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F-429, Industrial Area, Phase 8B
SAS Nagar, Mohali, India -160059

Improving Maritime Safety With Artificial Intelligence

- A Case Study

Our Client

- A maritime risk management company headquartered in London, United Kingdom. Consists of a team of mariners, statisticians, and maritime experts.
- Specialized in domains such as:
  - Maritime safety
  - Risk analysis
  - Maritime innovation

Problem Statement

The client required a solution for improving the safety of the workforce in the maritime and shipping industry through state-of-the-art advanced machine learning and artificial intelligence techniques. Here are some of the challenges faced by our client:

- No standard format for data collection, every shipping company had its own parameters for reporting incidents.
- Classification of the seriousness of incidents manually was complex and time-consuming because the stakeholders had to go through the descriptions of the incidents individually.

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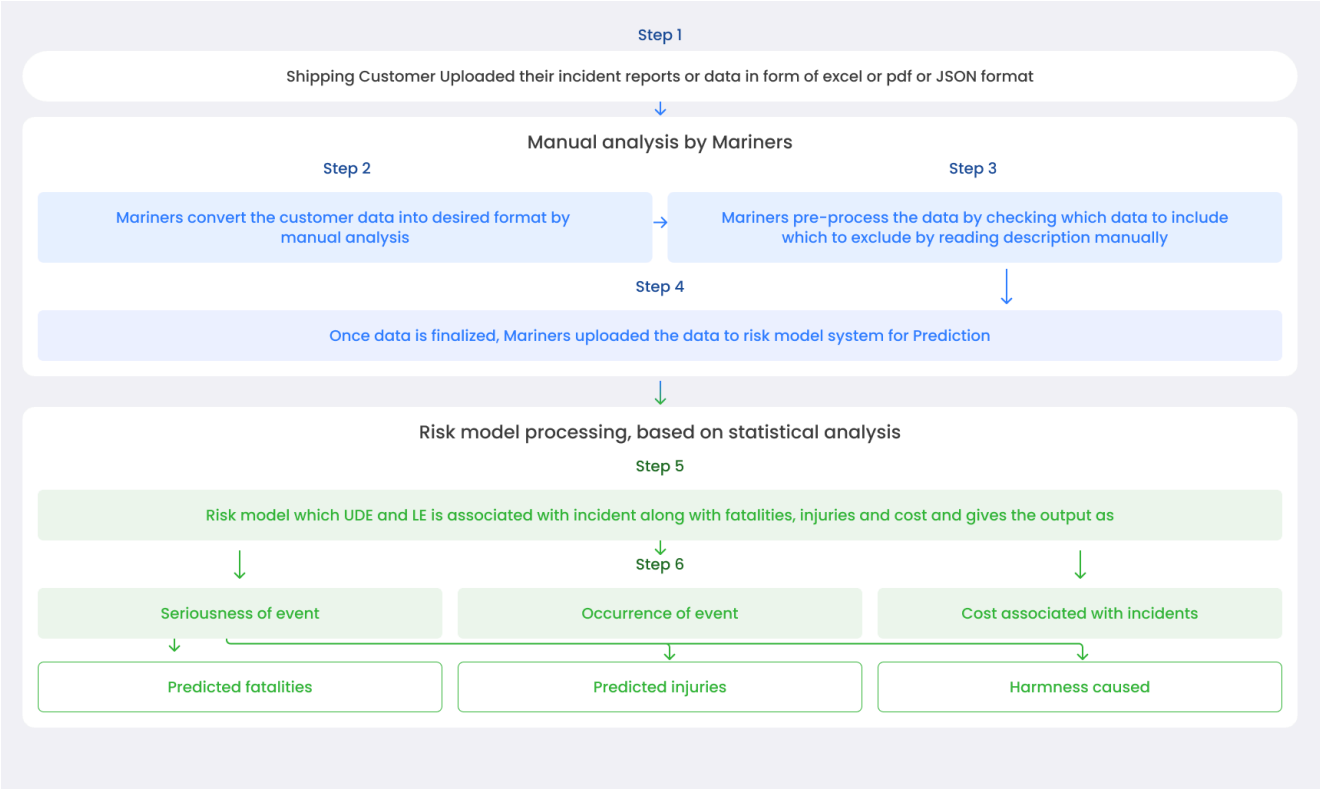
- Inability to predict the chances of incidents (no. of fatalities, no. of injuries, etc.), their seriousness, and the implications and costs associated with them.
- Lack of proper insights (on weather conditions, mechanical failure, etc.) to find the root cause of the incidents.

