



RecoSense

# DocuSense

Intelligent Document Analyzer Engine



## Vision

Help Enterprises Achieve Accelerated **AI Transformation**

## Mission

Transforming Unstructured to Structured Data using NLP & Machine Learning

## In the News

- Nominated in IBC.org - RecoSense paper on “Context Definition For Human - Content - Machine Interaction”
- Spotlight in Economic Times - Predicting The Future
- Frost & Sullivan - India OTT New Product Innovation Award
- Asia Red Herring 100 Winner



6+  
Years



15 Mn+  
Data Points



30+  
Employees



20+  
Customers



20+ Bn  
API Calls



Canada  
India  
US

# RecoSense Offerings

## ENTERPRISE GRADE AI PLATFORMS

**1** | DocuSense -  
Document Analyzer Engine

**2** | Customer Data Platform –  
Unified Data Repository

**3** | Knowledge Graph IP



**Enterprise Data Intelligence Solutions**  
**Financial Services (BFSI), Healthcare / LifeScience**

- Accelerated Research
- Compliance Management
- Report Analyzer
- Critical Event Identification

**Digital Business Solutions**  
**Media, Telcos, E-Commerce, Travel**

- Search & Personalization
- Analytics
- 360 Degree User Insights
- Unified Data Repository

**Process Automation Solutions**  
**Transportation/Manufacturing**

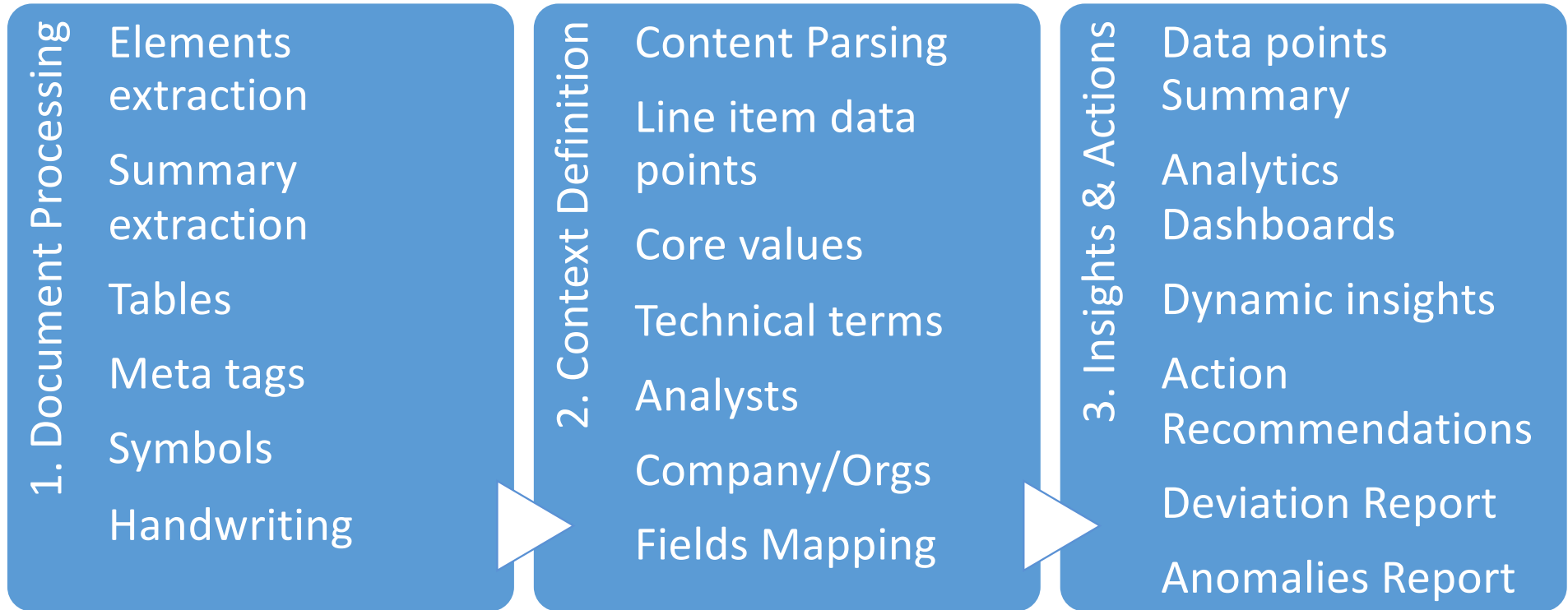
- Anomaly Detection
- MRO Automations
- Inventory Forecasting

# What makes it Intelligent?



- ✓ Key entity identification – Technical terms, People, Brands, Organizations, Events, Time Sensitivity, etc.
- ✓ Ability to differentiate topics within a domain Ex- Fund vs Cash or Part vs Component
- ✓ Taxonomy, Ontology, Pattern recognition and formation of meta-content
- ✓ Parse Structured and Unstructured Data
- ✓ Sentiment Analysis and Generation

# How do we do it?



# RecoSense Document Intelligence



- Ability to process any type of documents even handwritten and Images
- Domain-specific Contextual extractions and co-relations between key entities
- Data enrichment with the ability to read manuals, news sources, internal/external data sources, etc.
- Missing entities and fields validation
- Entries and Field formats validation
- Comparator engine for Compliance management
- Reporting mechanism

**DocSense**

GTN Limited

Pages: 24 Doc Type: Annual Report Doc Year: 2018

**Amortization**

Year	Core Value	Date In Text	Month In Date
2018	\$3,152 Thousand	Half Years Ended	31 December
2017	\$3,120 Thousand	Half Years Ended	31 December

**Quote**

Stock Name: TATA MOTORS LTD. TOTAL TRADED QUANTITY: Last Open: 495.95

Stock Price: In: Lac. TOTAL WEEK AVERAGE QUANTITY

Change: -8.00 Value: 11.66

**VendorX Lte Ptd**

**REPAIR ESTIMATE**

Our Reference: 6497063 / 5500548 Customer name:

Estimate N°: 200658178 Your repair order N°:

Unit received: Unit to be Released:

Description: LCDU,725 Description:

PN: C19298AF05 PN:

SN: C19298005959 SN:

Amendment(s): A;B;C Amendment(s):

**Technical Informations**

**Visual inspection:**

Visual inspection found satisfactory.

Pre-test: PPM defective - No image can be seen during power up.

**Repair actions to be performed**

To Quote:

1) (FC) Standard exchange of PPM PN#E24232BB02 to correct functional failure.

