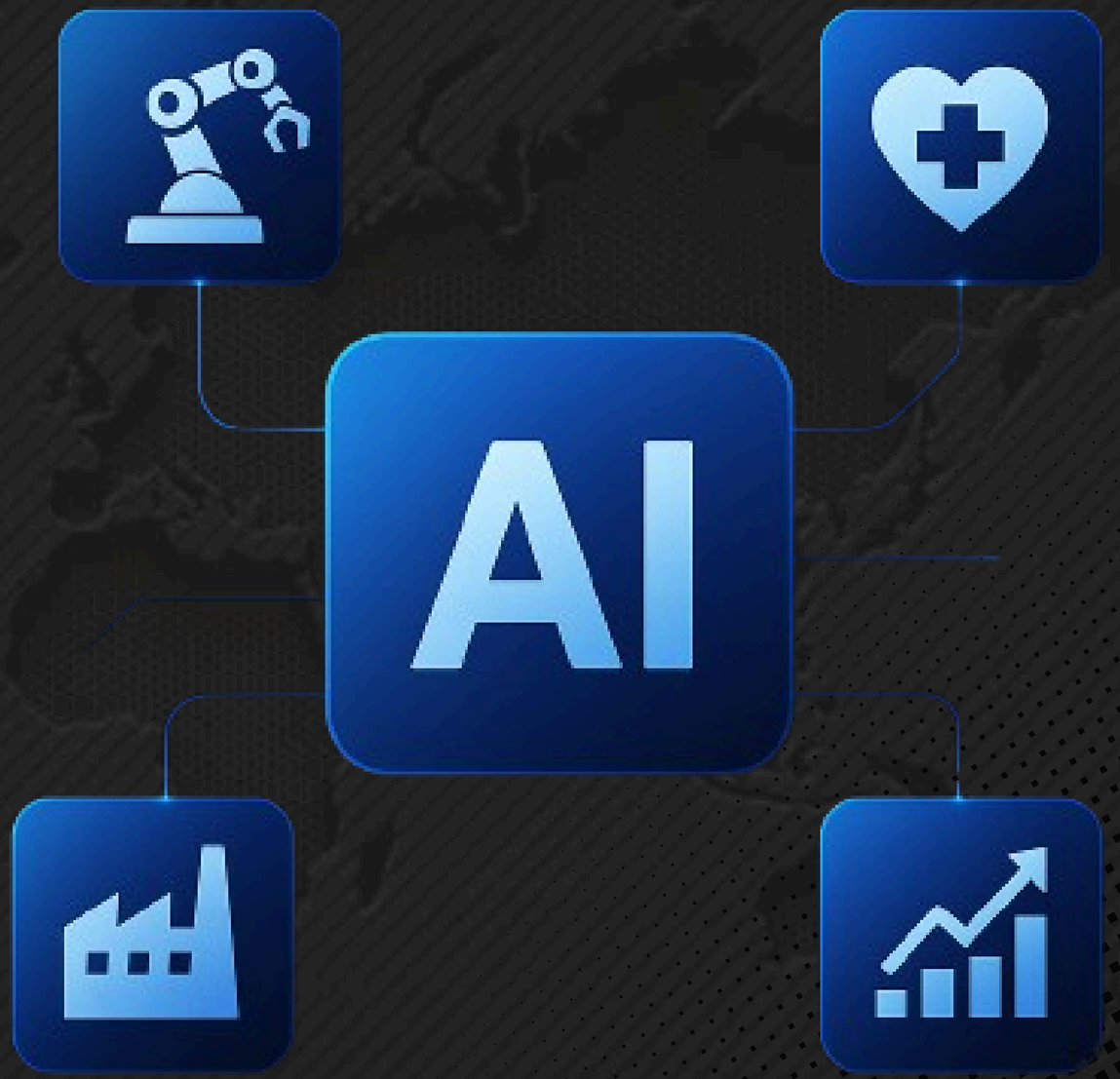
M10 Labs

Select client and partner use cases

Strategic Use Cases

Smart Efficiency, Seamless Operations, and Human-Centered Transformation



#1 - Document Analysis

Intelligent Document Processing for Medical Claims

Insurance | OCR | AI/ML

Leading European insurer modernizing claims processing with AI to improve speed, accuracy, and compliance.

