Luein analytics

Transform Data into Strategic Advantage & Scalable Efficiency

Identify AI Opportunities

Build Winning AI Strategies

Deliver Tailored AI Solutions

" The most valuable AI solutions are not those that make headlines, they are the ones that solve your specific problems within your business constraints. "

www.lueinanalytics.com

Luein analytics

With deep expertise in AI research and development consulting, we help businesses to solve their most important problem statements.

About us

Founded in 2017, **Luein Analytics** is a cutting-edge AI research and consulting firm headquartered in **Bangalore, India**, with an operational base in **Malaysia** and a client footprint spanning **Southeast Asia, the UK, UAE, and United States**.

To date, we have delivered **160+ successful AI research solutions**, helping our global clients unlock data-driven innovation.

- **AI & Data Science Consulting**
- **Deep-Tech Contract Staffing (C2H & C2C) -** Mid Level to Architect level- Data/SaaS, Cybersecurity, Cloud/DevOps/MLOps, Semiconductor, EV/Embedded, AI/ML/LLM/Data Science/GenAI, EU Compliance Expertise.
- **Cybersecurity-as-a-Service (CSaaS)**
- **Data Science Development Service**

We design and develop AI platforms, GenAI applications, and intelligent SaaS products, from idea to scalable deployment.

ISO

ISO 9001:2015 IAF-Certified
Quality Management System

ISO 27001:2013 IAF-Certified
Information Security Management System

55+ AI Consultants

55+ Clientele

160+ Innovative solutions delivered

17 Internal AI team

3 In-house products

42000+ Total Product customers

Industries We Serve

Luein Analytics

Our AI solutions have delivered measurable impact across **55+ clients in diverse sectors**. We bring deep domain expertise and tailored AI innovation to every engagement.

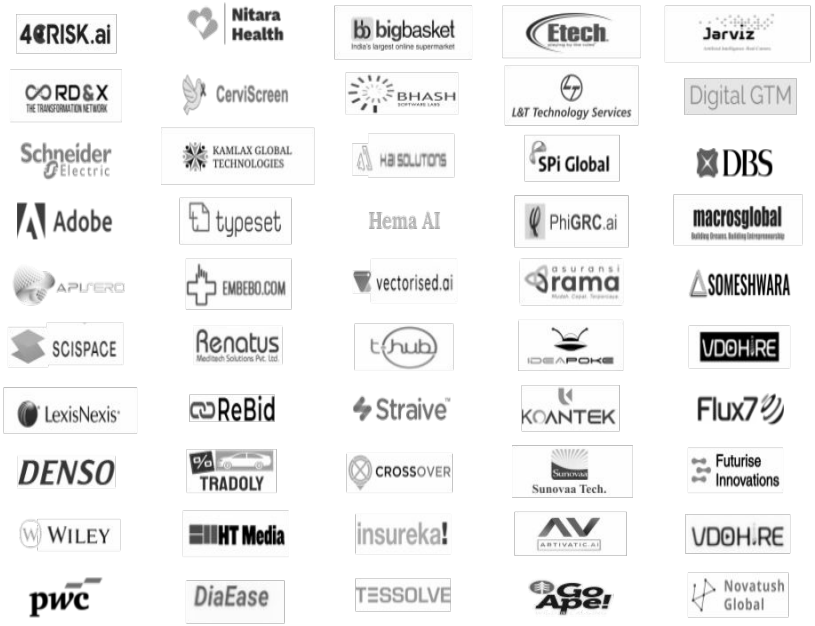
Finance & Risk Banking - InsurTech, Financial Services, Financial Fraud Detection, and Regulatory Compliance.

Technology & Digital Media - ePublishing , AdTech, MarTech and e-Commerce .

Healthcare & Life Sciences - Hospitals & Clinics, Preventive Diagnostics, Pharma Research, and PAP Cancer assistance.

Enterprise & Human Capital - HR Analytics, Talent Acquisition, and Contact Centers.

Industry & Engineering - Automotive, Smart Manufacturing, ESG & Compliance Analytics.



Case Study Highlights

160+ AI use cases delivered — here is a glimpse into the breadth of our work across industries.

AI in Healthcare

* AI Assisted Cervical Cancer Screening App
* Cancer PAP Assistance Workflow
* AI Driven Diabetic Retinopathy Screening
* Automating Medical Document Digitisation
* In-hospital claim prediction from medical codes
* AI Diagnostic Suite for EU Market Expansion
* PCPNDT Compliant SaaS Platform for Diagnostic Clinics

Language AI, Semantic Search & LLMs

* AI-powered scientific literature search engine
* Compliance & risk rule mapping with semantic similarity
* Smart document digitization, invoice parsing, and PDF intelligence.
* Email classification & multilingual support for service desks

AI for Semiconductor Industry & Engineering

* Auto-routing of PCB traces using deep learning
* PCB test code conversion (legacy to modern)
* IC spec extraction using AI chatbot
* Design defect detection
* Design comparison

Business Automation & Strategy

* Talent hiring automation platform — from JD to selection
* Cross-sell prediction in insurance contact centers
* ESG and social impact assessments
* Chat/call/email churn predictors to reduce attrition
* Automated call auditing
* Multilingual transfer desk agent
* Email priority routing and ticketing

Governance, risk & compliance (GRC)

* Traceability, Impact Assessment & Compliance Map
* Obligation Generation
* Business risk monitoring (BRM)
* Social impact assessment (SIA)
* GIS-Based Agritech Assistance

Computer Vision & Image Intelligence

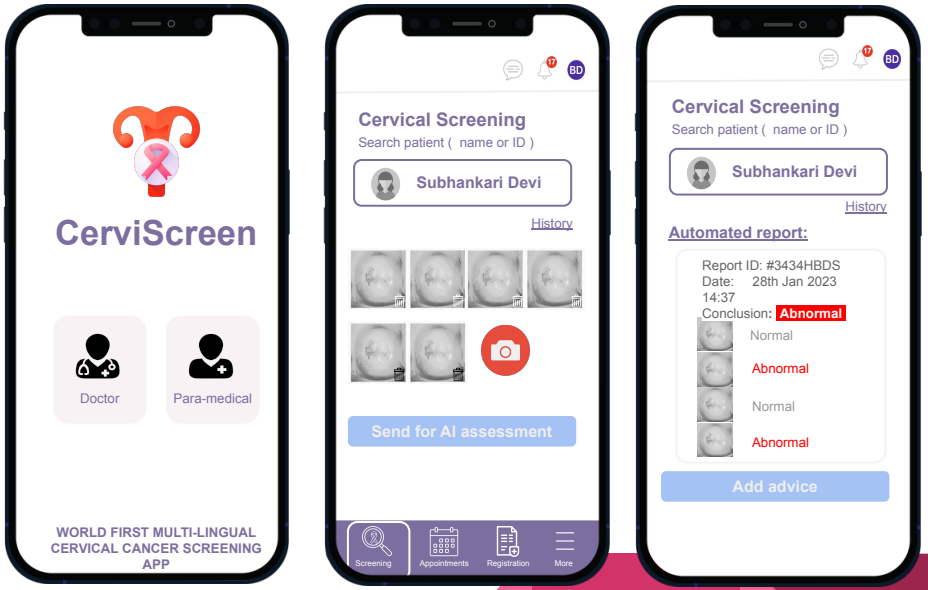
* Crop disease detection via mobile PWA (20+ regional languages)
* Insurance damage detection from car images
* Face recognition-based school attendance system

AI Assisted Cervical Cancer Preliminary Screening

Develop an AI-powered mobile solution that assists healthcare workers in detecting and classifying cervix images as normal, suspicious, or abnormal, supporting early cervical cancer screening in low-resource settings.

Challenges
Poor-quality images from mobile devices
Untrained personnel in rural clinics
Difficulty filtering non-gradable (blurry) images
Limited internet bandwidth for real-time screening

Solution
Django based PWA for mobile screening
AI based cervix detection, trained to ignore blurry images
Fast (<0.5s) filtering of low-quality or off-center images
Cropped cervix region passed to AI model for 3-class classification: Normal, Suspicious, Abnormal
Built-in zoom and torch features to improve image capture
Deployed in 11 clinics; 1300+ patient screenings completed



✅ >85% AP50, >80% AP75 in cervix detection
✅Reliable exclusion of poor-quality images
✅Accurate AI classification across 3 risk levels
✅Continuous model updates with clinical feedback
✅CDSCO commercial licensed received ethical committee approved.

Streamlining Cancer Patient Assistance Program (PAP) Workflow for Pharma Firm

Digitize the end-to-end Cancer Patient Assistance Program (PAP) for pharmaceutical firms, creating a unified flow for patient onboarding, eligibility, treatment allocation, and payment tracking.

Challenges

Slow, paper heavy application handling that delayed critical care.
Disconnected communication between patients, underwriters, and pharma partners.
A lack of automated tools for both medical and financial risk assessment.
No real-time visibility into treatment (infusion) progress or EMI recovery.

Integrated Solution

The platform synchronized three core verticals into a single digital workflow:

Financing Help (Loans & Funding)- Automated financial underwriting using rule engines, integrated verification APIs, e-mandates for EMI tracking, and customized revenue plans (30+ filters).

Patient Navigation (Doctors & Hospitals)- Streamlined patient onboarding and eligibility evaluation, ensuring faster treatment allocation and medical underwriting.

Health Ecosystem (Pharmacy & Labs)- Enabled real-time monitoring of infusion progress and stakeholder management, ensuring seamless coordination between labs and pharma partners.

✅ 85% reduction in manual processing time.
✅ Faster and more accurate PAP allocations.
✅ Enhanced compliance and data accuracy.
✅ Better tracking of treatment continuity and EMI recovery.

AI Driven Diabetic Retinopathy Screening in a High Volume Diabetology Setting

Integrate an AI-powered ECA-ResNet50 screening pilot module into a specialist Diabetology clinic to provide "point-of-care" retinal exams, ensuring every diabetic patient is screened for vision loss during their routine glucose monitoring visits.

Challenges

Patients frequently skip external eye clinic referrals, leading to late-stage diagnosis.

Non-ophthalmologists cannot manually grade fundus images with specialist accuracy.

No real-time correlation between glycemic data (HbA1c) and retinal health.

Standard AI often misses Mild DR (Grade 1), the critical window for lifestyle intervention.

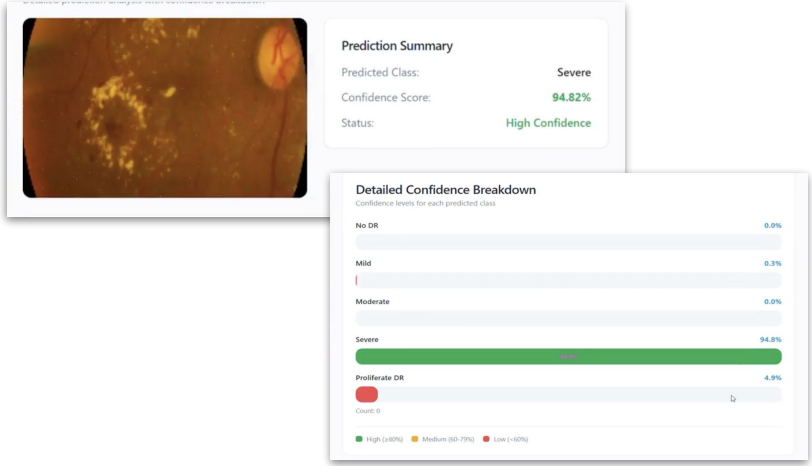
Integrated Solution

Leveraged Efficient Channel Attention (ECA) ResNet50 to boost sensitivity to microaneurysms, vascular changes often invisible to the human eye.

Optimized for portable, non-dilation cameras, allowing nurses to capture high quality images without blurring patient vision.

Automated referral trigger through instant reporting for Grade 2+ cases, automatically syncing data with a partner network of retinal surgeons.

Created a "Progression Score" by comparing historical scans, mapping how diabetes management impacts microvasculature over time.



✅ 100% screening rate

✅ The ECA module flagged the smallest lesions, preventing "hidden" disease progression.

✅ <30 second diagnosis

✅ Improved referral accuracy, ensuring only high-risk patients occupy specialist slots.

Automating Medical Document Digitisation via Intelligent OCR

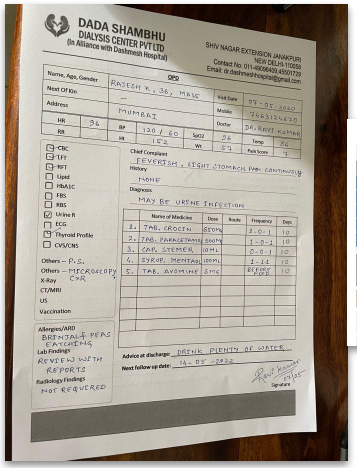
Digitise handwritten prescriptions and admission forms using an AI-driven extraction engine to eliminate manual entry and synchronise patient data directly into the EHR ecosystem.

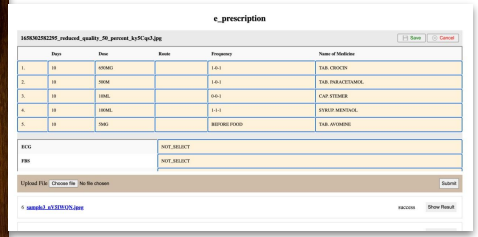
Challenges

Paper-heavy admission and prescription workflows delayed treatment and exhausted administrative staff.
High risk of clinical errors due to difficult-to-read handwriting and manual transcription slips. Physical forms remained "dark data," inaccessible for real-time clinical audits or insurance processing. Standard OCR failed to handle the diverse layouts of various hospital departments and external prescriptions.

Integrated Solution

Deployed a deep-learning OCR engine trained on medical lexicons to accurately transcribe both printed text and complex clinical handwriting.
Implemented a layout agnostic "Field-Mapper" that identifies critical data points (e.g: patient vitals, drug dosage) across any form format.
EHR Auto-Population. A high-speed verification interface flags low confidence characters for quick human approval, ensuring 100% data integrity.



