Infrrd

Infrrd's AI-enabled Platform Reshaping the Future of the Oil and Gas Industry

Use Case

Client Background

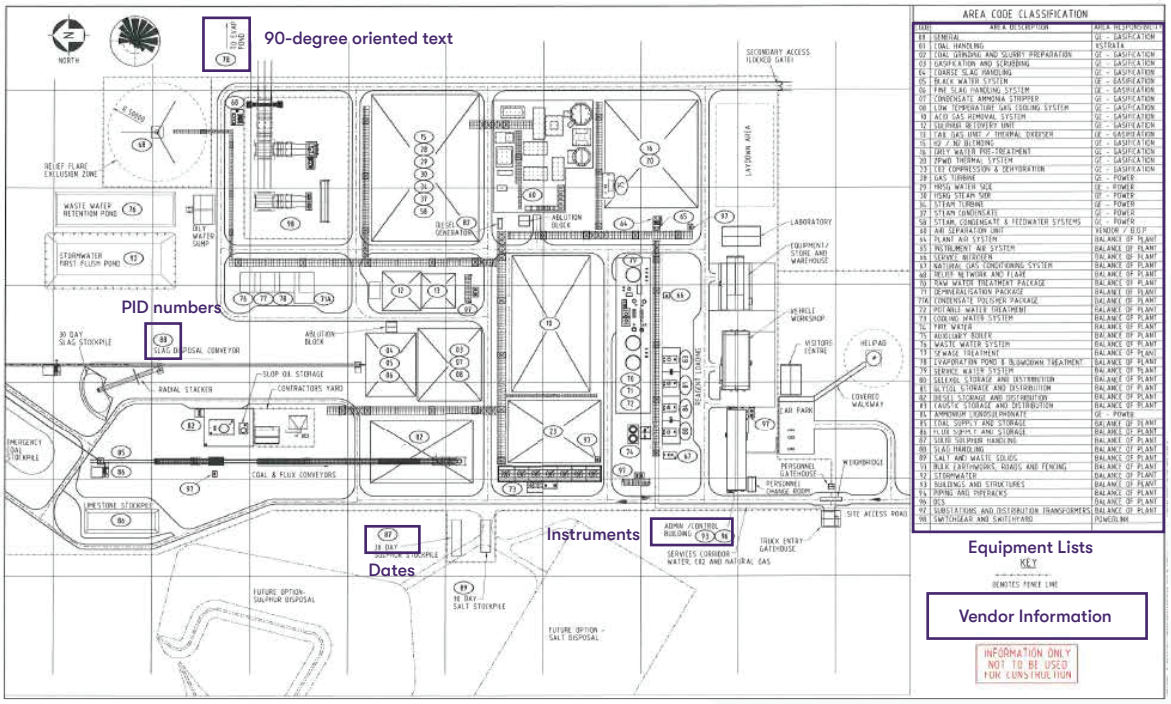
Our client uses custom software development to help organizations achieve their business objectives. By offering complex systems integrations to custom web applications, they are able to deliver enterprise solutions to fit business needs and thereby solve some of the more intricate challenges of business technology.

Vision

Trending developments in machine learning, computer vision, and predictive analytics have shown incredible results in processing complex schematics such as engineering drawings and piping & instrumentation diagrams; leading to the streamlining of the data extraction process. Automation would enable process experts to obtain information instantly and reduce the time required for data retrieval.

Problem Statement

Embracing the technology, our client had already experienced a conventional OCR for processing complex representations such as engineering drawings and piping & instrumentation diagrams. The convergence and divergence of connections and lines in the diagrams was a further cause for concern. Though it successfully reduced the manual effort, it failed to extract the data accurately which affected the performance and efficiency of the organization.



Piping & Instrumentation Diagram

Challenges Faced

Understanding the client's workflow assisted us in listing the issues faced by the client, which includes:

Mode of execution

While using the conventional OCR for extraction there existed vision-related issues due to the presence of different elements like symbols, convergence, and divergence of connecting lines between elements.

The layout of the text

The presence of geometrical and non-geometrical information in engineering diagrams and piping and instrumentation diagrams, as well as text, graphical primitive symbols, and dimensions in the tables in the engineering diagrams, also led to challenges within the data extraction process.

