



AI & ML capabilities

Timspark, 2024



What is Timspark

A custom software development boutique with a special business model that ignites and fosters full-fledged development teams and inspires every engineer to deliver outstanding results.



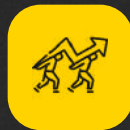
Core Teams



Understanding of industry & business domain



High-quality teams with a proven expertise



Teams are highly motivated



Accountability and ownership within the teams

Quick facts

30+

teams onboarded

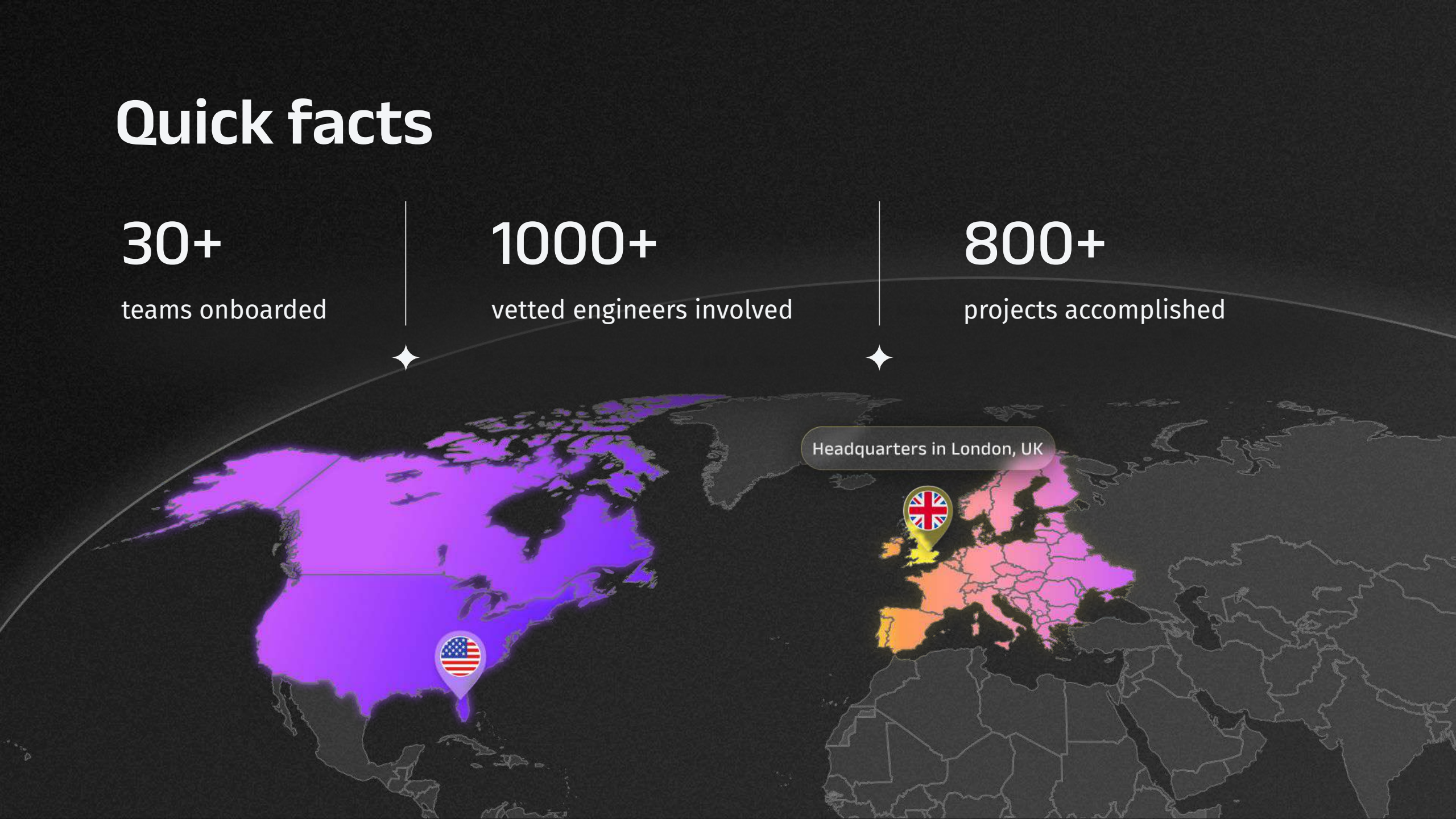
1000+

vetted engineers involved

800+

projects accomplished

Headquarters in London, UK



Key information

Certified development centers in
Poland, Lithuania, Georgia

Headquarters in
London, UK



Global 200+ client base covering following industries:

- Finance
- Banking
- Healthcare
- eCommerce
- Education
- Logistics
- Transportation
- Manufacturing

Technology stack

BACK-END



JAVA



RUBY



SOLIDITY



PYTHON



C/C++



UNITY



.NET/C#



RUST



UNREAL
ENGINE



NODE.JS



COBOL



ELIXIR



PHP



GO



SCALA

FRONT-END



REACT

NEXT.js Next.js



ANGULAR



VUE.JS



JAVASCRIPT



TYPESCRIPT

MOBILE



SWIFT



KOTLIN



FLUTTER



REACT
NATIVE



XAMARIN,
.NET MAUI

PLATFORMS



AWS



AZURE



CGP



SAP



SALESFORCE

Industry verticals



Finance, banking and insurance



Logistics, supply chain and transportation



Architecture, construction and real estate



Healthcare and life sciences



Tourism and hospitality



Energy, oil and gas



eCommerce and retail



Media and entertainment



Public services and utilities



Education



Telecommunications



Agriculture



Manufacturing



Business management



Art and culture



Automotive



HR and recruiting



Ecology



Our services

Timspark provides professional services around **bespoke software**:



Full-cycle product development

- ◆ We deliver a premium market-ready product that meets your customers' needs, from conceptualization to the design phase to final production and launch.



IT-Consulting

- ◆ With our technology audit and consulting expertise, we offer holistic guidance, identify areas for improvement, and develop effective strategies to meet your business needs.



How you can work with us

We are flexible. At Timspark, we offer different engagement models, from full-fledged teams to staff augmentation, to help you achieve your current business needs.



Core Teams

Pre-built development teams with deep expertise



Dedicated teams

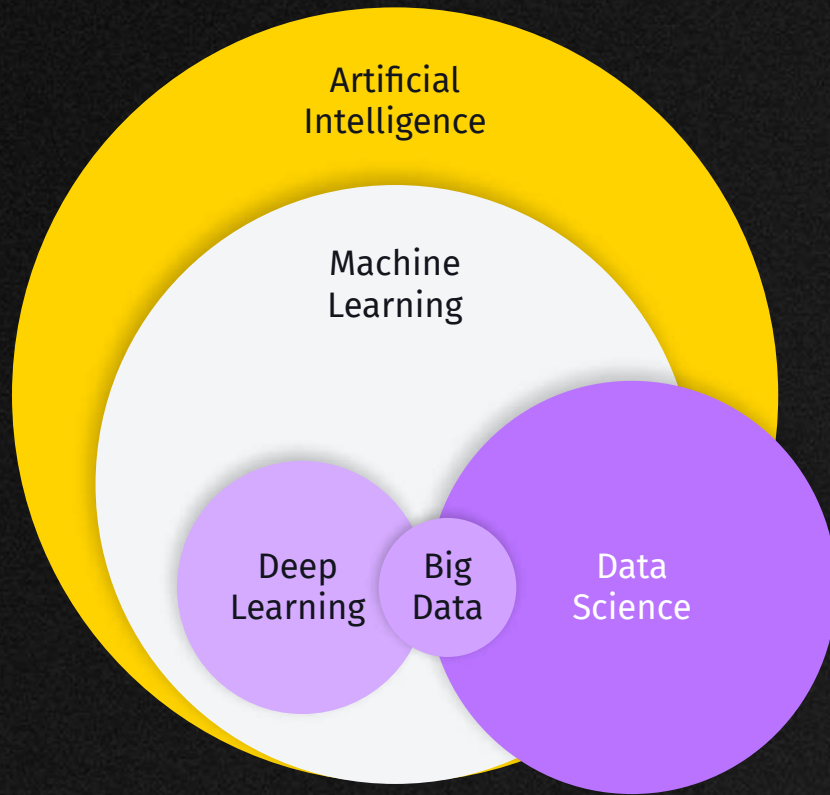
Development units built specifically for your project



Team augmentation

Skilled engineers to enhance your in-house team

Artificial intelligence components



Artificial Intelligence

Artificial intelligence is a wide-ranging branch of computer science with the ability to imitate intelligent human behavior, react and analyze data. AI is widely used to provide personalized recommendations to people based on their previous searches and purchases or other online behavior.

Machine Learning

Machine Learning is a part of Artificial intelligence. It is the science of getting computers to learn and act like humans do, and improve their learning over time in an autonomous fashion, by feeding them data and information in the form of observations and real-world interactions.

Deep Learning

Deep Learning is the final version of data. It is the science and practice of analyzing large amounts of data using all kinds of mathematical methods and solving related problems related to collecting, storing, and processing data sets. The DL uses complex algorithms and neural nets to train a model.

