# Project Case Studies

### Project 1: AI-Powered Voice Agent for Brian Tracy Publishing

**Tech Stack:**

* **Backend:** Python (FastAPI), Node.js
* **AI & Machine Learning:** Google Cloud Speech-to-Text, ElevenLabs (Text-to-Speech), OpenAI GPT-4 for Natural Language Understanding.
* **Telephony Integration:** Twilio API for PSTN connectivity.
* **Real-Time Communication:** WebSockets for low-latency transcription streaming.
* **Database:** PostgreSQL for storing call logs, transcriptions, and analytics.
* **Frontend (Standalone App):** React, Vite
* **Deployment:** Docker, AWS EC2

**Third-Party Libraries:**

* twilio-python: Official Twilio library for voice and messaging.
* websockets: Library for building WebSocket servers and clients.
* SpeechRecognition: Python library for performing speech recognition.
* pydub: For audio manipulation and processing.
* react-icons: For UI elements in the standalone application.

#### AI Voice Agent - Features & Functionality

**Overview** For a global entity like Brian Tracy Publishing, engaging with a diverse, international audience is paramount. We engineered a sophisticated AI-powered Voice Agent to shatter language barriers and streamline communication. This solution provides a scalable, multi-lingual, and intelligent first point of contact, capable of handling inbound and outbound calls over standard telephony networks, ensuring no potential client is left behind due to linguistic differences.

**Core Features**

* **Multi-Lingual Communication:** Fluent in 5 languages, enabling seamless conversations with a global audience.
* **Intelligent Call Handling:** Advanced Natural Language Understanding (NLU) to comprehend user intent, answer FAQs, and route complex calls.
* **Real-Time Transcription & Analytics:** Live transcription for monitoring and sentiment analysis to gauge customer satisfaction and identify trends.
* **Standalone Management Portal:** A dedicated web application for managing the AI agent, viewing call logs, and analyzing performance metrics.

**Conclusion** The AI Voice Agent for Brian Tracy Publishing is more than a simple IVR; it's a strategic asset that drives global growth. By automating and personalizing communication, it reduces operational costs, enhances customer engagement, and provides invaluable data insights.

### Project 2: OfinaPulse - Unified Dental Communication Suite

**Tech Stack:**

* **Frontend:** React, Next.js for the dashboard.
* **Backend:** Node.js, Express.js
* **Database:** MongoDB for flexible data storage.
* **API Integrations:** Facebook Graph API, Instagram API, Gmail API.
* **AI & NLP:** Google Gemini for intelligent auto-replies, AssemblyAI for voice agent transcription.
* **UI/UX:** Material-UI (MUI), Recharts for data visualization.

**Third-Party Libraries:**

* @reduxjs/toolkit: For robust state management.
* axios: For handling API requests.
* mongoose: ODM for interacting with MongoDB.
* nodemailer: For sending email notifications.

#### OfinaPulse - Features & Functionality

**Overview** Dental practices face a significant operational challenge: managing patient communication across fragmented channels. OfinaPulse solves this by creating a single, unified command center. This suite centralizes all patient interactions and leverages AI to automate responses and appointment scheduling, freeing up staff to focus on patient care.

**Core Features**

* **Unified Inbox:** Aggregates messages from Facebook, Instagram, and Gmail into one intuitive dashboard.
* **AI-Powered Assistant:** Provides instant, accurate auto-replies to common queries using business and appointment data.
* **Voice Calling Agent:** Handles inbound calls, identifies patient needs, and books appointments directly into the database.
* **Comprehensive Dashboard:** A central hub for monitoring all communication channels, tracking appointments, and viewing performance analytics.

**Conclusion** OfinaPulse transforms patient communication from a logistical challenge into a competitive advantage. By unifying channels and automating routine tasks, the platform dramatically improves operational efficiency, reduces administrative overhead, and enhances the patient experience.

### Project 3: BEDS 24 - AI-Powered Property Management Agent

**Tech Stack:**

* **Automation Core:** Custom-built workflow automation engine (n8n.io architecture).
* **AI Models:** Google Gemini for market analysis, OpenAI GPT-4 for query resolution.
* **API Integration:** Deep integration with the BEDS24 property management API.
* **Frontend (Chatbot):** React-based web widget.
* **Backend:** Python (Flask) to serve AI models and manage workflows.

**Third-Party Libraries:**

* requests: For interacting with the BEDS24 API.
* langchain: To structure and chain LLM calls for complex tasks.
* beautifulsoup4: For scraping market data.
* celery: For running asynchronous tasks.