Continuous - Structural variations

- Conventional OCR failed to support the variate size and layout of the tables. Therefore, it creates a need to distinguish between tables of variate structures.
- The other aspect is that the tables are being identified using the intersection between the perpendicular and parallel lines.

Inaccurate - Classification of Data

The complex schematics of an oil and gas industry includes variate instruments, types of equipment, and connections. Using the conventional method, it was difficult to differentiate between the instruments and equipment, etc. once the data was extracted.

Manual - Cross-Referencing

The validation of the extracted data of the complete master data list was tedious to go through to search the exact or closest match to the extracted data.

Diminished - Accuracy

- The conventional method failed to read, understand and extract the data from the complex representations and drawings.
- The validation of manual data extraction was prone to errors due to human intervention.

Incorrect - Data Interpretation

Using the conventional method, an additional character enclosed within the borders was discovered; considered noise, it had a direct impact on the result of the data extraction.

- **Reduced - Efficiency and Performance**

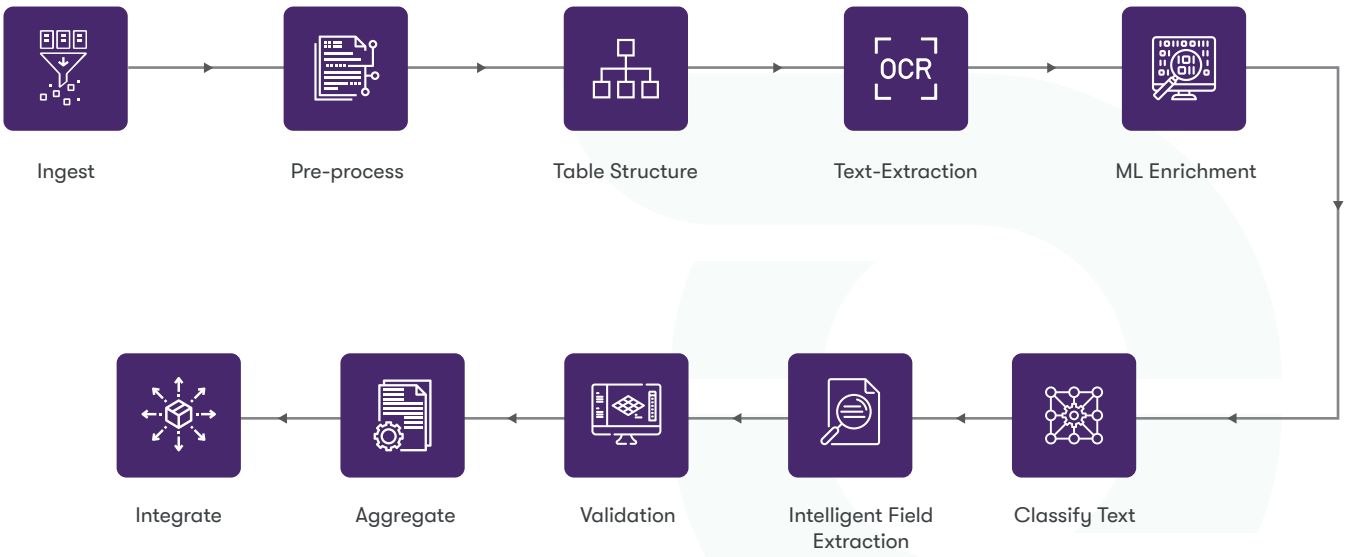
  Human intervention in the validation in the conventional method failed to extract data correctly affecting the efficiency and performance of the company.

> *"After trying numerous solutions, we were not satisfied. We had a hitch inside saying this is not the solution that would meet our requirements. Later, we came across Infrrd's AI-enabled platform that automated our processes and resulted in a pretty dramatic improvement and experience that we could offer our customers."*

Infrrd IDP

Infrrd developed a platform equipped with the core AI components such as Machine Learning, Computer Vision, Natural Language Processing, and Predictive Analytics. AI and machine learning train the platform by going through the records to identify, classify, extract, and validate critical data from the documents without any direction from someone. The execution process uses technologies such as NLP, Computer Vision, and Predictive Analytics. The platform not only speeds up the processing of an enormous volume of documents but also trains itself to learn and make corrections for future use.