Our AI & ML experience

Conversation AI,
NLP-based chatbots

Sentiment analysis for social
networks

Speech-to-Text and
Text-to-Speech tools

Voice recognition modules

Voice control for smart home app

Face recognition systems

Visual search
applications

Smart virtual assistants

Recommendation systems

Demand and sale forecasting
models

Clustering algorithms for
customer segmentation

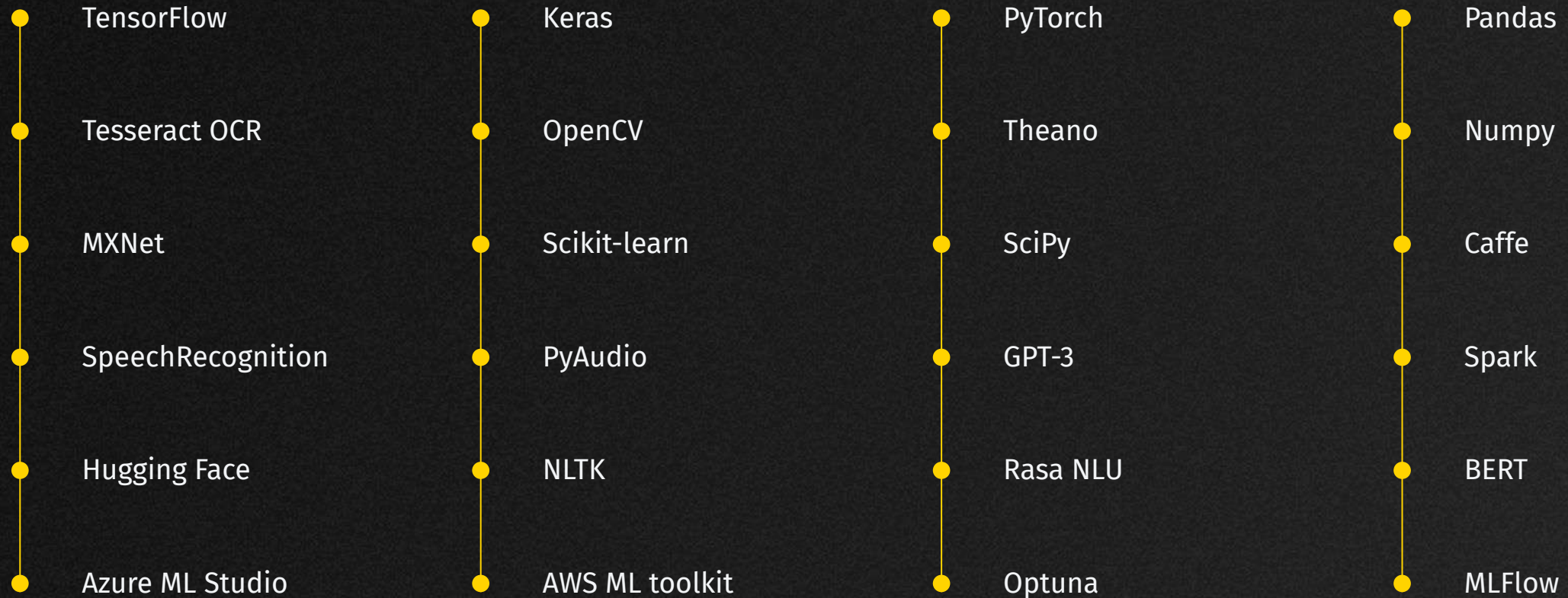
Customer churn prediction
models

✦ Fraud detection systems

ML-powered apps for patient
treatment

Predictive maintenance systems

AI & ML tech stack we master



Industry competence



eCommerce and retail



Logistics, supply chain and transportation



Architecture, construction and real estate



Finance, banking and insurance



Tourism and hospitality



Energy, oil and gas



Healthcare and life sciences



Media and entertainment



Public services and utilities



Education



Telecommunications



Agriculture



Manufacturing



Business management



Art and culture



Automotive

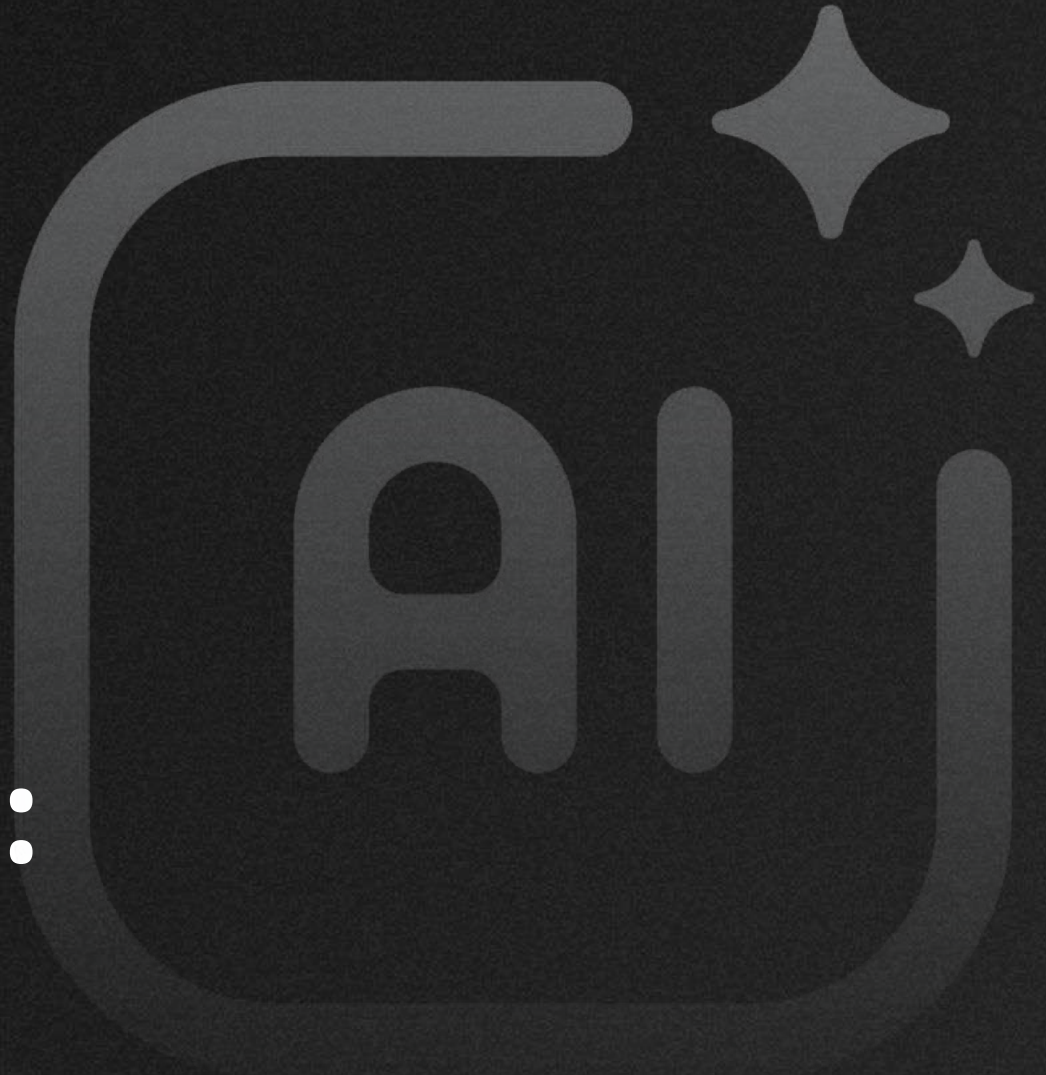


HR and recruiting



Ecology

AI/ML expertise:
Case studies



AI-powered vocal learning app

ENTERTAINMENT

MUSIC

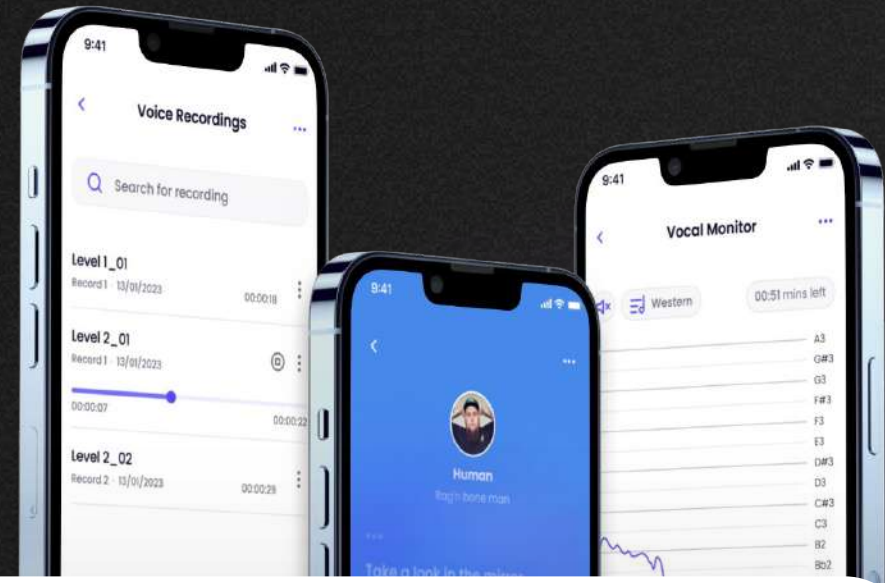
CHALLENGE

Design an app that provides vocal training using voice recognition and smart recommendations.

SOLUTION

We have created an AI-powered app allowing users to practice their vocal skills and get individual suggestions for future training. The app with voice recognition analyzes the user's singing to determine areas for improvement. When processing each individual sample, the AI-based system breaks the sample down to two processing levels: audio correlation system and phoneme evaluation model. The audio correlation system identifies speech characteristics (tone, rhythm, etc.) and compares them to human samples. The evaluation model conducts a precise phoneme comparison, detecting difficulties at specific moments and suggesting additional exercises.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

SwiftUI, Combine, Alamofire, Realm, AVFoundation, AVKit, AudioKit; Kotlin, Clean Architecture, MVVM, JetpackCompose, Coroutines, Coroutines Flow, Retrofit, Room, TensorFlow Lite, Mockito; Python, TensorFlow, Keras, SpeechRecognition, NLTK, PyAudio.

Music app with AI recommendations

ENTERTAINMENT

MUSIC

CHALLENGE

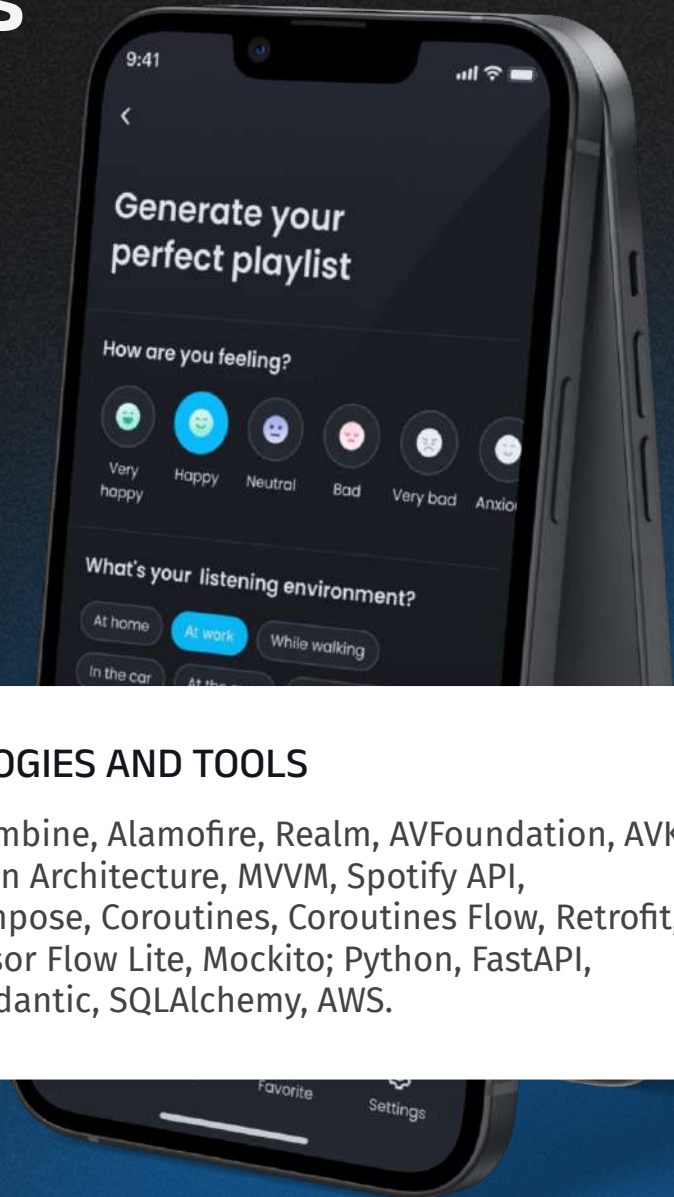
Develop a music app featuring highly personalized recommendations.