Overview

Intelligent document processing system using OCR and AI to help insurance providers automatically extract, classify, and validate data from unstructured medical claims, forms, and supporting documents.

Challenge

The medical reports were unstructured, varied in format, and often low quality. Key-value pairs appeared inconsistently, making rule-based extraction unreliable.

Solution

A multi-stage AI pipeline to address structural variability and enhance extraction accuracy:

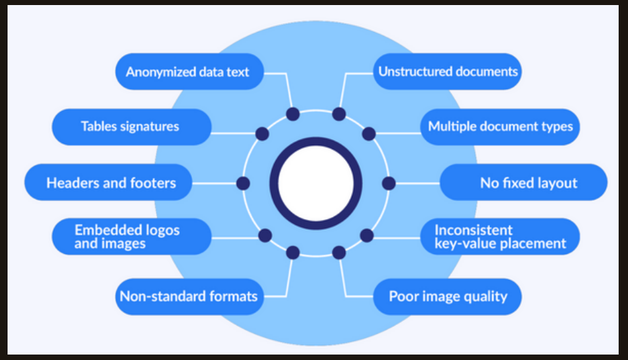
- A transformer-based Named Entity Recognition (NER) model trained for German-language segmentation and classification.
- A Random Forest classifier implemented to detect relationships between key-value pairs using spatial data from OCR bounding boxes.
- Multiple model experiments and post-processing routines were conducted to refine segmentation accuracy and bounding box precision.

Technologies Frameworks

Programming Language	AI & Deep Learning	OCR & Document Processing
Python	LayoutLMv3	Tesseract

Key Features

- A joint multimodal architecture combining NER and classification to segment content into HEADER, QUESTION, ANSWER, and OTHER
- QUESTION and ANSWER fields are identified as primary extraction targets
- A machine learning classifier matches related question-answer pairs
- xNER models are applied to extract standalone patient details such as name, birth date, and address, even when not linked to predefined keys



#2 - Document Analysis

Enhancing Pharmacovigilance with AI and OCR

Pharma | OCR | AI/ML

Advisory arm supporting healthcare providers, payers, and life sciences.

Overview

OCR and AI extract critical data from reports to enhance drug safety monitoring and streamline pharmacovigilance workflows.

Challenge

Manual data extraction from PDFs and XML slows drug safety monitoring and approval workflows, creating inefficiencies and risks in pharmaceutical research and development.

Solution

A serverless platform on AWS, developed using Python and MLOps best practices:

Automated ML Pipelines: Utilized AWS services to create pipelines for training and deploying ML models, enabling efficient document processing with a focus on OCR-based PDF data extraction.

Infrastructure as Code (IaC): Managed infrastructure using AWS SAM for consistent, version-controlled deployments integrated with CI/CD workflows.

Technologies Frameworks

Core Infrastructure	Programming Language
aws	

Results

- Streamlines approval workflows during the research and development phase of product life cycles, which is particularly valuable in the pharmaceutical industry
- Supports both XML and PDF formats through distinct processing methods
- XML files are directly converted to structured JSON
- PDFs undergo OCR and Machine Learning model orchestration to extract and transform data into a usable format

#3 - Document Analysis

Automated Aid Processing for COVID-19 Relief Operations

OCR | AI/ML

Tech giant offering cloud, e-commerce, and healthcare solutions through AWS.

Overview

Automated OCR and backend systems were developed to process relief applications and documents, enabling the City of Phoenix to rapidly verify eligibility and distribute COVID-19 aid.

Challenge

Manual processing of relief applications was slow, error-prone, and unable to handle high volumes. Families in need faced delays due to time-consuming document reviews and a lack of system integration for identifying and verifying eligibility.

