



Automated Deduction Resolution Solution

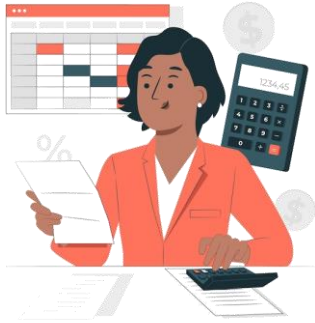
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Manual Deductions handling is a challenging business problem

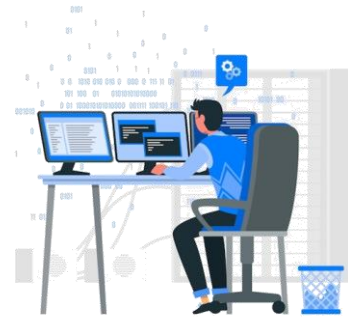
Volume of deductions can be unpredictable, and handling thousands of deductions manually can be very cumbersome

Hubbell Situation



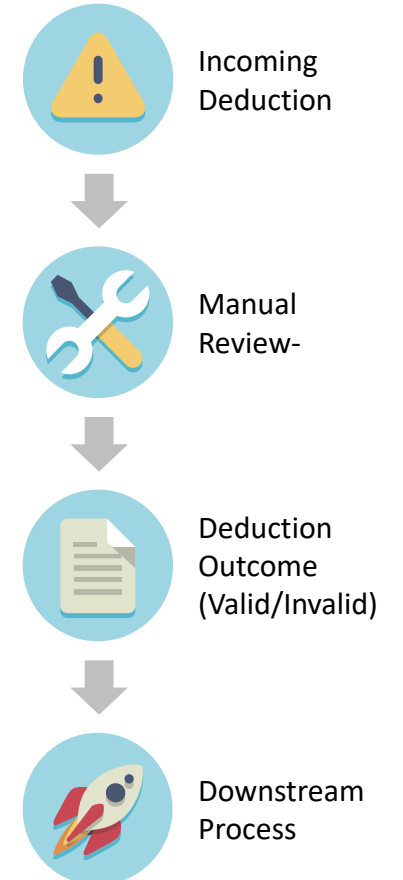
- Deductions initiated by customers due to **discord** or **dispute** in trade relations.
- Faces a high volume of deduction cases, numbering in the **Tens of thousands per year**.
- **Multiple teams are involved** in the manual handling process.
- Data utilized for managing deductions manually involves **mix of structured and unstructured data**