Our Solution

Our client followed a system to analyze the data that required the manual intervention of the stakeholders. This was the process followed by them:



What did we propose?

We understood the challenges in depth and devised a 3 part solution to address them:

- Automating the process of converting the data into the desired format.

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- Automating the process of filtering incidents that need to be analyzed.
- Using advanced machine learning techniques and incorporating automation into the existing risk model.

I. Data Conversion

For automating the data conversion process, these were the steps we followed:

- Identify the various formats in which the data was being collected, such as Excel, PDF, simple text, JSON, or even scanned documents. The parameters and fields in the data were also identified.
- Mandatory and non-mandatory column mappings were segregated.
- With the help of the stakeholders and marine experts, we understood the meaning of different parameters and created our own mappings with different customer parameters.
- We used advanced text similarity and rule-based engines to compare and match the customer parameters with the data parameters that we had created. This was done to check the similarity of the data and convert it to the desired format.

The workflow was as follows:

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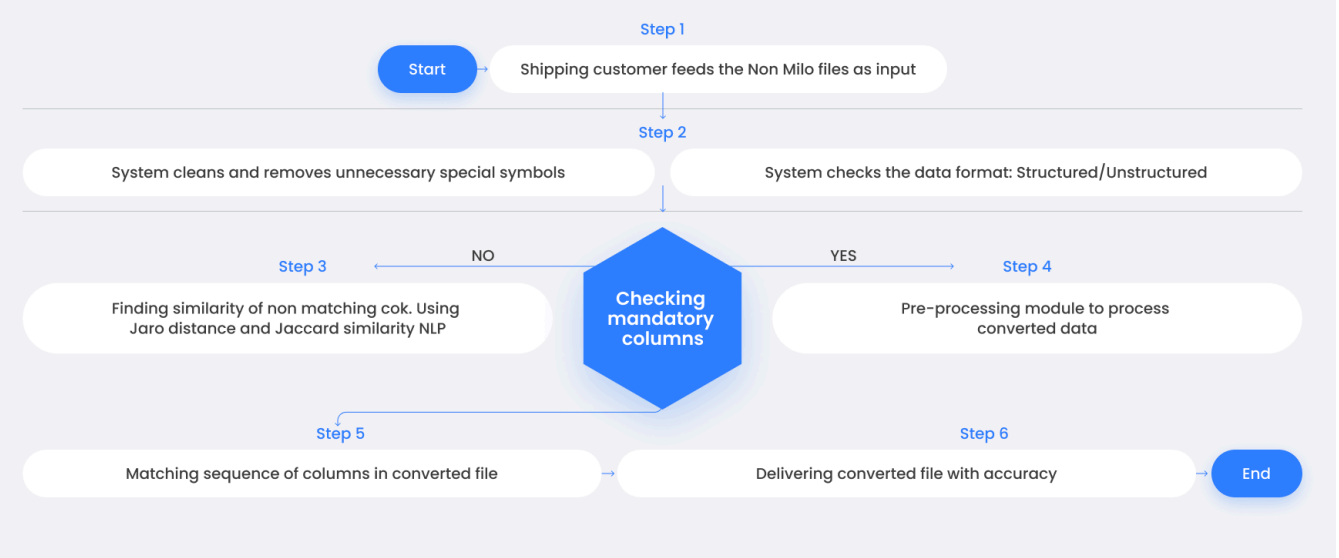

II. Data Processing

After collecting data from multiple sources, the next step is filtering the customer incidents data.

The concerned mariners will assess the incident data and determine whether to keep or exclude any data.

Once the filtering is done, mariners check the pending incidents and finalize the dataset.

To streamline this process we developed Auto Data Processing API which automatically filters the incidents data. This API is powered by a combination of approaches such as a rule-based model, advanced text classification model (BERT), and reinforcement learning model.