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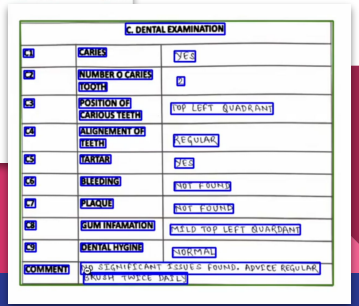


✅ 95% Extraction Accuracy ✅ Real-time Data Availability ✅ Digitised records became immediately searchable across OPD, IPD, and Billing departments.

Multi-Modality AI Diagnostic Suite for EU Market Expansion (ongoing)

Accelerating diagnostic precision for an EU-based healthcare provider through ongoing pilot development of deep learning models for skeletal and thoracic pathology.

Challenges

High difficulty in detecting Early Stage Osteoarthritis and Endometriosis via standard visual inspection, often leading to delayed treatment.
High volumes of Chest X-rays in emergency care is leading to diagnostic "misses" in high stakes conditions like Lung Cancer & TB. Need for a unified AI framework capable of processing diverse inputs.
Requirement for models to meet stringent EU MDR (Medical device regulation) and GDPR compliance for clinical pilots.

Integrated Solution

Developing pilot high resolution segmentation algorithms to detect joint space narrowing and subchondral changes for Early Osteoarthritis detection.

Constructing a multilabel chest X-ray classifier for TB, pneumonia, and lung cancer with integrated heat-map visualization for rapid radiologist review.

Training 3D CNNs for MRI based endometriosis detection and fine-tuning real-time computer vision for identifying lesions in laparoscopic imagery.

Implementing standardised DICOM processing with built-in de-identification protocols to ensure GDPR-compliant integration into European PACS systems.

Active model training and clinical validation on EU sourced datasets ongoing to ensure alignment with EU MDR Class IIa requirements.

AI for Predicting Customer Leakage in Healthcare from Audio Calls

Identify customers at risk of switching providers by analyzing conversation patterns in agent-customer calls within the healthcare sector.

Challenges

Rising customer churn due to service dissatisfaction or unclear communication

Manual QA missed subtle dissatisfaction signals during support calls

No consistent way to measure leakage risk from spoken conversations

Limited visibility into agent performance and tone effectiveness

Solution

Ingested and transcribed agent-customer call recordings

Applied AI for:

- Sentiment and emotion detection
- Tone mismatch identification
- Topic extraction and pain point mapping

Generated leakage risk scores per call and flagged at-risk accounts

Tracked common leakage drivers like billing confusion, follow-up delays, and unempathetic tone

✅ 3x improvement in identifying churn-prone customers

✅ Enabled targeted retention outreach by care teams

✅ Improved customer satisfaction and loyalty

✅ Enhanced coaching insights for contact center agents

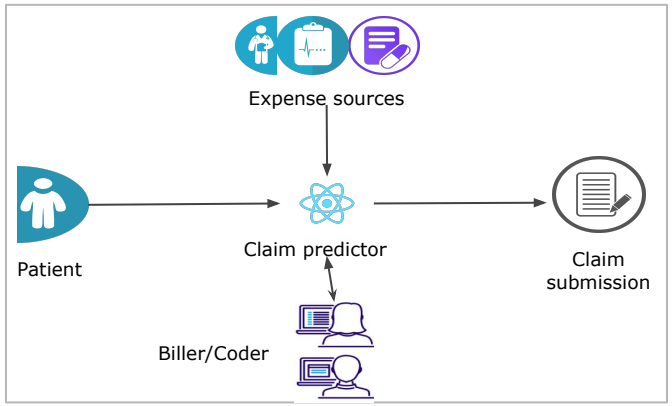
AI for In-Hospital Medical Claim Prediction

Improve hospital revenue integrity by predicting missing charges in medical claims before submission.

Challenges
Hospitals often miss charges for procedures, diagnostics, or devices due to incomplete documentation
Revenue leakage from under-billing and claim rejections
Manual review by coders was inconsistent and time-consuming

Solution
Built a predictive analytics system using historical coded data from patient care episodes
Applied NLP and ML models to identify likely missing charges
Developed a review interface for medical coders to validate and accept model suggestions
Integrated system into the claim submission workflow to ensure complete billing

Key Features
Predicts missing procedures, diagnostics, implants
Coders review suggestions before submission
Analytics dashboard for documentation improvement and revenue loss insights



✅ Significantly reduced revenue leakage

✅ Increased completeness of initial claims

✅ Boosted coder productivity and consistency

✅ Improved claim acceptance rates and cash flow

Pre-Natal Diagnostic SaaS Compliance Platform for Diagnostic Clinics

To develop a secure, cloud-based SaaS platform that simplifies and digitizes the entire PCPNDT Act compliance workflow for diagnostic clinics across India, improving regulatory adherence, data accuracy, and operational efficiency while supporting patient-centric data handling.

Challenges

Manual, paper-based PCPNDT compliance processes prone to error and delay
Lack of centralized digital records for audits and inspections
Complex state-wise regulatory variations
Operational delays due to fallback processes when online systems fail
Need for secure identity verification and consent capture

✅ Digitized, standardized processes aligned with PCPNDT regulations

✅ Reduced manual work, faster onboarding, and case processing

✅ Encrypted data handling and verifiable digital consent

✅ Centralized record-keeping with automated reporting and logs

✅ Designed for use across clinics in multiple states with local compliance support

Solution

Clinic & Staff Management- Multi-clinic support with role-based access (Admin, Doctor, Technician, etc)

Patient Lifecycle- Auto-recognition of returning patients, historical data retrieval

Form-F Management- Complete digitization, autofill, and printable versions for signatures.

Offline Support- State-specific fallback forms with auto-email to authorities

Document Verification: Secure uploads, categorized tagging, OCR, and Aadhaar-based verification via APIs Video KYC & Consent: In-clinic video module with timestamped storage and optional AI metadata tagging

On-screen signing or scanned upload for official records

Pre-defined, print-ready templates for all required forms

End-to-end encryption, audit logs, daily backups, 5-year retention

Real-time clinic and platform-level insights, exportable reports for audits

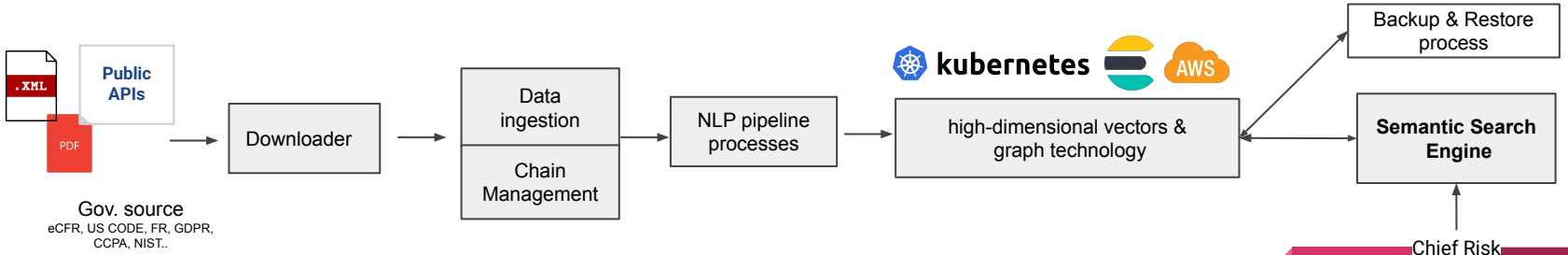
Alerts & Notifications- SMS OTPs, reminders for missing documents, pending actions.

AI Powered Semantic Search for Risk & Compliance

Stay ahead of US regulatory changes and ensure policy alignment with our advanced semantic search engine — built specifically for compliance and governance teams.

Challenges
Manual reviews were slow and error-prone
No visibility into legal update impact
Limited traceability between internal controls and regulations
Daily monitoring took days to complete
Complex and vast US regulatory landscape

Solution
Developed a multi-stage NLP pipeline to process regulatory updates into a local data lake
Enabled semantic search across GDPR, US CODE, eCFR, CCPA, etc.
Automatically detects similar obligations and maps them to internal policies
Generates alerts and impact reports for new or updated rules



✅ Faster regulatory compliance audits
✅ Reduced manual review effort
✅ Higher policy-to-law traceability
✅ Smart alerts for rule changes

Scientific Literature Search Engine Optimisation

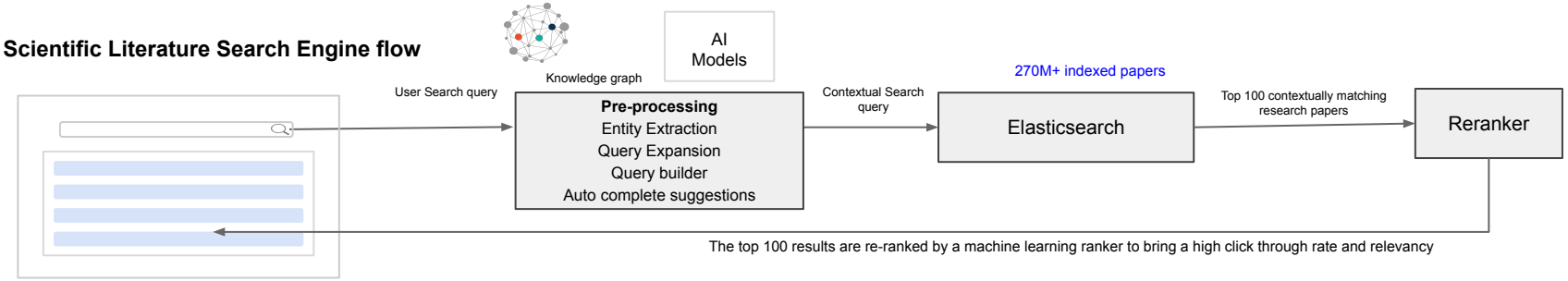
Improve the relevance and accuracy of search results in an AI-powered scientific research engine.

Challenges
Search results lacked contextual relevance
No semantic understanding of user queries
Low user engagement due to poor result quality
Difficulty ranking millions of research papers effectively

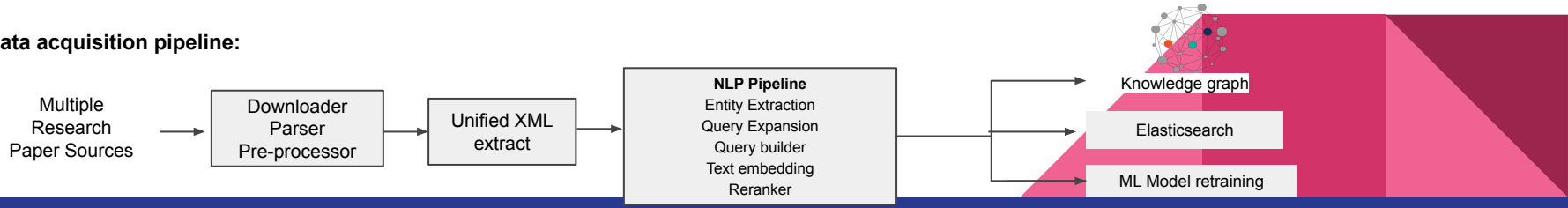
Solution
Integrated a domain-specific knowledge graph for better query understanding and expansion
Indexed 270M+ research papers with semantic embeddings (title + abstract)
Used 2 years of search logs to train a LightGBM re-ranking model
Implemented query auto-complete and contextual suggestions

✅ 65% increase in top result click-through rate
✅ Stronger semantic understanding of technical queries
✅ Improved relevance and ranking of research content
✅ Scalable indexing and continuous learning from user behavior

Scientific Literature Search Engine flow



Data acquisition pipeline:



GIS-Based Agritech Assistance for Crop Management and Insurance Verification

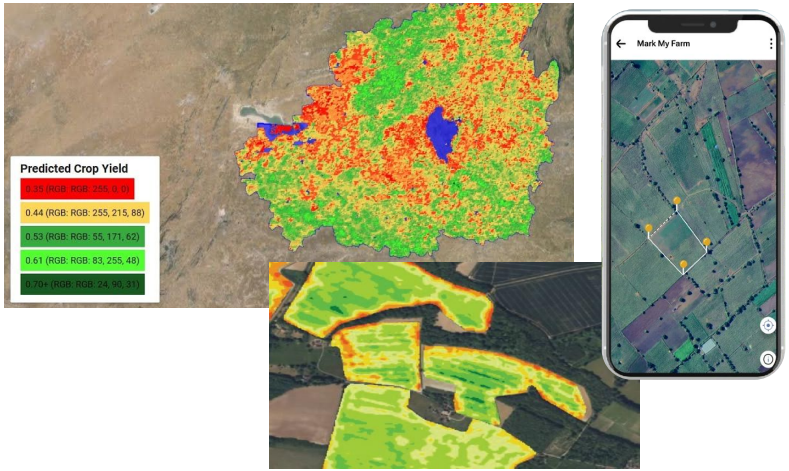
GIS powered agritech platform into an Indian state's agricultural ecosystem to provide real-time crop field mapping, yield estimation, insurance discrepancy detection, and historical season analysis, accessible via web portal & mobile app for farmers, cooperatives and insurance providers.

Challenges

Farmers and cooperatives lack accurate field boundaries and crop type data, leading to inefficient resource allocation.
Crop yield predictions are inconsistent, making planning for storage, sales, and subsidies difficult.
Insurance claims often fail due to mismatched reports between claimed losses and actual field conditions.
Manual data collection is slow, error-prone, and cannot scale to cover all fields.

Integrated Solution

Developed a GIS web portal and mobile app giving stakeholders real-time access to field-level crop data. Digitized crop field mapping using GIS layers, capturing exact field boundaries, crop types, and planting density. Built crop yield estimation models using historical GIS and satellite data combined with soil and planting patterns for accurate predictions. Created an Insurance Discrepancy Detection Module, leveraging satellite imagery and GIS layers to verify claims and identify mismatches between reported and actual field conditions.
Enabled historical season analysis, allowing stakeholders to estimate yields and field conditions for past seasons to support audits, scrutiny, and year-over-year comparison of crop performance.