Complications

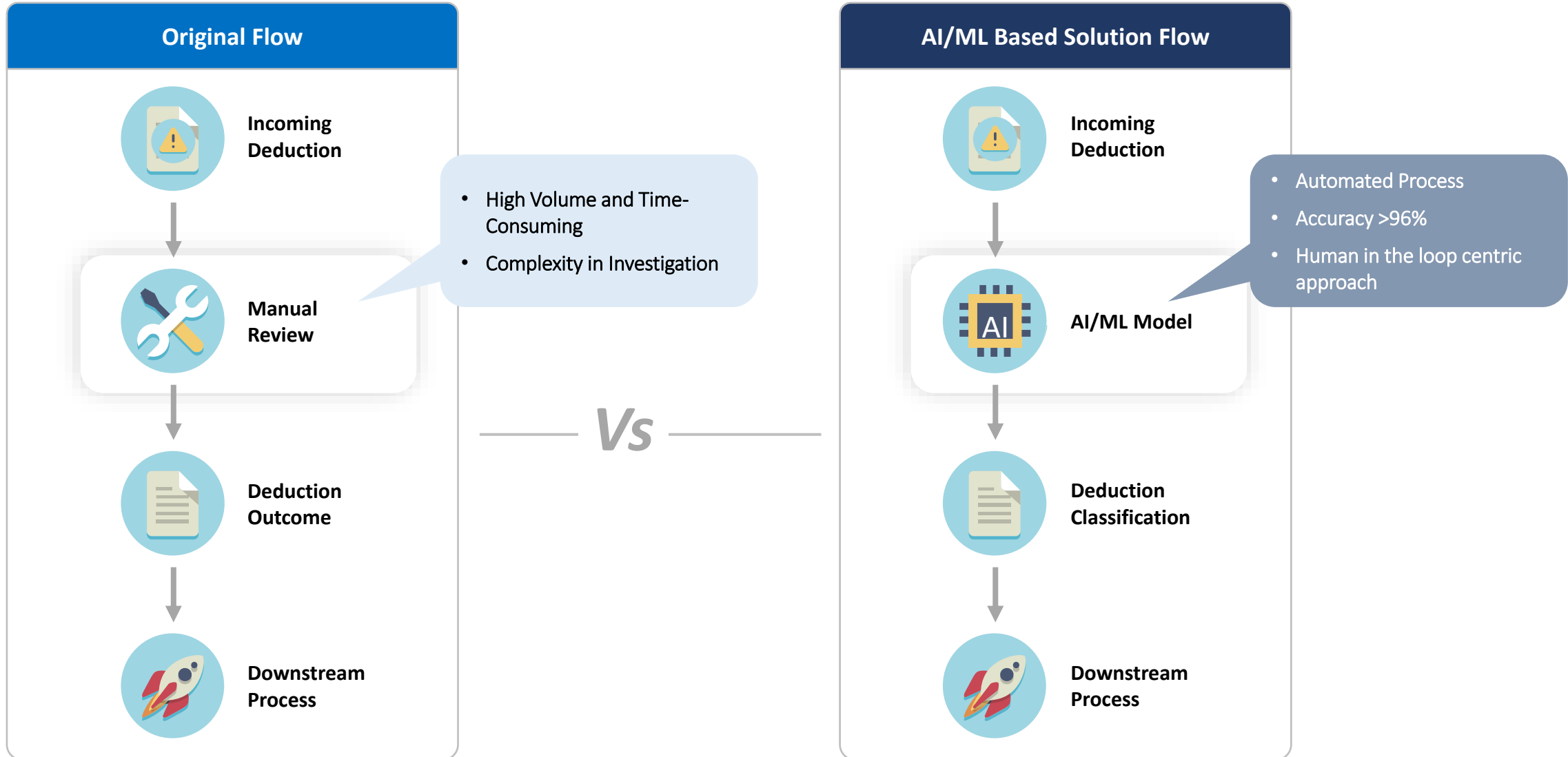


- **High Volume and Time-Consuming:** Managing **Tens of thousands** deductions is time-consuming and labor-intensive
- **Complexity in Investigation:** Manual process involving multiple teams results in inefficiencies and errors.
- **Dependence on Unstructured Data:** Dependency on unstructured data complicates deduction automation
- **Inconsistency and Inaccuracy:** Manual handling can result in inconsistencies and inaccuracies

