DTCC Infosys®

Innovate.DTCC: AI-Powered Hackathon

Self-Service Investigation (Chat NLP)
Corporate Action Reference Data Ingestion

PRESENTER: Team InfyTelligence

DATE: February 7, 2025

COMPANY: Infosys

Agenda



- 1. Team Introduction
- 2. Problem Statement
- 3. Solution Overview
- 4. Technical Implementation
- 5. Model Performance and Metrics
- 6. Industry Impact & Collaboration
- 7. Demo
- 8. Conclusion and Q&A
- 9. Appendix



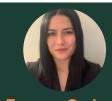
Team Introduction

Use Case Title: Al-Powered Corporate Action Data Ingestion and Processing

Team InfyTelligence



Nikhil Goel
Corporate Action SME



Zeynep Ozdas
Corporate Action SME



Jasleen Singh
Specialist Al Engineer



Soumya Chakraborty
Senior Technical Architect







Sharmeen Javed Shaikh
Senior Generative AI Developer



Anuja Datta
Technology Lead



Yashvant Sridharan Generative Al Developer



Senior Al Architect



Problem Statement

Corporate Actions Volume

95+

Asset types supported by DTCC

Election option types

110+

Corporate action events & sub events

7,000+

Paying agents and **Issuers**

The Challenge

Complexity around capturing of CA events information

Manual processes for event sourcing, data extraction, and data validation

Lack of standardization in event sourcing, event document types, data structure in documents

Increased volumes and complexity of CA events leading to high processing time

Estimated amount of global event data published and received manually, driving

Industry Need

The industry must automate corporate action event sourcing to streamline operations, minimize risk, and ensure timely access to accurate data

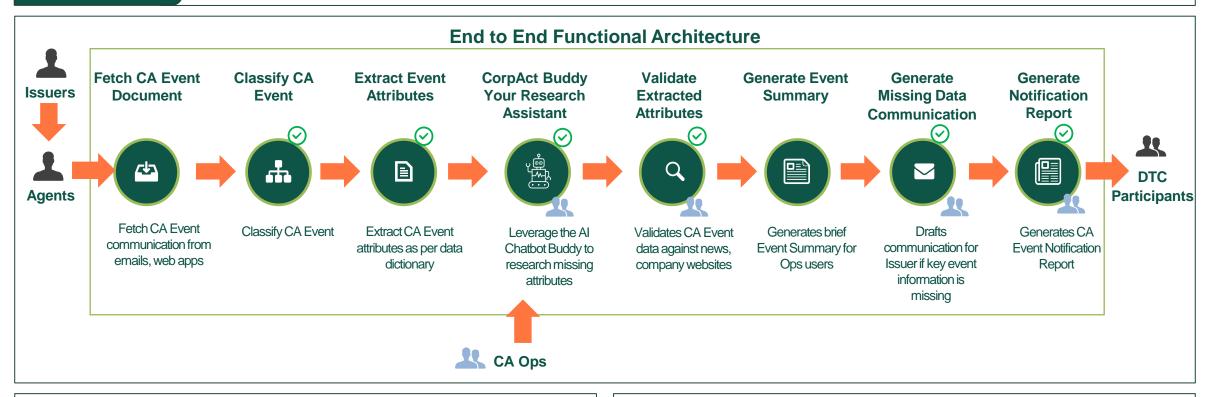
SIFMA US Corporate Actions Standardization Position Paper



Solution Overview

Our Approach

A scalable Generative AI-based system for ingesting, extracting, and validating corporate actions data



