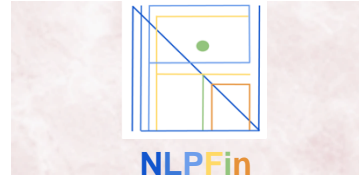# GADFA: Generator-Assisted Decision-Focused Approach for Opinion Expressing Timing Identification

NLPFin

Chung-Chi Chen, Hiroya Takamura, Ichiro Kobayashi, Yusuke Miyao, Hsin-Hsi Chen

Artificial Intelligence Research Center, AIST, Japan
Ochanomizu University, Japan
University of Tokyo, Japan
National Taiwan University, Taiwan

Overview

- Previous works discussed the significant influence of professionals' opinions (like those from CDC or financial analysts) on public decision-making and market movements.
  - **Understand** (From Opinion Mining to Financial Argument Mining. Springer Nature)
  - **Generate** (From Facts to Insights: A Study on the Generation and Evaluation of Analytical Reports for Deciphering Earnings Calls. COLING-2025)
- This Paper
  - Introduce a novel task — identifying the **optimal timing for expressing opinions**, an underexplored area in opinion dynamics
  - Introduces GADFA, which **integrates an opinion generator** to mimic professional decision processes by generating analysis from news before deciding on report issuance
- News-Triggered
  - Previous Work: Market Information Prediction
 - This Paper: **Timing for Expressing Opinions**

Task

- **Primary Source Selection: News** articles are chosen as the primary source for the models due to their up-to-date coverage of financial markets, summarizing information from diverse sources including financial reports and social media.

- **Task Definition:** The task involves predicting whether a professional analyst will release a report the day after the news is published, considering news from a set time period before the report day (**T=0 or T=5** days).

- **Statistical Overview:** Data includes statistics of news reports influencing whether reports are released or not, under different time settings (T).

	Release Report	Not Release Report
Train	2,717	2,717
Development	322	322
Test	325	325
Total		6,728

|	$T = 0$	$T = 5$
One News	3,632	3,051
More Than One News	3,096	3,677

Dataset

- **Data Sources:** Utilizes Bloomberg Terminal for analysis reports and major Chinese news outlets for gathering news, covering the period from **2014 to 2020**.

- **Dataset Alignment and Filtration: Aligns data by release times, filters for instances with news on day t and reports on day t+1**, and controls for stock based on the positive instances to mitigate bias.

- **Yearly and Monthly Report Distribution:** Analyzes the distribution of report releases throughout the year, noting peaks **during months of financial statement releases – March, August, November**.

- **Day-of-Month Trends:** Reports tend to be released less at the beginning and more towards the **middle and end of the month**, correlating with companies' revenue disclosures.
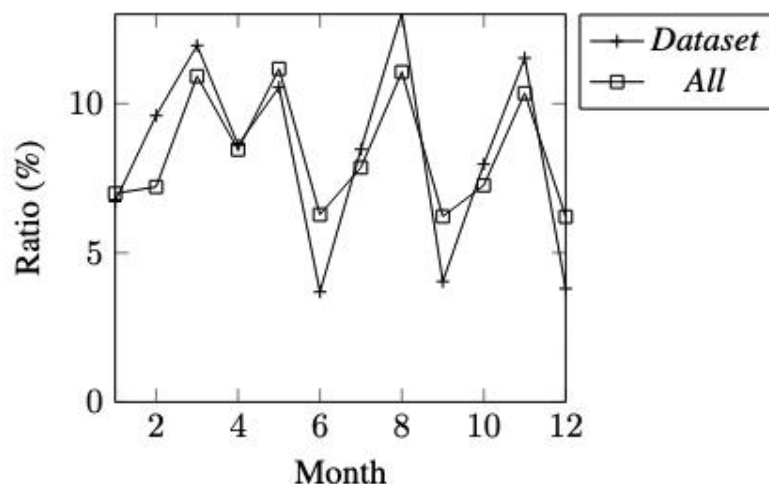
Period	Dataset	All
Beginning of the month	29.04%	29.73%
Middle of the month	34.48%	35.41%
End of the month	36.47%	34.85%