#### BEDS 24 AI Agent - Features & Functionality

**Overview** In the fiercely competitive short-term rental market, success hinges on dynamic pricing and exceptional guest service. We developed an AI agent for a BEDS24-based property management company to automate these critical functions. The result was a system so effective it led to a significant reduction in manual labor, proving the immense ROI of targeted AI automation.

**Core Features**

* **Dynamic Pricing Engine:** Intelligently analyzes real-time market rates and local events to recommend optimal pricing, maximizing revenue and occupancy.
* **Automated Guest Services:** A 24/7 chatbot that instantly resolves user queries, from payment status to property access, dramatically improving the guest experience.
* **Seamless Property Management:** Directly integrates with BEDS24 to fetch property details, check availability, and manage calendars, acting as a central intelligence layer.

**Conclusion** This AI agent is a game-changer for property managers. By automating pricing strategy and guest communication, it directly addresses the two biggest levers for profitability and scalability in the rental industry, allowing companies to manage more properties with less overhead.

### Project 4: DELLARIA Saloon - SMS/MMS Automation

**Tech Stack:**

* **Core Platform:** GoHighLevel (GHL) for CRM and marketing automation.
* **Telephony:** Twilio for SMS/MMS messaging.
* **Backend Logic:** Custom workflows and triggers built within the GHL platform.
* **Integrations:** GHL API for connecting with other business systems.

**Third-Party Services:**

* **Twilio API:** For programmatic sending and receiving of messages.
* **GoHighLevel CRM:** As the central hub for client data.

#### DELLARIA Saloon Automation - Features & Functionality

**Overview** For a client-centric business like a high-end salon, personal communication is key to retention. We implemented a complete SMS/MMS automation solution for DELLARIA Saloon to streamline client engagement, automating everything from appointment reminders to marketing promotions through a scalable, centralized platform.

**Core Features**

* **Automated Appointment Messaging:** Sends automated confirmations, reminders, and follow-ups, drastically reducing no-shows.
* **Dynamic Marketing Promotions:** Automatically generates and sends unique discount coupons via MMS to drive repeat business.
* **Client Feedback Loop:** Automatically requests reviews from clients post-appointment, boosting the salon's online reputation.
* **Scalable Multi-Location Management:** Built on GHL, the platform easily integrates and manages additional salon locations.

**Conclusion** This automation solution transforms client communication from a manual chore into a powerful marketing engine. By leveraging Twilio and GHL, DELLARIA Saloon delivers a personalized, timely, and engaging experience for every client, boosting loyalty and revenue.

### Project 5: SalesAura - All-in-One AI Marketing & Sales Team

**Tech Stack:**

* **Frontend:** Next.js, Tailwind CSS
* **Backend:** Node.js, Python (for AI agents)
* **AI Agents:** LangChain for agent orchestration, OpenAI GPT-4, Google Gemini.
* **Database:** MongoDB, PostgreSQL for lead management.
* **Integrations:** Apollo.io API, LinkedIn API, various social media APIs.

**Third-Party Libraries:**

* Puppeteer: For web scraping and lead generation.
* Nodemailer: For automated email outreach.
* Socket.IO: For real-time dashboard updates.
* Prisma: As the ORM for database interactions.

#### SalesAura - Features & Functionality

**Overview** Assembling a full-stack marketing department is a major hurdle for growing businesses. SalesAura solves this by replacing the entire team with a coordinated group of specialized AI agents. Led by an AI Manager, this platform automates everything from lead generation to social media management, offering a revolutionary, cost-effective solution for scaling businesses.

**Core Features**

* **Specialized AI Agents:** A team of seven AI agents, each with a unique skill set covering lead generation, outreach, social media, SEO, and ad analysis.
* **AI Manager (Atlas):** Orchestrates the entire team, coordinating tasks, managing schedules, and providing comprehensive performance reports.
* **Automated Lead Generation & Outreach:** Identifies the target audience, generates high-quality leads, and executes personalized outreach campaigns at scale.
* **Content & SEO Automation:** Automatically generates SEO-optimized blog posts and social media content to build brand presence and drive organic traffic.

**Conclusion** SalesAura represents the future of marketing. By offering a fully autonomous, 24/7 active AI team, it provides an unparalleled level of efficiency and cost savings, empowering businesses to achieve exponential growth without the overhead of a traditional marketing department.

### Project 6: High-Frequency Trading (HFT) Bot for Forex

**Tech Stack:**

* **Core Language:** C++ for maximum performance and low-latency execution.
* **API Connectivity:** Custom FIX Protocol engine and cTrader Open API integration.
* **AI & Machine Learning:** TensorFlow and PyTorch for signal generation models.
* **Data Analysis:** Real-time processing of Depth of Market (DOM) Level 2 data.
* **Database:** InfluxDB (Time-Series Database) for tick-level market data.