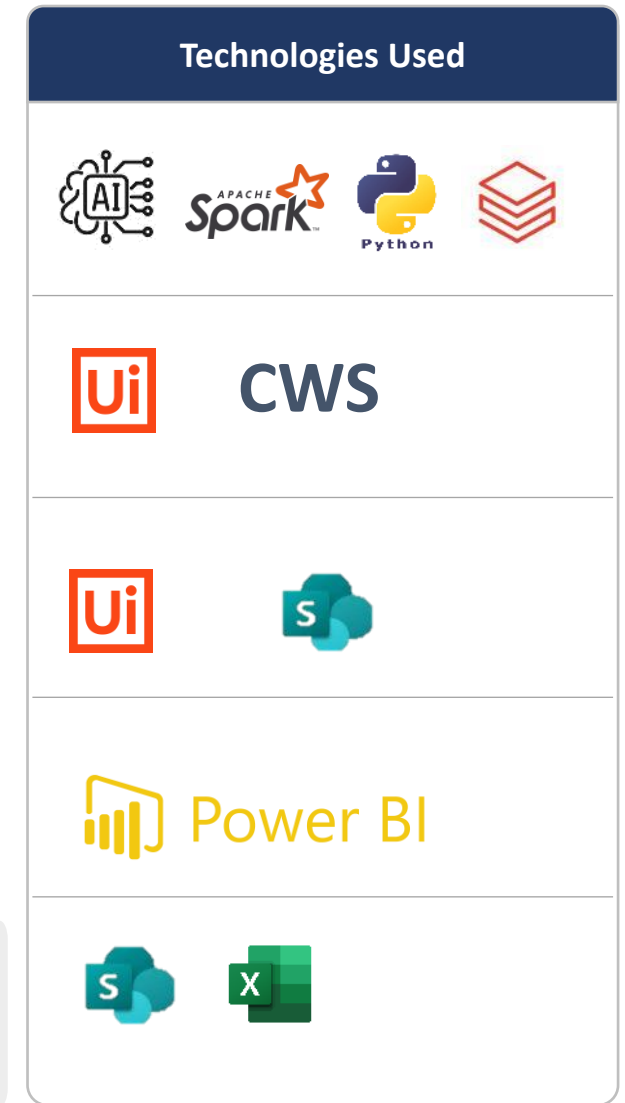
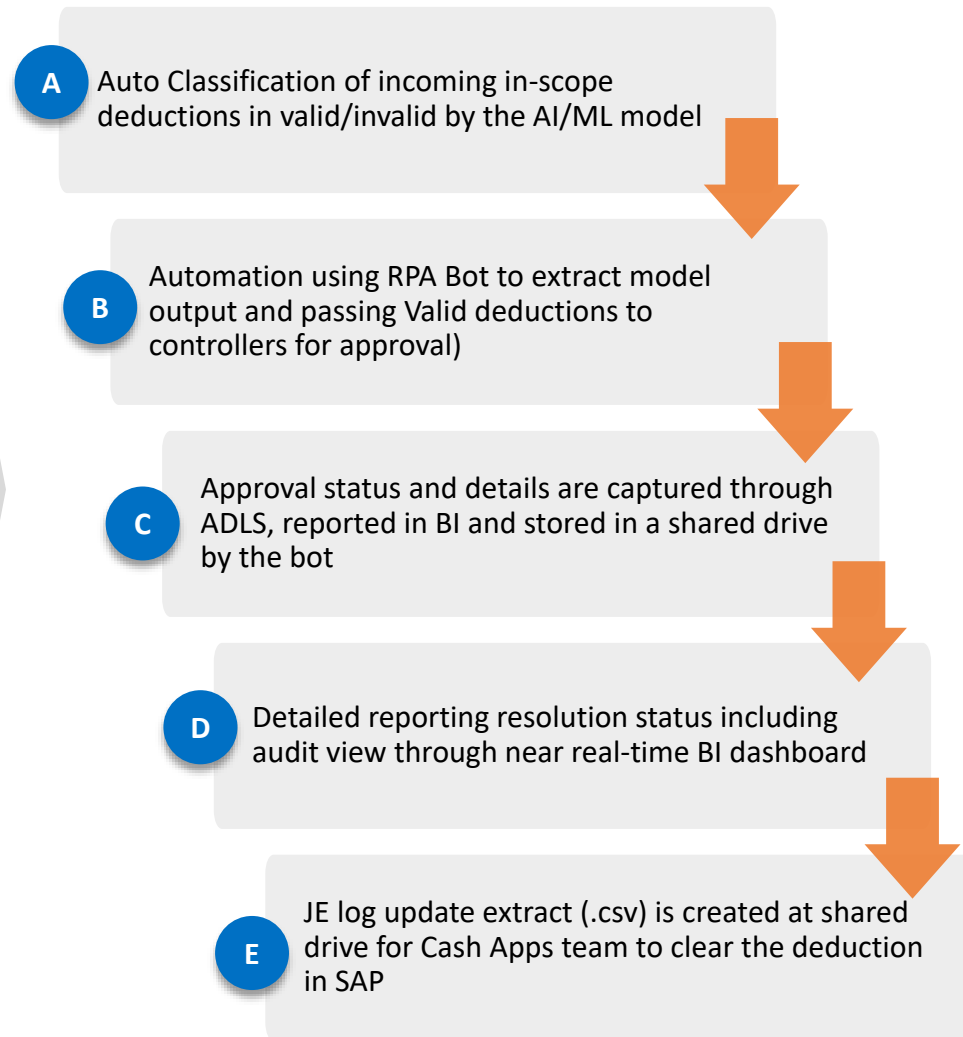