- ✅ Complete digital mapping of crop fields
- ✅ Accurate per-field yield predictions
- ✅ 40% fewer insurance claim discrepancies via GIS
- ✅ Historical season data for claim verification
- ✅ Real-time access via web portal & mobile app
- ✅ Reduced manual errors, streamlined workflows

Mobile-Based Crop Disease Detection

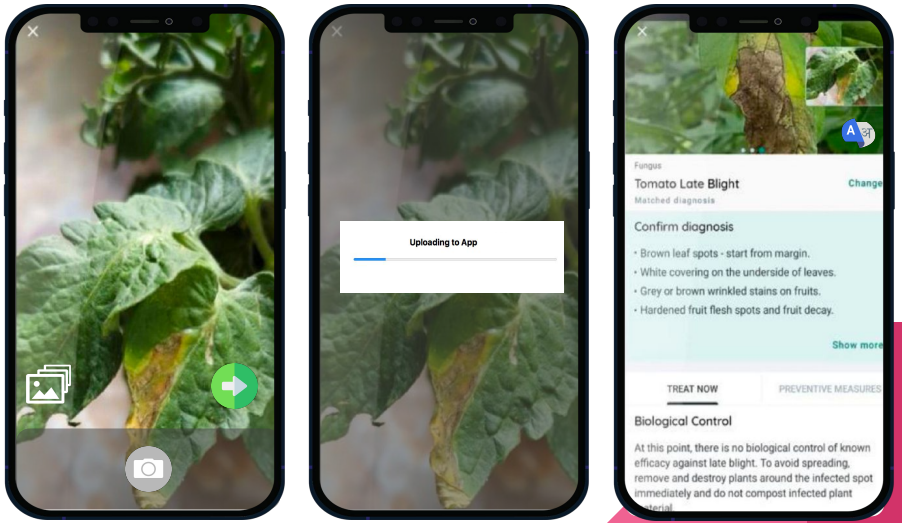
Build a fast, AI-powered tool for farmers to detect crop diseases via mobile devices.

Challenges
Manual disease identification was time-consuming and inaccurate
Diverse crop types and regional language needs
Need for fast deployment and offline usability

Solution
Developed a mobile-first Progressive Web App (PWA)
Trained AI models to detect diseases across 6 vegetable crop categories
Enabled photo upload for instant diagnosis
Added support for 20+ Indian regional languages
Built architecture for future video-based assessments

✅ App built and deployed in 3 months (~1500 hours)
✅ AI model retraining for new 5 crop types in just 1.5 weeks
✅ Farmers receive instant, image-based diagnostic reports
✅ Foundation for multilingual and real-time video diagnosis

1. Click photo
2. Upload for analysis
3. Receive detailed result



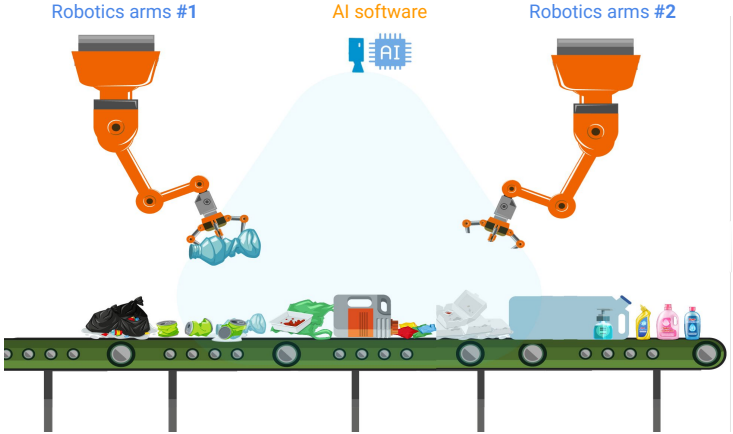
AI for Smart Waste Sorting

Automate the segregation of solid waste using AI and robotics to improve recycling efficiency.

Challenges
Manual sorting was inefficient and labor-intensive
High contamination in recyclable material streams
Need for continuous, high-throughput processing

Solution
Developed an AI-powered waste classification model
Integrated with robotic arms to physically separate materials
Enabled real-time identification of recyclable and non-recyclable items using computer vision
Built for scalable deployment to improve precision year over year

✅ Reduced dependency on manual labor
✅ Improved material recovery and sorting accuracy
✅ Foundation for scaling to nationwide waste management systems



1. **Search** with AI visions
2. **Grab** with Robotics Arms
3. **Separate** the commodities for recycling

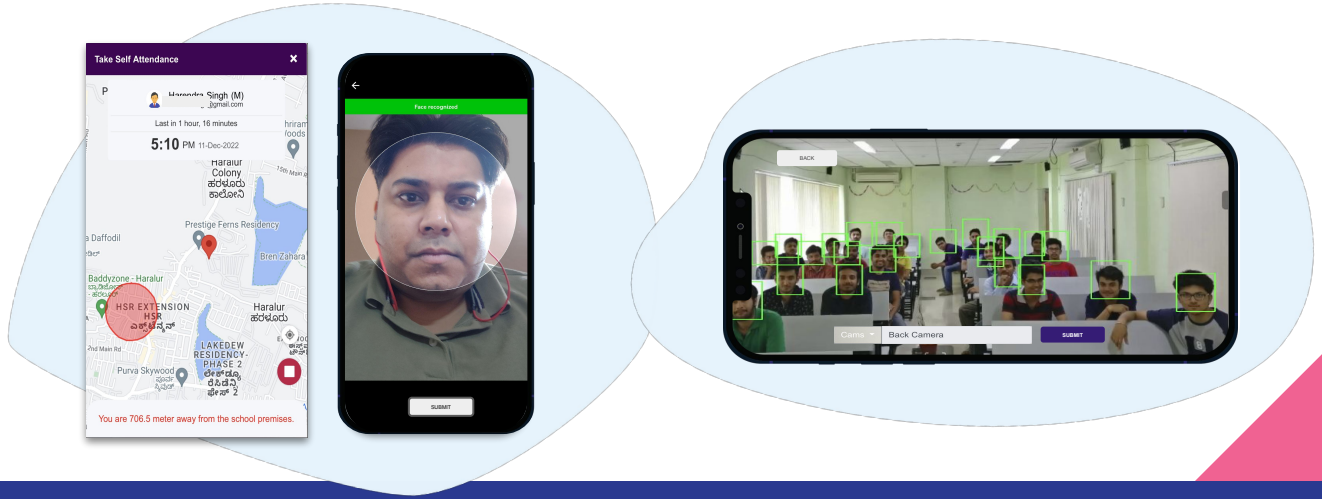
AI-Powered School Attendance with Face & Location Recognition

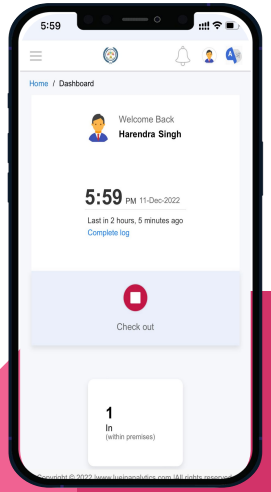
Automate school attendance using facial recognition and geo-tagging to reduce manual errors and fraud.

Challenges
Manual attendance was error-prone and easy to manipulate
Required a contactless, location-aware, scalable solution
Needed compatibility across diverse devices and networks

Solution
Built a lightweight face recognition system using deep learning
Integrated geo-location tracking to validate physical presence
Deployed as a mobile and desktop-responsive app
Scalable backend with REST APIs, Docker containers, and queuing system for high-load handling

✅ Successfully piloted in Anganwadis and student hostels
✅ Works on any internet-connected device with a 10MP+ camera
✅ Handles millions of simultaneous requests
✅ Reliable and fraud-proof attendance tracking





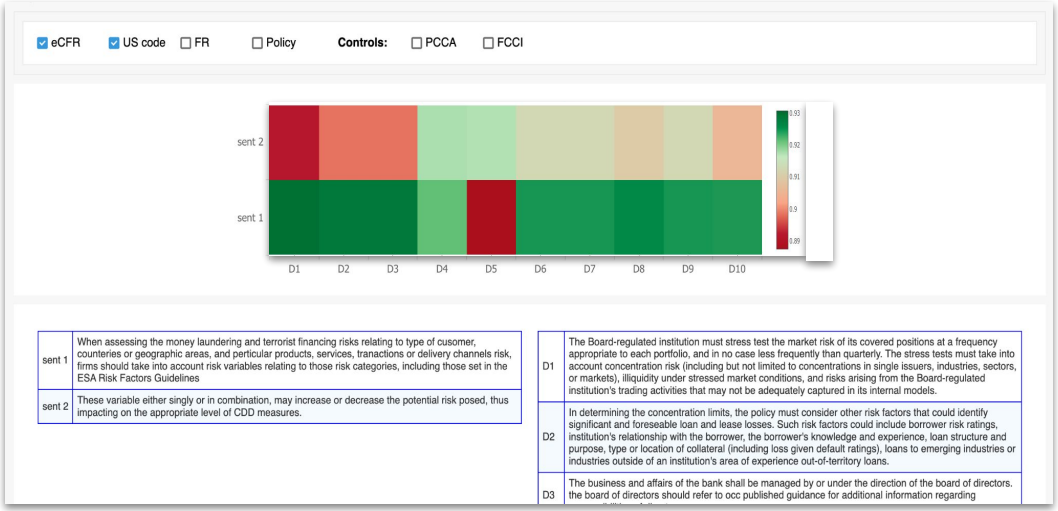
AI-Powered Compliance Traceability & Mapping

Help compliance teams trace internal policies against new regulatory requirements and generate structured obligations.

Challenges
Manual policy mapping was slow and inconsistent
Weak visibility into compliance gaps
High effort needed to track changes across departments

Solution
Built an AI engine to semantically match internal policies with regulatory requirements
Generated correlation scores to highlight weak or missing mappings
Created regulatory maps and auto-generated obligations
Implemented ETL flow to track internal rule changes over time

✅ Stronger compliance visibility across business units
✅ Faster identification of weak control areas
✅ Automated obligation generation with traceability
✅ Continuous change monitoring and audit readiness



Here in the example image, the input “Sent 1” requirements show a high similarity map against the available top matching internal rules. Whereas “Sent 2” ideally is a new requirement that has to be adapted internally to meet the compliance, as the existing top contextual matching rules have a huge gap.

AI for Complex Obligation Generation

Automatically generate clear and traceable business obligations by summarizing multiple regulatory rules and internal governance requirements.

Challenges
Manual obligation drafting was time-consuming and inconsistent
High risk of redundancy or loss of key regulatory intent
Needed traceability across diverse rules from multiple regulators

Solution
Developed an AI summarization pipeline to merge related obligations
Applied concept extraction, duplication removal, and chronology-aware binding
Used generative rewriting to produce clean, concise obligations
Compared variations for traceability and contextual coverage

✅ Accurate, high-confidence obligations with clear legal intent
✅ Reduced manual summarization effort
✅ Enabled peer review and cross-regulatory validation
✅ Strengthened compliance documentation quality

Rules	Domain	Agency	Law/Act	Product Class	Theme/Sub-Theme
Any transaction not specifically permitted in a special purpose acc Title 12 Part 1022 (Section 1022.43) https://demo1.phigrc.dev/ecf	Banking	CFPB	CFR Title..	Lending	CDD timing requirement Add/Change
Direct dispute notice contents. a dispute notice must include: this Title 12 Part 1022 (Section 1022.43) https://demo1.phigrc.dev/ecf	Banking	CFPB	CFR Title..	Insurance	CDD timing requirement Add/Change
Delivery against payment, payment against delivery, or a c.o.d. tra Title 12 Part 1022 (Section 1022.43) https://demo1.phigrc.dev/ecf	Banking	OCC	CFR Title..	Lending-Insurance	CDD timing requirement Add/Change
Margin means the amount of margin which a creditor would requ Title 12 Part 1022 (Section 1022.43) https://demo1.phigrc.dev/ecf	Banking	FRB	CFR Title..	Lending-Credit	CDD customer identity Add/Change
Buying or carrying any part of an investment contract security whi Title 12 Part 1022 (Section 1022.43) https://demo1.phigrc.dev/ecf	Banking	NCUA	CFR Title..	Investment	CDD customer identity Add/Change
"signed" means that the written attestation, declaration, or permi CCPA 1.0.999_301|u (CCPA|1.0.999_301|u)	Privacy	State of California	CCPA 301	Deposit-Now	CDD customer identity Add/Change

Category/topic/theme wise generated obligation response. Confidence score highlights the machine level prediction confidence in generating the best summary, including the intent and context of the selected rules.

Thems/Sub-Theme	Description	Confidence Score	Source	Related Rules	Jurisdiction
CDD timing requirement	Customer Due Diligence must be performed for occassional transactions which exceeded the following	95%	eCFR, GDPR	Title 12 Part 1022 (Section 1022.43) Title 12 Part 1022 (Section 1024.3) Title 12 Part 1022 (Section 1022.35)	USA
CDD customer identity	The bank is under the obligation to identify and verify the customer's identity on the basis of documents or	85%	eCFR	Title 12 Part 1022 (Section 1022.43) Title 12 Part 1022 (Section 1024.3) Title 12 Part 1022 (Section 1022.35)	USA

Automotive AI for Motor Insurance (Indonesia)

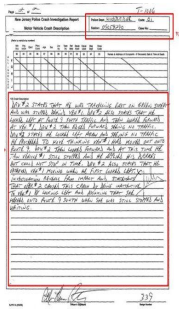
Modernize the insurance claim, underwriting, and inspection process using AI to reduce costs and manual effort.