**Third-Party Libraries:**

* QuickFIX/n: An open-source FIX engine implementation.
* Boost: For high-performance C++ utilities.
* OpenBLAS: For optimized linear algebra computations.
* protobuf: For efficient data serialization.

#### HFT Bot - Features & Functionality

**Overview** In high-frequency trading, success is measured in microseconds. We engineered a sophisticated HFT bot that integrates directly with the cTrader platform, leveraging AI and ultra-low-latency APIs to execute complex trading strategies with precision and speed that far exceed human capabilities.

**Core Features**

* **Dual API Integration:** Utilizes both the cTrader Open API and the industry-standard FIX API for robust, low-latency market access.
* **AI-Driven Signal Generation:** Employs machine learning models trained on historical data to identify profitable trading opportunities in real-time.
* **Depth of Market (DOM) Analysis:** Analyzes Level 2 market data to understand liquidity and predict short-term price movements, providing a critical execution edge.
* **Risk Management Engine:** Includes built-in protocols like stop-loss and take-profit orders to protect capital automatically.

**Conclusion** This HFT bot provides a significant technological advantage in the competitive forex market. By combining AI-driven intelligence with low-latency execution, it empowers traders to capitalize on fleeting market opportunities that are invisible to the naked eye.

### Project 7: AI Sales Coach

**Tech Stack:**

* **Frontend:** React, Material-UI
* **Backend:** Node.js, Express.js
* **AI & NLP:** OpenAI GPT-4 fine-tuned on company SOPs and sales data.
* **Database:** MongoDB for knowledge base and user feedback.
* **Authentication:** JWT (JSON Web Tokens).

**Third-Party Libraries:**

* react-router-dom: For navigation.
* axios: For client-server communication.
* bcrypt.js: For hashing passwords.
* langchain: For managing the RAG pipeline.

#### AI Sales Coach - Features & Functionality

**Overview** Training and scaling a sales team is a major challenge. The AI Sales Coach acts as a personal, on-demand mentor for every sales representative. By providing instant, expert guidance based on a company's own best practices, this agent ensures every team member can perform at their peak, dramatically increasing sales performance.

**Core Features**

* **Real-Time Sales Guidance:** Sales reps paste prospect messages and receive instant, optimized responses based on company SOPs.
* **Admin-Managed Knowledge Base:** An intuitive admin panel allows managers to easily upload and update the AI's knowledge base, keeping its advice current.
* **Continuous Learning Simulation:** A feedback panel allows users to correct the AI's suggestions, continuously fine-tuning the model over time.
* **Role-Based Access Control:** Secure login system with distinct roles for administrators and standard users.

**Conclusion** The AI Sales Coach is a transformative tool for sales enablement. It democratizes expertise, ensuring that every sales rep has immediate access to the best possible guidance, leading to shorter ramp-up times, higher conversion rates, and a more effective sales force.

### Project 8: Voice Calling Agent for CleanCubico

**Project Link:**<https://cleancubico.com/>

**Tech Stack:**

* **Frontend Integration:** Custom JavaScript widget embedded in a Shopify webstore.
* **Backend:** Node.js serverless functions (e.g., Vercel Functions, AWS Lambda).
* **AI & NLP:** Google Dialogflow for conversation management, OpenAI GPT for dynamic responses.
* **Telephony & Voice:** Twilio for voice streaming and telephony integration.
* **Database:** Firestore for storing appointment data and customer queries.

#### CleanCubico Voice Agent - Features & Functionality

**Overview** For an e-commerce business like CleanCubico, providing instant and accessible customer service is crucial. We developed and embedded a customer service voice calling agent directly into their Shopify store. This AI agent acts as a virtual assistant, capable of answering customer queries, booking car wash appointments, and sending email confirmations, all without human intervention.

**Core Features**

* **Seamless Website Integration:** The agent is available via a simple "Start a call" button on the website, providing an immediate point of contact for customers.
* **Intelligent Query Handling:** The AI can answer a wide range of questions about services, pricing, and availability.
* **Automated Appointment Booking:** Customers can book car wash services directly through the voice agent, which integrates with the company's calendar.
* **Email & Notification Automation:** Upon booking, the system automatically sends confirmation emails to both the customer and the CleanCubico team.

**Conclusion** The embedded voice agent for CleanCubico enhances the customer experience by providing instant, 24/7 support. It streamlines the booking process, reduces the workload on human staff, and captures leads that might otherwise be lost, directly contributing to increased sales and customer satisfaction.