Solution

A custom backend system and OCR API were developed using test-driven methods to extract and serialize data from uploaded documents such as utility invoices and IDs. The system allowed real-time coordination, streamlined document verification, and automated relief processing.

Technologies Frameworks

Backend - Serverless Archotecture

Code Quality & Testing

Results

The platform enabled the City of Phoenix to efficiently distribute over **$20 million in federal aid**, significantly reducing processing time, scaling operations, and delivering critical support to impacted families faster.

#4 - Diagnostic Support

AI Assistant for Symptom Analysis and Prescription

Healthcare | AI/ML

On-demand telemedicine and pharmacy platform for accessible patient care.

Overview

An intelligent assistant analyzes symptoms and suggests treatment paths, simplifying the prescription process for both patients and providers.

Challenge

With overwhelming patient demand and informal communication channels, healthcare providers struggled to optimize time, formalize remote consultations, and establish sustainable revenue streams.

Solution

An AI-powered virtual assistant that **lets patients describe symptoms in natural language (NLP) and receive preliminary diagnostic suggestions,** improving intake and aiding medical professionals.

Doctors can manage patient requests, view medical histories, and generate legally valid prescriptions via the recetario.com.ar API. The platform includes secure Google OAuth 2.0 login and Mercado Pago integration for service monetization.

Technologies Frameworks

AI/LLM	Backend & API	Frontend	Databases
OpenAI			

***Mercado Pago** integration for service monetization enables you to accept payments directly within your application or platform.*

***Recetario.com.ar** provides a RESTful API that enables seamless integration of its electronic prescription and medical order functionality into other systems*

Results

- Reduced consultation time by **70%** by automating repetitive tasks such as prescription delivery
- Achieved **92%** task completion rate through disciplined backlog execution and sprint planning
- Maintained **95%+** client satisfaction, driven by positive patient feedback and strong readiness for scaling medical professional onboarding

#5 - Bluetooth Device Integration

At-Home Monitoring for Glaucoma Treatment

External Device | Healthcare | AI/ML

AI-powered eye health company focused on at-home monitoring and glaucoma detection. (Start-up)

Overview

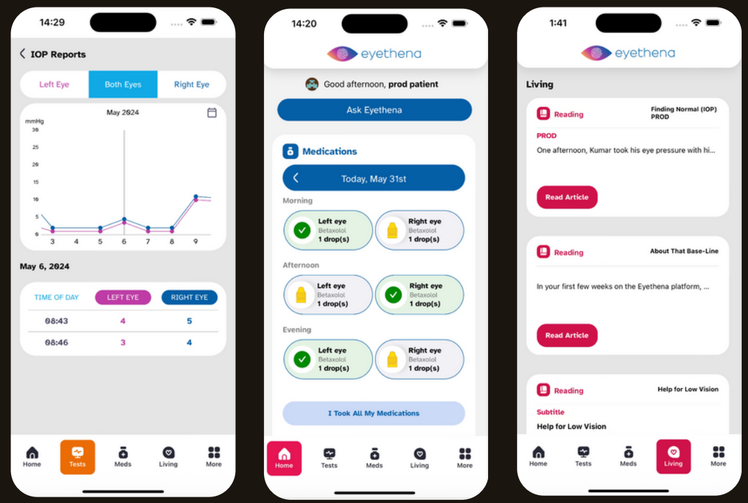
Remote AI-powered monitoring tools track glaucoma progression and alert clinicians with changes in a patient's condition.

Challenge

Patients with glaucoma often miss early signs of disease progression due to infrequent in-person checkups, leading to delayed interventions and irreversible vision loss. There was a need for a user-friendly, remote monitoring solution that empowers patients to track their condition from home while enabling clinicians to intervene in real time.