Key Features

End to End CA Event Sourcing Life Cycle

GenAl Solution

Operational
Efficiency with
Increased Accuracy

In-scope CA Events

Full Call Partial Call

Merger

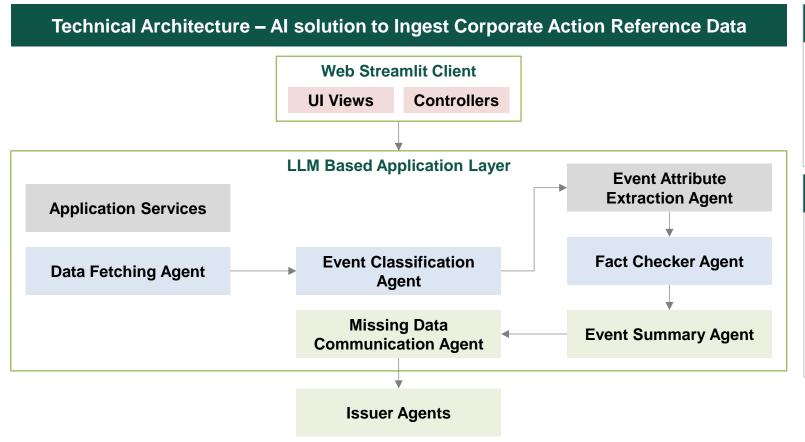








Technical Implementation



Tech Stack

Programming: Python

Storage: AWS S3

Deployment: AWS EC2

LLMs: claude-3-5-sonnet

Data Usage

- We used publicly available dataset (SEC regulatory filings)
- Leveraged Python libraries to pre-process regulatory filings
- Defined corporate actions contextual prompts to extract key event attributes using LLM calls

Applicable for Hackathon Implementation

Scalability	Accuracy	Maintenance	Implementation Complexity	Software Cost	Operational Costs	Responsible Al
High	Very High	Low	Low	Low	Low	N/A



Model Performance and Metrics

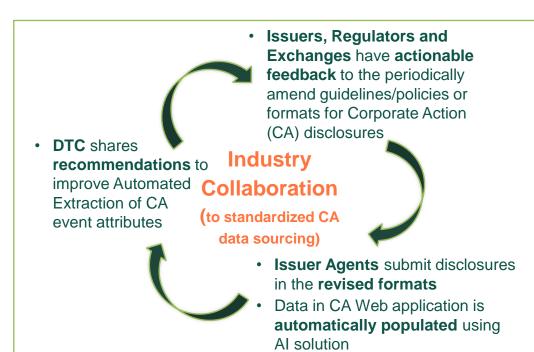
Metric Name	Performance Value	Comments
Precision	97%	Observed for in-scope CA events with limited data
Recall	100%	Observed for in-scope CA events with limited data
F1-Score	99%	Observed for in-scope CA events with limited data
False Positive Rate (FPR)	11%	Room to improve prompts for extracted attributes/false positives
Processing Time per Filing	70% to 80% reduction in processing time	Observed for in-scope CA events with limited data
Reduction in Manual Processing Costs	60% to 70% reduction in manual processing cost*	Observed for in-scope CA events with limited data
	Precision Recall F1-Score False Positive Rate (FPR) Processing Time per Filing Reduction in Manual	Precision 97% Recall 100% F1-Score 99% False Positive Rate (FPR) 11% Processing Time per Filing 70% to 80% reduction in processing time Reduction in Manual Processing Costs 60% to 70% reduction in manual

^{*} This includes manual processing cost, bottleneck (maker-checker) costs, penalty due to operational errors costs

Industry Impact, Collaboration and Production Viability

Path to Production

Measure	Hackathon Solution	Production Solution	Path to Production - Key Improvement Areas
Scalability	Medium	High	Leverage Cloud for Scalability and API for integrations
Accuracy	High	Very High	Implement Autonomous AgentsIntroduce Multi-model Capabilities
Maintenance	Low	Medium	LLM + RAG requires minimal fine- tuning
Implementation Complexity	Low	Medium	 Leverage Agentic RAG to optimize LLM usuage Improve UX/UI for intutive user experience
Software Cost	Low	Medium	Leverage Agentic RAG to optimize LLM usuage
Operation Cost	Low	Low	 Implement automated prompt to research missing attributes using CorpAct Buddy connected LLM have access to real-time data
Responsible Al	NA	Medium	 Implement controls around sending sensitive data to LLM/ CorpAct Buddy Implement Fact Check Agent for to avoid bias and data accuracy
Data Source	SEC 8K	Issuer Notice, Exchange Filing, News	 Expand scope to source/validate data using Issuer Notices, Exchange Filings, News etc. SEC EDGAR Integration