### Project 9: Sales AI Agent for Artekk & L&B Group

**Tech Stack:**

* **Automation Core:** Custom workflow automation engine (n8n.io architecture).
* **Lead Generation:** Apollo.io API integration.
* **AI & NLP:** OpenAI GPT-4 for company research, email personalization, and reply handling.
* **Data Enrichment:** Integration with services like Clearbit or Hunter.io.
* **Email Automation:** Nodemailer or integration with a dedicated email sending service.
* **Reporting:** Google Sheets API for weekly report generation.

#### Sales AI Agent - Features & Functionality

**Overview** For B2B companies like Artekk Corporation and L&B Group, a consistent pipeline of high-quality leads is the lifeblood of the business. We built a comprehensive, end-to-end sales automation agent that handles the entire top-of-funnel process, from lead generation and enrichment to personalized outreach and follow-up, culminating in weekly performance reports.

**Core Features**

* **Automated Lead Generation:** Taps into Apollo.io to generate targeted lists of prospects based on predefined criteria.
* **AI-Powered Research & Enrichment:** The agent automatically researches each prospect's company, enriching their profile with relevant data to enable deep personalization.
* **Intelligent Outreach & Follow-up:** Crafts and sends highly personalized initial emails and follow-up sequences, with an AI agent capable of handling initial replies.
* **Weekly Analytics Reporting:** Automatically compiles key metrics (leads generated, emails sent, open rates, reply rates) into a weekly report, providing clear visibility into performance.

**Conclusion** This Sales AI Agent automates the most time-consuming aspects of B2B prospecting. By combining automated lead generation with AI-driven research and personalization, it allows sales teams to focus on what they do best: closing deals. The system ensures a consistent, high-volume, and high-quality outreach effort, directly fueling pipeline growth.

### Project 10: InterveAI - Recruitment & Interview Automation

**Project Link:**<https://interve.vercel.app/>

**Tech Stack:**

* **Frontend:** Next.js, Tailwind CSS
* **Backend:** Python (FastAPI)
* **AI & Machine Learning:** OpenAI Whisper for transcription, GPT-4 for analysis.
* **WebRTC:** For real-time video and audio streaming.
* **Database:** PostgreSQL for candidate data and reports.

**Third-Party Libraries:**

* simple-peer: For handling WebRTC connections.
* ffmpeg-python: For processing video and audio streams.
* scikit-learn: For building technical assessment models.
* SQLAlchemy: For database interactions.

#### InterveAI - Features & Functionality

**Overview** The traditional recruitment process is slow, biased, and resource-intensive. InterveAI was prototyped to demonstrate how AI can revolutionize technical hiring. By automating the initial screening, this platform allows companies to assess more candidates concurrently, eliminate human bias, and receive in-depth, professional analysis.

**Core Features**

* **Automated AI Interviews:** Conducts behavioral and technical interviews via video, capable of running hundreds of sessions simultaneously, 24/7.
* **Custom Quiz Generation:** Allows recruiters to create custom technical quizzes with a mix of objective and subjective questions.
* **Advanced AI Analysis:** Transcribes the interview and provides a detailed, unbiased report on the candidate's communication style, content, and technical accuracy.
* **Secure & Private:** Video streams are used solely for analysis and are not stored, ensuring candidate privacy.

**Conclusion** InterveAI presents a paradigm shift in technical recruitment. By leveraging AI to handle the heavy lifting of initial screenings, it empowers hiring managers to focus their time on the most promising candidates, leading to a faster, fairer, and more efficient hiring process.

### Project 11: Voice Calling Agent for Life RX & Cutco Corp

**Tech Stack:**

* **Voice AI Platform:** Vapi
* **Telephony:** Twilio for SMS and call routing.
* **Backend Automation:** Custom workflow automation engine (n8n.io).
* **Database:** PostgreSQL or Firestore for storing user information, call logs, and analytics.
* **Frontend Integration:** Custom JavaScript widget for website embedding.

#### Life RX & Cutco Voice Agent - Features & Functionality

**Overview** For service-oriented businesses like Life RX and Cutco Corp, providing immediate, intelligent, and helpful customer service is key to building trust and driving sales. We developed a sophisticated customer service voice agent that acts as a 24/7 virtual representative, handling a wide range of tasks to improve efficiency and customer satisfaction.

**Core Features**

* **Intelligent Query Resolution:** The agent can answer common customer questions, provide product information, and explain services.
* **Automated Appointment Booking:** Seamlessly books appointments for customers, checking calendar availability in real-time.
* **Multi-Channel Communication:** Can send follow-up emails and SMS messages to confirm appointments or provide requested information.
* **Data Capture & Analytics:** Stores user information and detailed call logs for analysis, providing insights into customer needs and agent performance.