**Parts replaced:**

P/N	Description
E24232BB02-F9111	PCB_PPM

ACTION TAKEN	TECH	LAE/AH & DATE
REFER TO ATTACHED SNJC : MST-3A-568-2014 FOR WORK LOG ON RUBBER TOP AFT TIP FOUND DILMATING STRIKE.	XXX	16 SEP 14
RUBBER TIP : 321AT RE-INSTALLED AS PER AMM : 35-44-11-450-001-A	XXX	25 SEP 14
FORWARD REPAIRMAN OR AS PER AMM 20-28-00 CONTACT OUT FOUNO SALES PARTS.	XXX	29 SEP 14
APPLICATION OF SEALANT LIMIT.	XXX	09 OCT 14

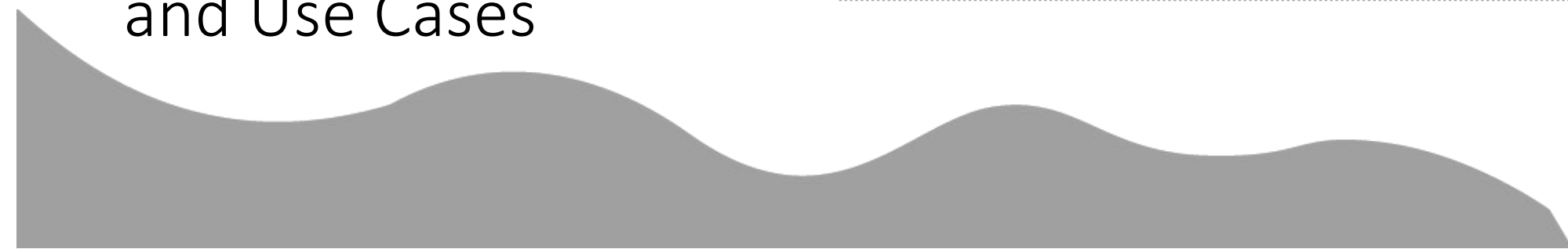
File Name	Quality
20501432RQH_Quot.pdf	Satisfactory
20501543RQH_Quot.pdf	Unsatisfactory
Repairquote-2.pdf	Satisfactory
20502646RQH_Rev1.pdf	Satisfactory

Key	Value	Type
AC REG	9V SHJ	Alphanumeric
AC TYPE	A350-900 Pax	Alphanumeric



## Domain-specific Document Intelligence and Use Cases

- 1 Financial Statement Analyzer
- 2 Property Assessment Mortgage Loan
- 3 Manufacturing Process Forms Analyzer
- 4 Pharma Safety Reports Analyzer



# 1. Financial Statement Analyzer



**Compliant with any Financial Report**

**Balance Sheet Annual Filings**

**Income Statement Sector Reports**

**Company Update Cashflow Statement**

**Analysts Reports 10K 10Q 8K**

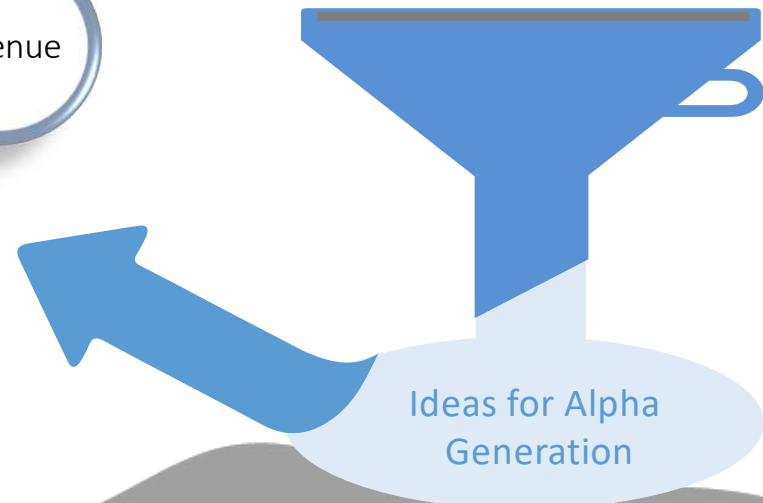
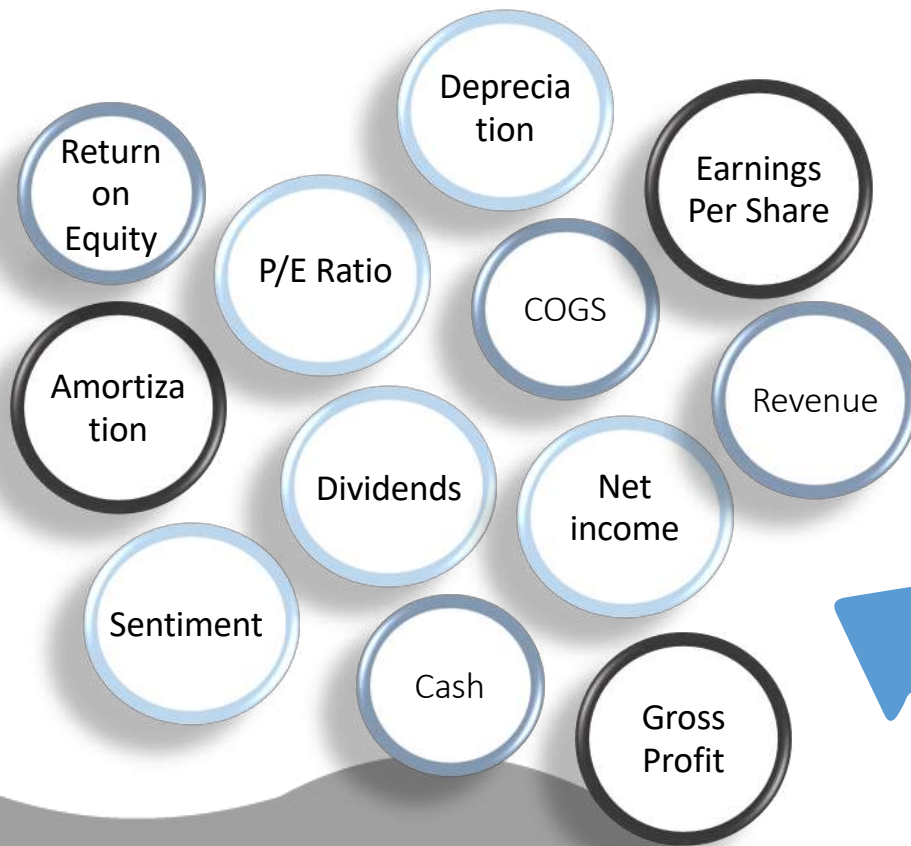
**Compliance Quarterly Filings**