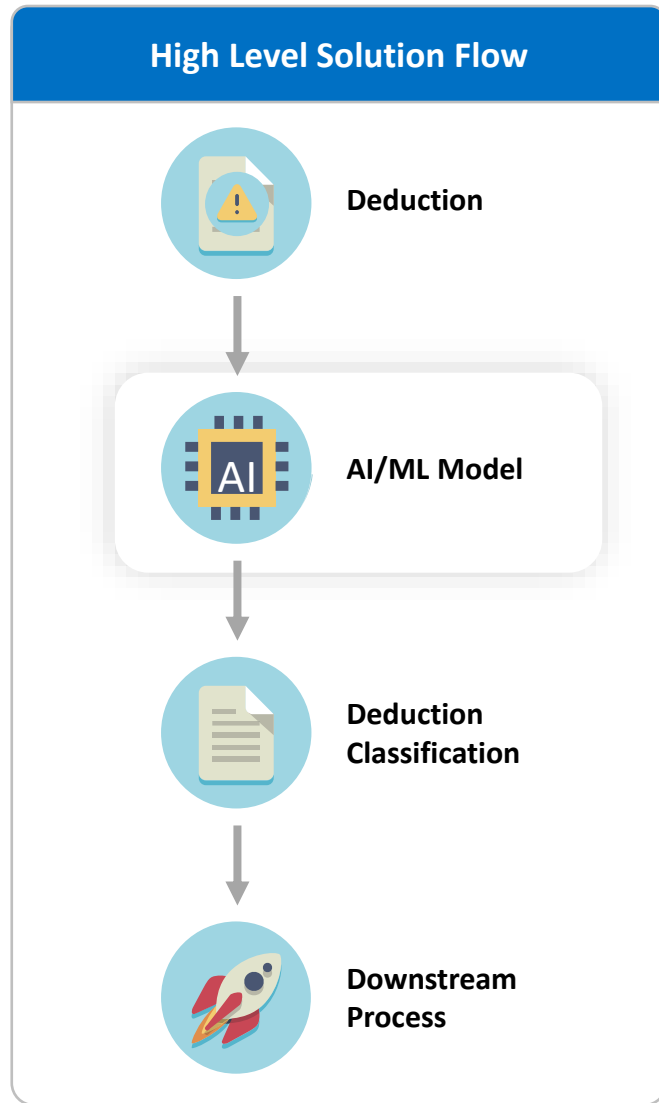
Original Flow