**Conclusion** This AI voice agent provides a scalable and cost-effective solution for managing high volumes of customer interactions. By automating routine tasks like appointment booking and query resolution, it frees up human staff to focus on more complex issues, while ensuring that every customer receives prompt and professional service, any time of day.

### Project 12: Automated Video Creation Agent

**Demo Video Link:** [https://drive.google.com/file/d/1BJgwBNeIlCaDyforZVtkVxe\_/view?usp=sharing](https://www.google.com/search?q=https://drive.google.com/file/d/1BJgwBNeIlCaDyforZVtkVxe_/view%3Fusp%3Dsharing)

**Tech Stack:**

* **Automation Core:** Custom workflow automation engine (n8n.io).
* **AI & Machine Learning:** OpenAI GPT-4 for script generation, ElevenLabs or similar for text-to-speech audio generation.
* **Video & Audio Editing:** Integration with a cloud-based video editing API (e.g., Shotstack, Editframe).
* **Content Sourcing:** APIs for sourcing royalty-free video clips and images (e.g., Pexels, Unsplash).

#### Automated Video Creation Agent - Features & Functionality

**Overview** Creating informative video content for social media is a time-consuming process involving scripting, voiceover, and editing. This project showcases a fully autonomous agent that automates the entire video creation pipeline, enabling the rapid production of ready-to-upload videos for platforms like YouTube and Instagram.

**Core Features**

* **AI Script Generation:** The agent takes a topic or prompt and generates a complete, engaging script for an informative video.
* **Automated Audio Generation:** The generated script is converted into a natural-sounding voiceover using a text-to-speech API.
* **Intelligent Media Sourcing:** The agent searches for and selects relevant, royalty-free video clips and images to match the script's content.
* **Automated Assembly & Editing:** All assets (video clips, audio, and potentially background music) are programmatically combined, synced, and rendered into a final video file.

**Conclusion** This automated video creation agent is a powerful tool for content creators and marketers. It dramatically reduces the time and cost associated with video production, allowing for the creation of high-quality content at an unprecedented scale and speed.

### Project 13: Job Application Automation Agent

**Sample Data Link:**<https://docs.google.com/spreadsheets/d/1pXaNiBeQNFBrfd-T-LnPsPqhfY-pB-HsqI-WU/edit?usp=sharing>

**Tech Stack:**

* **Automation Core:** Custom workflow automation engine (n8n.io).
* **Web Scraping:** Puppeteer or Playwright for scraping job postings.
* **AI & NLP:** OpenAI GPT-4 for analyzing job descriptions and tailoring CVs.
* **RAG (Retrieval-Augmented Generation):** FAISS or ChromaDB for creating a vector store from the user's CV.
* **Data Management:** Google Sheets API for logging scraped jobs and applications.

#### Job Automation Agent - Features & Functionality

**Overview** The job search process is often a numbers game, requiring countless hours of searching and applying. This project automates this tedious process with a two-pronged AI agent: one that scrapes job postings from multiple platforms, and another that uses a user's CV to automatically tailor and submit applications.

**Core Features**

* **Concurrent Job Scraping:** The agent scrapes job postings from multiple major platforms simultaneously (LinkedIn, Indeed, Glassdoor, etc.), consolidating them into a single list.
* **CV-Based Application Tailoring:** Using a RAG approach, the agent analyzes a new job description against the user's provided CV and intelligently customizes the application to highlight the most relevant skills and experiences.
* **Automated Application Submission:** The agent can automatically fill out and submit job applications on behalf of the user.
* **Comprehensive Tracking:** All scraped jobs and submitted applications are logged in a Google Sheet for easy tracking and management.

**Conclusion** This job automation agent provides a massive efficiency boost for job seekers. By automating the most repetitive parts of the job hunt, it allows users to apply to more relevant positions in less time, significantly increasing their chances of landing an interview.

### Project 14: AI Story Adventure Generator

**Project Link:**<https://advenai.streamlit.app/>

**Tech Stack:**

* **Frontend:** Streamlit
* **AI & Machine Learning:** Fine-tuned Llama-2 model for narrative generation.
* **Backend Framework:** LangGraph for managing stateful, multi-step AI chains.
* **Database (Memory):** FAISS for Retrieval-Augmented Generation (RAG) and long-term memory.
* **Deployment:** Streamlit Cloud

#### Adventure Generator - Features & Functionality

**Overview** This project explores the frontier of interactive entertainment by creating a dynamic, AI-driven text adventure game. The chatbot generates unique stories based on user choices and leverages a sophisticated memory system to ensure narrative consistency, providing a deeply immersive and endlessly replayable experience.