Solution

Mobile app captures key indicators of disease progression through a Bluetooth-enabled device and periodic prompts to answer questions. Data is securely transmitted to a backend platform, where physicians monitor trends and adjust treatment in real-time. Initially designed for glaucoma, the model can be extended to other degenerative conditions.



Technologies Frameworks

Full-Stack Web Development

Key Features

- FHIR Compliance for secure, standardized data exchange across healthcare systems
- Machine Learning Integration to detect trends and support clinical decision-making
- Scalable Microservices Architecture to support performance and future expansion
- Accessible Design with a responsive web app (React) and cross-platform mobile app (React Native)

#6 - IoT for Precision Analysis

Real-Time Monitoring App for Fracturing Equipment

External Device | IoT | AI/ML

Global energy services company providing technology and solutions for oil and gas exploration and production.

Overview

A real-time desktop platform tracks the performance and health of pumps and blenders during hydraulic fracturing operations, improving safety and efficiency.

Challenge

Hydraulic fracturing operations lacked real-time visibility into equipment performance, resulting in unplanned downtime, safety risks, and inefficient maintenance practices.

Solution

Integrated IoT devices for continuous data collection, Big Data infrastructure for scalable storage and analysis, and AI models to generate intelligent alerts.

Technologies Frameworks

Frontend & Design

Backend Development

Cloud & Infrastructure

Databases

Results

- Real-time equipment visibility
- Proactive detection and prevention of failures
- Reduced downtime and improved operational efficiency
- Enhanced worker safety

- **120** fracturing units analyzed
- Over **2.1 million** events generated
- More than **100GB** uploaded to the equipment data cloud

#7 - Object Identification

AI-Based Teeth Detection from Dental X-Rays

Image Processing | Dental Automation | AI/ML

Modern dental clinic using AI to enhance care.

Overview

An AI-powered teeth numbering system uses machine learning to automatically detect and label teeth in dental X-rays. It enhances diagnostic speed, improves accuracy, and integrates seamlessly into dental imaging workflows.

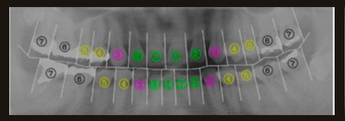
Challenge

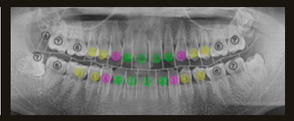
Manual tooth labeling is slow and error-prone, creating the need for a faster, more accurate, and standardized detection method.

Solution

A custom object detection mode using TensorFlow's Object Detection API. The model is trained to recognize and classify individual teeth from X-ray images with high precision.

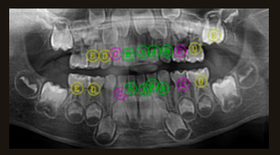
Normal Teeth

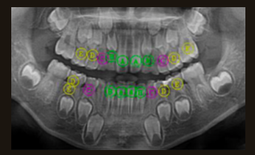




Old Teeth

Baby Teeth





Technologies Frameworks

Programming & AI Development

Results

High accuracy of prediction:

99% — Normal Teeth

97% — Old Man Teeth

73% — Baby Teeth

Implementatiion

Dataset Preparation:

1,230 dental X-ray images categorized into training, testing, and validation sets

Image Labeling:

Multiple labeling approaches were tested; final decision was to label individual teeth only

Model Development:

The TensorFlow Object Detection API was modified for the development environment, and a custom model was built to optimize accuracy for this use case

#8 - Object Identification

AI-Powered Insect Detection for Food Safety

Image Processing | Food Safety | AI/ML

Food production company specializing in scaling operations and maintaining high safety standards.

Overview

AI system for food manufacturing detecting insects on trap sheets in real time to improve product quality and production efficiency.

Challenge

Food manufacturers struggled with slow, manual insect detection, leading to delayed quality control, production inefficiencies, and potential regulatory risks.

Solution

The system utilizes AI to scan insect traps, detecting real bugs of all sizes while ignoring false alarms. It alerts teams early to maintain food safety and keep production running smoothly.