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GADFA: Generator-Assisted Decision-Focused Approach
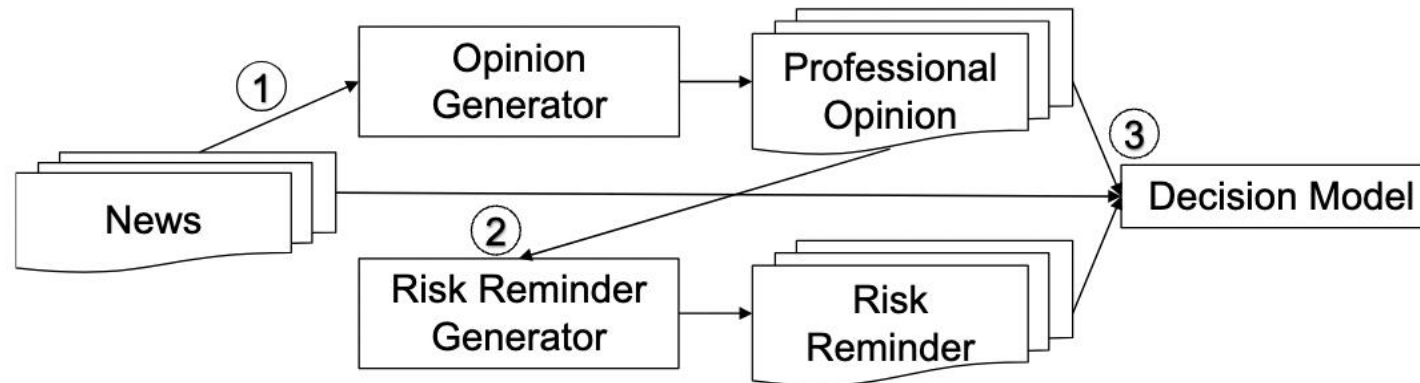
News	Key takeaways from Quanta's 1Q22 analyst call included: 1) 1Q22 GMs dipped to an eight-quarter low due to inferior product mix and inefficient production; 2) weak 2Q22 earnings outlook with both PC demand weakness and supply constraints…
Professional Opinion	We believe that QCT could suffer from a potential slowdown in enterprise spending, while China hyperscalers' demand also seems a bit mellowed down in the near term. We forecast 23%/10% server revenue growth for Quanta in 2022/23.
Risk Reminder	Key downside risks include margin erosion in servers and a potential slowdown of PC demand post Covid-19.

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Opinion & Risk Reminder Generators
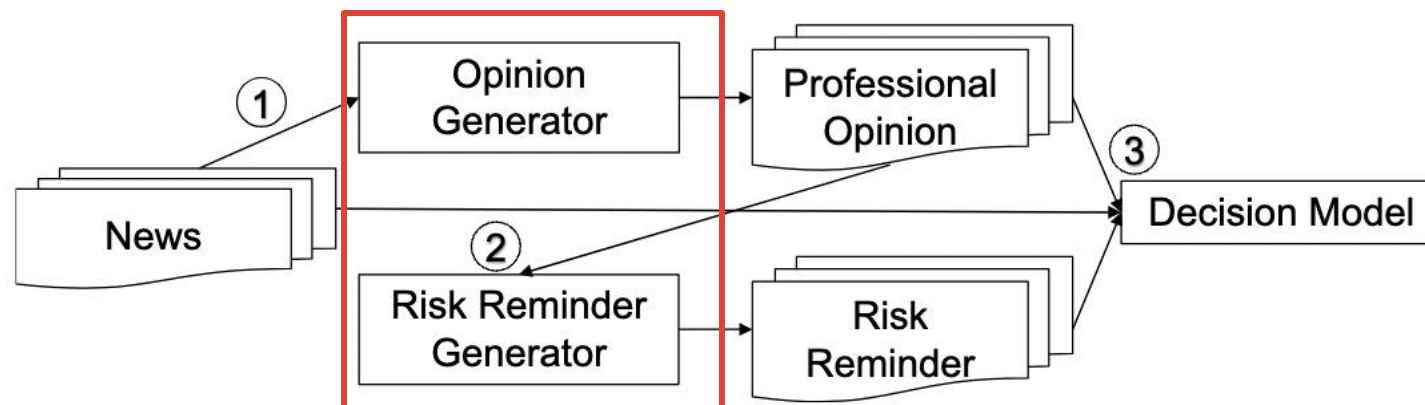
	Opinion Generator				Risk Reminder Generator			
	ROUGE-1	ROUGE-2	ROUGE-L	BERT Score	ROUGE-1	ROUGE-2	ROUGE-L	BERT Score
mT5	0.1238	0.0475	0.1195	0.6471	0.6630	0.4878	0.6554	0.8581
Pegasus	0.2098	0.0951	0.1997	0.7034	**0.6883**	**0.5306**	**0.6801**	**0.8752**
Mengzi T5	**0.2397**	**0.1150**	**0.2250**	**0.7061**	0.6652	0.5130	0.6591	0.8745