Challenges
Manual KYC verification and claim processing slowed down workflows
Lack of automation in document handling and damage assessment
Inefficient inspection team scheduling and routing

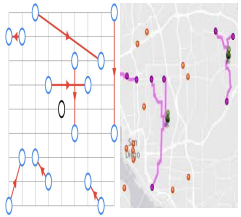
Solution
Deployed AI for KYC document verification system (Indonesia formats)
Digitized insurance documents using OCR and NLP
Built car orientation guidance via image recognition for 360° capture
Optimized field inspection routing using AI with time windows

✅ Faster and more accurate claim validation
✅ Reduced manual data entry and errors
✅ Efficient home inspection scheduling
✅ Enhanced customer satisfaction through automation

KYC verification Verify Indonesian and Indian KYC documentations.



Digitize scanned insurance documents



Home inspection Routing Problem with Time Windows

Dent and intensity of impact detection for repair cost evaluation

Digitize scanned insurance documents

Car orientation detection
Dynamically guide user to capture car 360 deg video

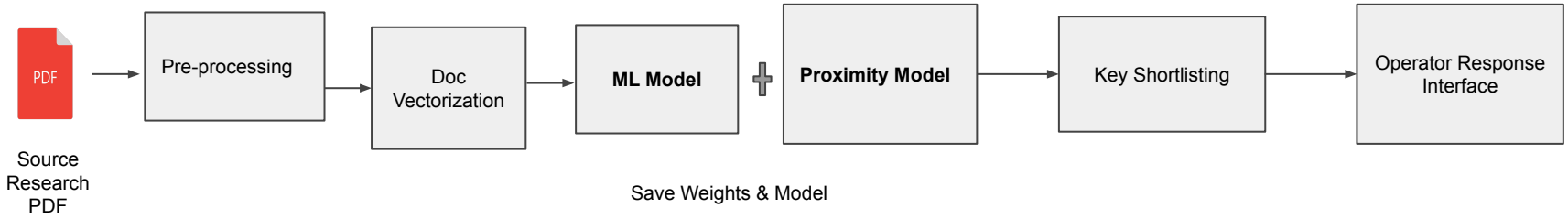
AI-Powered Biomedical Concept Extraction & Indexing

Automate the extraction and tagging of biomedical and chemical research content to reduce dependency on manual SME efforts.

Challenges
Manual concept indexing was slow, expensive, and inconsistent
Highly technical language and unstructured document formats
Needed scalable solution across 40+ academic areas

Solution
Used existing biomedical & chemical ontologies as base
Applied NLP pipelines for concept extraction, clustering, and filtering
Implemented heuristics and manual QA loop for refinement
Built an auto-indexing tool recommending 15–20 concepts per doc with high confidence

✅ 85%+ tagging accuracy
✅ Drastically reduced reliance on SMEs
✅ Scalable solution for large academic content sets
✅ Accelerated indexing across thousands of research papers



AI-Powered Customer Churn Prediction from Chats, Emails & Calls

Enable early detection of customer dissatisfaction and churn risk by analyzing unstructured communication data (chats, emails, and voice calls), allowing businesses to intervene proactively.

Challenges
Large volumes of chat transcripts, email threads, and call recordings were underutilized for customer insight
Existing systems lacked real-time monitoring of dissatisfaction indicators
Support teams were unable to detect hidden issues or emerging patterns until customers had already disengaged
Manual analysis was time-intensive, inconsistent, and non-scalable

✅ Early identification of churn-prone customers before final drop-off

✅ Enabled targeted retention campaigns based on conversation analytics

✅ Improved response quality and prioritization by the support team

✅ Strengthened customer loyalty and reduced churn rates

Solution
We developed a comprehensive NLP and speech analytics pipeline to transform unstructured communication into actionable insights:

1. Ingested historical chat logs, group support emails, call recordings, and feedback forms
2. Extracted frequently discussed topics, keywords, and problem areas
Applied sentiment analysis and emotion detection models to measure tone and urgency
Classified issues based on severity (low/medium/high) using contextual understanding
3. Matched extracted conversation topics with past churn data to identify early-warning patterns
Developed a churn risk scoring model based on multi-source interaction history
4. Built dashboards and alert systems to highlight at-risk users in real-time Helped support teams prioritize cases based on churn probability and issue severity

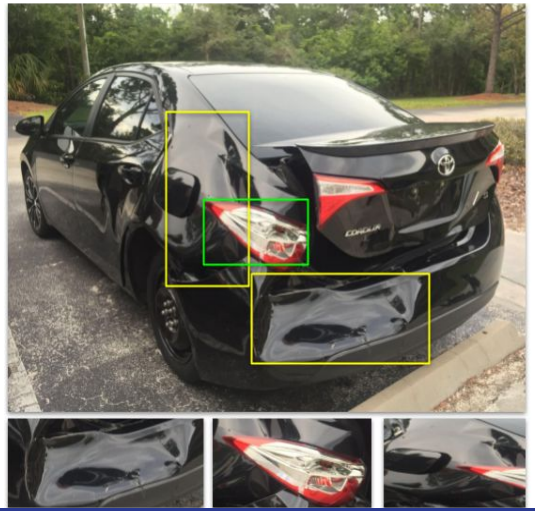
AI-Powered Car Insurance Claim Automation (India)

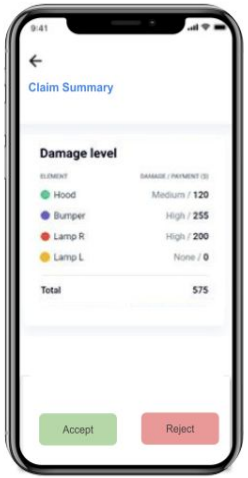
Automate the vehicle damage assessment and claim prediction process to accelerate insurance settlement and reduce manual errors.

Challenges
Manual review of car damage images was slow and subjective
High volume of claims created delays in assessment
Difficulty standardizing evaluations based on car model, plan, and location

Solution
Developed a computer vision model to analyze images of damaged vehicles
Used AI to identify damaged car parts, severity level, VIN, odometer, and license plate details
Built a prediction model to estimate the applicable claim amount using business rules and historical claim data
Integrated with the insurance portal to provide real-time claim recommendations to agents

Key Features
Damage severity scoring using CNN-based image processing
Smart field extraction for VIN, registration, and other identifiers
Final claim recommendation based on car specs, location, insurance plan





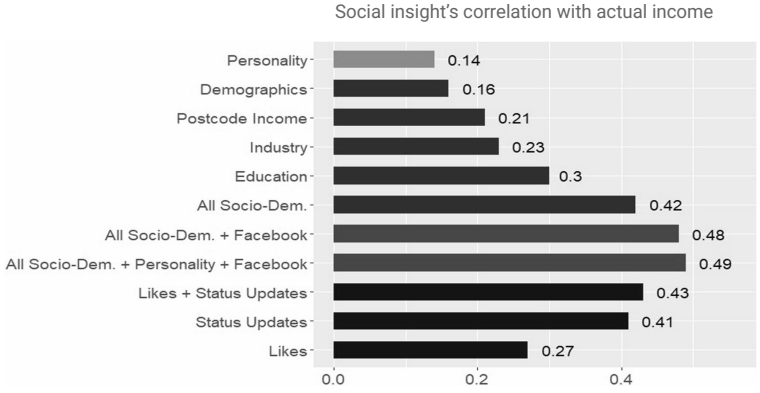
- ✅ Reduced claim processing time drastically
- ✅ Standardized damage assessments across agents
- ✅ Increased claim accuracy and customer satisfaction
- ✅ Laid foundation for fully automated claims in future

AI for Employee Retention & Salary Prediction

Predict employee salary and retention risk using a combination of resume data, salary history, and behavioral signals from social media.

Challenges
High employee churn with limited insight into retention triggers
Difficulty estimating market-aligned salary benchmarks
Lack of structured data on employee motivations and intent

Solution
Collected data from 500+ employees across startups, SMEs, and MNCs
Analyzed resumes, salaries, and social media activity (LinkedIn, Facebook, Instagram)
Extracted features such as location, education, job history, personality traits, and sentiment
Built models to predict: Estimated income range, Retention likelihood, and Engagement/intent signals from online behavior.



- ✅ Strong correlations between digital behavior and income brackets
- ✅ Identified key risk factors for attrition
- ✅ Enabled data-backed salary benchmarking
- ✅ Supported targeted retention strategies for at-risk employees

High income group
frequent words

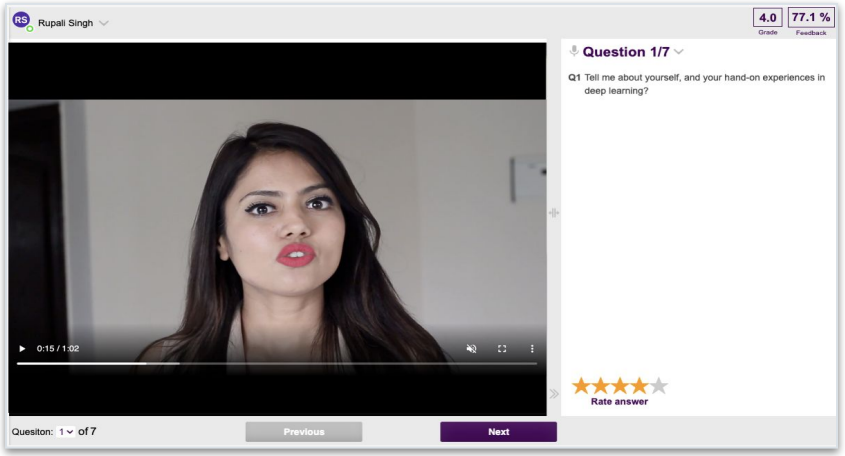
Low income group
frequent words

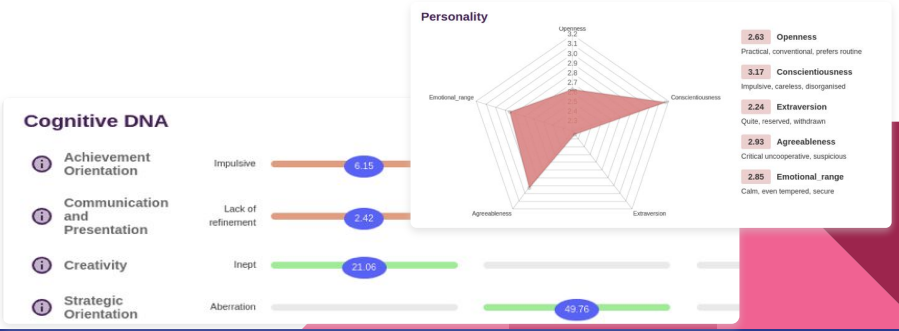
AI-Powered Video Hiring & Psychological Assessment

Modernize the hiring process with AI-driven video assessments that evaluate candidate's soft skills, personality, and behavioral traits at scale.

Challenges
Human bias in candidate evaluations
Inconsistent interview experiences
Lack of reliable behavioral and psychological insights
Manual hiring was time-consuming and error-prone

Solution
Built an AI-powered video hiring platform integrated with NLP, audio, and visual analytics
Enabled on-demand and live interviews with structured pre-assessments
Assessed candidates across dimensions like: Personality & communication style, Confidence & emotional tone, and Behavioral consistency & soft skills.
Provided intuitive dashboards for recruiters to review AI-evaluated candidates.





✅ Reduced hiring bias and improved fairness
✅ 60% faster shortlisting and evaluation cycle
✅ Scalable assessments across geographies
✅ Improved quality-of-hire with deeper candidate insights

Proxy Interview Detection Using Audio-Video AI

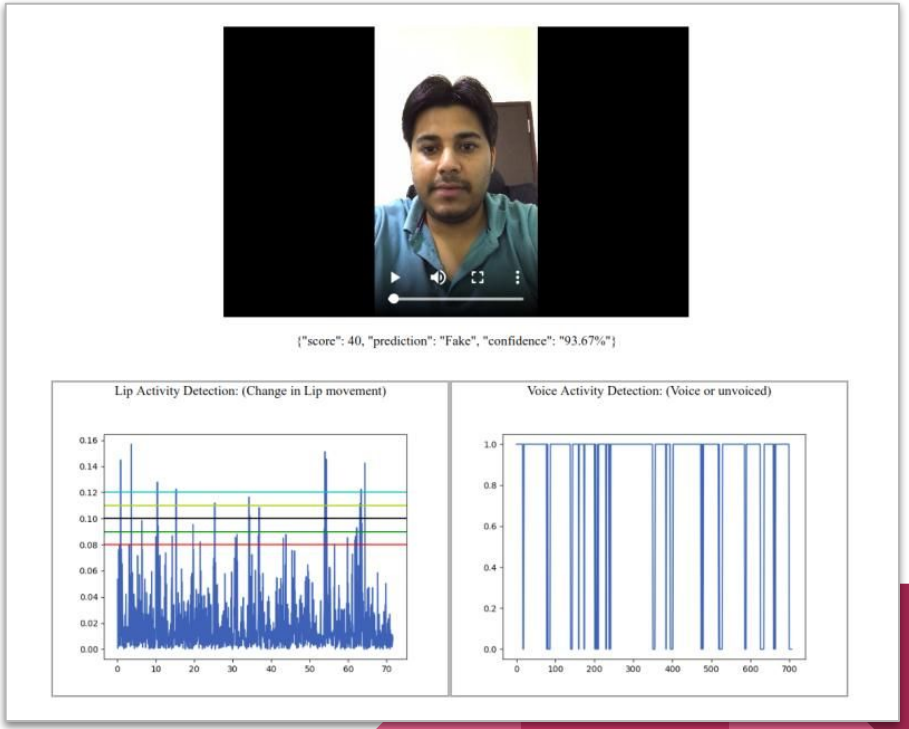
Prevent proxy interviews and fraudulent candidate submissions during remote hiring by detecting impersonation in real-time.