- **Image Processing:** Super Resolution, Semantic Segmentation, and custom enhancement algorithms
- **Object Detection:** YOLOv4, Scaled-YOLOv4, and CenterNet to detect insects of varying sizes
- **Data Analysis:** Dimensionality reduction, association rule learning, and clustering to interpret patterns
- **Classification:** Ensemble algorithms to improve the accuracy and reliability of results

Technologies Frameworks

Programming Language	Cloud Infrastructure
	

Results

The system performs with great accuracy for all sizes of insects.

#9 - NLP & Feedback Analysis

NLP Analysis | Healthcare | AI/ML

Turning Patient Feedback into Actionable Insights

Global consultancy driving digital healthcare transformation.

Overview

AI converts unstructured patient feedback into structured data, enabling healthcare teams to identify trends and improve care delivery.

Challenge

The client receives a high volume of patient feedback through audio messages.

Manually transcribing, interpreting, and analyzing these calls was time-consuming, resource-intensive, and prone to human error.

Solution

An AI-powered solution that uses Machine Learning and Natural Language Processing (NLP) to automatically analyze patient feedback. It identifies key trends, highlights areas for improvement, and detects potential safety concerns.

Technologies Frameworks

Core Infrastructure	Database
aws	

Key Features

- Transcribes audio to text, extracting key topics, sentiment (positive, negative, neutral), and patient concerns such as medication effects or side effects
- Exports insights to a CSV file and securely stores structured data in AWS DynamoDB for future access
- Visualizes results through an interactive, user-friendly dashboard
- Operates on a scalable AWS backend, seamlessly integrating with Roche's existing systems

#10 - NLP & Feedback Analysis

NLP Analysis | AI/ML

Trend & Sentiment Analysis with NLP

Telehealth and diagnostics platform partnering with remote care. service

Overview

Complaint narratives are essential for identifying safety issues and maintaining regulatory compliance. Manual review is slow and inconsistent, creating bottlenecks as data volumes grow. This platform uses Natural Language Processing to automate classification and streamline complaint handling.

Challenge

Manual processes required assessors to review large volumes of free-text narratives, leading to delays, inconsistent classifications, and growing backlogs. There was a need for a faster, scalable solution that ensured compliance while reducing the burden on review teams.

Solution

An AI-driven platform to automate the review of complaint narratives using NLP. The system reduces manual workload, accelerates case resolution, and ensures compliance through consistent and scalable processing. It provides real-time classification, secure data handling, and reliable deployment, freeing up assessors to focus on complex cases.

Technologies Frameworks

Core Infrastructure

aws

Programming Language

Key Features

- **AI-Powered Narrative Analysis:** NLP models on AWS SageMaker and Bedrock classify complaint narratives automatically
- **Serverless Workflows:** AWS Lambda, Step Functions, and SQS coordinate processing; S3 and DynamoDB handle secure storage
- **Modern App Architecture:** React frontend and Python backend connected via API Gateway for responsive, reliable operation
- **Automated Deployment Pipelines:** CI/CD processes enable fast, consistent rollouts across QA and production with full documentation

Conversational AI Agents for Personalized Education

Conversational AI | Education | AI/ML

IDB – Inter-American Development Bank funding innovation and development across Latin America.

Ministerio de Educación – National education ministry supporting public education and digital learning initiatives.

Overview

Two AI-powered assistants provide 24/7 conversational support. Profe Gabi supports new teachers, and Kai helps students explore careers in education.

Challenge

New teachers lacked accessible, real-time support for classroom challenges, while students had limited guidance in exploring teaching careers. Traditional resources were fragmented and difficult to navigate.

Solution

A scalable backend system, built with AWS Smart Cities and ASU CIC, enables fast, personalized AI responses. Originally developed for rapid COVID-19 relief deployment, it now delivers real-time educational support.