**Core Features**

* **Dynamic Narrative Generation:** A fine-tuned Llama-2 model creates compelling and coherent story narratives across multiple genres (Fantasy, Sci-Fi, Horror, etc.).
* **Long-Term Memory:** Utilizes a RAG architecture with FAISS to retain key plot points and character details, allowing for complex, evolving storylines.
* **Stateful Agent Logic:** LangGraph manages the game's state, ensuring that the AI's responses are contextually aware of the player's entire journey.
* **Interactive UI:** A simple and clean interface built with Streamlit allows users to easily choose their actions and progress through the story.

**Conclusion** The Adventure Generator ChatBot is a powerful demonstration of how advanced AI can create novel forms of entertainment. By combining fine-tuned models with state-of-the-art memory systems, it delivers a personalized and engaging storytelling experience that is unique to every player.

### Project 15: ReseAI - Research Assistant Chatbot

**Project Link:**<https://research-article-explorer-generative-ai.streamlit.app/>

**Tech Stack:**

* **Frontend:** Streamlit
* **Web Scraping:** BeautifulSoup4, Requests
* **AI & NLP:** LangChain for document processing, OpenAI embeddings, and GPT-4 for question answering.
* **Vector Store:** FAISS for creating an in-memory RAG vector store.
* **Deployment:** Streamlit Cloud

#### ReseAI - Features & Functionality

**Overview** Researchers and students often need to digest large volumes of information from multiple articles quickly. ReseAI is a simple but powerful research assistant designed to solve this problem. Users can input a list of article URLs, and the agent scrapes the content, creates a knowledge base, and allows the user to ask specific questions and receive context-aware answers.

**Core Features**

* **Multi-Article Scraping:** The agent takes a list of URLs, scrapes the full text from each article, and prepares it for processing.
* **On-the-Fly RAG Creation:** The scraped text is chunked, converted into vector embeddings, and stored in a FAISS vector store.
* **Contextual Question Answering:** When a user asks a question, the agent retrieves the most relevant chunks of text from the articles and uses them as context for a large language model to generate a precise, source-based answer.
* **Source Citing:** The agent provides the source URLs from which the information was derived, allowing for easy verification.

**Conclusion** ReseAI is an invaluable tool for anyone conducting research. It dramatically speeds up the process of information synthesis by allowing users to "chat" with their sources, quickly finding the specific information they need without having to manually read through every document.

### Project 16: Business Financial Management & Automation System

**Project Link:**<https://f-bms.vercel.app>

**Tech Stack:**

* **Frontend:** React, Next.js, Recharts, ApexCharts
* **Backend:** Node.js, Express.js
* **Database:** PostgreSQL with Prisma ORM.
* **AI & Machine Learning:** Scikit-learn (Python) for predictive trend analysis.
* **Deployment:** Vercel, Heroku

**Third-Party Libraries:**

* react-chartjs-2: For creating interactive charts.
* date-fns: For date and time manipulation.
* jspdf: For generating PDF reports.
* pandas & numpy: For data analysis on the backend.

#### Financial Management System - Features & Functionality

**Overview** Small businesses often lack resources for expensive financial software. We built a comprehensive, all-in-one Business Financial Management System to solve this. The platform provides powerful tools for tracking, analysis, and forecasting, empowering owners to make data-driven decisions.

**Core Features**

* **Automated Reporting:** Automatically generates detailed profit & loss statements, expense reports, and cash flow documents.
* **Extensive Analytics Dashboard:** Provides a detailed, visual breakdown of income and expenses with interactive charts.
* **Predictive Projections:** Utilizes a regression model to predict future income/expense trends and includes a break-even analysis calculator.
* **Multi-Business Management:** Allows users to manage the finances for multiple businesses from a single account.

**Conclusion** This system democratizes financial management, giving businesses the power of an enterprise-level analytics suite in an intuitive package. By automating reporting and providing predictive insights, it transforms finance from a reactive task into a proactive strategic tool.

### Project 17: City Swapp - Home Swapping Platform

**Project Link:**<https://www.cityswapp.com/>

**Tech Stack:**

* **Frontend:** React, Next.js, SASS
* **Backend:** Node.js, Express.js
* **Database:** PostgreSQL with Sequelize ORM.
* **Mapping & Geolocation:** Mapbox API
* **Payments:** Stripe Connect for handling payments between users.