SOLUTION

By analyzing user preferences, mood, or entered tags, the app's algorithms suggest tunes that cater to each individual's musical tastes and queries. We have integrated Spotify API into the app, giving access to a vast library of music tracks.

Using GPT technology, the app can recognize tags entered by users and match them with playlists that perfectly fit their preferences. The back-end service includes the endpoint sending asynchronous requests to GPT models. After instant processing and validating responses, the system sends multiple requests to Spotify API to generate personalized results and return song links directly to the app.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

SwiftUI, Combine, Alamofire, Realm, AVFoundation, AVKit; Kotlin, Clean Architecture, MVVM, Spotify API, JetpackCompose, Coroutines, Coroutines Flow, Retrofit, Room, Tensor Flow Lite, Mockito; Python, FastAPI, aiohttp, Pydantic, SQLAlchemy, AWS.

Crowd data analytics web app

RETAIL

AI

CHALLENGE

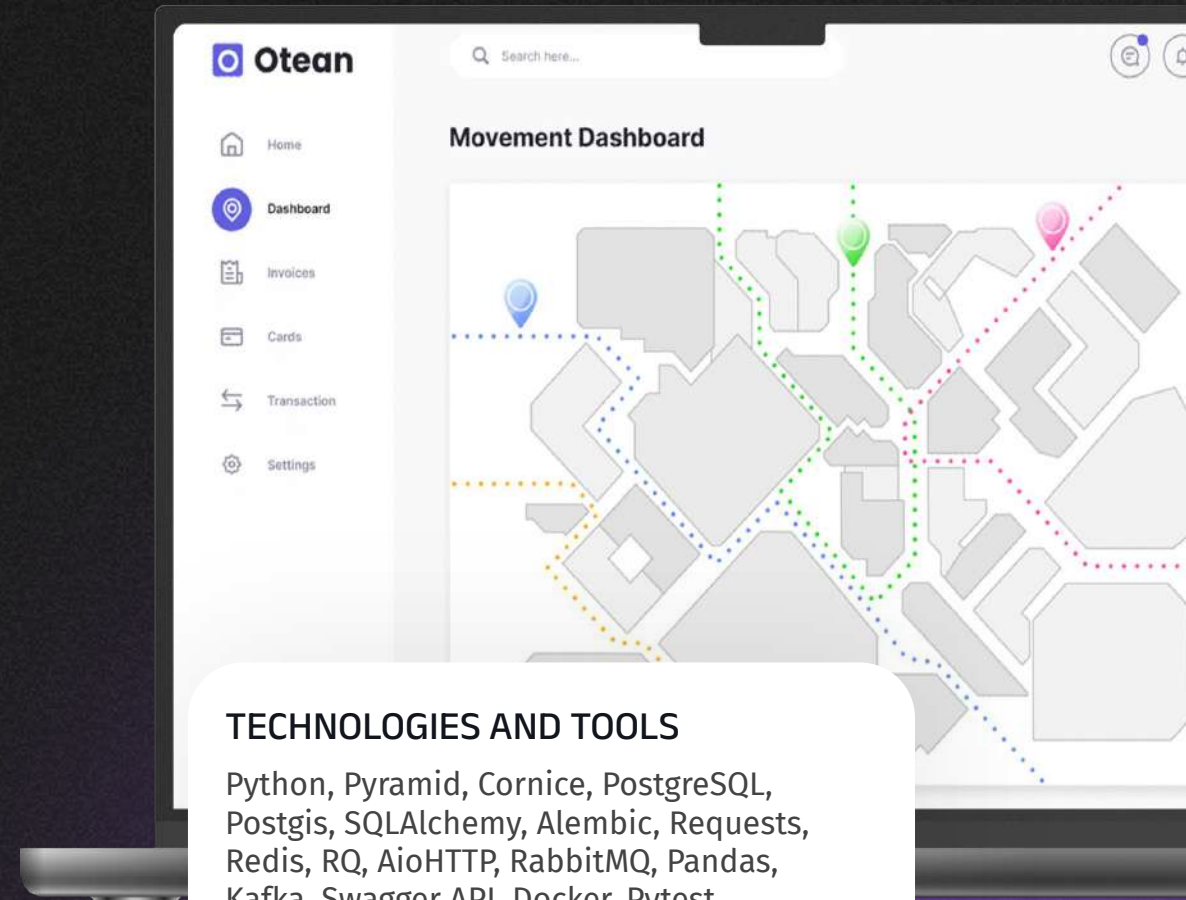
The web platform allows analyzing and predicting the behavior of visitors.

SOLUTION

The solution helps offline stores and places gain data on the number of visitors, their paths, time spent, etc. This information helps retailers gain a clear understanding of typical visitor behavior, evaluate business performance, develop new marketing strategies, and make informed decisions. The web application captures anonymized Wi-Fi signals from visitors' smartphones and uses MAC addresses of devices to fulfill its core functions.

Also, the solution is enriched with unique technologies, including Artificial Intelligence and Machine Learning. Thus, offline businesses get access to analytical data, comparable to the e-commerce sphere.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

Python, Pyramid, Cornice, PostgreSQL, Postgis, SQLAlchemy, Alembic, Requests, Redis, RQ, AioHTTP, RabbitMQ, Pandas, Kafka, Swagger API, Docker, Pytest, FactoryBoy, JavaScript, Kubernetes

Sales forecasting solution

RETAIL

FORECASTING

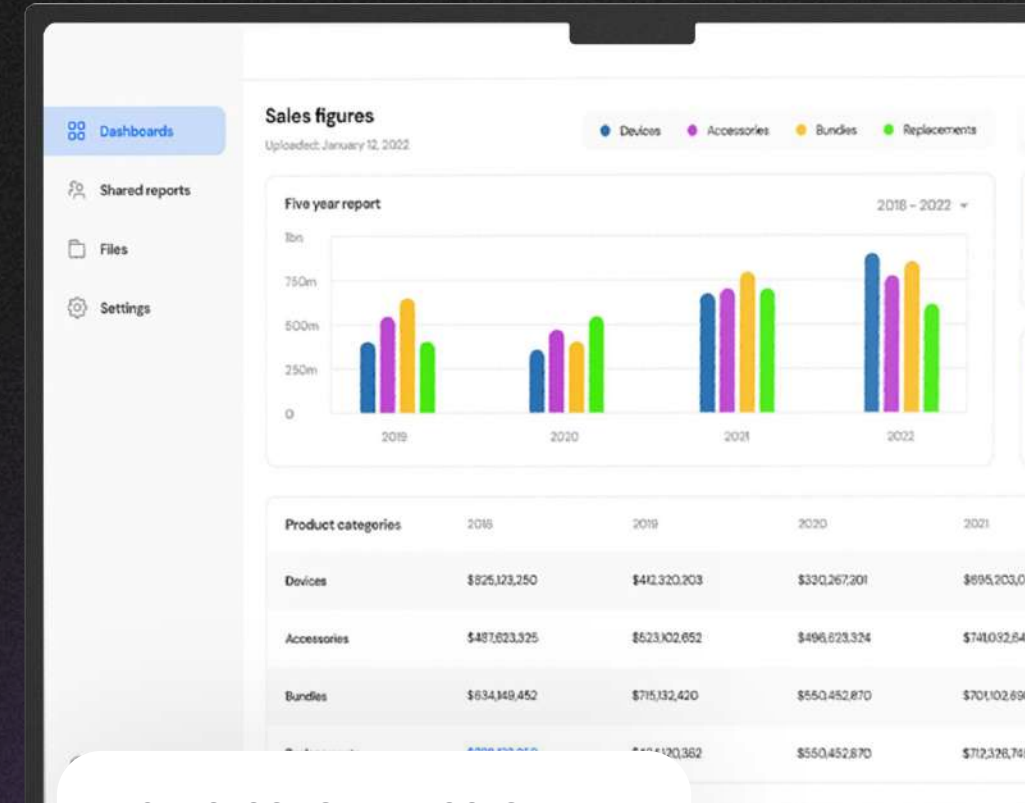
CHALLENGE

The solution allows forecasting sales and optimize inventory in the store's business processes.