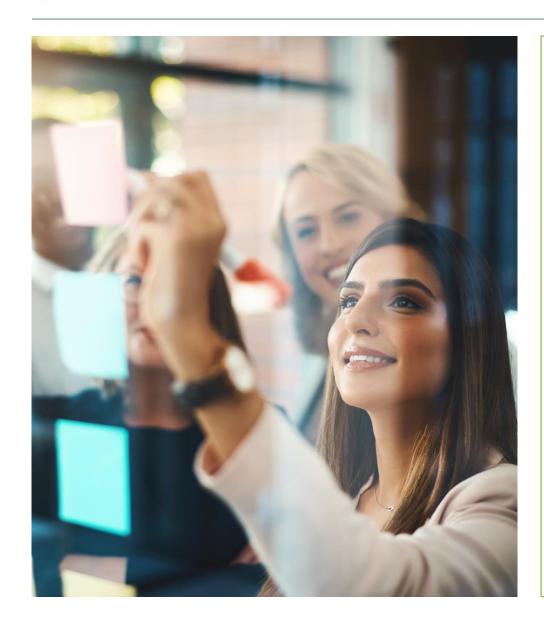


Challenges and Limitations

- Documents containing multiple CA events, event updates
- Complex documents containing tables/images
- Industry resistance to standardized document/data language
- CorpAct Buddy is not connected to LLM; accessing to real-time data



Solution Demo



Demo Steps





Upload CA Event Regulatory Filing

Upload 8K SEC Filing





Event Classification

Classify CA Event





Event Data Extraction

Extract CA Event attributes as per data dictionary





Human-in-the-loop and CorpAct Buddy

CA Ops review/ edit/ update event attributes, research using CorpAct Buddy





Event Summary Generation

Generates brief Event Summary for Ops users





Missing Data Communication

Drafts communication for Issuer Agent if key Event information is missing





Notification Report Generation

Generates CA Event Notification Report



Conclusion

Key Metrics

Business Impact

 We observed 70 to 80 % faster processing than traditional methods

Financial Efficiency

 This will help to cut corporate action processing costs by
 60% to 70%

Accuracy & Data Quality

 We observed high degree of accuracy and data quality – Precision – 97 %, Recall – 100 % and F1-Score – 99 %

Al Opportunity

Key metrics confirm that
Gen Al Solution holds
tremendous potential to
automate the extraction of
corporate actions
information from documents.





Industry Benefits



Promotes Straight
Through Processing



Reduction in Operations Cost



Reduction in Operational Risk



Enhanced Accuracy and Timelines



Industry Collaborations



Thank You

Financial Markets.

Forward.



Appendix 1. Metrics Measurement



- 2. Application Screenshots



Metrics measurement (1/2)

Raw Measurement

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Metrics measurement (2/2)