**Third-Party Libraries:**

* react-dates: For selecting availability calendars.
* formik & yup: For form handling and validation.
* jsonwebtoken: For user authentication.
* aws-sdk: For storing user-uploaded property images on S3.

#### City Swapp - Features & Functionality

**Overview** City Swapp is a full-fledged platform designed to facilitate home swapping for travelers, offering a more authentic and affordable alternative to traditional lodging. We built the entire system from the ground up, focusing on user trust, a seamless search experience, and secure communication.

**Core Features**

* **Advanced Property Search:** Users can search for homes based on location, availability, amenities, and more, with results displayed on an interactive map.
* **Detailed Property Listings:** Users can create rich profiles for their homes, including photo galleries, descriptions, amenities, and availability calendars.
* **Secure Messaging & Booking System:** An integrated messaging system allows users to communicate and arrange swaps securely. A formal booking process ensures both parties agree to the terms.
* **User Profiles & Review System:** Building trust is paramount, so the platform includes detailed user profiles and a two-way review system after a swap is completed.

**Conclusion** City Swapp is a comprehensive and scalable platform that addresses a clear need in the travel market. With its focus on a great user experience, security, and trust-building features, it provides a robust foundation for a thriving community of home-swapping enthusiasts.

### Project 18: Ashjar - Co-Working Space Mobile App

**Project Link:** [https://apps.apple.com/pk/app/ashjar-space/id6479621495](https://www.google.com/search?q=https://apps.apple.com/pk/app/ashjar-space/id6479621495)

**Tech Stack:**

* **Mobile App:** React Native
* **Backend:** Node.js, Express.js
* **Database:** MongoDB
* **Cloud Services:** AWS (for hosting and storage), Firebase (for push notifications).
* **Admin Dashboard:** React, Ant Design

**Third-Party Libraries:**

* react-native-maps: For displaying branch locations.
* stripe-react-native: For in-app payments and bookings.
* react-navigation: For handling navigation within the app.
* moment.js: For managing dates and times for bookings.

#### Ashjar - Features & Functionality

**Overview** Ashjar required a seamless mobile experience for its co-working space members. We developed a cross-platform React Native application and a corresponding web-based admin dashboard to manage all aspects of the user journey, from finding a space to booking and payment.

**Core Features**

* **Branch & Workspace Discovery:** Users can browse different Ashjar branches, view available workspaces (desks, rooms), and see amenities on an interactive map.
* **Real-Time Booking System:** A simple and intuitive interface for booking workspaces by the hour or day, with real-time availability updates.
* **Secure In-App Payments:** Integration with Stripe allows for secure and easy payment for bookings directly within the app.
* **Comprehensive Admin Dashboard:** A powerful web portal for Ashjar staff to manage branches, workspaces, bookings, users, and view financial analytics.

**Conclusion** The Ashjar mobile application provides a modern, convenient, and efficient way for members to interact with the co-working space. The platform streamlines the booking process, improves the user experience, and provides the administration with powerful tools to manage their operations effectively.

### Project 19: CarSnap - AI & Blockchain for Automotive Parts

**Tech Stack:**

* **Frontend:** React Native for cross-platform mobile app.
* **Backend:** Node.js, Express.js
* **AI & Machine Learning:** TensorFlow, Keras/PyTorch for damage detection models (CNNs).
* **Blockchain:** Ethereum with custom Smart Contracts in Solidity.
* **Real-Time Communication:** WebSockets (Socket.IO) for chat.
* **Database:** MongoDB for listing data, IPFS for decentralized image storage.

**Third-Party Libraries:**

* web3.js / ethers.js: For interacting with the Ethereum blockchain.
* OpenCV: For image pre-processing.
* Truffle Suite: For developing and testing smart contracts.

#### CarSnap - Features & Functionality

**Overview** The used car parts market is plagued by a lack of transparency. CarSnap addresses this by combining AI and blockchain technology. The platform uses AI to accurately identify damaged parts and leverages a blockchain ledger to create an immutable and transparent history for parts and seller reviews, building a marketplace founded on trust.

**Core Features**

* **AI-Powered Damage Identification:** Users snap a photo, and the app's deep learning model automatically identifies and highlights damaged parts.
* **Blockchain-Based Marketplace:** A decentralized system for buying and selling parts where all transactions and reviews are recorded on an immutable ledger.
* **Transparent Review System:** Reviews stored on the blockchain cannot be altered or deleted, creating a highly trustworthy reputation system.
* **Integrated Secure Chat:** A real-time chat system allows buyers and sellers to communicate securely within the platform.

**Conclusion** CarSnap is a revolutionary platform that brings unprecedented transparency to the automotive parts industry. By integrating AI for accurate assessments and blockchain for verifiable trust, it solves the core pain points for both buyers and sellers, creating a more efficient and reliable marketplace.