Leveraging AI/ML to simplify and automate deductions process



Leveraging Technologies including ML/AI & RPA to address the problem of manual deduction



Comprehensive Exploration of Data to Identify Factors Influencing Deduction Validity and Classification

Data Exploration

- **170+** variables across **30+** tables analyzed for relevance in **AI modelling**.
- **35 out of 170+** variables showed relevance
- **30+** features engineered to further **improve AI model output**.
- Data cleaning to remove any **outliers**

Selected Data Category

 Demographics / Customer

 Sales

 Invoice

 Product

 Payment

 Shipment

 Deduction

 Plant

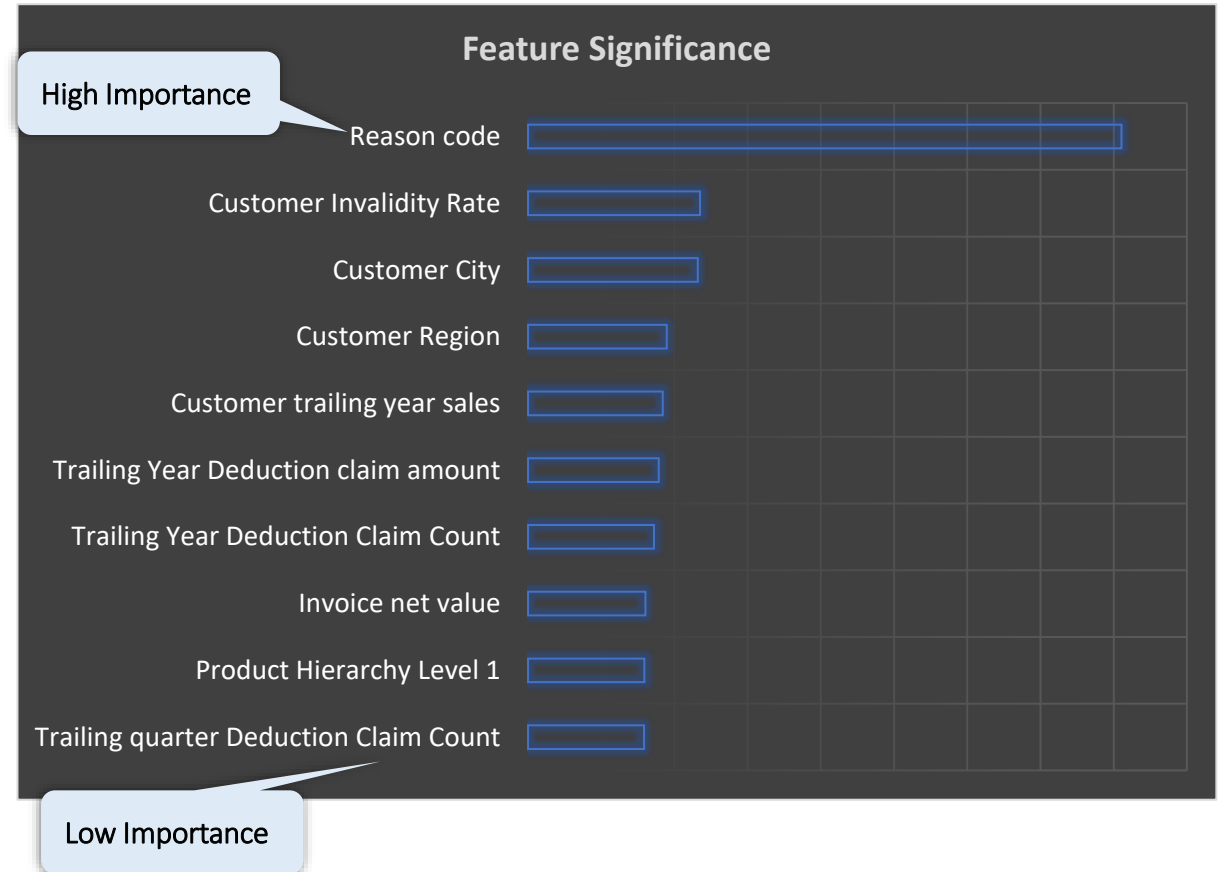
Selected Variables

Variable Category	Feature Name
Demographics / Customer	Customer Invalidation Rate
	Customer City
	Customer Region
	Customer trailing year sales
	Trailing Year Deduction claim amount
	Trailing Year Deduction Claim Count
Deduction	Trailing quarter Deduction Claim Count
	Reason code
Invoice	Invoice net value
Product	Product Hierarchy Level 1

A look at variable importance



Not all variables are created equal in the world of machine learning. The true significance lies within the **information content** of each variable, a factor that **varies uniquely** from one organization to another



High Accuracy Achieved on Deduction Classification using AI

AI/ML model performed at par with manual deduction process & showed more than 96.5% accuracy in identifying Valid deductions