Technologies Frameworks

AI & Backend Development with Python

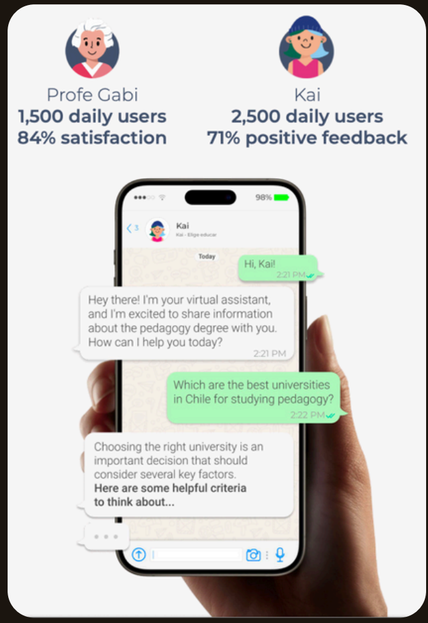
LlamaIndex

Conversational Interfaces & Messaging

Voiceflow

Results

Users avoid complex navigation. They ask questions and receive direct, relevant answers instantly.



#12 - Conversational AI & Chatbots

Automating Car Sales Funnel via WhatsApp Chatbot

Conversational AI | AI/ML

AI and automation company focused on streamlining workflows for enterprises.

Overview

A conversational AI on WhatsApp qualifies leads, answers buyer questions, verifies credit, and books appointments to automate the car sales process.

Challenge

The car sales process was slowed by manual lead qualification, fragmented communication, and time-consuming appointment scheduling, limiting conversion rates and operational efficiency.

Solution

Using n8n as the orchestration layer, a GPT-4-powered assistant engages customers on WhatsApp Business. It collects key details such as budget, savings, and vehicle info, integrates with external APIs for credit and valuation, and delivers tailored vehicle recommendations.

Appointments are scheduled automatically within the same chat.

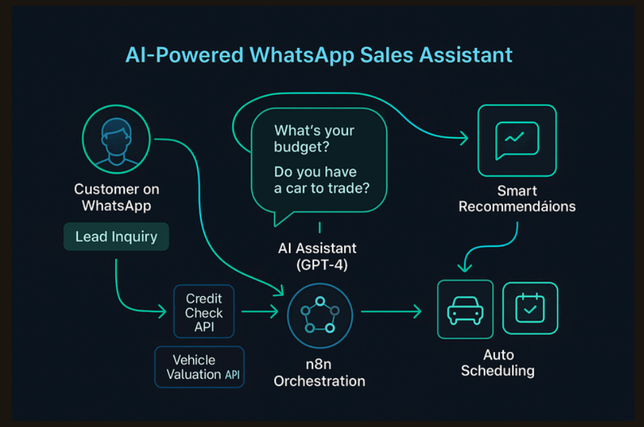
Technologies Frameworks

Conversational Interfaces & Messaging

LlamaIndex

Results

- Faster sales cycles by reducing response times and automating initial inquiries
- Increased efficiency as staff focus on high-value tasks
- Optimized lending capacity through better pre-qualification



#13 - Conversational AI & Chatbots

AI-Powered Personalized Learning Evaluator

Conversational AI | Education | AI/ML

Conversational AI company building chatbots and virtual assistants for customer engagement and automation.

Overview

An AI-powered platform matches students with personalized lessons based on their skills, learning goals, and pace. This approach drives higher engagement and improved learning outcomes across a range of subjects.

Challenge

Static, one-size-fits-all lessons led to low engagement and uneven progress. A scalable, personalized approach was needed to improve learning outcomes.

Solution

A custom matching engine was built on AWS EKS with Kubernetes, load-tested for **3,000+** users using K6.

An AI language coach leveraged OpenAI's Realtime API and Whisper to tailor responses to user proficiency. To ensure safe, high-quality sessions, Google Gemini analyzes visual behavior for compliance, while Whisper evaluates speech patterns like speed and fluency.