Challenges
Rising incidents of fake candidates during remote interviews
Manual detection was unreliable and inconsistent
Difficult to monitor both verbal and non-verbal cues at scale

Solution
Developed an AI system to detect proxies by analyzing:

- 2500+ facial movement markers
- Voice-lip synchronization
- Verbal and non-verbal behavioral patterns

Supported multilingual environments and both live (2-way) and on-demand (1-way) interview formats
Provided real-time alerts during interviews and flagged suspicious timestamps post-interview for review



✅ Significantly reduced proxy interview incidents
✅ Enhanced hiring integrity and candidate trustworthiness
✅ Successfully piloted by a leading Malaysian staffing agency
✅ Scalable solution adaptable to global hiring systems

AI for Optimized Logistic Packing (Grocery E-Commerce)

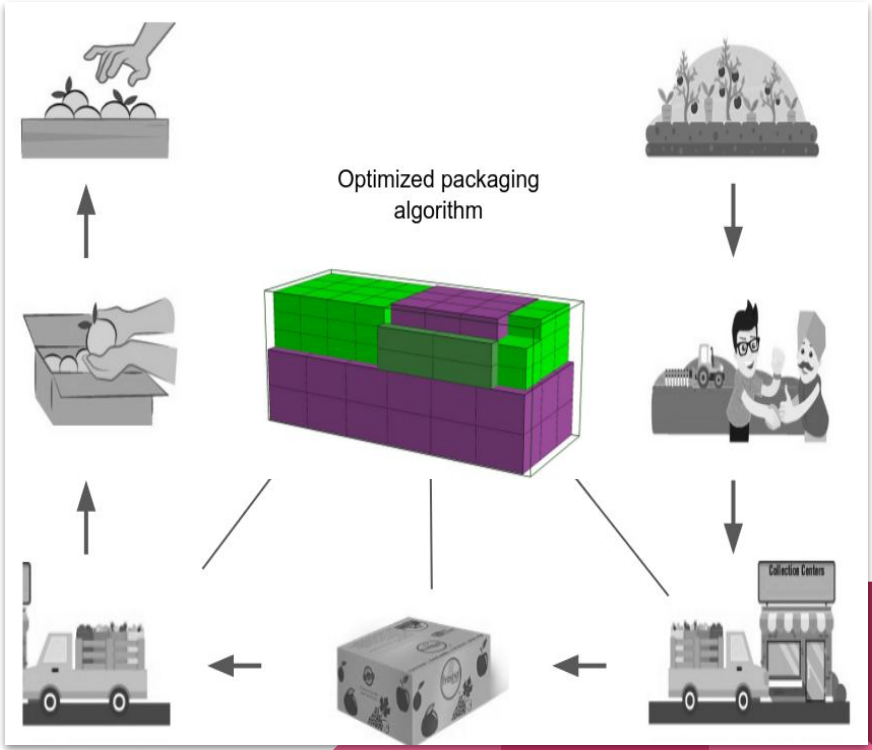
Improve packing efficiency and reduce shipping costs by selecting the optimal box for each grocery order using AI.

Challenges
Manual box selection led to inefficient packing
Increased shipping costs due to space wastage
Delays and customer dissatisfaction due to improper box sizing
Complexity in handling diverse product dimensions and combinations

Solution
Built an ensemble AI model combining:

- First Fit Descending (FFD) for efficient space utilization
- Knapsack algorithm to maximize value per box
- Bin Packing to minimize the number of boxes

Factored in product size, rotation, stacking rules, shipping cost, and operational ease
Designed a real-time decision engine integrated with the order management system



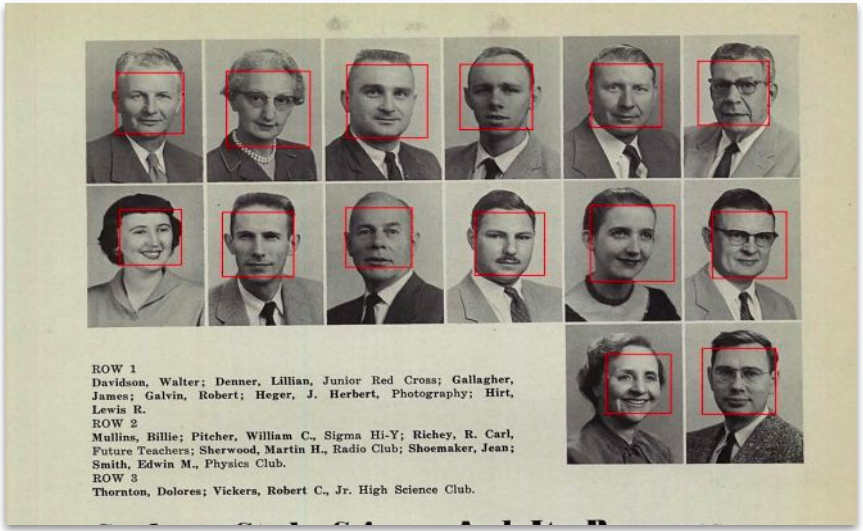
✅ ~7.5% reduction in average cost per order
✅ 12% increase in full-order delivery rates
✅ 12% improvement in on-time deliveries
✅ Enhanced packing speed and accuracy across warehouses

AI for Ancestry Data Mapping from Yearbook Images

Automate the extraction and association of faces and names from historic yearbooks to build a searchable ancestry database.

Challenges
Unstructured scanned yearbook images
Faces often appeared in groups with no direct text association
Manual tagging was slow and error-prone across decades of records
Needed scalable face-name linking with high accuracy

Solution
Developed a pipeline using face detection to extract individual faces from scanned group photos
Applied OCR and NLP techniques to extract and clean name data
Built a custom face-to-name mapping logic using layout clues, alias detection, and proximity analysis
Created a facial identity database that grows as more yearbooks are processed



Sample input image file

- ✅ Processed 45+ years of data from multiple countries
- ✅ Automatically extracted and mapped 1.2 billion in face-name pairs
- ✅ Scalable framework for expanding ancestry datasets
- ✅ Enabled advanced genealogy search for researchers and individuals

AI-Powered Recommendation System for Rejected Research Articles

Assist a major academic publisher (**Wiley publication**) in rescuing high potential articles that were rejected from one journal by recommending more suitable alternative journals within their ecosystem.

Challenges
Authors often submitted articles to the wrong journal/category, leading to rejection even when content was valuable
Editors lacked tools to reassign submissions intelligently within the publisher's network
Rejected articles often got lost, causing dissatisfaction among authors and revenue loss for the publisher
Manual matching across hundreds of journals and thousands of sub-categories was not scalable

✅ Reduced article loss by rerouting 40–50% of rejected papers to better-fit journals
✅ Improved author satisfaction and retention through actionable resubmission guidance
✅ Increased submission success rate within the journal ecosystem
✅ Saved editorial teams significant time in reassignment workflows

Solution
We developed an AI recommendation engine using natural language processing and deep learning to:

Build a Category-Specific Classifier -
- Collected a dataset of all published and rejected articles across journals and sub-categories
- Used document embeddings and over 300+ linguistic and thematic features to model content similarity

Document Matching Logic -
- For each rejected article, the model evaluated its semantic closeness to various journals and categories
- Applied dimensionality reduction and vector proximity matching to identify ideal fit

Top-5 Journal Recommendations
- Generated a ranked list of alternative journals with suggested category and subcategory paths
- Provided editorial teams with justification scores for each match to aid decision-making

AI for Sentiment-Based Chat Response Suggestions (Delivery Agents)

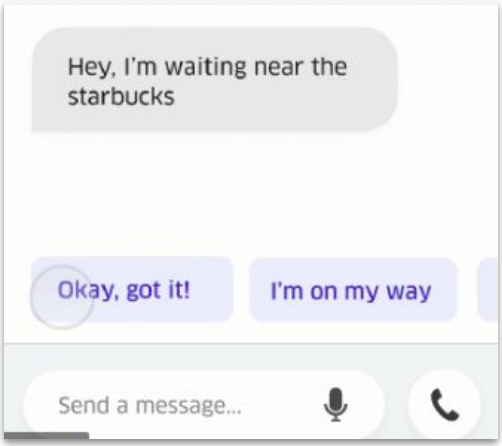
Assist delivery agents in responding to customer messages with context-aware, sentiment-aligned replies, reducing escalations and improving satisfaction.

Challenges
Delivery agents struggled to craft empathetic and appropriate responses under pressure
Inconsistent tone in chats often escalated customer frustration
Need for quick, personalized responses without training every agent in communication nuance
High volume of daily chats with limited supervision or quality control

Solution
Sentiment + intent detection on live customer chats
AI suggested pre-approved, polite replies tailored to:

- Customer mood (angry, anxious, neutral)
- Order context (delayed, delivered, wrong item)

Integrated into chat interface with top 3 ranked reply options
Supports multilingual use and editable suggestions



Reference : Uber & LinkedIn one click chat

✅ 60% faster average response time
✅ Significant drop in chat escalations
✅ Consistent brand tone in responses
✅ Easier onboarding of new and non-native agents

AI for Journal Content Summarization

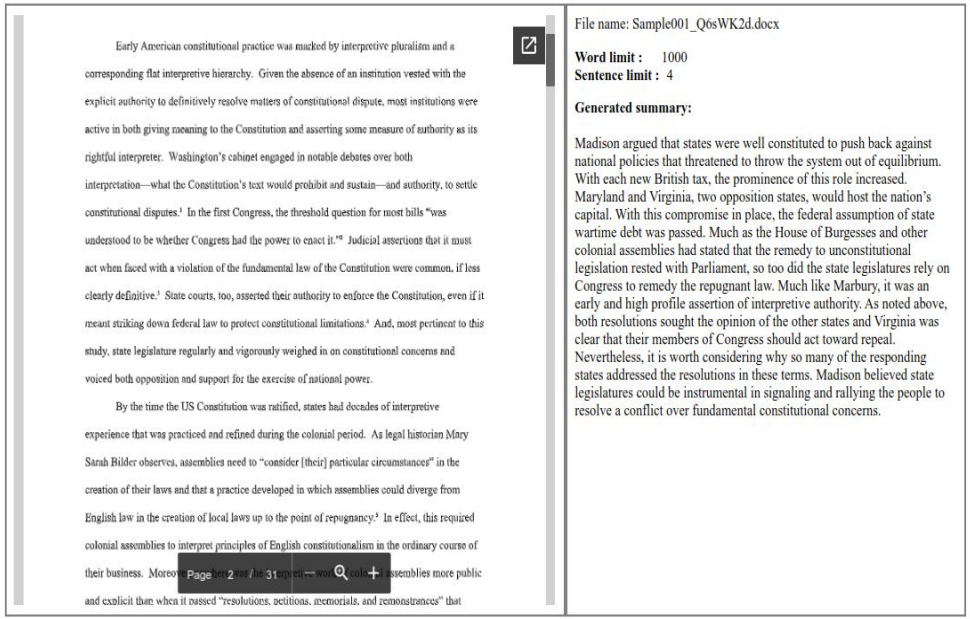
Automatically generate high-quality summaries for academic journal articles to boost discoverability and reader engagement.

Challenges
Articles were long, complex, and highly technical
Manual summarization was time-consuming and inconsistent
Needed to maintain scientific accuracy and author intent
Required language simplification for broader audiences

Solution
Built a domain-trained summarization model using transformer-based NLP
Summarized abstracts and full texts into:

- Short summaries (2–3 lines) for listings
- Medium summaries (5–7 lines) for previews

Tuned for tone, clarity, and terminology control
Applied scientific sentence ranking and redundancy reduction techniques



Academic book summarization result

✅ 70–80% automation of summary creation across journals
✅ Improved article click-through and readability
✅ Ensured consistency across disciplines and editors
✅ Scalable summarization across thousands of articles/month

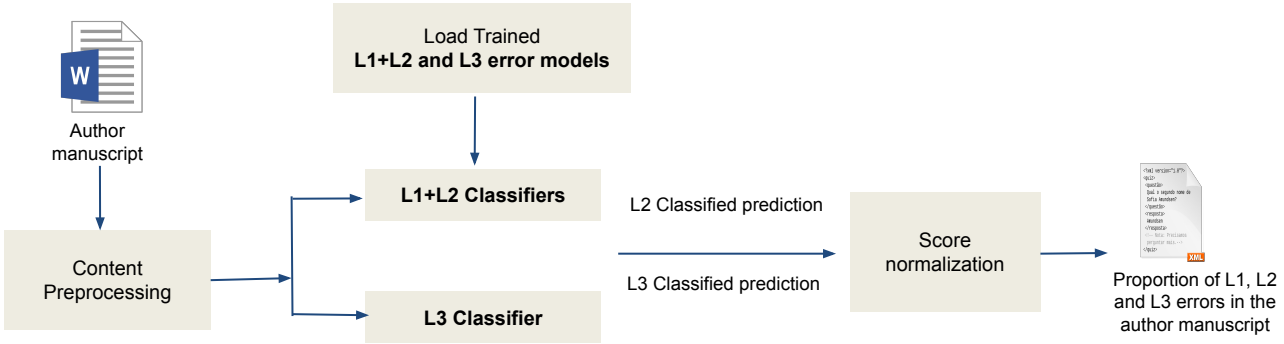
AI-Powered Language Assessment for English Proficiency

Automate spoken English assessment for learners by evaluating pronunciation, fluency, grammar, and confidence, with scoring aligned to global standards like CEFR.

Challenges
Manual language assessments were time-intensive and inconsistent
Existing tools lacked detailed feedback on pronunciation and fluency
Need for a scalable, bias-free solution across accents and geographies
Required alignment with international proficiency benchmarks

Solution
Built an AI tool for spoken English analysis using speech recognition and NLP
Evaluated audio responses on:
- Grammar, fluency, vocabulary, and pronunciation accuracy
- Detected hesitation, mispronunciation, and confidence level

Delivered automated scoring aligned with CEFR A1 to C2
Provided personalized feedback reports and improvement tips



✅ Consistent, unbiased language assessment at scale
✅ Enabled institutions to assess thousands of candidates simultaneously
✅ Reduced assessment turnaround time by 80%
✅ Boosted learner confidence with clear, actionable feedback

Multilingual Transfer Desk Agent

Automate customer support for travel transfer desks by enabling real-time, multilingual assistance across channels — with context-aware recommendations.

