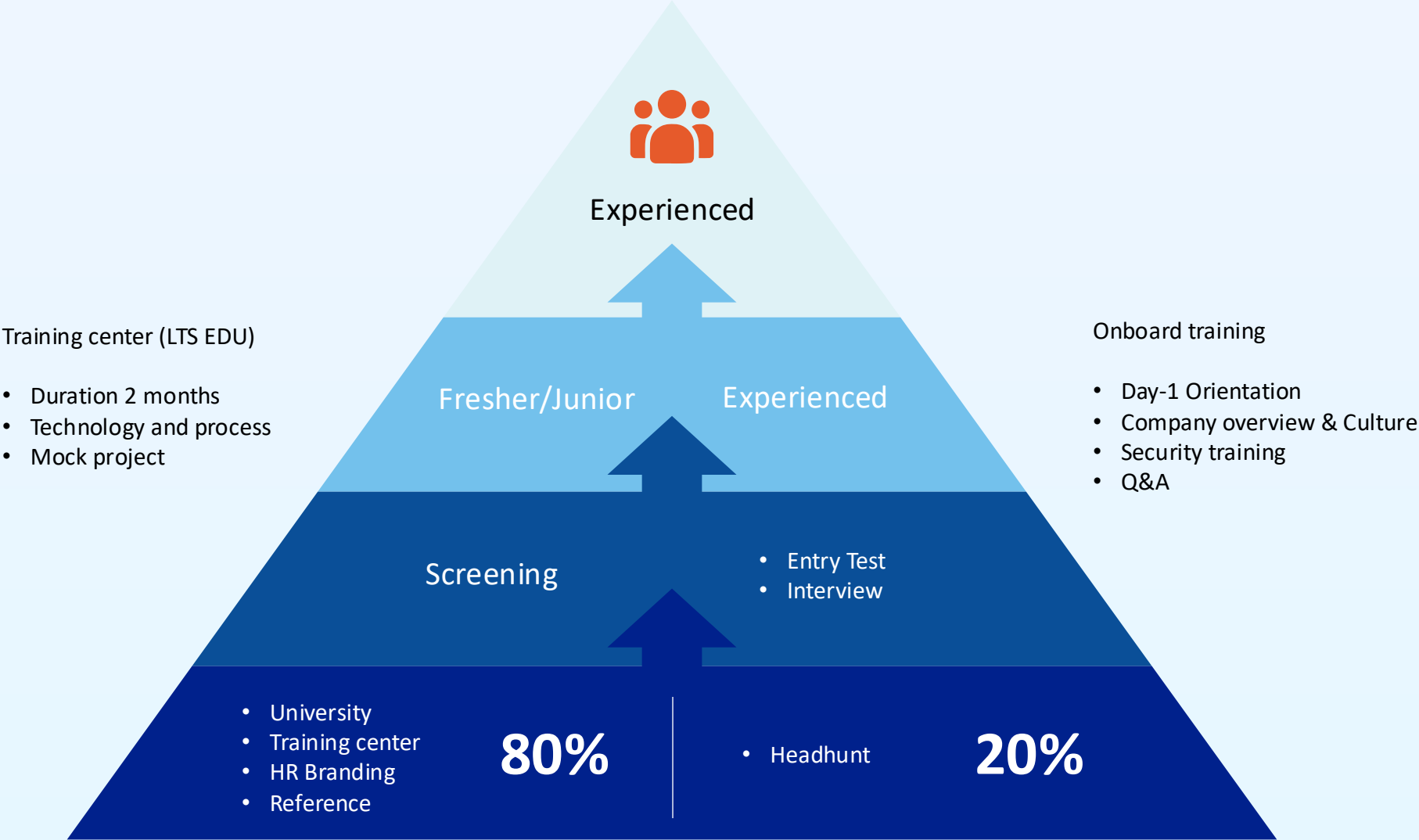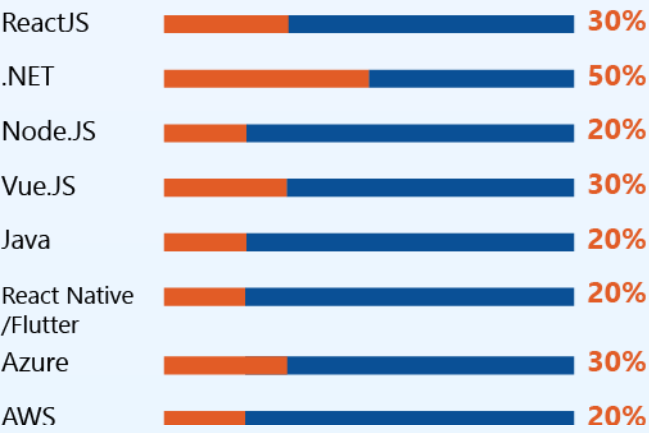
- Client feedback for CVs within 2 working days
- Passed rate: 80-90%
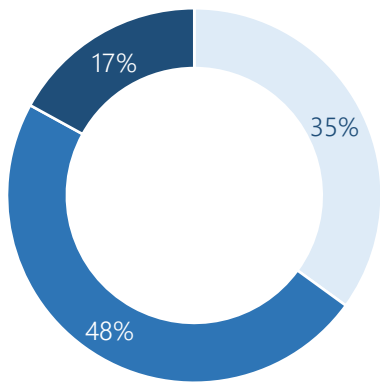
- Interview within 1 weeks
- Onboard within 2 weeks after confirm result
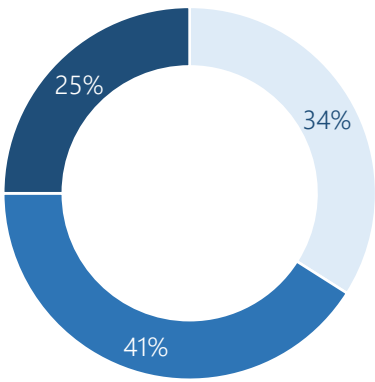- Passed rate: 60-70%