SOLUTION

The retailer solution makes forecasts for 5,000+ products. Using three years of accumulated data on daily sales, purchased items, average checks, loyalty card types, etc., the application identifies seasonality in demand by month and day of the week, determines trends for each product group, and evaluates the impact of discounts and promotions on product sales. Based on this analysis, the program builds sales forecasts for 1, 3, and 12 months, as well as identifies changes in demand for individual groups of customers. As a result, the solution helped increase the accuracy of forecasting for the next 3 months from 77% to 93%, which helped optimize logistics and storage of goods in the warehouse.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

Python, Tensorflow, Keras, PyTorch, ARIMA, ARCH, Recurrent neural networks, Prophet

Customer outflow forecasting

RETAIL

FORECASTING

ECOMMERCE

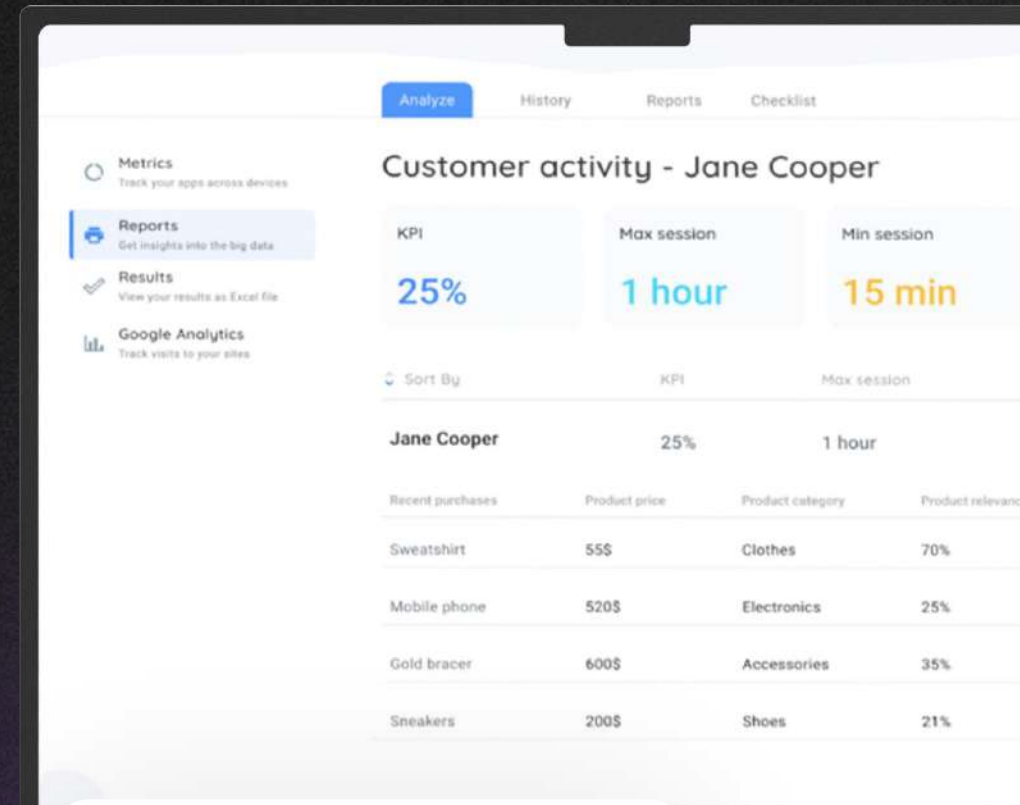
CHALLENGE

The solution created for large stores can predict and manage customer outflow.

SOLUTION

Using a number of parameters that we identified through a study of customer activity, our team calculated the likelihood of outflow within 1-3 months. We identified groups that are "at-risk zone" and helped the company find out the most relevant text messages, which will motivate customers to buy goods. During the preparation stage, we analyze the following parameters: frequency and volume of purchases, number of site visits, date of the last purchase, viewed and selected products, positive or negative user experience.

As a result, the solution enabled the business to increase the efficiency of communications with users, conversion and repeat purchase rates, and the customer lifetime value (LTV).



TECHNOLOGIES AND TOOLS

Python, Tensorflow, Keras, PyTorch, Pandas, NumPy, Scikit-learn.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.

ML-based sales forecasting

ECOMMERCE

FORECASTING

ML

CHALLENGE

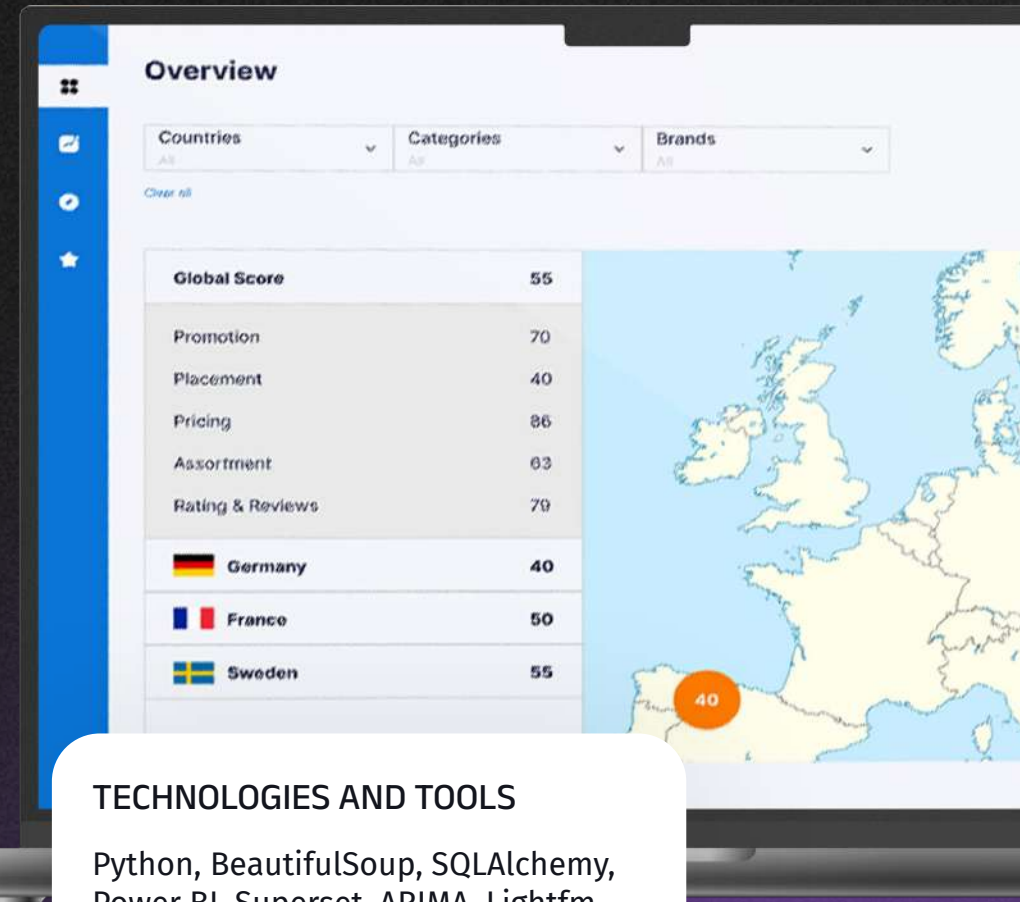
Custom solution for an eCommerce company designed to analyze and predict demand and sales based on data.

SOLUTION

Our goal was to use data engineering and AI to predict product trends. The solution collects data from major e-commerce platforms such as Amazon, eBay, Walmart and Aliexpress, and uses Parse, the largest commerce performance analytics platform. Web scraping and API calls were used to extract and process product search and purchase data.

Using time-series forecasting techniques and ML tools such as collaborative filtering and ranking algorithms, we optimised inventory levels by predicting demand for specific products and adjusted marketing strategies to target the most promising customer segments, resulting in increased sales.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

Python, BeautifulSoup, SQLAlchemy, Power BI, Superset, ARIMA, Lightfm, LightGBM, RankLib, Prophet, Statsmodels, AWS

Contract analysis platform

MANUFACTURING

CHALLENGE

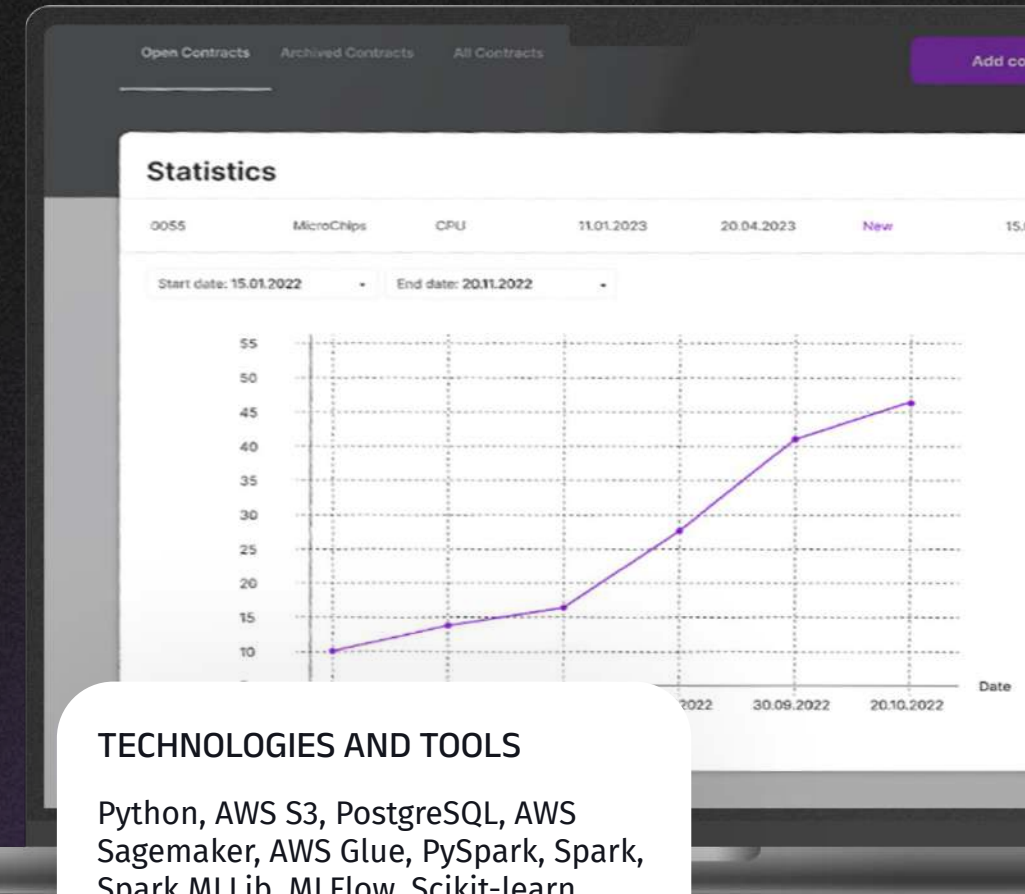
An ML platform that analyzes previous interactions with partners and predicts possible outcomes for the future ones.

SOLUTION

Our data engineers have built a separate module for the client's platform that gathers historical data about the contracts with partners and their outcomes and puts it to in-depth analysis to create a model of interacting with a particular partner. Based on the analyzed data, the solution builds the predictions on future shipments and visualizes all the data via graphs.