Challenges

Agents faced high ticket volumes in multiple languages

Frequent delays due to manual translation and response generation

Limited consistency in issue handling across regions

Difficulty capturing real-time intent and customer emotions

Solution

Built an AI assistant capable of understanding and responding in 20+ languages

Integrated speech-to-text, translation, and context-aware intent detection

Automatically suggested responses for:

- Flight rescheduling
- Hotel rebooking
- Travel disruptions and refund queries

Allowed agent override with editable suggestions and multilingual preview

✅ 65% reduction in agent response time

✅ Handled multilingual tickets without need for local translators

✅ Improved first-contact resolution and traveler satisfaction

✅ Consistent tone and policy adherence across regions

AI-Powered Email Classification for Enterprise Support

Automatically route and prioritize incoming emails by identifying category, intent, and urgency - improving resolution speed and team efficiency.

Challenges

High daily volume of incoming support and service emails

Manual triaging led to delays, misrouting, and backlogs

Lack of visibility into urgent vs. non-urgent communication

Needed support for multilingual content and ambiguous wording

Solution

Built a multi-layered email classification model using NLP and ML

Classified emails into categories like:

- Complaint, Feedback, Service Request, Escalation, Sales Inquiry

Detected urgency and sentiment for prioritization

Supported multilingual email processing with contextual understanding

Integrated into enterprise ticketing system with real-time routing rules

✅ 90%+ accuracy in email category classification

✅ Reduced first response time by 50%

✅ Streamlined email-to-ticket conversion with correct routing

✅ Better workload distribution across teams and faster resolutions

AI for Automated Call & Email Analysis in Investigations

Investigators manually sifted through thousands of calls and emails High risk of missing critical cues or misconduct patterns No automated way to correlate communications across channels Time-consuming keyword searches with low accuracy

Challenges

Deployed AI to analyze call transcripts and email threads using:

- Topic extraction
- Tone and sentiment shifts
- Anomaly and behavioral pattern detection

Correlated data across channels, timelines, and participants

Flagged interactions for potential fraud, abuse, or compliance breaches

Generated investigation-ready reports with evidence highlights

Solution

Built a multi-layered email classification model using NLP and ML

Classified emails into categories like:

- Complaint, Feedback, Service Request, Escalation, Sales Inquiry

Detected urgency and sentiment for prioritization

Supported multilingual email processing with contextual understanding

Integrated into enterprise ticketing system with real-time routing rules

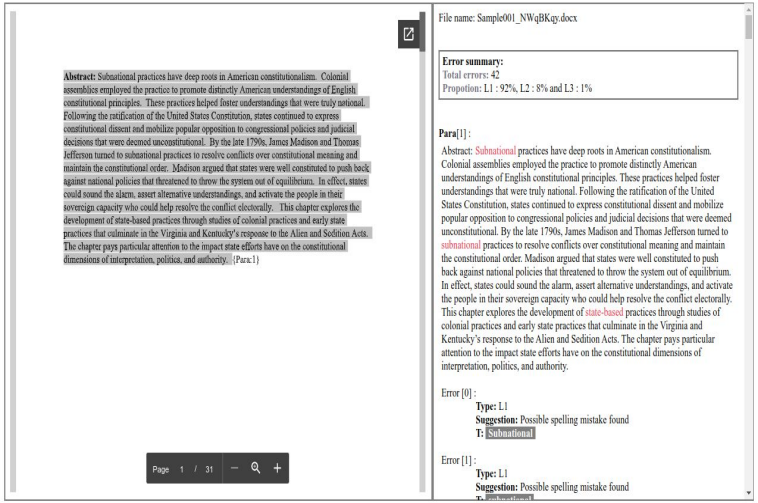
✅ 26% increase in agent compliance
✅ 66% reduction in quality monitoring costs
✅ 32% complaints reduction
✅ 86% collections revenue

AI-Powered Contextual Copy-Editing Tool (Grammarly Alternative)

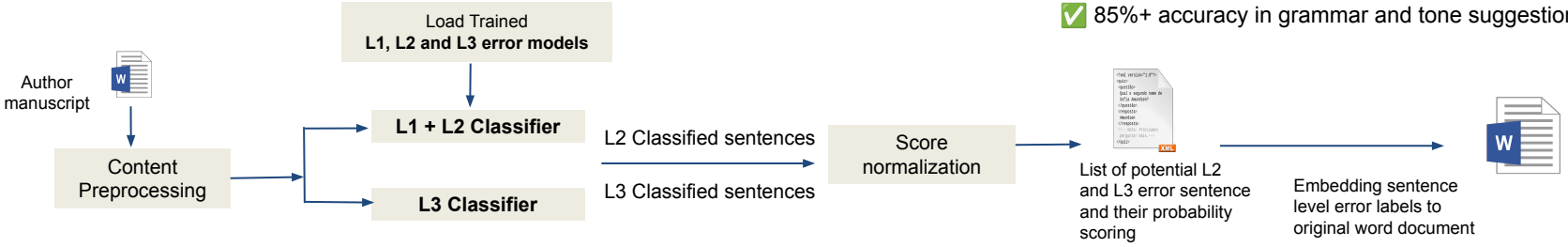
Develop a writing assistant that corrects grammar, enhances clarity, tone, and flow, tailored to professional and domain specific content.

Challenges
Standard grammar tools lacked contextual understanding
No support for domain-specific writing styles (e.g. legal, medical, academic)
Limited ability to suggest tone adjustments or structure improvements
Needed real-time feedback with user-friendly UI

Solution
Built a context-aware NLP engine for grammar, fluency, and tone correction
Evaluated text for: Grammar & punctuation Redundancy & sentence structure Tone (formal, neutral, persuasive) Domain relevance (custom vocabulary handling)
Used transformer-based models trained on domain-specific corpora
Offered rewrite suggestions, summary generation, and readability grading
Integrated into a real-time editor interface for user feedback and learning



✅ 85%+ accuracy in grammar and tone suggestions



AI for Affiliation & Reference Structuring in Academic Publishing

Automatically clean, parse, and structure author affiliations and references from academic manuscripts to match publishing standards.

Challenges
Author affiliations and references were submitted in unstructured, inconsistent formats
Manual editing was time-consuming and error-prone
Lack of standardization in institution names, country codes, and citation styles
High volume of manuscripts needing fast, accurate formatting

Solution
Built NLP pipelines for:

- Affiliation parsing (e.g. name, department, institution, country)
- Reference segmentation and citation type classification (journal, conference, book, etc)

Applied fuzzy matching and canonicalization for institution names using external databases
Structured outputs to match publishing schemas (e.g. JATS XML, Crossref formats)
Included tools for editors to review and override AI suggestions

Structured affiliations

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Structured references

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```

✅ 90%+ accuracy in affiliation and reference structuring
✅ Reduced manual editorial effort by 70%
✅ Improved consistency in published metadata
✅ Enabled large-scale processing of manuscript submissions

AI-Driven Call Auditing for Contact Center Experience Enhancement

Automate the auditing of customer support calls to assess service quality, detect friction points, and improve overall customer experience at scale.

Challenges

Only 1–3% of calls were audited manually due to time/resource constraints

Missed critical service issues, policy breaches, and agent behavior concerns

Inconsistent evaluation across QA teams

No unified view of customer sentiment trends

Solution

Built an AI-powered speech analytics system to automatically audit 100% of call recordings

Extracted and analyzed:

- Tone, sentiment, and emotion shifts Script adherence and compliance breaches
- Hold time, interruptions, escalation markers

Flagged calls needing human QA review with priority scores

Dashboard with CX insights, agent feedback, and trend tracking

✅ 30x increase in call coverage vs. manual audits

✅ Faster detection of negative experiences and compliance issues

✅ Improved agent performance through actionable feedback

✅ Measurable gains in customer satisfaction and loyalty

AI for Technology Scouting & Innovation Discovery

Help R&D and innovation teams discover emerging technologies, relevant startups, and academic breakthroughs aligned to their product roadmap.

Challenges

Manual scouting from patents, research, and startup ecosystems was time-consuming and incomplete

Difficult to track innovation trends across industries and domains

Needed a way to map technology potential to internal capabilities and goals

No unified system to rank and cluster opportunities

Solution

Ingested large-scale data from: Global patents, academic papers, funding databases, startup profiles

Applied NLP and graph algorithms to:

- Extract core technology concepts and use cases
- Cluster related innovations
- Score based on relevance, maturity, and market momentum

Delivered an interactive scouting dashboard with filters by sector, readiness level, and geography

Integrated with internal R&D pipelines for tech-to-product matching

✅ Identified 10x more relevant tech signals vs. manual scouting

✅ Accelerated partner discovery and research collaboration

✅ Enabled proactive innovation planning across business units

✅ Reduced scouting cycle time by 60%

Financial risk prediction from external web sources + internal transaction data

For a new product, RISK related to its release are not always know from internal process flow data, but even from an existing product reviews, competitor new product release announcement, negative company feedbacks/news, similar product release in market, all such factors plays a vital role in computing the final risk related with a new product release..

Challenge

1. Industry & product specific risk information are available all across the web (competitor website, public blogs, news platforms, product review websites, etc).
2. Manual extraction of ever changing financial or product related risk information is impossible

Solution

1. Use the industry relevant news and product review-source-platform urls for content crawling
2. Remove noisy and repetitive raw contents using core NLP based raw content scoring technique
3. Extract relevant entities (product SKU, brand, location, competitors reference), new topics, relevant product feedback/review statements and likes.
4. Structure individual url contents into a group, and pass it for risk assessment.
5. Record the potential risk factors, related custom score in data based for alter search.

✅ Potential product risk factors are now collected and populated to the company Chief-Risk Officer on daily basis.

✅ Reduced the risk related information extraction from 8-10- days to less than 1 hour.

Loan Fraud Detection via Call Behavior Analysis

Detect potential loan fraud and misrepresentation by analyzing customer behavior and sentiment during onboarding and support calls.

Challenges

Traditional fraud detection relied heavily on document checks, missing behavioral cues

Fraudulent intent was often masked in voice interactions

Manual call reviews were limited and ineffective at scale

High exposure to loan default risk due to undetected red flags

Solution

Ingested onboarding and verification calls from loan applicants

Applied AI to extract and analyze:

- Tone inconsistencies, hesitation, overconfidence
- Sentiment shifts across question types
- Speech-lip desync for potential impersonation (in video calls)

Created fraud risk scores based on behavioral markers and speech anomalies

Integrated with loan processing system to flag high-risk applicants for further review

✅ Identified 3x more fraud indicators missed by traditional checks

✅ Reduced loan approval time for genuine applicants

✅ Prevented high-risk disbursements before underwriting

✅ Strengthened fraud intelligence for banking compliance teams

AI for Automated Zoning & Searchable PDF Creation

Transform scanned, unstructured PDFs into searchable, structured, and navigable documents by auto-zoning text and extracting metadata for legal, academic, and regulatory use.

Challenges
Scanned documents lacked structure and were non-searchable
Manual zoning (e.g. title, sections, footnotes) was labor-intensive
OCR tools failed on complex layouts or multi-column formats
Metadata like page numbers, titles, section names were often missing or misaligned

Solution
Applied AI and computer vision for auto-zoning of PDFs:

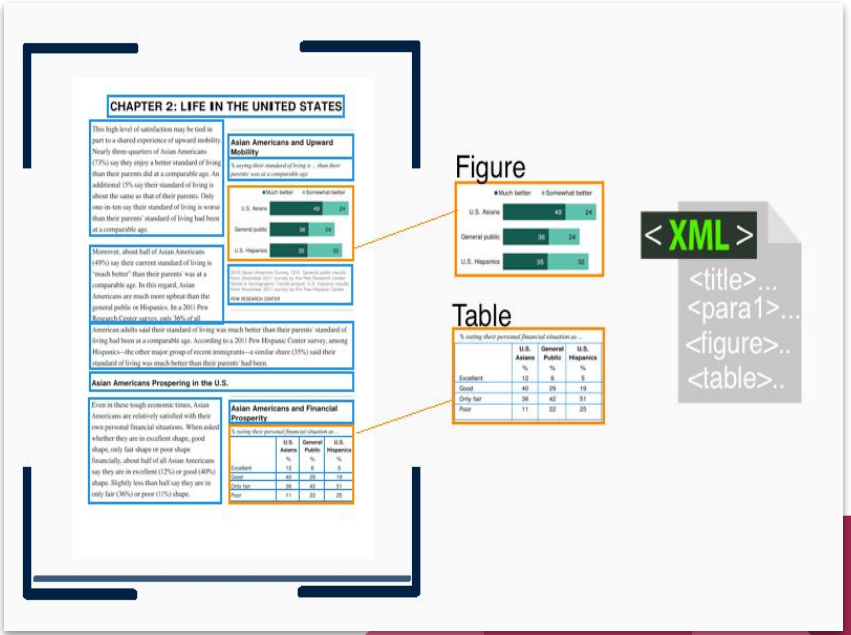
- Detected headers, footers, paragraphs, tables, and figures
- Handled multi-column and multilingual layouts

Combined with OCR + NLP for full text extraction and semantic labeling
Generated fully searchable PDFs with:

- Clickable sections
- Indexed terms
- Embedded metadata (title, author, tags)

Delivered an end-to-end pipeline for bulk document conversion

Auto sectioned sample PDF output



✅ 90%+ accuracy in zoning and text classification
✅ 70% time savings in manual document structuring
✅ Enabled search and retrieval for regulatory and academic use cases
✅ Scalable for processing thousands of PDFs per day

AI-Powered Auto Proofreading for Academic & Enterprise Publishing

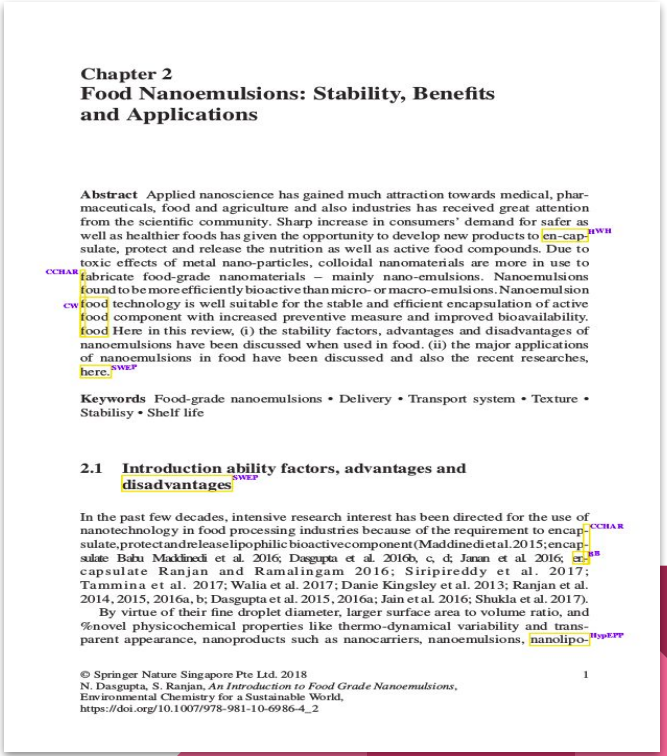
Automate proofreading to correct grammar, formatting, punctuation, and style errors in manuscripts, reports, and technical documents — at scale and with domain awareness.