Our Human Resources

ReactJS — 30%
.NET — 50%
Node.JS — 20%
Vue.JS — 30%
Java — 20%
React Native /Flutter — 20%
Azure — 30%
AWS — 20%

All AI/Data Engineers/Developers are experienced in Python.

Development Skills

17%
35%
48%

- Data & Analytics
- AI Engineering
- Cloud & System Infra

Seniority

25%
34%
41%

- Junior
- Middle
- Senior

Language Ability

We obtain high level of language proficiency for effective communication with our clients.

87% English

26% Japanese

5% Korean

A number of Employees are trilingual

Professional Certificate

Our staff can meet the international standards of both management and technical skills.

52% ISTQB Certified Tester Foundation Level

10% ISTQB Certified Tester Advanced Level Test Manager

5% PMI PMP

36% PSM Professional Scrum Master

aws certified Machine Learning SPECIALTY

aws certified Security SPECIALTY

aws certified Solutions Architect ASSOCIATE

Microsoft CERTIFIED AZURE DATA ENGINEER ASSOCIATE

Microsoft CERTIFIED AZURE SOLUTIONS ARCHITECT EXPERT

databricks CERTIFIED Data Engineer Associate

aws certified Advanced Networking SPECIALTY

aws certified SysOps Administrator ASSOCIATE

Cloud Engineer GOOGLE CLOUD CERTIFIED : ASSOCIATE

Data Engineer GOOGLE CLOUD CERTIFIED : PROFESSIONAL

databricks CERTIFIED Data Analyst Associate

Onboard Process

OPERATION

- Select candidate based on skills
- **Interviewed by Client**

- Rank upgrade
- Compensation upgrade

Main resource

Resource ondemand

PROJECTS

Performance Review

- Work done
- Self development
- Contribution

CHECKPOINT

Good performance

PROMOTION

Repeated low performance

Not Good skills

- Free resource
- 10% buffer
- Need re-train

RESERVED POOL

Interviewed by Client

LTS EDU

- Technology
- Process
- Languages