The solution allows the client to plan sales and manufacturing actions more precisely, increase the accuracy of shipment predictions, and reduce customer churn rate.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

Python, AWS S3, PostgreSQL, AWS Sagemaker, AWS Glue, PySpark, Spark, Spark MLLib, MLflow, Scikit-learn, XGBoost, CatBoost, LightGBM, Matplotlib, MLflow, Tensorflow

Recommender system

HRM

BUSINESS PROCESSES

CHALLENGE

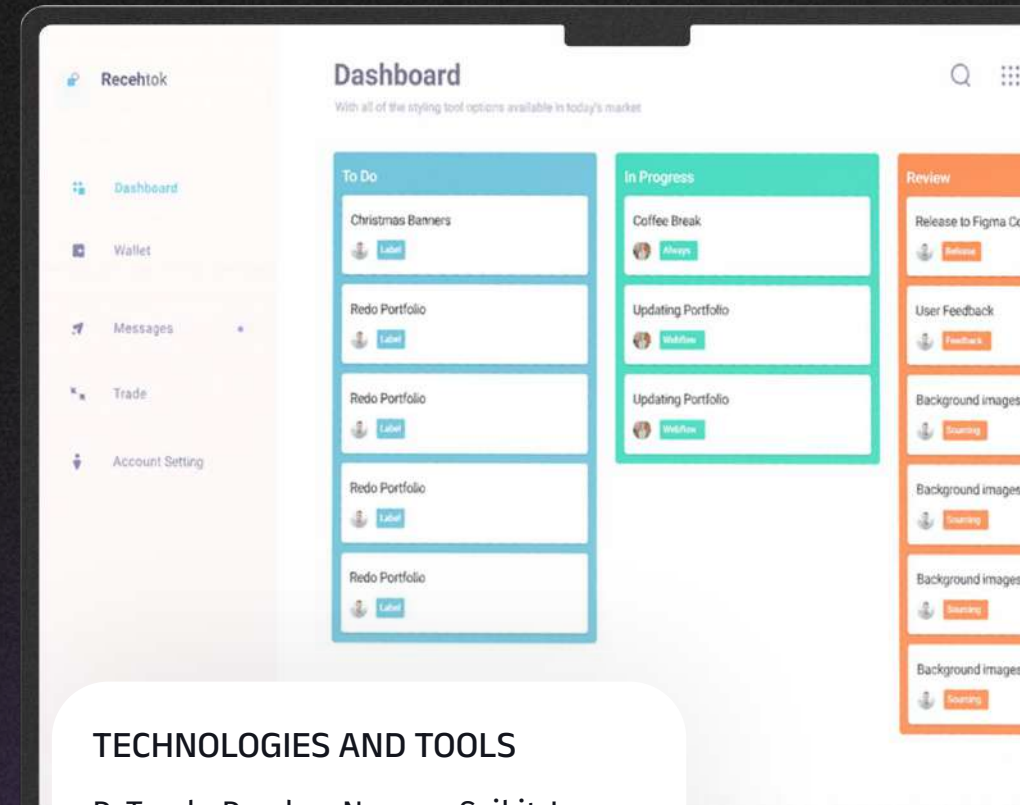
Our team developed a recommendation system for the staffing process that would ease business processes.

SOLUTION

We built the system from scratch, starting from the data flow design, integration of specific business rules and restrictions into the product, and creation of an explainability layer for each model proposal.

The system was designed as a ranking algorithm built around a DNN with a custom multi-headed loss function in order to incorporate penalties from different types of environment feedback. Despite the tabular nature of the data, DL approach turned out to be the only one that could meet business process features. Due to recent changes in business processes, we also designed a solution for data drift detection and handling.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

PyTorch, Pandas, Numpy, Scikit-Learn, Redis, Docker, Docker Compose, PostgreSQL, Kafka, AWS (S3, Redshift, Kinesis, Sagemaker, Studio, Pipelines, Experiments), MLFlow, Optuna, GitHub

Risk analysis API

FINTECH

CHALLENGE

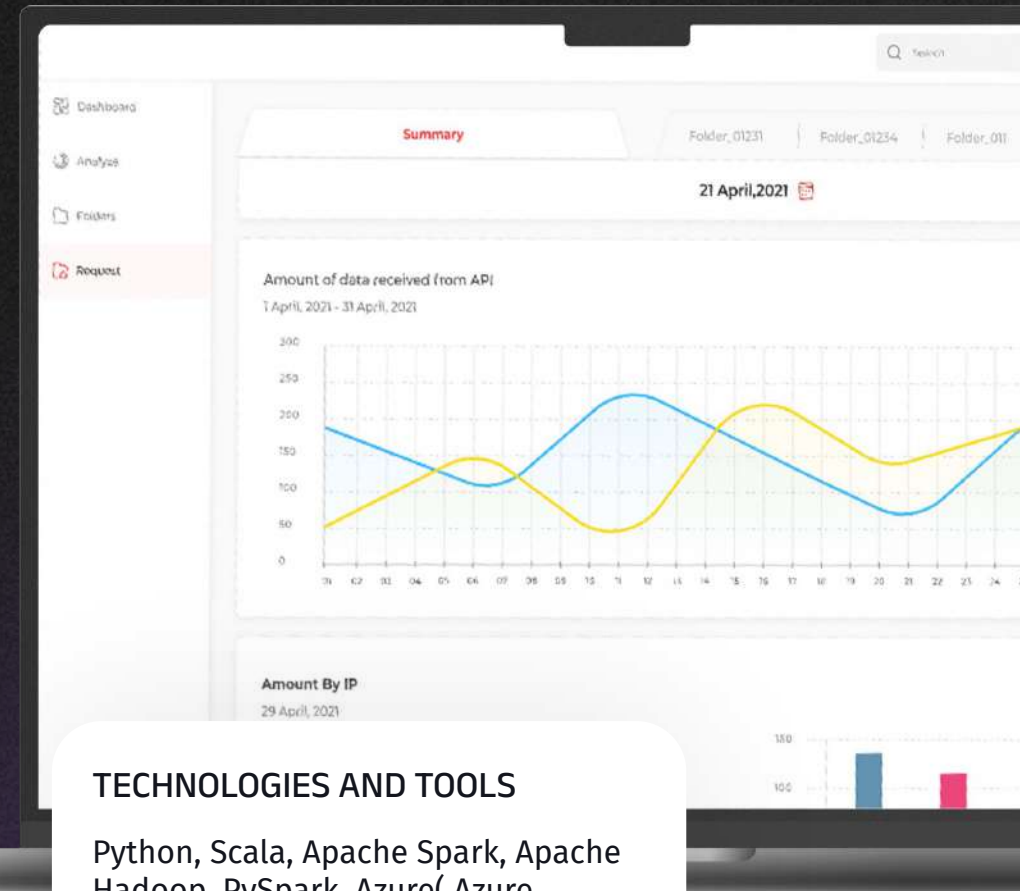
The solution allows a FinTech company to accumulate information about the client's credit score and latest loans for further assessment of non-return risks.

SOLUTION

Timspark has built a solution that accumulates data about the client's recent loans and overall credit score. After that, the accumulated historical data is processed by ML algorithms to create forecasts about the particular client's capabilities of covering the requested loan conditions.

The data is gathered from various sources including public records and our client's history of interactions with the particular customer, put into a multi-layer data warehouse, and then analyzed by an array of data analytic tools integrated into the solution.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

Python, Scala, Apache Spark, Apache Hadoop, PySpark, Azure(Azure Machine Learning, Data Lake, Data Factory, Synapse), PowerBI.

Anomaly detection in banking

BANKING

CHALLENGE

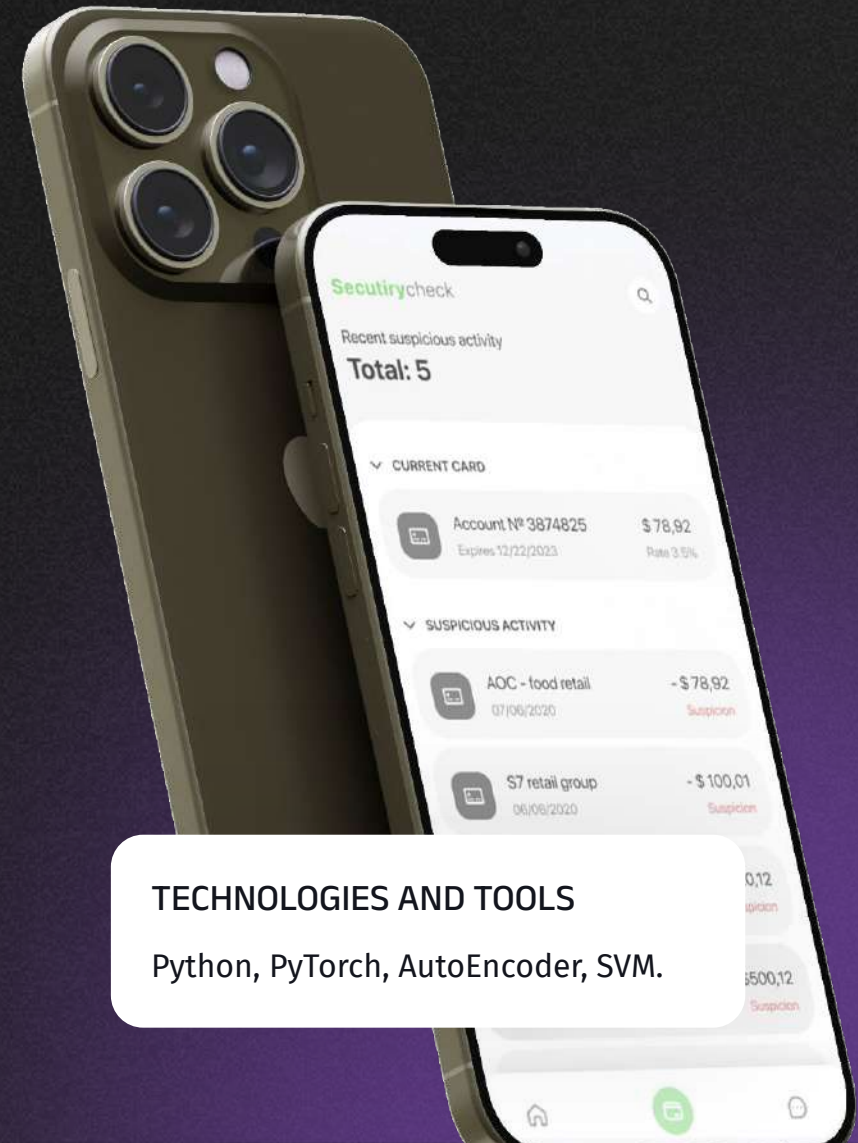
The system integrates with the banking equipment and calculates uncharacteristic for the user transactions made by the card.

SOLUTION

The corporate system allows identifying possible threats associated with card transactions at ATMs, payment terminals, etc. Unusual behavior is considered a threat. For example, making many transactions without entering a pin code, or making transactions not previously conducted for this product group.