Overall Scores

CA Metrics																
Events	# of documents tested	# of attributes in event	# of attributes extracted	# of attributes tested	% Completeness	# of accurate attributes	% Accuracy	Time Taken to Record (in Min)	True Positive- TP	False Positive - FP	True Negative - TN	False Negative- FN	Precision = TP/(TP+FP)	Recall = TP/(TP+FN)	F1 Score = 2×Precision×Recall / (Precision+Recall)	FPR (False Postive Ratio) = FP / (FP+TN)
Full Call	4	84	84	84	100%	82	98%	99	66	2	16	0	97%	100%	99%	11%
Doc 1 - Enovix Corp	1	21	21	21	100%	20	95%	24	16	0	5	0	100%	100%	100%	0%
Doc 2 - Marina Joint Powers Financing Authority	1	21	21	21	100%	20	95%	28	16	1	4	0	94%	100%	97%	20%
Doc 3 - Cyxtera Technologies	1	21	21	21	100%	21	100%	25	17	0	4	0	100%	100%	100%	0%
Doc 4 - CITY OF ARLINGTON, TEXAS	1	21	21	21	100%	21	100%	22	17	1	3	0	94%	100%	97%	25%
Partial Call	3	63	63	63	100%	59	94%	80	51	3	8	0	94%	100%	97%	27%
Doc 1- American Pacific Corporation	1	21	21	21	100%	20	95%	30	18	1	2	0	95%	100%	97%	33%
Doc 2- Coca Cola	1	21	21	21	100%	20	95%	30	16	0	4	0	100%	100%	100%	0%
Doc 3- Hertz	1	21	21	21	100%	19	90%	20	17	2	2	0	89%	100%	94%	50%
Merger	4	68	68	68	100%	63	93%	102	36	2	27	3	95%	92%	94%	7%
Doc 1- Merger_Cash&Securities_SEC_AT&T	1	17	17	17	100%	16	94%	30	10	0	6	1	100%	91%	95%	0%
Doc 2 - Merger_Stock_SEC_AMR	1	17	17	17	100%	15	88%	26	9	2	6	0	82%	100%	90%	25%
Doc 3 - Merger_Stock_SEC_Disney	1	17	17	17	100%	16	94%	24	8	0	8	1	100%	89%	94%	0%
Doc 4 - Merger_Cash_SEC_MSFT	1	17	17	17	100%	16	94%	22	9	0	7	1	100%	90%	95%	0%
Overall Score	11	215	215	215	100%	204	95%	281	153	7	51	3	96%	98%	97%	12%
Industry Danahasada					_											

Industry Benchmark

FI Score

Good F1 Score: In most real-world applications, an F1 score around 0.85 - 0.95 is considered excellent for automated extraction of structured corporate action data from well-structured documents (e.g., ISO 20022 messages, spreadsheets, etc.).

Moderate F1 Score: For less structured or noisy data (e.g., press releases, unstructured text), a 0.70 - 0.85 F1 score may be achievable, but performance will likely vary depending on how clean and standardized the data is.

Lower F1 Score: For complex, highly ambiguous documents with non-standardized formats, F1 scores below 0.70 may be expected, but these can be improved with additional fine-tuning and better preprocessing techniques.