**M&A Documents**

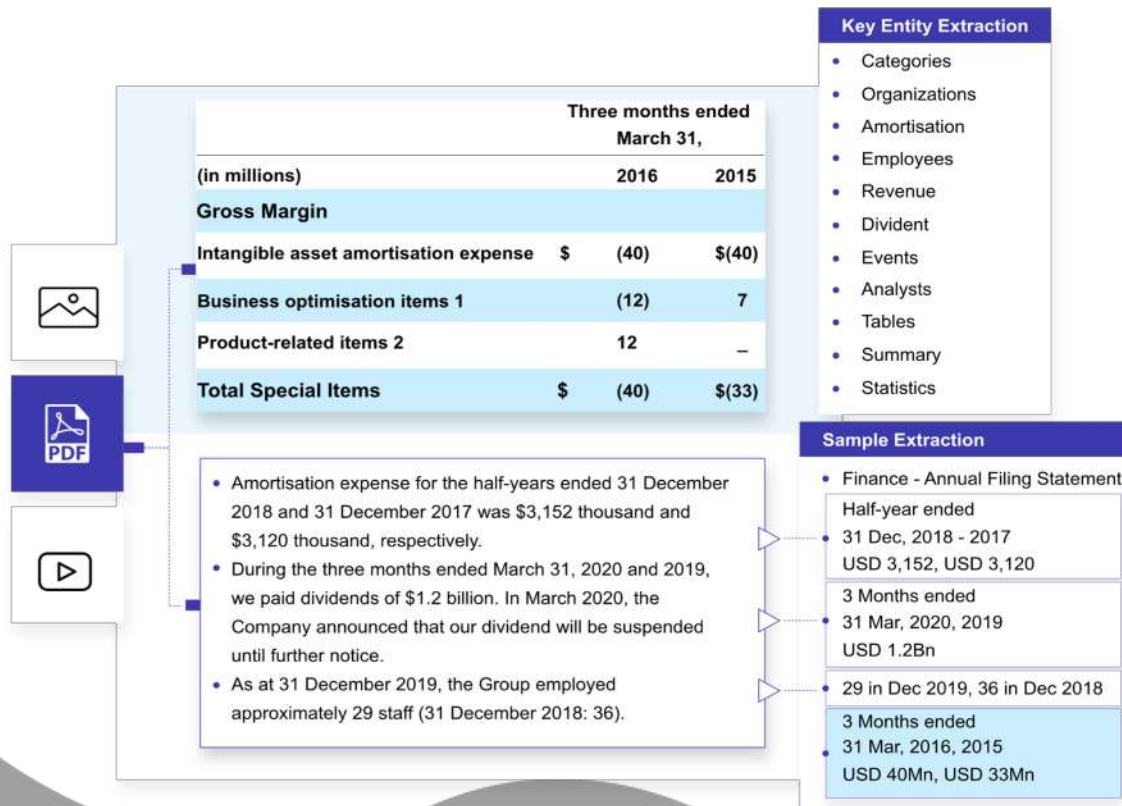




# Auto-extraction of Data Points



# Financial Intelligence End to End Work Flow

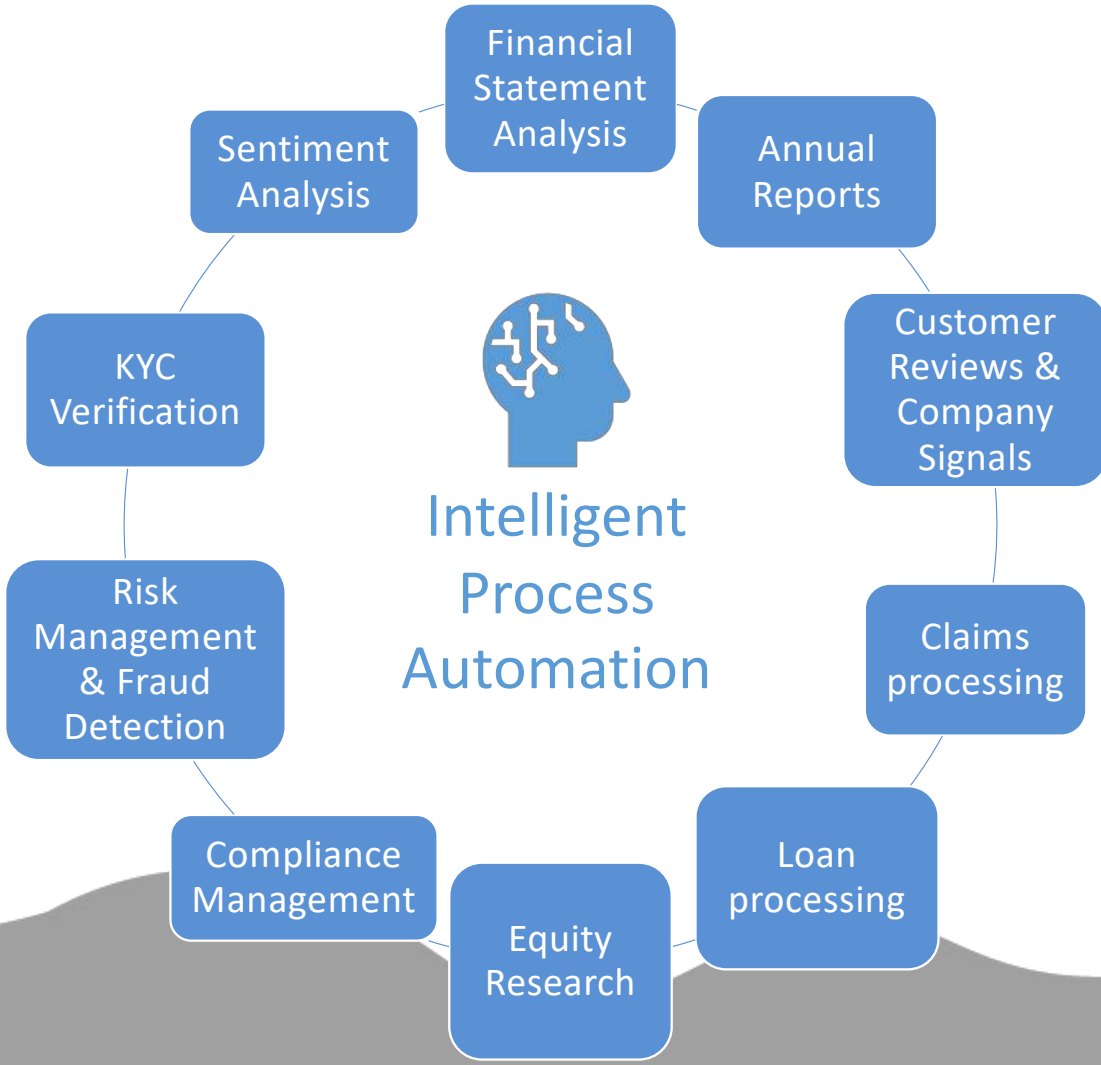


Our platform understands the context/intent behind the queries and a well-informed search results.