When a threat is detected, the system transmits this data in real-time to the administrator. We identified the factors that facilitate the detection of anomalies and integrated software and hardware sensors into the equipment. Then we analyzed the initial anomalies and created a training environment to train the system. Our next step was creating an anomaly alert module and an analytics module that can be used to identify and recognize deviations.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

Python, PyTorch, AutoEncoder, SVM.

Agricultural cost forecasting service

AGRICULTURE

ML

CHALLENGE

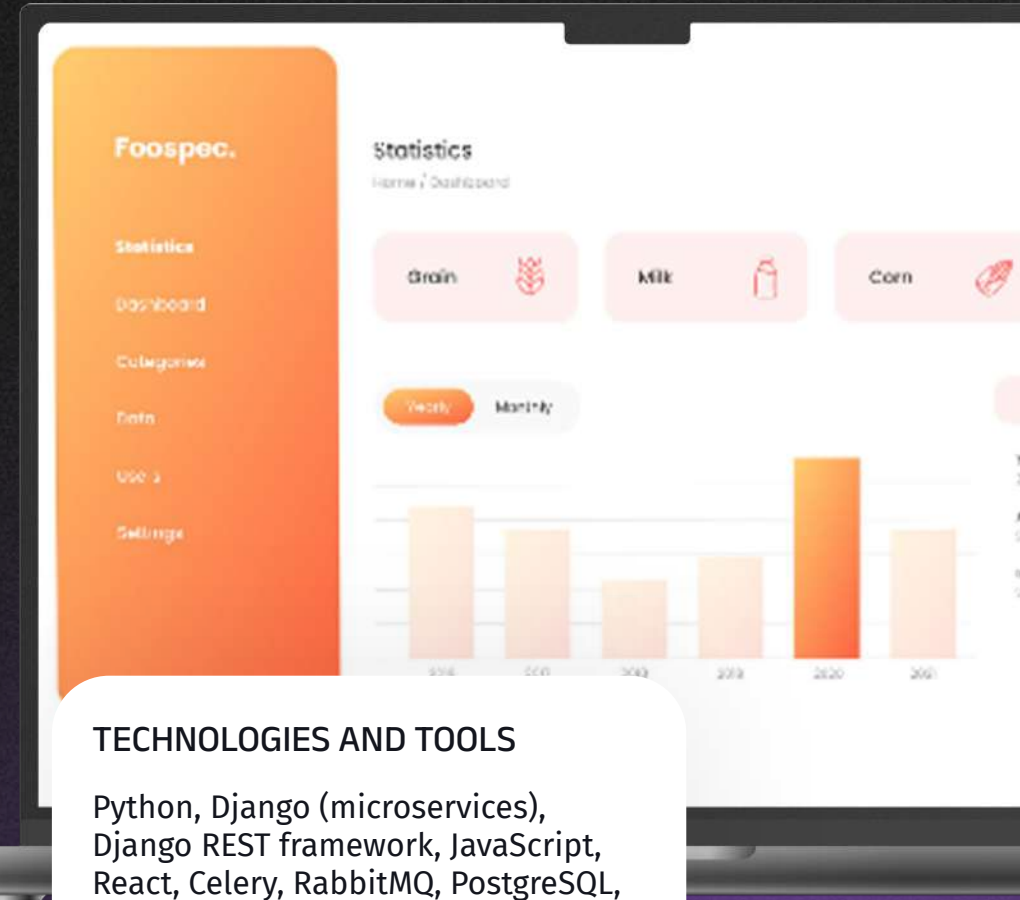
ML-based system for precise forecasts of agricultural products cost.

SOLUTION

Timspark team participated in the development of the web app that uses various data sources, including time series, texts, images, etc., to generate the most accurate agricultural commodity cost forecasts. The solution is based on Data Science and Machine Learning technologies.

A unique AI algorithm generates the most accurate trend forecast possible from over 65 million pieces of data. The system's users can differentiate their requests depending on the agriculture product, time frame, and region. Also, we have adjusted a backend to release a comprehensive web application allowing users to subscribe and view price predictions.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

Python, Django (microservices), Django REST framework, JavaScript, React, Celery, RabbitMQ, PostgreSQL, Stripe, Docker, Docker Compose, AWS, Kubernetes, Jenkins, GitHub

Vehicle market price forecasting

VEHICLE

FORECASTING

CHALLENGE

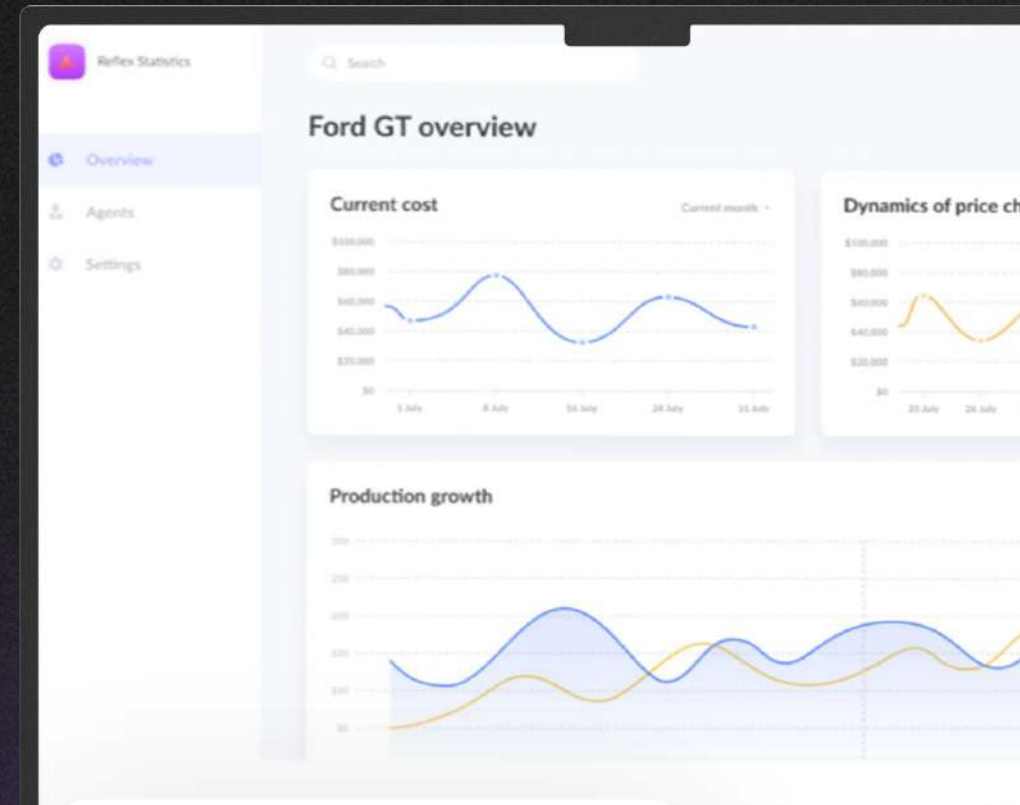
The forecasting solution can predict prices for vehicle models based on user request.

SOLUTION

With the third-party systems integration, the solution collects data from the vehicle market and predicts an increase/ decrease in the price of a vehicle model over a given period of time. To find out the forecast, the user enters the parameters: make, year, mileage, condition of the car.

So the system recognizes a specific car, collects data from integrated services and gives the average price and its dynamics over a certain period of time. This allows vehicle sales companies to set prices in such a way as to ensure optimal sales and the highest possible margins.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

Python, Tensorflow, Keras, Pandas, Numpy, Scikit-learn.



AI Business Operations

Automation:

Case studies



AI-based call center software

TELECOM

CHALLENGE

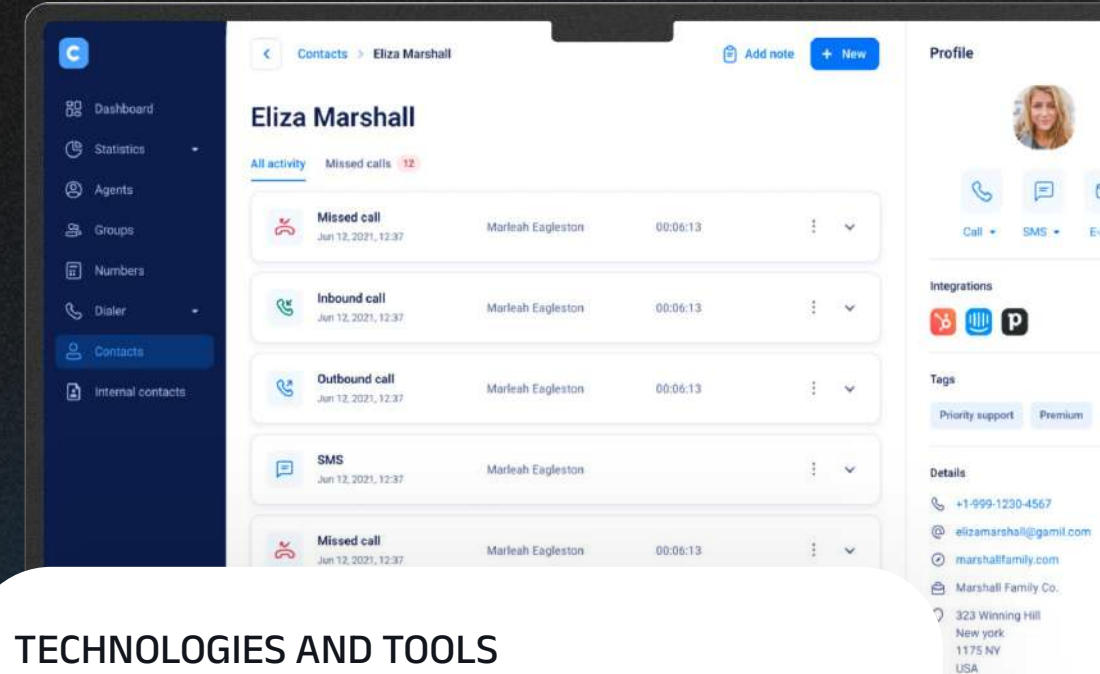
To develop a custom call center scheduling software for streamlining customer support operations and enhancing customer experience.

SOLUTION

The team developed a robust AI-based call center automation software that processes client calls. Artificial intelligence takes the lead in interacting with callers. The message processor AI bot, based on modern natural language processing techniques, using the concepts of BERT models and various speech recognition tools, engages in a conversation and recognizes the caller's voice and request. The AI then seamlessly routes the call to the appropriate operator or department.