Manual Output

2,432

Vs

Model Output

2,346

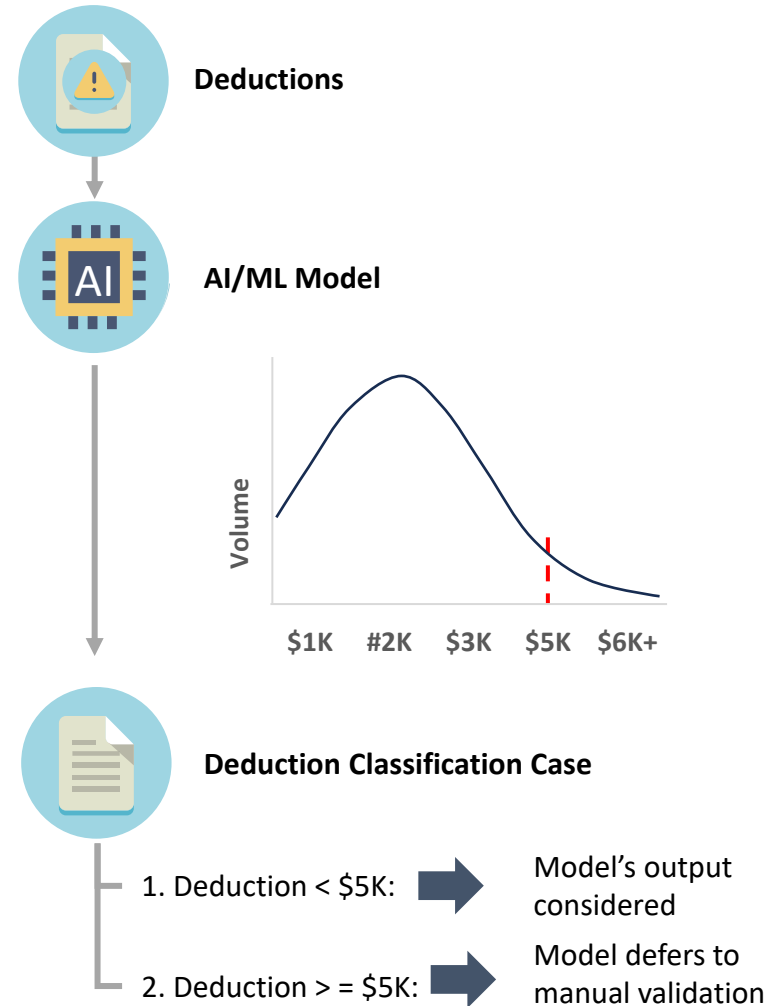
96.5%

Model Accuracy



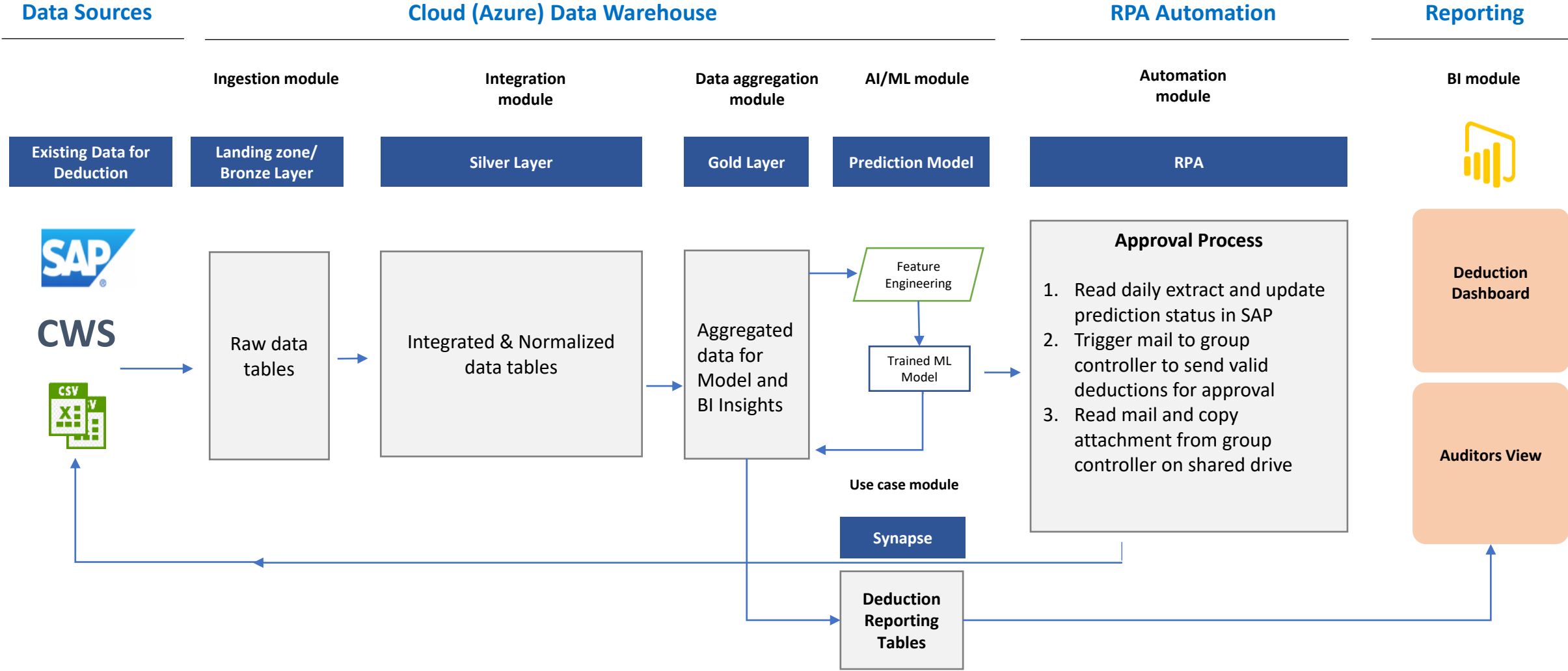
Human in the loop for practical implementation of AI/ML model