Extensible platform to auto extract and compute relations for:

- Data point to Data point
- Document to Document
- Content to Company
- Company to Sector

# Finance Use Cases



## 2. Property Assessment of Mortgage Loan



### Mortgage Documents

- Legal Documents
- Government Guidelines
- Property Documents
- Income Statements
- CIBIL
- Bank Statements
- Loan Documents

### Research & Insights

- Technical Assessment Reports
- Compliance Matrix
- Industry Data Guidelines
- Government Regulations
- Underwriter Values

# Transcode Loan Documents



- Readable PDF documents
- Use case-specific Legal entities extraction
- Verifiable entities with unique identifiers
- Integration with client tech eco-system

**MORTGAGE LOAN APPLICATION FORM**

Please fill in all the required details in BLOCK LETTERS. Tick  boxes as applicable. All Fields Mandatory

Application Form No. \_\_\_\_\_

Requested Loan Amount: \_\_\_\_\_ Tenure in Months: \_\_\_\_\_

Purpose of Loan: \_\_\_\_\_

Type of Loan Facility:  HL  CP  LAP-R  LAP-C  LRD Type of Loan: New  Refinance  Top-Up  Refinance+Top-Up

**Demographic Details - Individual** Applicant  Co-Applicant  Co-rentor

Name: \_\_\_\_\_

Father's/Husband's Name: \_\_\_\_\_

Mother's Maiden Name: \_\_\_\_\_

Gender:  M  F Marital Status:  Married  Single Residential Status:  Resident  NRI  PIO

Date of birth: \_\_\_\_\_ No of Dependants: \_\_\_\_\_ No of Children: \_\_\_\_\_

Religion:  Hindu  Muslim  Christian Others: \_\_\_\_\_

Caste:  SC  ST  OBC  General Others: \_\_\_\_\_

Education:  Under Graduate  Graduate  Past Graduate  Professional Others: \_\_\_\_\_

Pan No: \_\_\_\_\_ Voter ID: \_\_\_\_\_

Passport No: \_\_\_\_\_ UID No: \_\_\_\_\_ Others: \_\_\_\_\_

Current Residence Address: \_\_\_\_\_

Landmark: \_\_\_\_\_ City: \_\_\_\_\_ PIN: \_\_\_\_\_

Landline: \_\_\_\_\_ Mobile: \_\_\_\_\_ Email: \_\_\_\_\_

No of yrs at above address: \_\_\_\_\_ No of years at current city: \_\_\_\_\_ Residence Type:  Owned  Rented Others: \_\_\_\_\_

Permanent Address: \_\_\_\_\_

Landmark: \_\_\_\_\_ City: \_\_\_\_\_ PIN: \_\_\_\_\_

Landline: \_\_\_\_\_ Mobile: \_\_\_\_\_ Residence Type:  Owned  Rented Others: \_\_\_\_\_

**Key Entities**

- Symbols
- Names
- Vendor Details
- Metatags
- Date & Time

**Fields Mapping**

- Handwriting
- Text
- Stamps
- Visuals
- Signature
- Form Fields

RecoSense Document Analysis

Key	Value	Type
AC REG	9V SHJ	Alphanumeric
AC TYPE	A350-900 Pax	Alphanumeric
ACTIVITY	Inspection General	Alphabetical
CHECK	01926714	Numeric
DATE OF TASK	19 MAR 20	Date

# Loan Form Entities Extraction & Fields Mapping



Name: \_\_\_\_\_  
(First name) (Middle name) (Last name)

PAN/GIR No.: \_\_\_\_\_  
Date of Birth: \_\_\_\_\_  
(DD) (MM) (YYYY)

Age: \_\_\_\_\_ (years)  
Sex: \_\_\_\_\_ Male/Female

Marital Status:  
Single/Married/Divorced/Widowed

E-mail: \_\_\_\_\_

Employment status (tick mark):

- Salaried
- Self-employed
- Professional
- House wife
- Others

Changed Residence in past 3 years:  
Not Changed Once More than Once

**Present address:**  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_  
Pin code: \_\_\_\_\_  
Phone number: (O) \_\_\_\_\_ (R) \_\_\_\_\_  
Years in current address: \_\_\_\_\_  
Mobile phone no: \_\_\_\_\_  
Fax no: \_\_\_\_\_

**Permanent address:**  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_  
Pin code: \_\_\_\_\_  
Phone number: \_\_\_\_\_

**Previous address:**  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_  
Pin code: \_\_\_\_\_

**Loan Details Extraction**  
- Cost, Property type, plot details, area/size, purchase details, cost, market value, etc.

Income and expenses		
Primary monthly income	Other income details	Monthly expenditure
Gross income: _____	Rent received: _____	Loan repayment: _____
Deduction: _____	Agriculture: _____	Rent paid: _____
	Others: _____	Others: _____
	Description: _____	

**Salaried: Please tell about your work:**  
Employer name: \_\_\_\_\_  
Department: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_  
Country: \_\_\_\_\_  
Pin/Postal code: \_\_\_\_\_  
Phone no: \_\_\_\_\_ Extn No: \_\_\_\_\_  
Fax no: \_\_\_\_\_  
Company email: \_\_\_\_\_  
Designation: Executive/Managerial/Clerk  
Years with employer: \_\_\_\_\_  
Contact person: \_\_\_\_\_  
Name of previous employer: \_\_\_\_\_  
Retirement age: \_\_\_\_\_

**Self-employed/Professionals: Please tell about your work:**  
Name of company/firm: \_\_\_\_\_  
Activity: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_  
Country: \_\_\_\_\_  
Pin /Postal code: \_\_\_\_\_  
Phone no: \_\_\_\_\_ Extn No: \_\_\_\_\_  
Mobile No.: \_\_\_\_\_  
Fax no: \_\_\_\_\_  
Company email: \_\_\_\_\_  
Designation: Executive/Managerial/Professional  
If professional, then choose one of the following:  
Doctor Architect CA  
Engineer Lawyer Others: \_\_\_\_\_  
Years in business/profession: \_\_\_\_\_  
Contact person: \_\_\_\_\_

**Working with:**

- Govt./Public sector
- Public Ltd
- Private Ltd

**Applicant/Guarantor Details Extraction**  
- Name, demographics, address, employment, locations, etc.

**Proposed Loan Details:**

Loan Amount requested (Rs): \_\_\_\_\_

Tenure in Months: \_\_\_\_\_

Purpose: \_\_\_\_\_

**Details of immovable Properties offered as security for the Loan**

**Nature of the property (mark ✓ )**

<input type="checkbox"/> Residential Building	<input type="checkbox"/> Commercial Building
<input type="checkbox"/> Plot of Land	<input type="checkbox"/> Godown <input type="checkbox"/> Others (specify) _____
<input type="radio"/> Rented	<input type="radio"/> Self occupied
<input type="checkbox"/> Purchased	<input type="checkbox"/> Inherited