The software includes such functionality as creating client request cards, which enables operators to access and update relevant client details swiftly, automated task setting and progress tracking, as well as customizable statistics and analytics tools.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

React, Typescript, Redux, Electron, SignalR, jssip, bootstrap; .Net Core, C#, .Net WebAPI, NHibernate, FluentMigrations, SignalR, RabbitMQ, MassTransit, Kamilio, Asterisk, XUnit; PostgreSQL, Redis; Docker, k8s; Python, Tensorflow, Keras, Pytorch, CMUSphinx, gTTS, Librosa, NLTK, Gensim, Pandas, Numpy, Flask; ELK; Prometheus, Grafana

ML-powered hotel booking application

HORECA

TRAVEL

CHALLENGE

Design a custom mobile and a web application for searching and booking ski resort rooms worldwide.

SOLUTION

Our team faced the challenge of custom B2C travel software development from scratch. We created a mobile and web solution with an ML-based booking engine, making smart recommendations on the best price options. The app supports integrations with suppliers, streamlining and managing the booking process, search rules customization, and has an in-built price change tracking system.

This solution enabled an online travel agency to automate their work almost entirely, set the most favorable competitive prices and commission rates, process international payments, and optimize the support service using a smart bot.

The client gained 14% revenue growth with smart pricing and automation of 83% of booking processes.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

Java, Spring Boot, Spring Data, REST, Hibernate, jOOQ, PostgreSQL, Liquibase, ElasticSearch, AWS, Kafka, Docker, Kubernetes, ELK; TypeScript, React, Redux Toolkit Query, Webpack, ESLint, Prettier, Material UI, CSS, React-hook-form, Recharts; Kotlin, CleanArchitecture, MVVM, ViewModel, LiveData, Coroutines, Dagger2, Room, Retrofit, Compose, Swift, VIPER, MVP, Combine, SwiftUI, Alamofire, CoreData; PostgreSQL, MongoDB; Python, pySpark, Spark MLLib, Pandas, Numpy, Pytorch

Odoo ERP implementation

E-COMMERCE

RETAIL

CHALLENGE

Replace the client's legacy ERP with the Odoo ecosystem, implement a new CRM, and build an AI-powered chatbot to automate business processes and enhance marketing metrics.

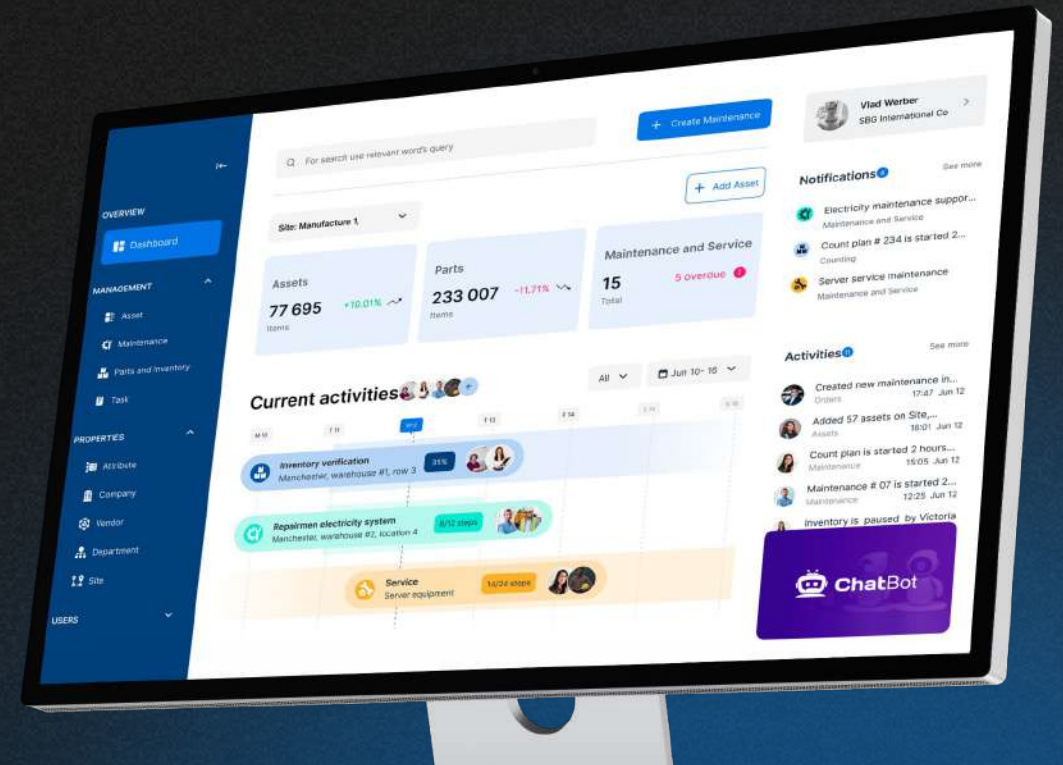
SOLUTION

We selected Odoo as a highly customizable solution for ERP, adaptable to the retailers' specific business requirements. All critical business processes, from initial touchpoints to completed deals, were automated, including inventory management, order processing, sales tracking, pricing policies, tax management, financial reports, and more.

We expanded the ERP's functionality with customizable options, CRM integration, and advanced features such as QR code compatibility, an intelligent AI chatbot, and Google Ads support.

With the new CRM, the client gained a centralized hub for managing customer data, leads, and interactions, while Odoo's implementation helped automate business processes and enhance digital sales by 16%.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



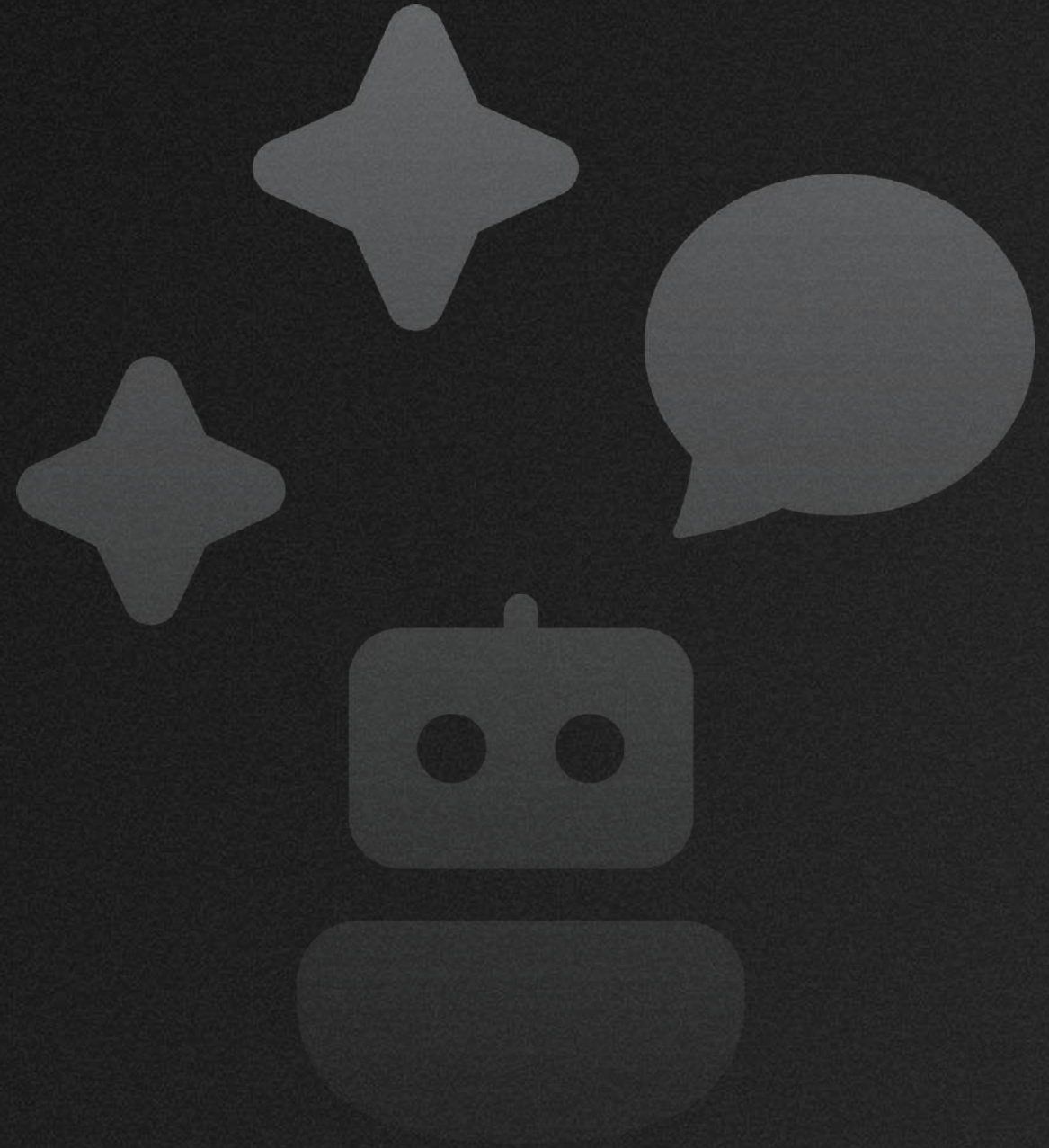
TECHNOLOGIES AND TOOLS

Python; HTML, CSS, JavaScript, React, Dialogflow, Rasa; Odoo ecosystem; Apache Kafka, RabbitMQ, Google Ads API; PostgreSQL; Selenium, JMeter, Pytest

✦

AI Chatbots: Case studies

✦



Omnichannel enterprise bot

SALESFORCE

CUSTOMER SUPPORT

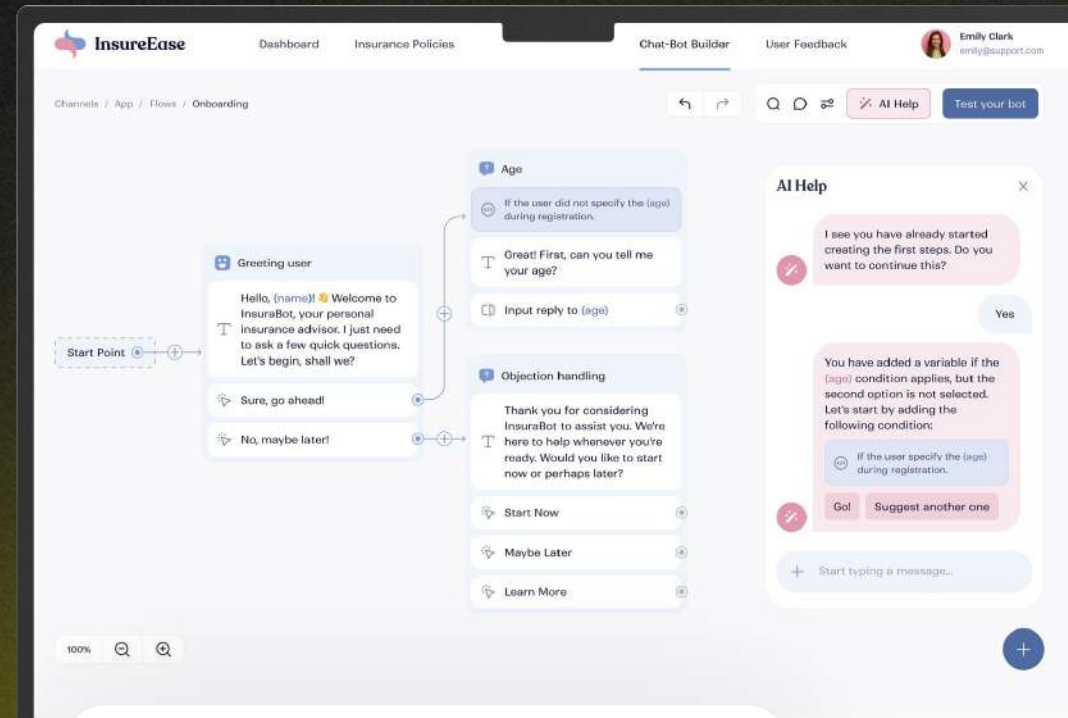
CHALLENGE

We have created the omnichannel enterprise bot for an insurance company to enhance the quality of their customer support and communication experience.