Customized IDP for Oil and Gas Industry



After understanding the client's workflow, Infrrd tailors the IDP accordingly. The phases of the personalized IDP for the Oil & Gas Industry include:

Ingest

In this initial phase of extraction, the source (in this case, pdf's of engineering drawings) are uploaded to our Infrrd IDP platform.

Pre-process

The document preprocessor comes into action after the drawing is completely uploaded. Here in this phase, the following operations take place:

- The preprocessor looks through the complete document and breaks it into pages and sections, selecting the pages containing relevant data.
- The preprocessor splits, stitches, and crops the data, resulting in reducing noise and improving text clarity.

Classify Images

Here, our Intelligent Data Processing platform identifies and classifies images for data extraction.

Table Structure Extraction

IDP first identifies the sections of the document that contains table structures. Then, it posts which of our platforms' unique capabilities to extract data from within the said tables. It allows us to seamlessly extract data while also understanding the context associated with it.

Text Extraction

At this stage, our core AI capabilities such as Machine Learning, Natural Language Processing, and Predictive analytics are used to extract text from the drawings.

ML Enrichment

Infrrd's IDP enriches the raw text with a contextual understanding of expense reports. We achieve this by utilizing Infrrd's ML-based spell checker and correction module.

Classify Text

The NLP-based classification framework in the Infrrd's AI-enabled platform further classifies the extracted text. This framework is enabled with a contextual understanding of data and hence can identify whether the data contains relevant details or not.

Intelligent Field Extraction

NLP Capabilities are used to train a custom model to extract key entities relevant to the engineering diagrams and other schematics.

Validation

Infrrd's AI-enabled platform implements contextual data validation and correction algorithms on extracted data for validation through comparison between extracted data with the master data list.

Aggregate

Infrrd's AI-enabled platform consolidates the output in a single document.

Integrate

This is the last step of the data extraction process. The output is integrated into other applications within the organization's ecosystem (ERP, account payable systems, document management systems, etc.).

Features

Automated - Platform

Infrrd's AI-enabled platform helps the client streamline the process extracting data from complex schematics such as engineering drawings and piping and instrumentation diagrams. It handles all the tasks involved in the process with little to no human effort.

Smart Correct

While experiencing conventional OCR, our client discovered that after extraction an extra character was added to the extracted data. Our platform is programmed to understand the context of the data and automatically eliminates the additional character; enhancing data accuracy.

Programmed - Cross-referencing

Infrrd's AI-enabled capabilities reduce the time and effort needed for validation while getting rid of tedious jobs. Manual cross-referencing was a challenge, but we trained our platform to find data spread across the scanned document.

Orientation

Our platform is equipped with core AI capabilities such as Machine Learning, Image Recognition, and Predictive Analytics to seamlessly and accurately process diverse components of diagrams including equipment, instruments, connections, etc.

Improved - Classification of data

In synergy with machine learning algorithms, our platform is trained to understand, analyze, differentiate, and extract information concerning different components of diagrams to improve turnaround time.

Better - Accuracy

Infrrd's AI-enabled platform understands and analyses the complex schematics collected from various sources, thereby increasing the accuracy of the extracted data.

Results

- Ability to cross-reference the extracted data present in the complex schematics with the information in the master data list.
- Infrrd's AI-enabled platform proved to completely optimize the process of extracting data from complex schematics. Within a few seconds and acquire a **data accuracy rate of above 90%.**
- Ability to process complex schematics faster which consequently reduces the number of turnaround time.

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About Infrrd

Infrrd Inc is a leading Machine Intelligence partner to Banking, Financial services and Insurance industries across the globe. Infrrd's focus is on providing AI as a service and leveraging its homegrown machine learning platform to solve analytics and automation related problems for its customers. Infrrd's platforms and algorithms extract deep insights from big data based on artificial intelligence and deep learning and offer these insights to drive decisions & automate extraction for customers.

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