Balancing automation and enhancing AI/ML with Human expertise



Applied logical cut-offs based on human inputs to override model outputs and prioritize human inputs. E.g. any deduction >\$5K is reviewed manually

Solution Architecture for Deductions Processing Automation Solution

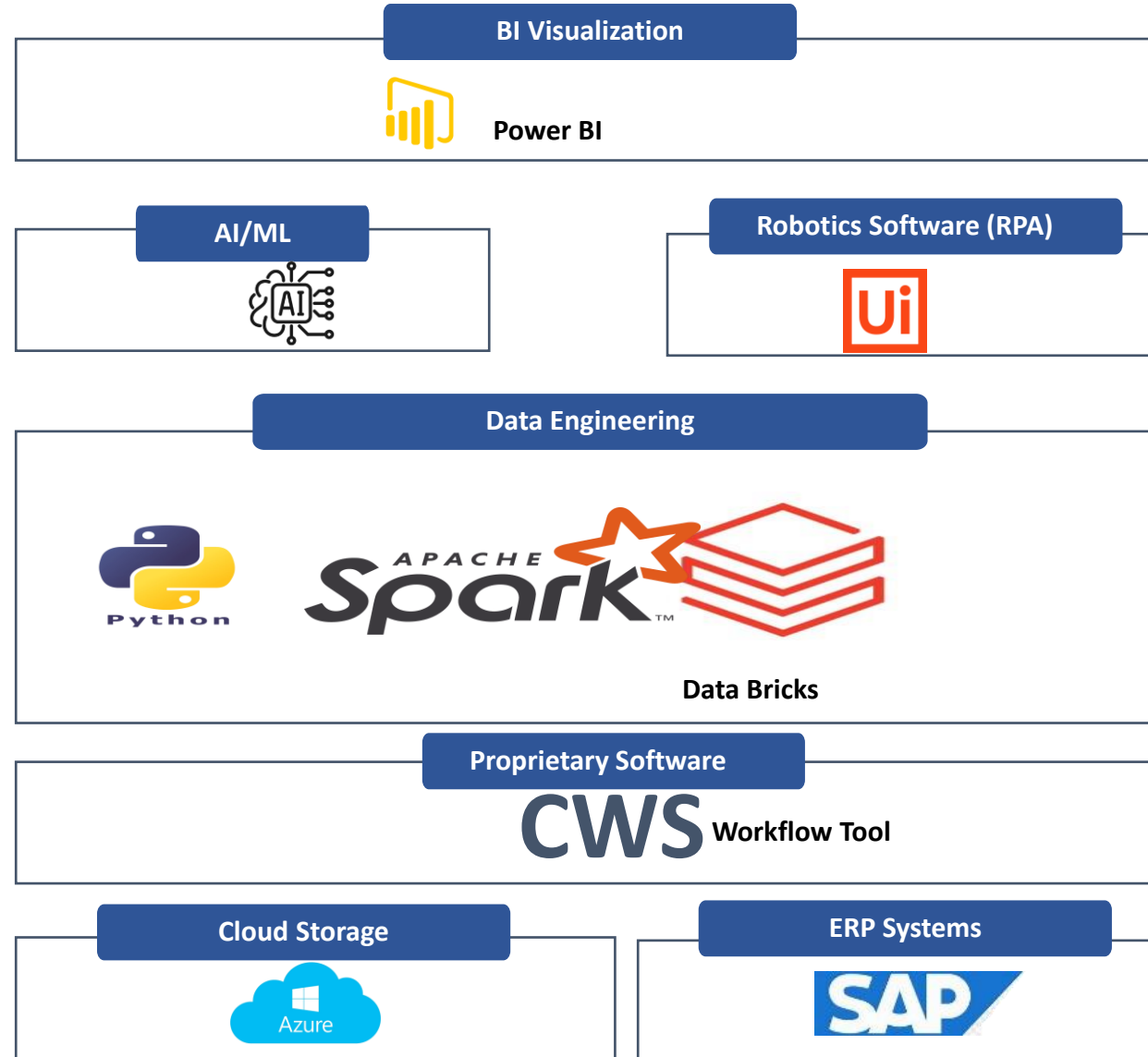


Technologies Utilized



Understanding the Big Picture:

AI and ML implementations work alongside existing systems and technologies within businesses. Understanding the architecture and assembly of these solutions is crucial for ensuring smooth operation and optimal efficiency



Collab Tools and Others





Thank you

Appendix

Quarterly Monitoring of Automated Deduction Resolution Performance

Quarterly Checks

Is there a substantial change in the model classification distribution?

Is there a substantial change in the data distribution of key features?

Drop in the model performance versus a random selected sample (10%) of in-scope deductions

Methodology

Model output's overall distribution of scores will be compared with the previous distributions of the training data set used to train the models

The distribution for all key features used to train the model will be compared with the previous distributions

A random sample of 10% deductions will be passed to the manual team and the results will be compared to check the accuracy and precision of the model