If a Plot of Land, whether it is purchased from any Development authorities: Yes / No / Not applicable  
If yes, Name of the Development Authority: \_\_\_\_\_  
**Location:** Survey / House No. \_\_\_\_\_  
Street / locality \_\_\_\_\_  
Village/ Town \_\_\_\_\_  
Dist: \_\_\_\_\_ State: \_\_\_\_\_  
**Property in whose name?:** \_\_\_\_\_  
**Area / Size of the property:** \_\_\_\_\_  
**Date of Purchase/acquiring:** \_\_\_\_\_  
**Cost (at the time of purchase):** Rs. \_\_\_\_\_  
**Present estimated market value:** Rs. \_\_\_\_\_  
**Whether encumbered:** \_\_\_\_\_

**Financial/Income Entities Extraction**  
- Bank details, salary, expenses, property cost, plot cost, employment/business details, outstanding loans, Credit card, etc.

# Banking and NBFC Use Cases

- Loan Process Automation
- Transcode Legal Documents
- Document Analysis
- Central Data Platform
- Fraud detection for NBFC
- Automating Technical Valuation

Property Assessment  
for Mortgage Loans



- Compliance Monitoring
- Customer Analytics
- Sentiment Analysis
- Enterprise Data Search
- Predictive Analytics

Other Use Cases



# Case Study – Financial Statement Analyzer



- Global leader in financial content services as our customer in partnership with Refinitiv.
- Legal, Tax, and Accounting industry services providing trusted insights.

**REFINITIV**



## Problems

1. Lack of a system to automate financial document analyses
2. Lack of a system to build context and auto-classify documents based on key financial concepts
3. Lack of a system to auto identify key concepts from multi-page PDF documents
4. Lack of a system to auto-extract data fields/core values accurately

## RecoSense Solution

1. Automated Financial Statement Analyzer
2. Cognitive engine to build context around any type of financial documents
3. ML module to identify and highlight the right summary sentence in the PDF for specific financial concepts
4. Meta engine to map and extract core values for identified concepts
5. Simplified User interface for insights, actions, and reporting

## Impact

1. **Accuracy** - **97%** (Highest among the 40+ vendors assessed over 2yrs period)
2. **Error Rate** - **< 2%** (Out of 600+ sample documents analyzed)
3. **Success Rate** - **100%** (Financial data points successfully identified on production scale)
4. **Scalability** – **400,000+** documents processing per annum



# 3. Manufacturing Process Forms Analyzer



**Compliant with any Process Forms**

**Job Cards - Routine/Non-Routine even  
Handwritten**

**Logbooks Manuals SFRs**

**Repair Orders M&E/MRO Records**

**Technician Reports EOs**

**Compliance Inspection Reports**



# Automate Maintenance Audit



Maintenance Request Raised

Job Completion & Sign-off

RecoSense Cognitive Engine for Automated Job Card Auditing

Recommendations for Rectification

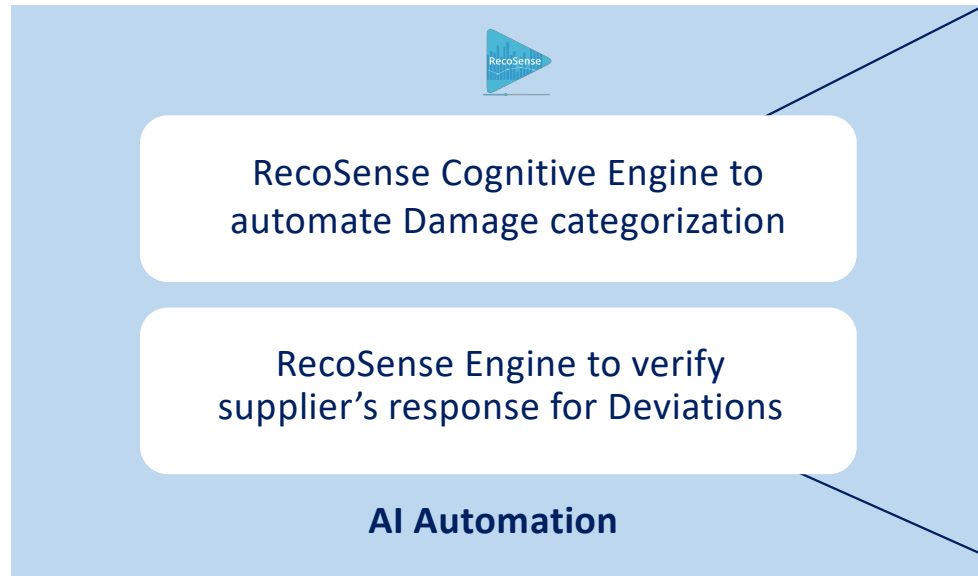
Engineer Rectified Records for Submission

missing LAE stamp\_pg 1\_6.pdf 2 / 9 100%

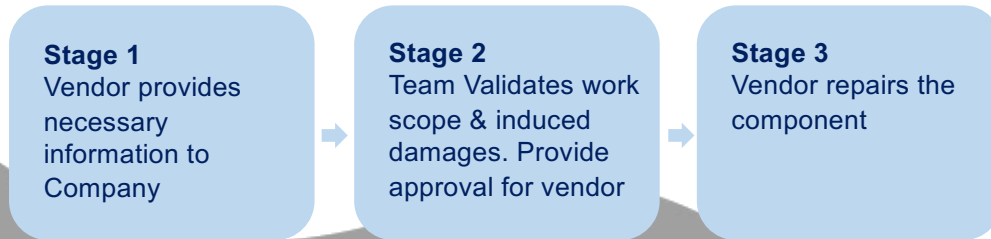
Inspection General		SI11990101	TA350710002	00214981				
COMPONENT		PART NO		S/N				
S/TITLE INS- FRONT BEARING HSE VENT VLV-BOTH ENG								
DOCUMENT TYPE		DOCUMENT NUMBER		REVISION NO				
ZONE 4.00		REVISION DATE		<b>AL</b>				
Remark								
REV	ITEM	TASK DESCRIPTION	TRADE	MH	SIGNATURES			
		DONE BY 2 DIFFERENT LAEs.			MECH	LIC/AUTH HOLDER		
CERTIFIES THAT THE WORK SPECIFIED EXCEPT AS OTHERWISE SPECIFIED WAS CARRIED OUT IN ACCORDANCE WITH SAR-145 AND THE AIR NAVIGATION ORDER AND IN RESPECT TO THAT WORK THE AIRCRAFT / AIRCRAFT COMPONENT IS CONSIDERED READY FOR RELEASE TO SERVICE.								
CARD SIGN-OFF								
DATE COMPLETED: 25/11/2020								
PART USAGE								
ITEM NO	DESCRIPTION	PART NO	QTY	S/N ON	S/N OFF	APP CERT NO	SPARE REQ BY (stamp or staff no)	PROGRESS CHASER (stamp or staff no)