	Professional Opinion		Risk Reminder	
	Sentiment	Entity	Sentiment	Entity
mT5	25.44%	0.47%	65.68%	72.05%
Pegasus	48.38%	39.96%	71.96%	72.35%
Mengzi T5	49.38%	40.06%	76.01%	79.50%

	Professional Opinion		Risk Reminder	
	Sentiment	Entity	Sentiment	Entity
mT5 vs. Pegasus	24.94%	25.60%	63.47%	43.76%
mT5 vs. Mengzi T5	29.68%	27.63%	64.57%	70.69%
Pegasus vs. Mengzi T5	52.37%	25.05%	59.78%	47.77%

Examples of Generated Opinions

- **Sentiment Analysis:** Both the generation models and professional analysts express neutral sentiments towards the analyzed company, indicating alignment in sentiment analysis capabilities.

- **Numerical Inaccuracies:** There are discrepancies in numerical data between the model-generated opinions and those from professional analysts (e.g., revenue figures of 5.032 billion vs. 99 billion).

- **Temporal Misalignments:** The models sometimes generate temporal information that does not match the timelines given by analysts (e.g., fiscal years 2018/19 vs. 2019/20).

- **Estimation Variances:** Differences in financial estimations were noted, such as earnings per share figures of 3.08/3.17 yuan vs. 3.44/3.68 yuan, suggesting potential issues in the model's estimation capabilities.

Given News	Uni-President announced its Q3 financial report last night. The net profit after tax in the third quarter was **5.032 billion yuan**, down 8.23% quarter-on-quarter and 11.92% year-on-year. The single-quarter EPS was 0.89 yuan, a relatively large decline.
Analyst	Third-quarter earnings fell short of expectations, mainly due to slower earnings growth at several key subsidiaries. We continue to view UPC's high-end product strategy positively, coupled with a 3% cash yield, which is usually a safe haven during market volatility. However, it is believed that the current stock price upside is limited, mainly due to the slow growth of the Chinese business entering the off-season and the slow growth of convenience stores due to e-commerce fees. It is recommended to be neutral, and the EPS in **2018/19** is estimated to be **3.08/3.17 yuan**.
mT5	The Center believes that the decline in UPC's net profit after tax in the fourth quarter is expected to increase quarter by quarter, because 1) the Chinese government intends to reduce the pressure through early repayment and lower interest rates. Stress is lessened, so we remain neutral on Uni-President Enterprises Corporation.
Pegasus	Uni-President's 3Q19 net profit after tax was **99 billion yuan**, lower than expected, mainly due to the group's deferred capital expenditures and shipments. Looking forward to the market outlook, we believe that Uni-President will continue to benefit from its high-value strategy, coupled with the strengthening of Uni-President's profit rate outlook, and Uni-President's same-store sales growth in the second half of 2019 is expected to improve, and we recommend paying close attention. Estimated EPS for **2019/20** are **3.44/3.68 yuan**.
Mengzi T5	Although Uni-President's revenue showed a quarterly decline, Uni-President's revenue showed a quarter-to-quarter decline that was slightly lower than expected. We continue to take a positive view on UPC's high-end product strategy and the recent purchases on revenue and profit. However, we suggest waiting for a better time, because: 1) China's business is facing slower consumption upgrades and intensified competition; 2) UPC has surpassed this year's Earnings outlook is flat, as e-commerce fee revenue growth momentum slows and reinvestment gains are modest.

Opinion vs. Risk Reminder

- **Text Length Comparison:** Models generally produce shorter texts compared to the ground truth in both the investment generation and risk reminder generation tasks.