### Project 20: Aedilo - Recruitment Platform for Blue-Collar Workers

**Project Link:**<https://www.aedilo.com/>

**Tech Stack:**

* **Frontend:** React, Next.js
* **Backend:** Node.js, GraphQL
* **Database:** PostgreSQL
* **UI/UX:** Tailwind CSS, Framer Motion
* **Deployment:** Vercel, AWS

#### Aedilo - Features & Functionality

**Overview** Aedilo is a marketing and recruitment platform designed to solve the unique challenges of hiring blue-collar workers. The platform provides a transparent, efficient, and compliant solution for both employers and workers, streamlining everything from recruitment and compliance to payroll.

**Core Features**

* **Digital Recruitment:** Employers can browse detailed profiles of candidates, including prior experience and video introductions, streamlining the hiring process.
* **Compliance Management:** The platform includes a process tracker for migration and immigration steps, ensuring full compliance with regulations.
* **Integrated Payroll:** A robust payroll system simplifies payments and ensures compliance with local labor laws and wage protection systems.
* **Value Proposition:** The platform is built on a foundation of "No recruitment fees, Transparent job offers, No scams," building trust within the blue-collar community.

**Conclusion** Aedilo provides a much-needed digital transformation for the blue-collar recruitment industry. By creating a transparent and simplified platform, it reduces costs for employers, protects workers from exploitation, and increases the overall efficiency of the public and private sectors.

### Project 21: Al-Seddiq Labs - Laboratory Management System

**Tech Stack:**

* **Frontend:** React, Material-UI
* **Backend:** Node.js, Express.js
* **Database:** MySQL or PostgreSQL
* **Reporting:** jspdf and react-to-print for generating and printing reports.
* **Authentication:** Passport.js with JWT strategy.

#### Al-Seddiq Labs - Features & Functionality

**Overview** Medical laboratories handle a vast amount of sensitive patient data and require a highly efficient system to manage operations. We developed a comprehensive Laboratory Management System for Al-Seddiq Labs to digitize and streamline their entire workflow, from patient registration to final report generation.

**Core Features**

* **Patient Record Management:** A secure and centralized system for managing all patient records, test orders, and historical data.
* **Complete Lab Test Management:** A full workflow management system for tracking lab tests from sample collection to result entry and validation.
* **Automated Report Generation:** The system automatically generates professional and accurate test reports, which can be printed or shared digitally with patients and doctors.
* **Analytics Dashboard:** An administrative dashboard provides key analytics on test volumes, turnaround times, and other operational metrics, enabling data-driven management.

**Conclusion** The Al-Seddiq Labs Management System replaces manual, error-prone processes with a secure, efficient, and automated solution. This increases the lab's accuracy and throughput, improves the patient experience, and provides management with the tools they need to optimize operations.

### Project 22: Bridgelinx - Logistics & Supply Chain Automation

**Tech Stack:**

* **Frontend:** Next.js, React.js
* **Backend:** Node.js, GraphQL
* **Database:** PostgreSQL (Relational), Neo4j (Graph), Redis (Caching)
* **Cloud/DevOps:** AWS (EC2, Lambda, ElastiCache, S3), SQS (Simple Queue Service)

#### Bridgelinx - Features & Functionality

**Overview** As a key developer for Bridgelinx, a $10 million logistics startup, I was instrumental in building and scaling the core infrastructure that powered their explosive growth. My work involved complex data migrations, performance optimization, and the development of key operational portals that automated manual processes and significantly boosted efficiency.

**Core Features**

* **Scalable Data Architecture:** Contributed to the foundational architectural shift, utilizing a mix of PostgreSQL for relational data and Neo4j for complex logistics relationships, enabling the company to scale.
* **Performance Optimization:** Reduced database query execution time by 40% by implementing raw Cypher queries in Neo4j. Implemented AWS ElastiCache (Redis) to enable real-time updates and dramatically improve system responsiveness.
* **Comprehensive Data Migration:** Autonomously authored and executed data migration scripts for over 10 of the company's applications, ensuring data integrity and providing significant value across all internal teams and clients.
* **Operational Efficiency through Automation:** Led the development of more than three internal operational portals. These tools automated previously manual processes, resulting in a 20% boost in operational efficiency and reducing human error.

**Conclusion** My contributions at Bridgelinx were pivotal in transforming the company from a nascent startup into a major player with Pakistan's largest seed financing round in 2021. By architecting scalable systems, optimizing performance, and driving automation, I helped build a robust technological foundation that was critical to the company's success.