Results

- Natural, avatar-driven conversations with adaptive feedback
- Personalized insights based on session recordings
- **1,000+** daily active users
- **30,000** registered users
- **20%** annual growth

Technologies Frameworks

Cloud & Containerization

DevOps & CI/CD

Programming Languages

Database

#14 - Conversational AI & Chatbots

AI Chatbot Agents for Scalable Customer Service with Context-Aware Routing

Banking | Conversational AI | AI/ML

Bank focused on modernizing customer experience and operational efficiency through technology.

Overview

Powered by large language models, agent-based chatbots deliver scalable, context-aware interactions that mimic human conversation for smarter automation.

Challenge

Traditional rule-based NLP chatbots struggle with ambiguous or complex inputs, leading to rigid interactions, high escalation rates, and limited user satisfaction. Businesses need smarter, more adaptive automation to meet rising customer expectations.

Solution

An LLM agent-based chatbot was developed to support dynamic, multi-turn conversations with contextual understanding. It adapts to user input in real time, enabling more natural and efficient support experiences.

Key Features

- Less effort is required for training and maintenance
- Seamless handling of complex, evolving user conversations

90–95% intent recognition accuracy

70–85% of queries resolved on first contact

50%+ reduction in unhandled queries

Technologies Frameworks

LLM & Models

LangChain, LLAMA 3, LangGraph, OpenAI

Programming & AI Development

Databases

ArangoDB

#15 - Business Automation

Multi-Agent AI Platform for Investor Intelligence

Automation | AI/ML

Global investment manager focused on infrastructure, private equity, debt, and listed equities.

Overview

A multi-agent AI platform automates the creation of business reports by gathering, analyzing, and formatting data from multiple systems, reducing manual workload and improving efficiency.

Challenge

Generating accurate business reports was a time-consuming process, requiring users to manually search across disconnected data sources, perform complex analyses, and ensure compliance with internal policies. To address these challenges, the goal is to automate report generation, improve efficiency, and ensure accuracy and alignment with organizational standards.

Solution

Three conversational agents were deployed to streamline the process:

- Document Navigator retrieves and interprets institutional knowledge from SharePoint, delivering precise, context-aware responses.
- Data Analysis Agent enables natural language querying of SQL and Excel data to extract insights and perform advanced calculations.
- Business Advisor offers expert guidance on ESG strategy, sector trends, and regulatory frameworks, tailored to the organization's needs.

Technologies Frameworks

AI & LLM Frameworks

LlamaIndex

Programming & API Development

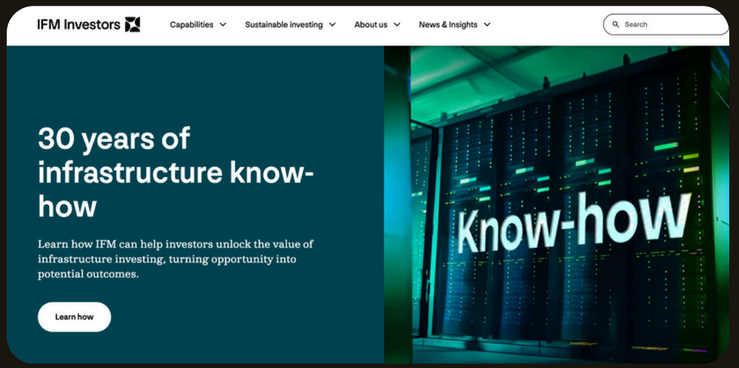
Databases

snowflake

Result

Users generate reports through simple queries, eliminating the need for manual navigation across systems and significantly accelerating access to critical business insights.

75% less time dedicated to crafting reports.



#16 - Quality Assurance (Non-AI)

Real-Time Data Analysis for Robotic-Assisted Surgery

QA

MedTech

Robotic surgery leader enabling real-time, minimally invasive procedures.

Overview

The Da Vinci surgical platform relies on the Case Reports app to surface real-time data and performance insights. Ensuring the accuracy and reliability of this data is critical to supporting surgical teams and maintaining operational efficiency.