- **Token Utilization:** The models use fewer tokens than the ground truth, with mT5 employing the fewest tokens among the three models tested.

- **Content Replication:** Approximately 50% of the words in the risk reminders generated by the models can be directly copied from the input, which consists of professional opinions.

		Professional Opinion	Risk Reminder
Analyst	Avg. # Words	93.29	44.56
	Unique Token	15,217	2,113
	Words from Input	15.33%	49.60%
	Positive	46.88%	20.66%
	Negative	33.17%	49.08%
	Neutral	19.95%	30.26%
mT5	Avg. # Words	66.23	37.77
	Unique Token	1,873	915
	Words from Input	33.68%	72.54%
	Positive	12.72%	21.40%
	Negative	3.24%	49.08%
	Neutral	84.04%	29.52%
Pegasus	Avg. # Words	63.53	40.20
	Unique Token	3,865	1,110
	Words from Input	32.91%	74.88%
	Positive	46.88%	17.71%
	Negative	30.92%	35.43%
	Neutral	22.19%	46.86%
Mengzi T5	Avg. # Words	68.08	38.82
	Unique Token	3,913	1,054
	Words from Input	31.76%	75.41%
	Positive	42.14%	19.56%
	Negative	30.42%	50.55%
	Neutral	27.43%	29.89%

News-Triggered Opinion Expressing Timing Identification

Method	Input of Decision Model	$T = 0$	$T = 5$
CPT		74.31%	70.44%
	News	75.64%	77.79%
BERT	News + XL-Sum Abstract	73.46%	77.25%
	News + mT5 Professional Opinion and Risk Reminder	77.80%	78.28%
GADFA	News + Pegasus Professional Opinion and Risk Reminder	77.75%	78.72%
	News + Mengzi T5 Professional Opinion and Risk Reminder	**78.12%**	**79.52%**

Opinion Generator	Macro-F1
mT5	76.71%
Pegasus	78.36%
Mengzi T5	78.34%
mT5 + Pegasus + Mengzi T5	**78.54%**

Without Risk Reminder

Opinion Generator	Macro-F1
mT5	67.45%
Pegasus	67.84%
Mengzi T5	**70.58%**

Only Generated Opinion

Future Work – Extensions

Generate More Forward-Looking Statements

- Company Manager Aspect
  - Term-Driven Forward-Looking Claim Synthesis in Earnings Calls. LREC-COLING-2024
- Analyst's Aspect
  - From Facts to Insights: A Study on the Generation and Evaluation of Analytical Reports for Deciphering Earnings Calls. COLING-2025
- Multimodal Resource

Historical Price → **Noted Price Chart** → **Analysis**

The rally from 1.08.2024 low at $135.09 unfolded as 5 waves impulse. So, we expected the pullback to unfold in 3 swings and find buyers again. We will explain the structure & forecast below: Here is the 1H Elliott Wave count from 1.17.2024. We expected the pullback to find buyers against 1.08.2024 low at red 2 in a 3 swing structure (ABC).

Chart to Analysis

Encoder	Decoder	ROUGE-1	ROUGE-2	ROUGE-L	BERTScore
TrOCR		0.2167	0.0958	0.1517	0.81015
DeiT	BERT	0.2410	0.1120	0.1646	0.82776
	RoBERTa	0.2333	0.1083	0.1615	0.82536
	LinkBERT	0.2373	0.1118	0.1604	0.83267
Swin	BERT	0.2323	0.1071	0.1588	0.82660
	RoBERTa	0.2440	0.1198	0.1685	0.83143
	LinkBERT	0.2431	0.1170	0.1665	**0.83514**
ViT	BERT	0.2336	0.1019	0.1554	0.82535
	RoBERTa	**0.2444**	**0.1213**	**0.1695**	0.83311
	LinkBERT	0.2361	0.1105	0.1598	0.83283

Error Analysis

- **Fluency of Arguments:** The generated arguments are generally fluent, indicating good linguistic capability.

- **Historical Data Interpretation Challenges:**
  - **Temporal Accuracy:** The model sometimes misidentifies significant historical points, generating incorrect time stamps as seen in the example where a different time stamp was provided compared to the ground truth.
  - **Numerical Detail Recognition:**
    - **Price Level Information:** Accurate identification of numerical details on the chart's y-axis is crucial for generating correct arguments.
    - **Incorrect Numerals:** Errors occur when the model fails to correctly interpret or reproduce the numeral information, leading to inaccuracies in the generated arguments.