SOLUTION

A seamless customer support process is vital for efficiently resolving incidents. Therefore, our task was to develop a set of tools that could seamlessly integrate with the client's existing platforms.

We created an AI-powered chatbot that allows users to make requests and the bot responds in real time. The tool also has a quick action menu that provides the most common or recommended actions that the user can select to interact with the bot (e.g., "Report an issue," "Renew a policy," etc.). The tool also keeps a history of its interactions with the user, so the conversation can be continued at any time.



TECHNOLOGIES AND TOOLS

GCP (Cloud Storage, Pipelines, Functions, Cloud GPU, Vertex AI), MLFlow, NLTK, spaCy, Python, FastAPI, HuggingFace, Numpy.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.

Retail chatbot

RETAIL

GPT-4

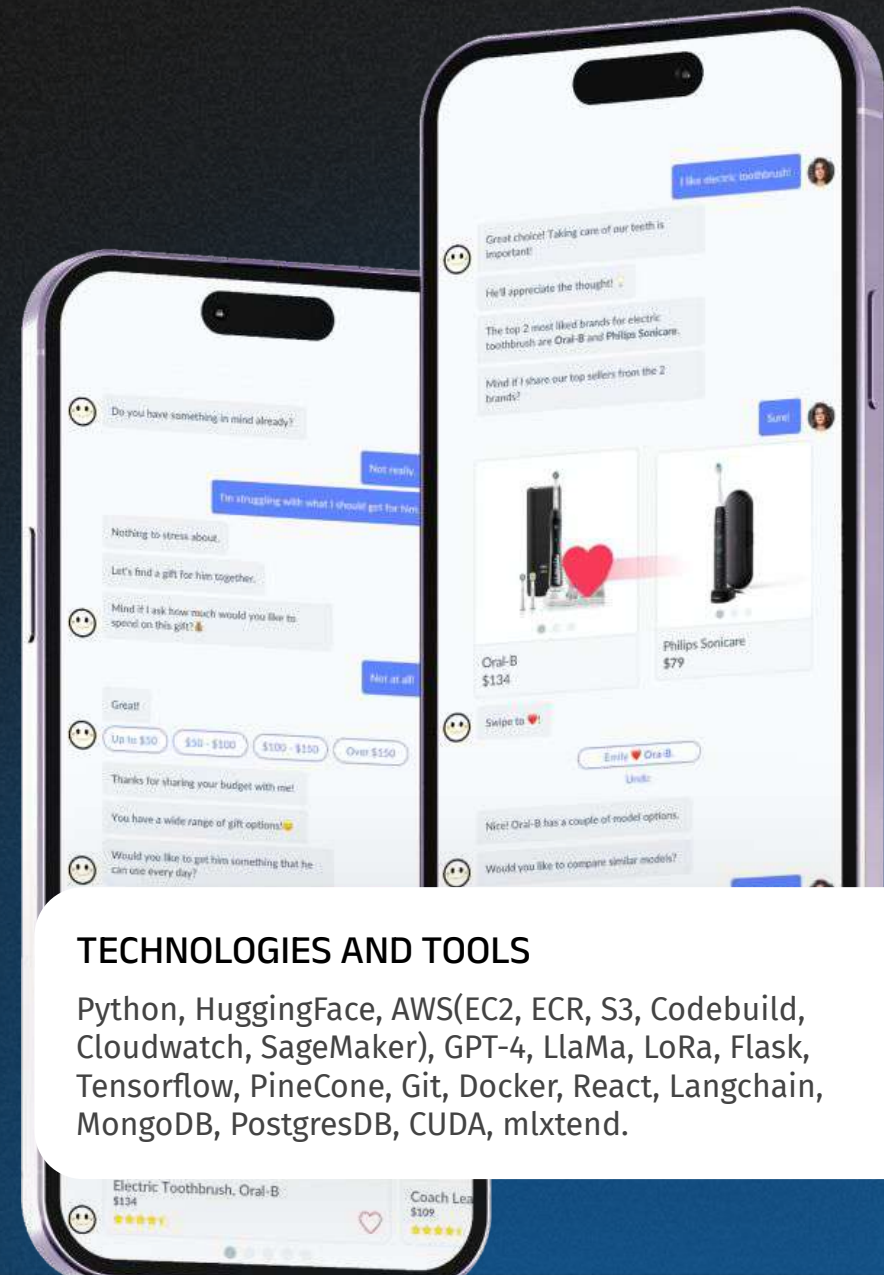
CHALLENGE

We have developed a smart chatbot that improves sales and customer satisfaction by tailoring product recommendations.

SOLUTION

The chatbot acts as an assistant, guiding customers to desired products and providing insights based on user preferences. Utilizing the RLHF (Reinforcement Learning from Human Feedback) approach, it refines recommendations over time, resulting in a 12% increase in upsells, a 25% boost in average sales per visit, and an 81% positive feedback score. The recommendation engine employs LLMS (Large Language Model Supervision) for processing customer queries and offering product insights.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

Python, HuggingFace, AWS(EC2, ECR, S3, Codebuild, Cloudwatch, SageMaker), GPT-4, LLaMa, LoRa, Flask, Tensorflow, PineCone, Git, Docker, React, Langchain, MongoDB, PostgresDB, CUDA, mlxtend.

GPT-bot for retail industry

RETAIL

GPT

CHALLENGE

We have developed a GPT bot which can efficiently respond to customer queries, offer personalized recommendations, and facilitate smooth transactions.

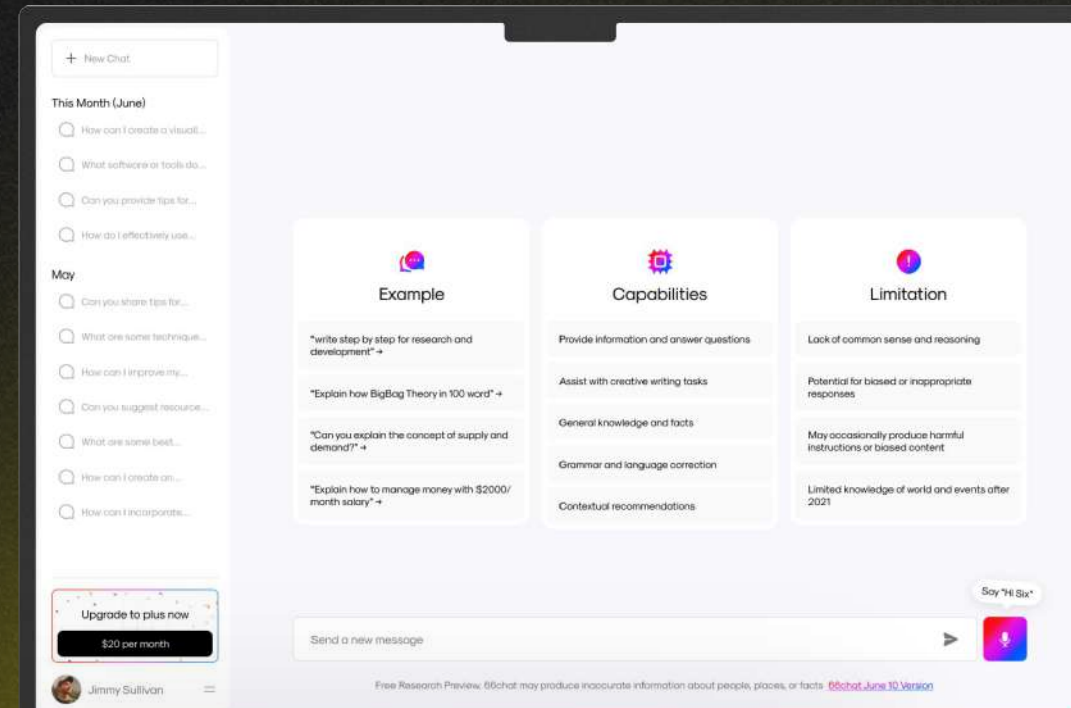
SOLUTION

The bot was designed to improve customer experience in the retail and eCommerce industry.

By leveraging its ability to analyze extensive data, including purchase history, customer preferences, and current market trends, the bot provides helpful suggestions to assist customers in finding products they are interested in.

Moreover, the bot seamlessly integrates with various platforms such as websites, mobile apps, and messaging apps like WhatsApp, Instagram, and Facebook, allowing customers to communicate in their preferred way.

* The image is illustrative. Project details cannot be disclosed due to the conditions of NDA between the Development Team and the Customer.



TECHNOLOGIES AND TOOLS

Azure (Blob Storage, VM, Functions, Endpoints, Static Apps), Azure ML, OpenAI API, Kubernetes, Azure Pipelines, Sentry, GitHub, Numpy, PyTorch.

Keen to **explore** this further?

Let's discuss your requirements and come up with a tailored solution!

At Timspark, we intend to bring value and competitive advantage to our clients. Our dedicated teams can help you achieve your goals and add value to your offerings.

REACH OUT



Samuel Krendel

Head of Partnerships

✉ samuel.krendel@timspark.com