Challenges
Manual proofreading was slow, costly, and error-prone
Editors struggled with consistency across high-volume content
Generic grammar tools lacked support for domain-specific terms
Formatting rules (e.g. citations, abbreviations) varied widely by publisher or client

Solution
Built an AI-based proofreading engine with:

- Grammar & punctuation correction
- Style and readability optimization
- Format standardization (capitalization, abbreviations, units, references)

Tuned for academic, legal, and scientific language using domain-trained models
Integrated feedback loop for continuous learning from editor overrides



Chapter 2
Food Nanoemulsions: Stability, Benefits and Applications

Abstract Applied nanoscience has gained much attraction towards medical, pharmaceuticals, food and agriculture and also industries has received great attention from the scientific community. Sharp increase in consumers' demand for safer as well as healthier foods has given the opportunity to develop new products to encapsulate, protect and release the nutrition as well as active food compounds. Due to toxic effects of metal nano-particles, colloidal nanomaterials are more in use to fabricate food-grade nanomaterials – mainly nano-emulsions. Nanoemulsions found to be more effectively bioactive than micro- or macro-emulsions. Nanoemulsion food technology is well suitable for the stable and efficient encapsulation of active food component with increased preventive measure and improved bioavailability. Here in this review, (i) the stability factors, advantages and disadvantages of nanoemulsions have been discussed when used in food. (ii) the major applications of nanoemulsions in food have been discussed and also the recent researches, here.

Keywords Food-grade nanoemulsions • Delivery • Transport system • Texture • Stabilisy • Shelf life

2.1 Introduction ability factors, advantages and disadvantages

In the past few decades, intensive research interest has been directed for the use of nanotechnology in food processing industries because of the requirement to encapsulate,protectandreleaselipophilic bioactivecomponent(Maddinedietal.2015;encapsulate Baku Maddinedi et al. 2016; Dasgupta et al. 2016b, c, d; Janan et al. 2016; encapsulate Ranjan and Ramalingam 2016; Siripireddy et al. 2017; Tammina et al. 2017; Walia et al. 2017; Danie Kingsley et al. 2013; Ranjan et al. 2014, 2015, 2016a, b; Dasgupta et al. 2015, 2016a; Jain et al. 2016; Shukla et al. 2017). By virtue of their fine droplet diameter, larger surface area to volume ratio, and %novel physicochemical properties like thermo-dynamical variability and transparent appearance, nanoproducts such as nanocarriers, nanoemulsions, nanolipo-

N. Dasgupta, S. Ranjan, *An Introduction to Food Grade Nanoemulsions*, Environmental Chemistry for a Sustainable World,
https://doi.org/10.1007/978-981-10-6986-4_2

✅ 85–90% accuracy across grammatical and stylistic errors
✅ Reduced proofreading time by up to 70%
✅ Ensured consistent tone and formatting across documents
✅ Scaled proofreading for thousands of pages per week

Automated Invoice Content Extraction

Extract key information from invoices of varying formats and layouts to enable automated processing, validation, and reconciliation.

Challenges

Invoices came in unstructured, inconsistent formats (scans, PDFs, images)

Manual data entry was time-consuming and error-prone

Traditional OCR failed on noisy layouts or multilingual content

Needed to capture both header data (vendor, dates) and line items (items, quantities, taxes)

Solution

Built a deep learning–based extraction engine combining:

- OCR + NLP + spatial layout models
- Header field extraction: Invoice #, Date, Vendor Name, Total
- Line-item parsing: Description, Quantity, Price, Tax, Discount

Handled multi-language invoices with robust error correction

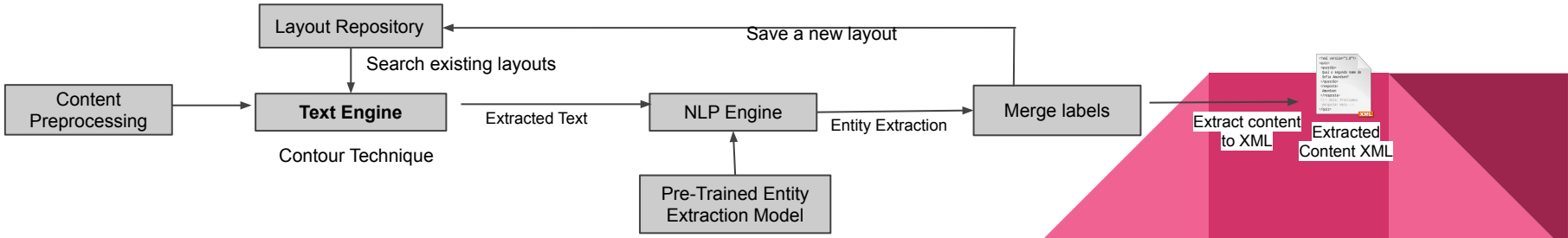
Output structured in JSON or XML for ERP/tax system integration

✅ 90%+ accuracy in field-level extraction

✅ Reduced manual invoice processing time by 80%

✅ Supported 1000s of templates and formats without rule rewriting

✅ Improved speed and accuracy of accounts payable automation



Smart OCR with Computer Vision & NLP

Extract structured data from complex, scanned documents by combining OCR with intelligent layout detection and contextual NLP understanding.

Challenges
Traditional OCR struggled with:

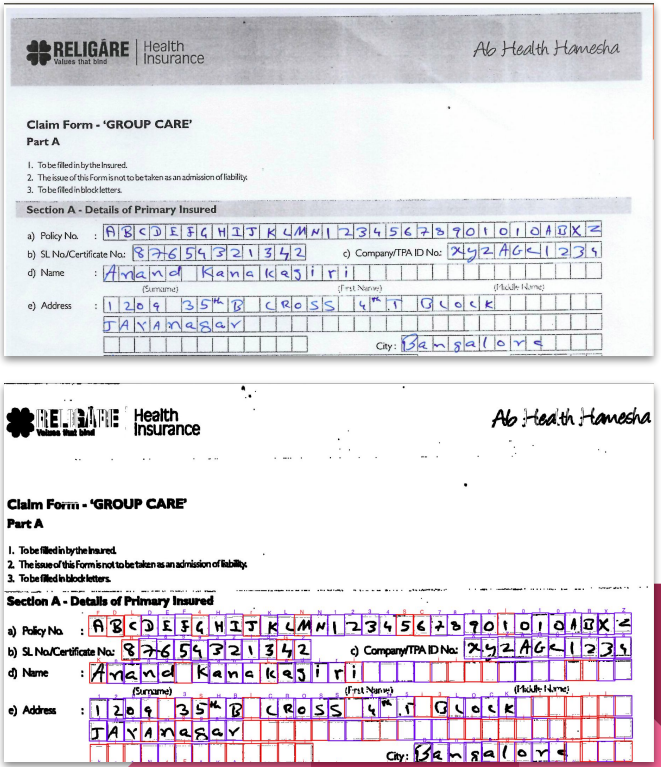
- Multi-column layouts, tables, handwritten text, and noisy scans

Difficult to map text to context (e.g. identifying which field a value belongs to)
Needed support for non-standard forms, multilingual content, and semantic understanding

Solution
Built a Smart OCR pipeline using:

- Computer Vision to detect zones: headers, tables, signatures, footnotes
- OCR to extract text from scanned PDFs/images
- NLP to semantically classify and label extracted text Entity recognition to tag items like names, dates, codes, and amounts

Designed to adapt to custom forms without retraining
Outputs mapped to structured formats like JSON, XML, or database rows



AI for Cross-Sell Opportunity Generation – UAE Insurance Firm

Identify personalized cross-sell opportunities across the insurance product portfolio by analyzing customer interactions and policy history.

Challenges

Limited visibility into customer intent from support conversations

Manual upsell attempts were generic and poorly timed

Data scattered across CRM, call logs, and policy records

Low conversion rates from traditional cross-sell campaigns

Solution

Analyzed customer call transcripts, email interactions, and policy data

Used NLP and behavioral scoring to detect:

- Customer needs and life events (e.g. new job, home purchase, health concerns)
- Unmet coverage gaps and complementary product fit

Generated cross-sell suggestions per customer (e.g. home + health, life + investment)

Integrated suggestions into CRM for agent visibility and campaign automation

✅ 45% increase in cross-sell offer acceptance

✅ Highly personalized offers with better timing and context

✅ Reduced customer fatigue from irrelevant pitches

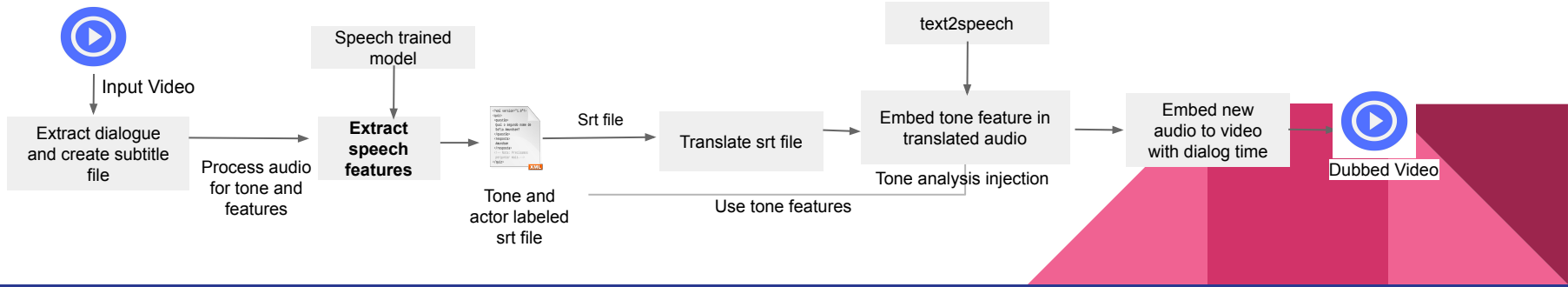
✅ Strengthened customer lifetime value and engagement

Auto-Dubbing 14000+ hours of tv series in multiple Asian languages

Automate solution for dubbing 14000+ hours US english archived tv series recordings into multiple Asian language (Vietnamese, Hindi, English, Russian, Indonesian, Tamil, Telugu and Bengali)

Solution

1. Video auto subtitleing.
2. Video emotion extraction (using emotionML).
3. Audio feature extraction.
4. Tone, pitch, intensity, analysis.
5. Subtitling translation to another language using 3rd party transcribe service.
6. Use text2speech library to convert translated text to another language speech.
6. Embed original tone intensity features from original audio to new audio, also embed video emotion features to make the final audio output look more realistic.
7. Embed new audio to original video file to generate dubbed video file.
8. Use minor manual modulation (if needed) to sync the final dialogue speed and timings



AI-Augmented Business Risk Monitoring for Lenders

To enhance credit risk assessment by incorporating real-time business sentiment and market signals alongside traditional financial data. This helps lenders make more informed decisions, detect early signs of distress, and reduce risk exposure.

Challenges

Over-reliance on historical and lagging indicators
Inability to capture current market sentiment or volatility
Delayed recognition of borrower distress

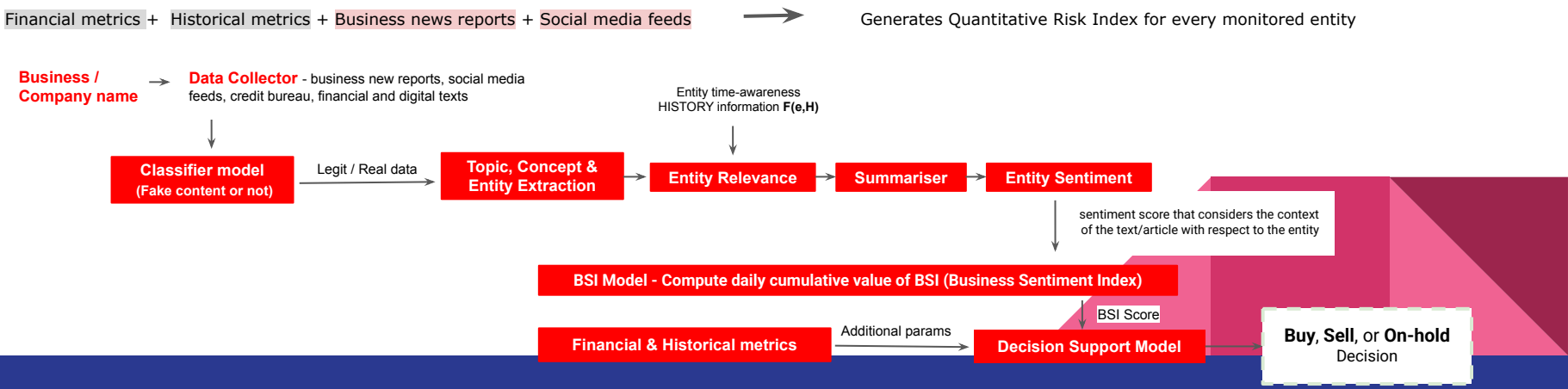
Solution

AI-driven financial early warning system Daily monitoring of:

- Social media (Twitter, Reddit)
- Business news, blogs, and reviews

Data inputs: Financial + historical + credit bureau + digital footprints
Outputs: Business sentiment and risk indices
Automated red-flag alerts

- ✅ Improved accuracy in credit risk forecasting
- ✅ Early detection of potential defaults
- ✅ Smarter, real-time lending decisions
- ✅ Minimized risk and financial loss



AI Powered Legacy Test Code Conversion for Semiconductor PCBs

Automate the conversion of legacy semiconductor PCB test code (e.g. LTX88) into modern programming languages (e.g. C++) using custom Large Language Models (LLMs), reducing manual engineering time and preserving functional integrity.