- Detected Stamp
- Detected Signature
- Missing Stamp or Signature
- Tags
- Form Fields

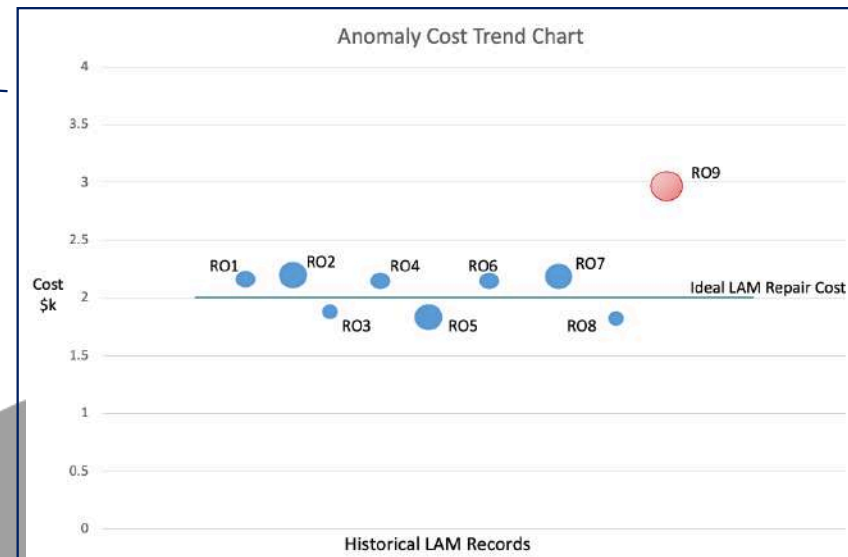
# Auto-Interpretation of SFRs



✓ LAM	20501432RQH_Quot.pdf	Satisfactory
SCOPE OF REPAIR	20501543RQH_Quot.pdf	Unsatisfactory
<ul style="list-style-type: none"> <li>LAM REPLACEMENT</li> <li>CALIBRATION HAS TO BE MADE</li> <li>FINAL ACCEPTANCE TEST MUST BE PERFORMED</li> </ul>	Repairquote-2.pdf	Satisfactory
✓ PHOTOCELLS FAULTY	20502646RQH_Revi.pdf	Satisfactory
✓ FCU	✓ ELECTRICAL TEST	
	✓ FCU2	



**Current Manual Process**



# Manufacturing Use Cases



Automate Maintenance  
Audit

Damage Categorization  
& Vendor Quote Analysis

Analytics Module for  
Streamlining M&E/MRO  
Activities

Centralized Data  
Intelligence Platform

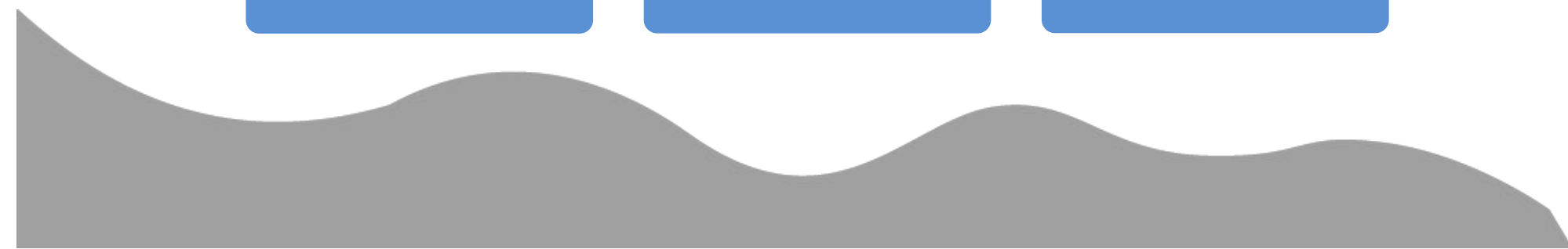
Compliance  
Management with Alert  
Mechanism

Comparator &  
Recommendation Engine

Energy Management &  
Monitoring System

Predictive Analytics

Inventory Management  
& Optimization



# Case Study – Automate M&E/MRO Activities



- One of the largest South-east Asian Airlines.
- Also has an Engineering Division handling MRO business across nine countries.

## Problems

1. Lack of a system to automate maintenance auditing
2. Lack of a system to auto-identify key entities from multi-format process forms including handwritten job cards
3. Lack of a system to auto-identify anomalies and recommend rectifications
4. Lack of a system to auto-categorize damages of an aircraft
5. Lack of a system for Vendor interpretation of work scope and induced damages