- **Forward-Looking Price Movement Understanding:**
  - **Investor's Perspective:** Understanding and accurately generating forward-looking statements based on the chart's indicated future price movement is a significant challenge.
  - **Sentiment Mismatch:** There are cases where the sentiment of the model-generated content does not align with the ground truth.

Index	Ground Truth	Generated Argument
C2A-1	$SAN : Sanofi Shows Monthly Bullish Structure May 6, 2020 By EWF Helgi Sanofi S.A. is a French multinational pharmaceutical company being within 10 largest pharmaceutical companies in the world.	$FP : Pattern of Total stock can be better January 19, 2020 By EWF Helgi Total SA is a German multinational company which designs, develops, and markets smart and connected premium electric vehicles, driving innovations in next generation technologies in connectivity, autonomous driving, and artificial intelligence.
C2A-2	Elliott Wave View: Apple in Zigzag Correction March 26, 2020 By EWFHendra Short Term Elliott Wave view in Apple (AAPL) suggests that cycle from February 13, 2020 high has ended at 212.6 low as wave w.	Elliott Wave View: Apple (AAPL) Continues to Benefit from Covid-19 Pandemic September 4, 2020 By EWFHendra Short term Elliott Wave view in Apple (Ticker: AAPL) suggests the rally from August 15, 2020 low is unfolding as a 5 waves impulse Elliott Wave structure.
C2A-3	wave ((i)) ended at 88.20	wave ((i)) ended at 64.49
C2A-4	Thus provided buying opportunity to our members at the blue box area looking for the next extension higher or for 3 wave reaction higher at least.	We suggested members to keep on selling the rallies in the blue box areas when get 3 waves down, while favoring buying the short side.

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Temporal Inference

- **Argument-Based Sentiment Analysis on Forward-Looking Statements – ACL-2024**
  - Analysis Report Impact Duration Inference (from investment aspect)

- **Pre-Finetuning with Impact Duration Awareness for Stock Movement Prediction – NTCIR FinArg-2 2025**
  - Social Media Impact Duration Inference (from investment aspect)

- **DynamicESG: A Dataset for Dynamically Unearthing ESG Ratings from News Articles – CIKM-2023**
  - ESG Event Impact Duration Inference (from Environmental, social, and governance aspect)

Type	Model	Accuracy	F1
SMP Model	StockNet	46.72%	44.44%
	HAN	57.35%	56.61%
	SRLP	61.76%	61.69%
PLM	BERT-Chinese	58.36%	58.33%
	Multilingual-BERT	58.36%	58.16%
	Chinese-BERT	60.32%	60.33%
	Mengzi-BERT	59.72%	59.70%
	Mengzi-BERT-Fin	57.61%	57.44%
Proposed	IDED-BERT	63.17%	62.92%
	IDED-mBERT	62.90%	62.84%
	IDED-CBERT	61.68%	61.36%
	IDED-Mengzi	64.05%	64.09%
	IDED-Mengzi-Fin	**64.18%**	**64.15%**

Conclusion

- We introduced the task of identifying the **timing of expressing opinions** triggered by news and proposed GADFA to address this task.

- We demonstrated that augmenting the decision model with **risk reminders** improves performance.

- Various discussions on model comparison, linguistic features, and analyst behavior based on temporal conditions provided a comprehensive understanding of GADFA and the task.

- Our approach is extendable to other professional behavior forecasting tasks, aligning with the steps involved in the decision-making process.

- In the future, we plan to explore GADFA's application in domains like clinical decision-making and **forecasting trading behavior**

Related Events

- ACL Special Interest Group on Economic and Financial Natural Language Processing (SIG-FinTech)
  - https://sigfintech.github.io/index.html

- The 10th Workshop on Financial Technology and Natural Language Processing
  - EMNLP-2025, Nov. 5th-9th, 2025, Suzhou, China
  - Call for Paper
  - https://sigfintech.github.io/finnlp.html

- Financial Information Access and Evaluation (FinEval)
  - Call for Task Proposal
  - Task proposals Due: 31 January 2025
  - https://sigfintech.github.io/fineval.html