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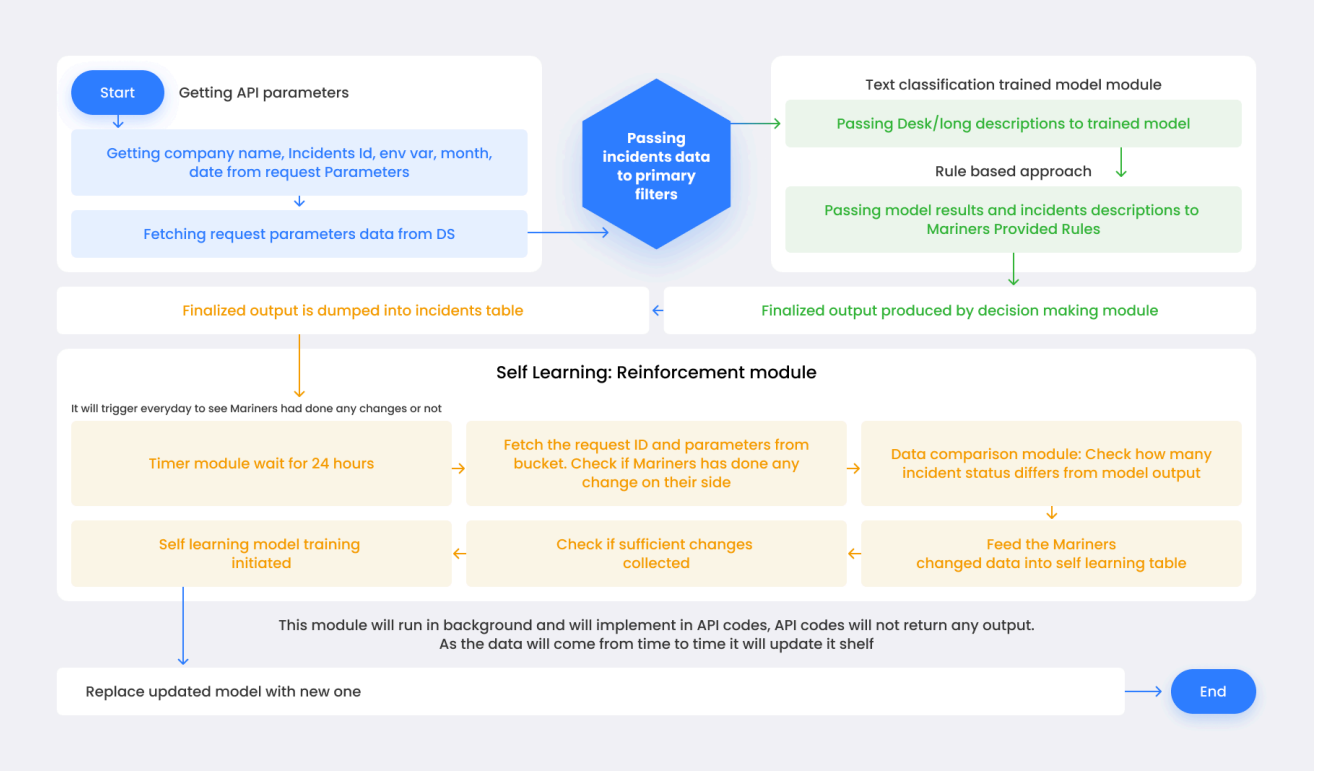

III. Risk Model Automation

The risk model being used by our client had many limitations such as:

1. The expertise of mariners played a crucial role as they were the ones responsible for conducting statistical calculations, thereby creating a dependency on them for any necessary tasks or alterations.
2. The existing risk model was complex because of the heavy calculations involved in the core.
3. Running the risk model on a fresh dataset required a considerable amount of time, with each calculation taking around 12-13 hours. This extensive waiting period made the process significantly time-consuming.

To automate the risk model, we created a hybrid approach that combined the rules and statistical analysis traditionally used by mariners with machine learning algorithms for training and analysis. This allowed the system to predict outcomes without significant time delays. By incorporating machine learning, we aimed to enhance efficiency and timeliness in the prediction process.