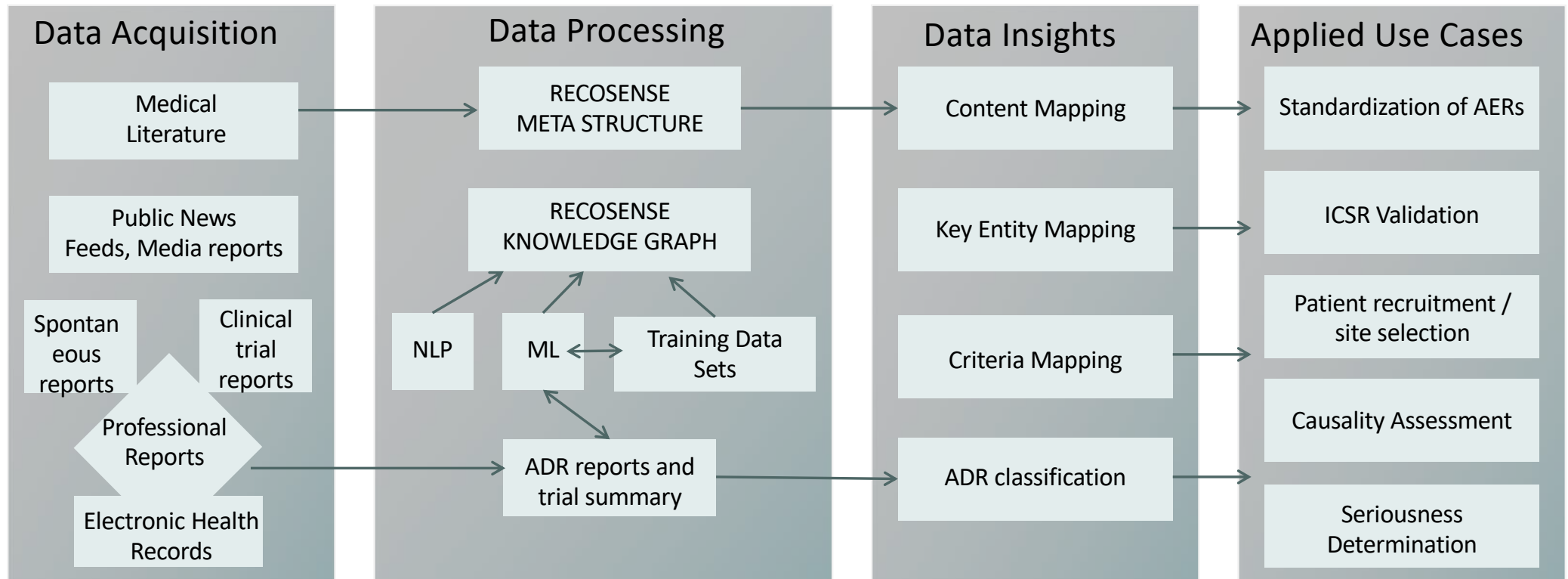
## RecoSense Solution

1. Automated Maintenance Auditing System
2. Cognitive engine with OCR capabilities to build context around any type of M&E/MRO process documents
3. ML module to auto-identify anomalies and recommend the right resolution
4. Meta engine to map and extract damages, parts, components, tests, and build contextual correlations
5. AI module for automating interpretation of shop finding reports and identify deviation in the work scope

## Impact

1. Highest **Accuracy** of more than **97%**
2. **Error Rate** - **< 2%** (Out of 400+ sample documents analyzed)
3. Reduced **Operational Cost** of up to **40%**
4. Prevented **Revenue Leakage** by saving cost on additional scope of work from the vendors
5. Overall **Process time** reduced with automation of manual dependencies

# 4. Pharmaceutical Safety Reports Analyzer



# Patient Recruitment



## Identify the right set of patients parsing through their **health records**

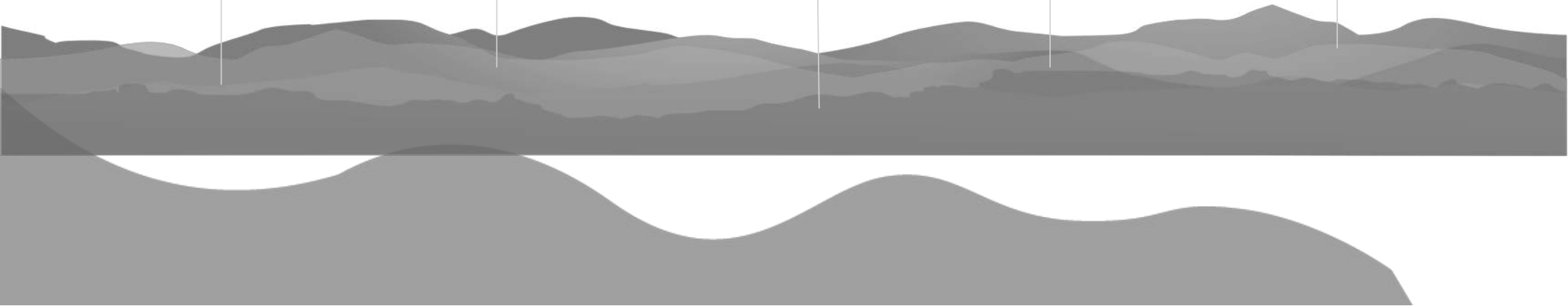
Upload eligibility criteria (age, gender, illness etc.) for recruitment and patient health records

Tweak algorithms to identify the desired parameters in these documents.

Training – team of research analysts assist to identify patients based on their health records

Test and deploy - search for desired parameters and identify patients meeting the recruitment criteria

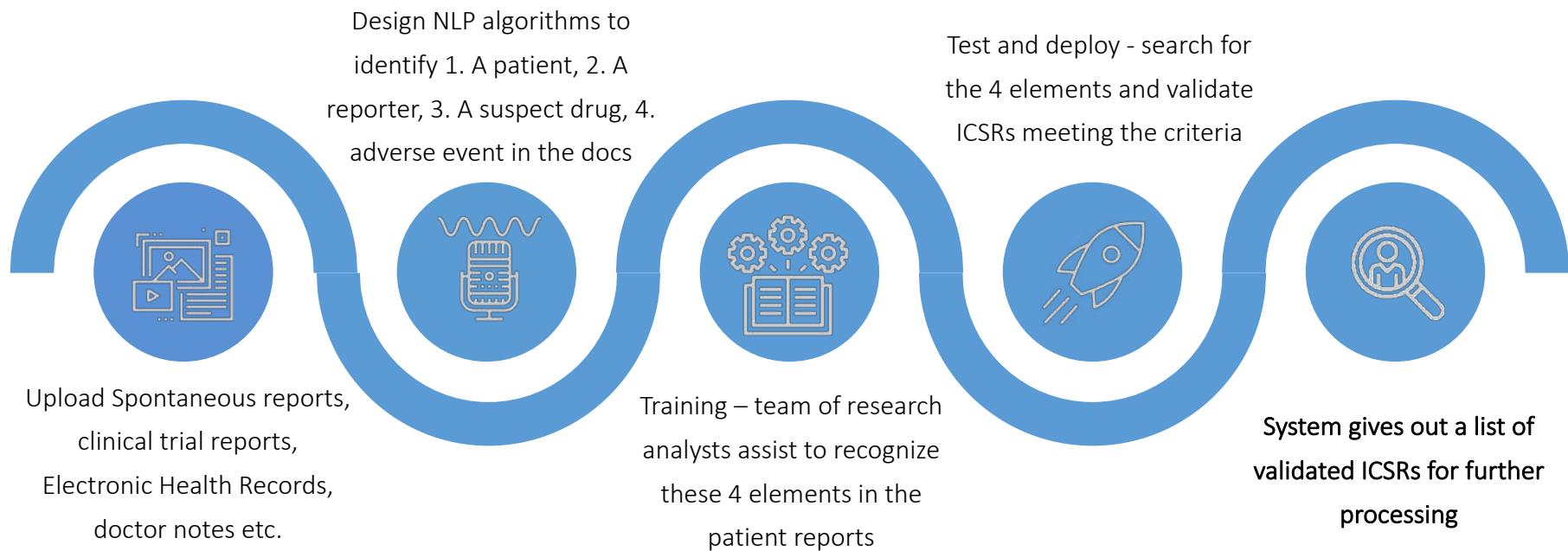
System gives out patient cohorts meeting the eligibility criteria using unstructured patient data.