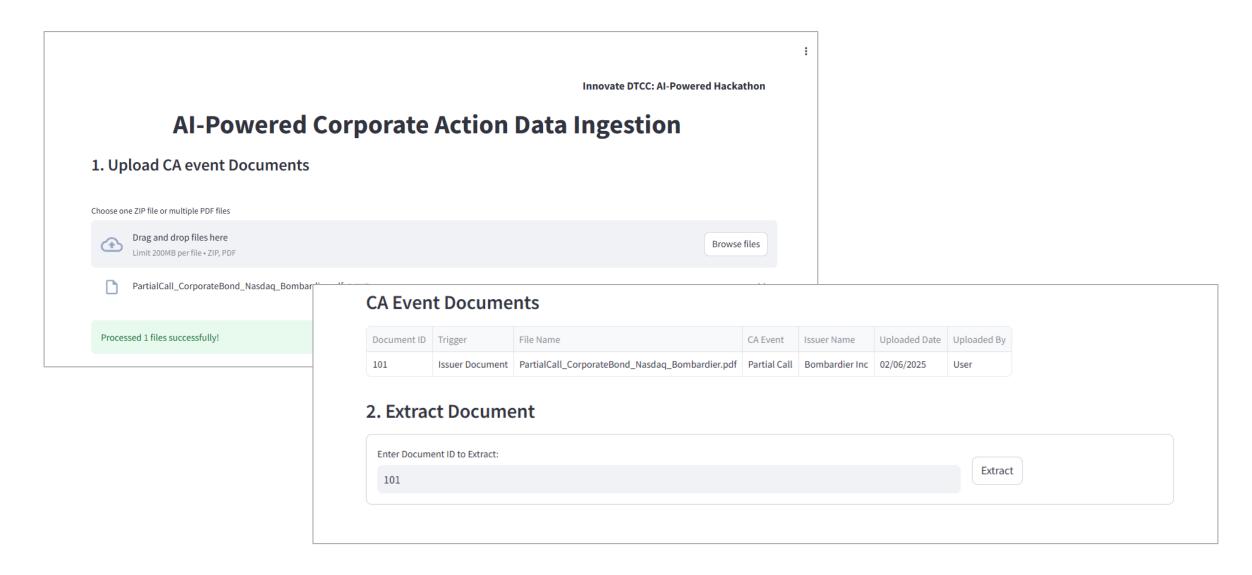
FPR Score

Excellent Performance (Low FPR): An FPR of less than 5% is generally considered excellent in financial document extraction. A system with such a low FPR is good at correctly identifying corporate action events without flagging too many non-events.

Good Performance (Moderate FPR): A moderate FPR range of 5% - 10% is often seen in many practical implementations of corporate action extraction systems. This range still allows for high precision and avoids overwhelming users with too many false positives.

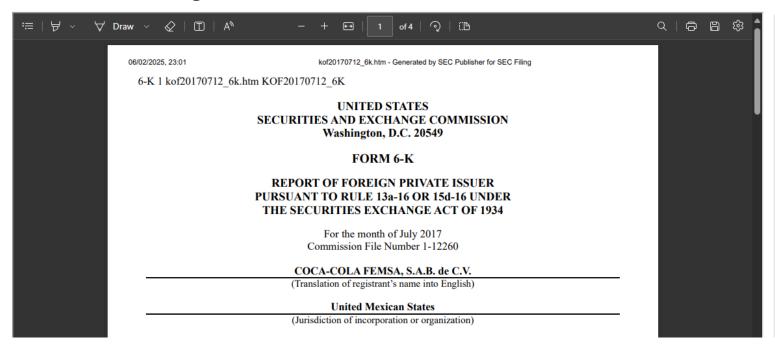
Acceptable Performance (High FPR): An FPR above 10%, especially in systems designed for high-volume processing, may indicate that the model or extraction process needs tuning or improvements, as a higher FPR could significantly increase the number of false alarms.

Application Screenshots (1/3)



Application Screenshots (2/3)

3. Partial Call Processing



	₹ Attribute Name	■ Attributes Type	= Extracted Value
1	basecusip	М	Not Available
2	class	М	2.375% Senior Notes due 2018
3	conditionalpaymentapplic	М	No
4	contactemail	М	mariadyla.castro@kof.com.mx,
5	contactphonenumber	М	(5255) 1519-5186, (5255) 1519-52
6	currency	М	USD
7	cusip	М	Not Available
8	caevent	М	Partial Call
9	caeventcategory	М	Redemptions
10	issuername	М	Coca-Cola FEMSA, S.A.B. de C.V.
11	securitysymbol	М	KOFL, KOF
12	maturity	М	2018
13	outstandingnumberofsecu	M	555,000,000

Chat with CorpAct Buddy

Welcome back, How can I assist you with your Corporate Actions Research today?

Application Screenshots (3/3)

4. Missing Data Communication Email

Issue summary:

Issuer: Bombardier Inc.

Security Name: Corporate Bond

Event Type: Call

Upon review, we have identified the following mandatory data points that are currently missing:

- cusip
- outstandingnumberofsecurities
- premiumcashrate

To ensure accurate processing and timely communication to stakeholders, please provide the missing details at your earliest convenience. Let us know if further clarification is needed.

Copy