Challenges

Legacy test code written in outdated languages (e.g. LTX88) required manual rewriting, leading to delays and errors

Structural and functional understanding of legacy code was critical for safe migration

Needed to ensure backward compatibility and retain test intent

Lack of tooling for domain-specific language transformation

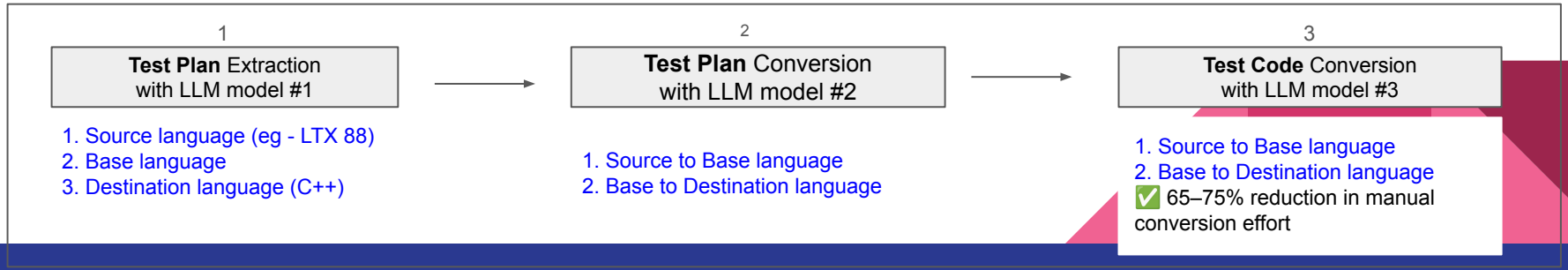
Solution

Developed a three-stage LLM-based pipeline for end-to-end code transformation:

Test Plan Extraction (LLM #1) - Extracted structured test plan logic from manuals and legacy code. Created a base intermediate format separating hardware sequences, timing, and logic

Test Plan Language Conversion (LLM #2) Translated plans from legacy format to C++-compatible plan language. Maintained intent and flow using domain-tuned transformation models

Test Code Generation (LLM #3) Auto-generated fully functional C++ test code Included unit-level validation and structural integrity checks. On-premise deployment ensured IP protection and data security. Patent registration in process by client for proprietary workflow



IC Specification Extraction via AI Chatbots

Automate extraction of specs from 50–1000 page semiconductor IC PDFs for faster engineering decisions.

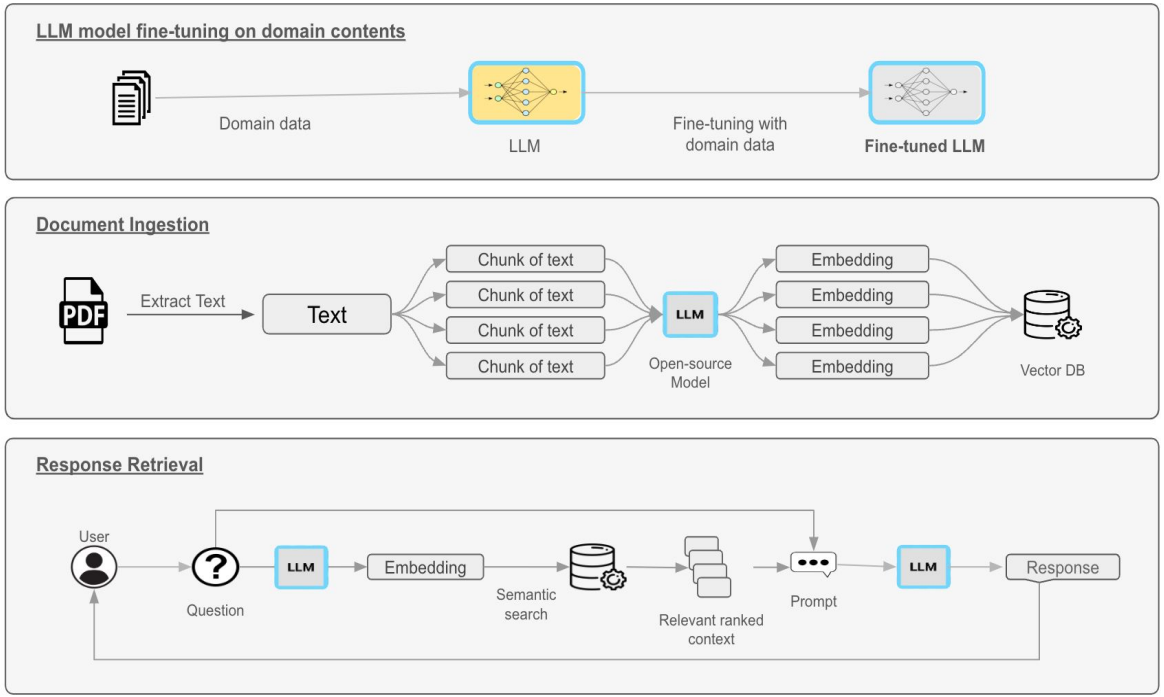
Challenge

Manual review was slow, error-prone, and required deep domain expertise to find relevant details buried in long documents.

Solution

On-premise LLM-powered chatbot
Fine-tuned on domain content
Extracts, summarizes, and structures data via semantic search + embeddings

- ✅ 80% faster spec extraction
- ✅ Reduced manual workload
- ✅ Accelerated IC design decisions



Automating PCB (Printed circuit board) routing with advanced AI architectures

Automate extraction of specs from 50–1000 page semiconductor IC PDFs for faster engineering decisions.

Challenges

Various PCB structures

Multiple layered routing

Variable numbers of inner bend points

Mimicking human learning

Following standard rules

Developing complex hidden machine learning algorithms

Solution

Built an ensemble model using:

- CNNs for spatial layout understanding
- RNNs for sequential trace prediction
- Transformers for capturing global dependencies
- Seq2Seq with attention for handling variable-length routing paths

Trained using manually traced PCB designs

Designed for multi-layer routing with strict no-intersection constraints

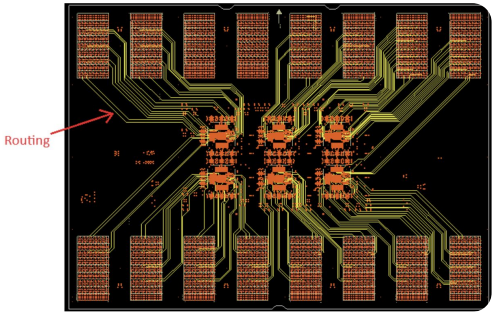
Product currently under patent registration

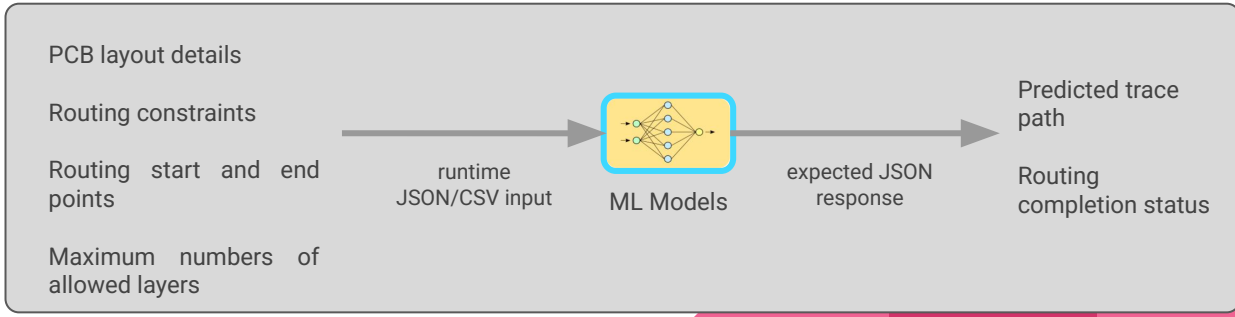
✅ Achieved near human routing accuracy across complex boards

✅ Reduced manual routing effort by over 70%

✅ Improved consistency and design rule compliance

✅ Scalable to various PCB layouts and IC test environments





Recognitions

13
Client Patent Assistance

18
Publications

20+
Workshops


Luein Analytics

recognized by siliconindia STARTUP CITY Magazine as

siliconindia STARTUP CITY 10 BEST AI STARTUPS 2021

The annual recognition of '10 Best AI Startups' not only signifies the prowess of the chosen company in rendering high quality AI solutions but also acknowledges the impact they are creating in the burgeoning marketplace.

Rachita Sharma
Special Editor
STARTUP

Luein Analytics:
Transforming Business Challenges into Tangible Outcomes

The economical unrest across the globe due to the Covid19 pandemic has affected different industries. Several businesses have gone through revenue hassles. It has impacted many product launches and marketing strategies to an extent that numerous industries and global businesses were compelled to either cease, halt or even shut their operations. Now, when businesses are trying to refurbish their existence across the globe, AI consulting service is helping companies to improve their business through artificial intelligence. It is an analytics technology that enables organizations to understand and automate processes and give efficiencies when one needs to manage the complexities of dynamic technological advances.

Luein Analytics established in 2017 is a next-generation AI consulting Services Company that helps organizations across diverse industries, make smarter decisions, implement and optimize Artificial Intelligence and analytics solutions. The real AI journey of Luein Analytics started way back in early 2014 in Bangalore, when founder Harendra Singh was working on Natural Language processing use cases. He realized at a very early stage that AI and process automation is going to be a big game-changer in the approaching days to solve real-time automation challenges. He gave independent AI consulting to multiple big and small companies till early 2017. Subsequently seeing a similar business challenge trend across diverse domains, he finally started Luein Analytics in May 2017. Later in June 2017, the firm signed up its first customer from the Philippines, and currently, it has delivered 100+ products & services with 36 satisfied customers to date.

Luein helps the customers maximize the power of their data to solve their most challenging tasks by combining industry expertise, leading cloud platforms, and data science "Around 50% of organizations named a shortage of data science talent as the primary barrier to realizing value from their big data technologies. We help those organizations with our unique solutions to unlock value, make real-time decisions and fill the talent gap at the early stage of AI adoption Journey by building a core scalable AI foundation in their organization" signifies Harendra Singh, Director and Founder at Luein Analytics.

The AI service offerings provided by the company can be broadly divided into three areas namely AI Opportunity Analysis, AI Strategy Consulting, and Custom AI Solution. The AI opportunity Analysis services assist the client find the lowest hanging fruits for AI-driven automation with clarity on the potential ROI and prepares them for future automation opportunities. Wherein, if the clients are don't have an idea to precede, the AI Strategy Consulting service aids to bring the clients' vision to life and move their AI agenda forward. Further, the Custom AI Solution is for the clients who want to get complex AI systems developed by experts. The firm starts with the business goals, followed by an analysis of the current technology stack, data availability, and more. The Luein Analytics team consists of some of the brightest minds in statistics, math, programming, and technology who are obsessed with how AI is defining the customer experience.

Moreover, Luein Analytics has grown multifold since its inception and further targets 3million USD in the current year. As the company has a service partner in Malaysia, it has foresighted to expand its presence in the country. Also, it is keenly looking forward to expanding its presence in the US, majorly in California, as most of the US-based clients that the company has worked with were purely from Silicon Valley and saw good traction coming out from there. Besides, Luein still aspires to stick with the same principle of adding more value to the clients.

4CRISK.ai

"Working with Luein Analytics on AI use cases was (and continues to be) an amazing experience. We worked closely with Luein Analytics to execute on our shared vision of trying to make customers successful through the adoption of AI that accelerates enhanced decision making around an ever-evolving risk and compliance landscape. They are extremely helpful and professional, they made everything so seamless for us, and we look forward to continuing the journey."

- Naveen Kumar T V, Managing Director, 4Crisk.ai Software Pvt Ltd

What clients says about us

"Working with Luein Analytics on AI use cases was (and continues to be) an amazing experience. We worked closely with Luein Analytics to execute on our shared vision of making customers successful through the adoption of AI that accelerates enhanced decision making around an ever evolving risk and compliance landscape. They are extremely helpful and professional, they made everything so seamless for us, and we look forward to continuing the journey."

- **Naveen Kumar TV (Managing Director, 4CRisk.ai)**

"Harendra Singh is a gifted enthusiastic social entrepreneur with a rare combination of patience, spunk, and research skills. Harendra is a AI strategy advisor to us for many products development in Artificial Intelligence (AI) and Data Science for APAC regions. I happily recommend him here on LinkedIn, and do so in person to my clients whenever I have the opportunity"

- **Srinivasan (Director, kamlaxglobal.com)**

Solving AI Challenges Swiftly and smartly

60+ in-house expert and profession

AI consultants across South-East Asia, California, UK

Our Team

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Kaustav
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Delhi, India

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Chief Advisor
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Dr. Navneet Agarwal
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AI Architect & Strategist
Greater Leicester Area, UK

Dr. Kirran Kandam
AI Psychology Practices
Ph.D. in Clinical Psychology

Sulabh
AI Architect & Strategist
Delhi, India

Vidit
AI Architect & Strategist
Bangalore, India

Awadhesh
AI Architect & Strategist
Bangalore, India

& 40 more....

We are a community of friendly, open-minded, collaborative and professionally growing people. Our team is made up of some of the brightest minds in statistics, math, data science, and, technology and we have obsessed with how AI is defining the customer experience.

Thank You

Contact us:

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