Challenge

The existing QA process lacked depth, risking undetected issues in data accuracy and app performance. Inconsistent data or system errors could impact surgical outcomes and limit visibility into usage trends.

Solution

Manual and automated testing were implemented across the data pipeline from the CaseReport DB (RDS). An inventory API generated usage and maintenance reports, improving platform reliability, tracking, and surgical support through real-time analytics.

Technologies Frameworks

Cloud Data Warehousing & Infrastructure

snowflake aws

Results

- The system documented and tracked approximately **130 test cases** within the database
- Following error detection, automated testing was performed on the internal application to assess system state and performance
- Reports were generated through the inventory API, providing insights into usage frequency, procedure demand, and trends in parts replacement
- These outputs enhanced visibility into system reliability and overall operational efficiency

Discussion & Fit Check

What Could AI Do For You?

- Which parts of your operations, such as documentation, access, staffing, or workflows, could benefit from greater efficiency?
- Are your teams spending time on repetitive, manual tasks that could be automated?
- Are you planning any system upgrades, digital transformations, or process redesigns in the coming year?
- Would a small pilot or test case help you validate the impact before scaling a broader solution?

Let’s explore where AI makes business sense for your operations.

M10 Labs

THANK YOU

Let’s talk. Reach out for pricing or tailored information.

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AI & Machine Learning

Tech Appendix

Technology	Description
OpenAI	Creator of GPT models and AI tools for natural language understanding.
LangChain	Framework for building applications powered by language models.
LangGraph	Extension of LangChain for stateful, multi-agent LLM workflows.
Llama 3 (Meta)	Open-source large language model developed by Meta.
LlamaIndex	Data framework connecting LLMs to structured/unstructured data.
LayoutLMv3	Document understanding model by Microsoft combining text, layout, and images.
PyTorch	Deep learning framework for building and training AI models.
TensorFlow	Google's ML framework for building and deploying deep learning models.
Tesseract	OCR engine for extracting text from images and scanned documents.

Backend & APIs

Tech Appendix

Technology	Description
FastAPI	High-performance Python web framework for building APIs.
NestJS	Node.js framework for scalable server-side applications.
Python	A programming language known for simplicity, widely used in web development, data analysis, automation, and AI.
Node.js	A JavaScript runtime built on Chrome's V8 engine, used for building fast, scalable backend applications.
Amazon API Gateway	Service to create, publish, and secure APIs.
AWS Lambda	Serverless compute service that runs code in response to events.

Databases & Storage

Tech Appendix

Technology	Description
Amazon DynamoDB	Fully managed NoSQL database with high scalability and low latency.
ArangoDB	Multi-model database supporting graph, document, and key/value types.
MongoDB	NoSQL document database for flexible and scalable storage.
PostgreSQL	Open-source relational database with advanced querying.
Snowflake	Cloud-based data warehouse for structured/semi-structured data.

DevOps & Infrastructure

Tech Appendix

Technology	Description
AWS (Amazon Web Services)	Cloud computing platform offering compute, storage, AI, and more.
Docker	Platform for developing and running applications in containers.
Kubernetes	Container orchestration platform for deployment, scaling, and management.
Jenkins	Automation server used for CI/CD pipelines.

Tech Appendix

Testing & Code Quality

Technology	Description
Jest	JavaScript testing framework for unit and integration testing.
ESLint	Tool for identifying and fixing issues in JavaScript/TypeScript code.

Frontend & UI/UX - Index

Technology	Description
React	JavaScript library for building interactive user interfaces.
Next.js	React framework for server-rendered and statically generated websites.
RedwoodJS	Full-stack JavaScript/TypeScript framework for modern web apps.
Figma	Collaborative design tool for UI/UX and prototyping.

Conversational Interfaces

Tech Appendix

Technology	Description
Voiceflow Voiceflow	Platform for designing and deploying conversational assistants (voice/chat).
WhatsApp API	Messaging API to build chat experiences inside WhatsApp.