# ICSR Validation



## Identify four elements of an **Individual Case Safety Report (ICSR)**





# Pharma Use Cases



01

## Clinical trial Site Selection

Identify site for clinical trials based on the selection criteria and mapping it to existing records

02

## Patient Recruitment

Identify the right set of patients parsing through their health records

03

## ICSR Validation

Identify four elements of an Individual Case Safety Report (ICSR) : 1. An identifiable patient, 2. An identifiable reporter, 3. A suspect drug, and 4. adverse event.

04

## Standardization of AERs

Map narratives to medDRA (preferred terms)

05

## Causality Assessment

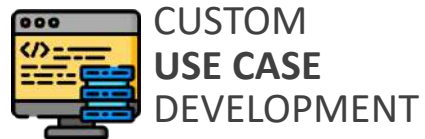
Extracting most appropriate relationships between a drug and an adverse event.

06

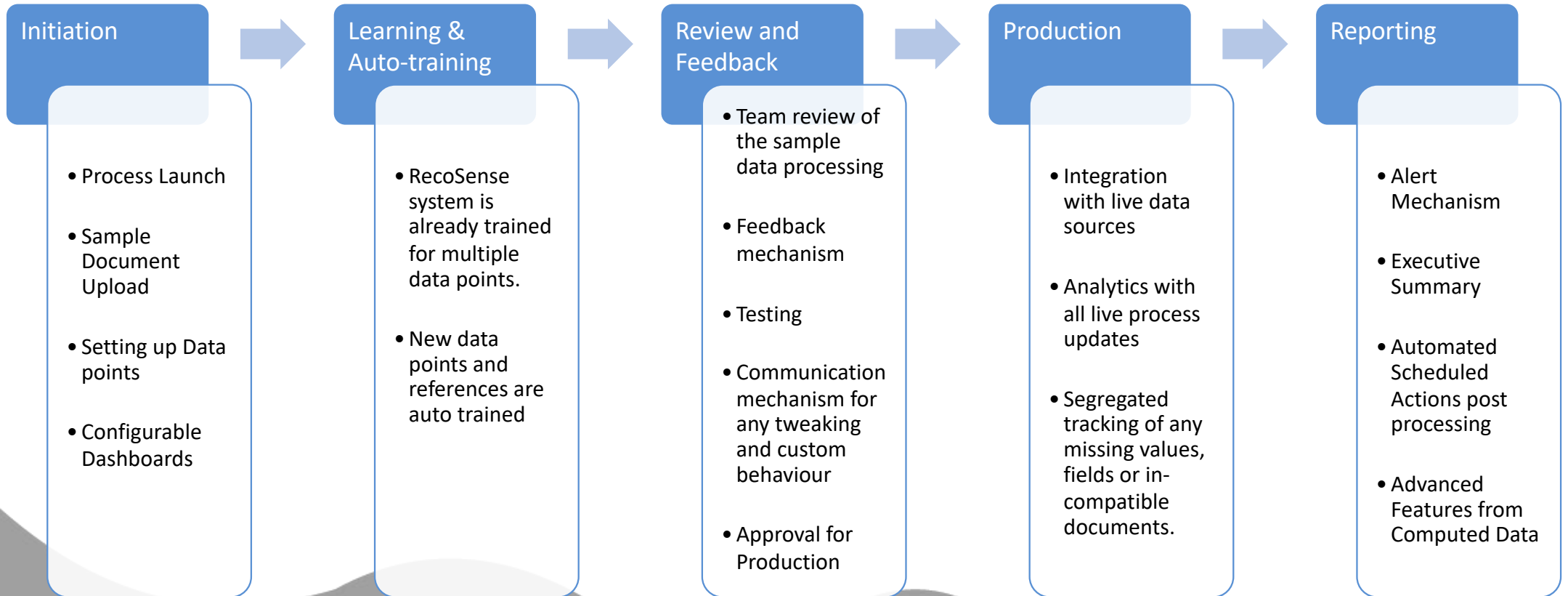
## Seriousness determination

Classify the ICSRs into 1. results in death or is life-threatening 2. requires inpatient hospitalization or prolongation of existing hospitalization 3. results in persistent or significant disability or incapacity 4. results in a congenital anomaly 5. medically significant

# Why RecoSense?



# Project Workflow



# Engagement Models



## Services Model

### Offerings:

Professional Engineering Services with solution ownership by Customer

### Resources:

Dedicated offshore team  
Extended engineering team for customer  
RecoSense responsibility to build, manage team and deliverables  
Product / Deliverables to be owned by Customer

### Development & Enhancements:

Custom solutions for customers.  
Mutually agreed milestones  
Any application development, integrations, testing etc.  
(No – in-scope / off-scope discussions)  
Continuous development

### Remarks:

Minimum 6 months commitment  
Accelerated development for customer

## Platform Licensing

### Offerings:

One-time Licensing and IP Co-ownership with Customer

### Resources:

IP transfer to customer, Source Code transfer, IP ownership by client

### Support:

Maintenance support for predefined period with very low monthly billing cost.  
Bug fixes, integration support, knowledge transfer etc.

### Development & Enhancements:

Customization, enhancements will follow monthly fixed cost model

### Remarks:

One time advance billing with monthly maintenance billing

## Subscription Model

### Offerings:

Platform Subscription

### Resources:

IP to be owned solely by RecoSense.  
SAAS service integration, served out of RecoSense hosted on public cloud or on customer hosted public cloud

### Support:

Platform support owned by RecoSense at no additional cost

### Development & Enhancements:

Bundled contract for enterprise customers with Application development, customization and engineering services cost Custom solution development, Custom feature development

### Remarks:

Monthly or Annual billing

# Awards and Honors



## 6. RecoSense Labs:

With its data intelligent platform which can independently interpret the context of the user and the content to generate structured meta-content, RecoSense helps Digital Publishers and Enterprises to automate the personalization of their content for every User. The platform achieves strong user engagement, content discovery and better monetization by delivering the right content to the right user for any endpoint – App, Web or even Devices.

RecoSense platform is derived from an indigenously built IP to interpret any kind of content (Videos, Text, Images, Ads) based on Natural language processing and Machine Learning framework.

It offers a distinct advantage for its customers with a strong focus on content interpretation compared to just the data insight from traditional clickstream analytics. The platform capabilities extend to Automated Metadata generation, Content management systems, Data analytics, Youtube solution, Loyalty Management Features etc.



“Document  
Intelligence  
Delivered”



# Thank You



US | India | Canada  
Contact us

 : [info@recosenselabs.com](mailto:info@recosenselabs.com)