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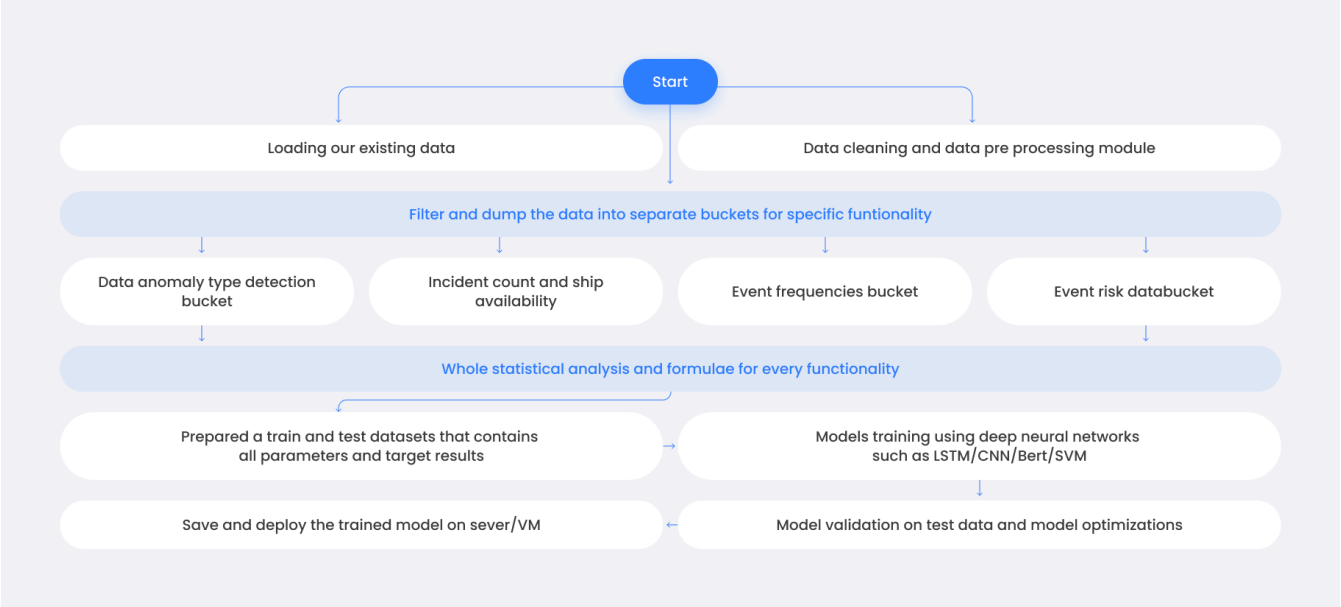
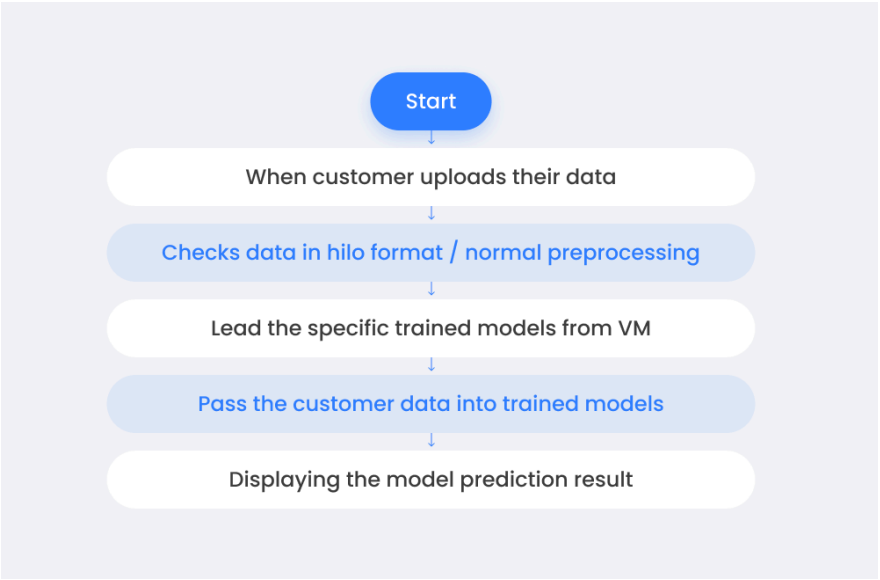
The solution was divided into 2 parts:

1. Model Training



2. Risk Model Workflow



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Business Impact

- Our solution not only streamlined the whole process but helped the client identify the risks faster and suggest corrective actions to their customers to reduce the number of such incidents. By the next FY, the number of serious incidents reduced by 1/3rd.

- With the help of insights gained from the solution, the client was able to reduce the costs associated with such incidents of their maritime and shipping customers.