Actions to be taken

No Action

- If the performance and the distribution of model output are in-line with the base results achieved

Retraining of the Models

- If the distributions of model output changed significantly, the models need to be retrained
- If the distribution of underlying data (key features) changes significantly

Rebuilding and re-analyzing the feature importance

- If the performance falls significantly as well, the models need to be rebuilt with new set data set
- Additional reason codes are added to the scope of deductions processed by the model

Actionable Insights on Deductions through Automated BI Dashboards

Dashboard with views customized for different stakeholders are created to provide details of deductions resolution status through the solution

Key insights

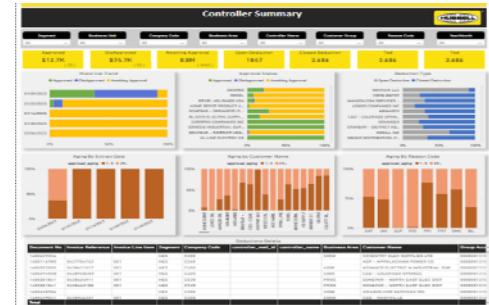
Deductions Summary

Captures key KPIs on deduction processed through the model by different dimensions like distribution across valid/invalid, segments/BU/Company codes, Customers, Reason Code and so on



Controllers' View

Shows status of deductions handling and resolution for the controllers with historical trends of deduction resolution, pending approvals and other details



Auditors' View

Provides details for a particular deduction to help auditors with the details associated invoice, customer, approval status, model output and associated parameters

