

DLP Final Project Proposal: Market Guided Stock Transformer

Group

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Outline

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- Motivation & Innovation
- Problem Definition

Introduction - Market Guided

Stock prediction features can be divided into two types:

1. Individual Stock Features:

- Open price, close price, etc.
- Trading volume

2. Shared market features:

- Market index
- Macroeconomic indicators, e.g. interest rate

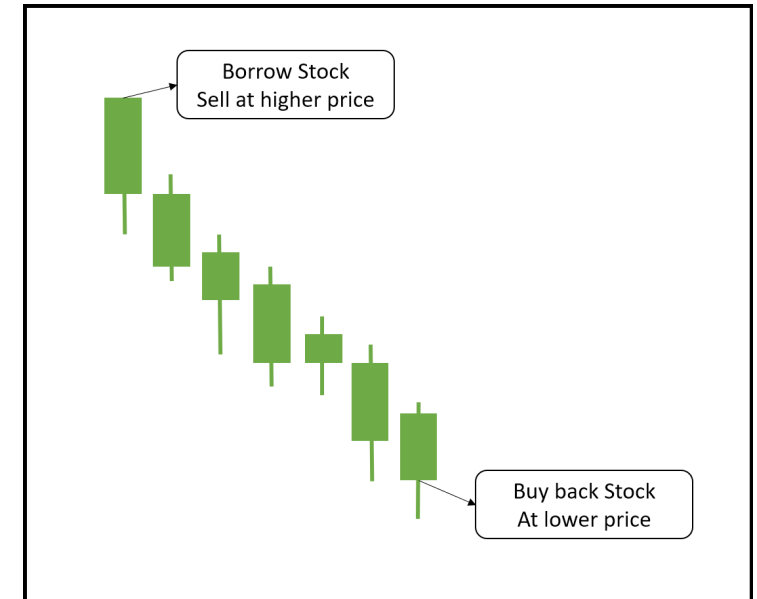
Introduction - Market Guided

The market feature impacts the effectiveness of other features.

Example: Short Selling

When investors believe a stock is overvalued.

1. Borrow stock, sell at high price.
2. Buy back at lower price when it falls.
3. Return to owner.



Introduction - Market Guided

The market feature impacts the effectiveness of other features.

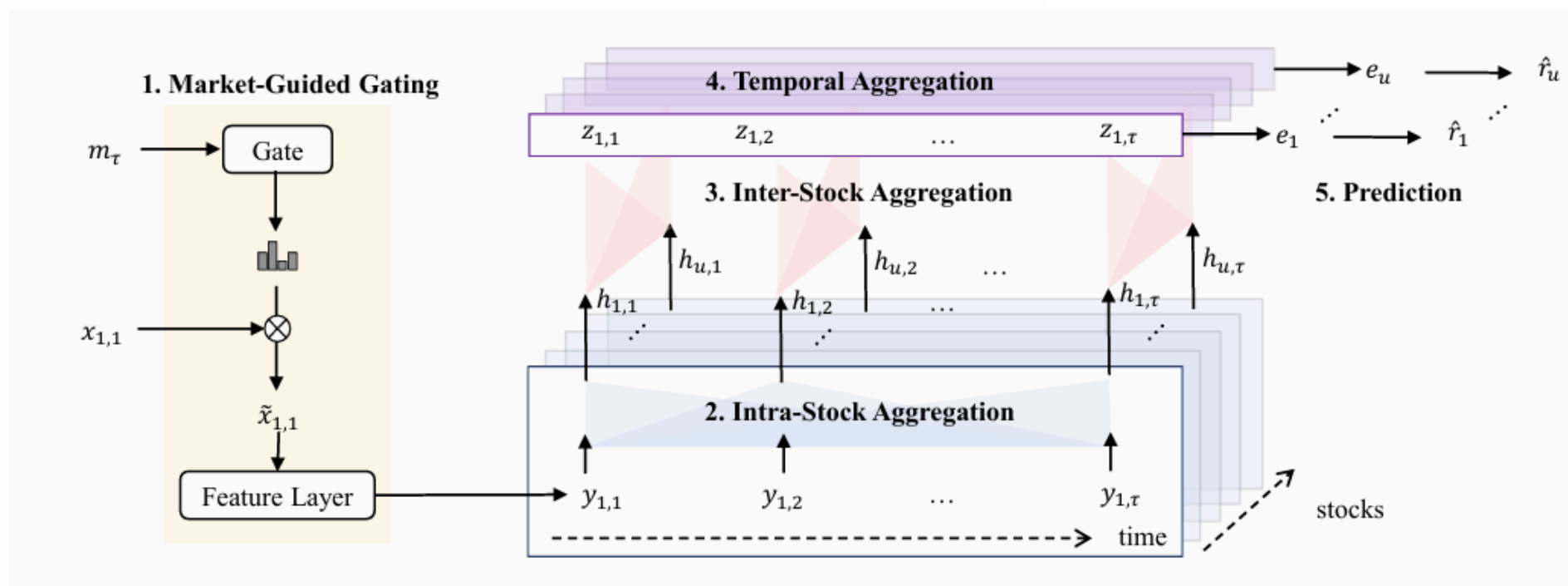
Example: Short Selling

Effectiveness in different market status:

- Bull Market: Short selling loses money, less concern.
- Bear Market: Short selling signals pessimism, more significant.

→ **Using market status to select relevant features.**

MASTER:Market-Guided Stock Transformer for Stock Price Forecasting ^[1]



Motivation

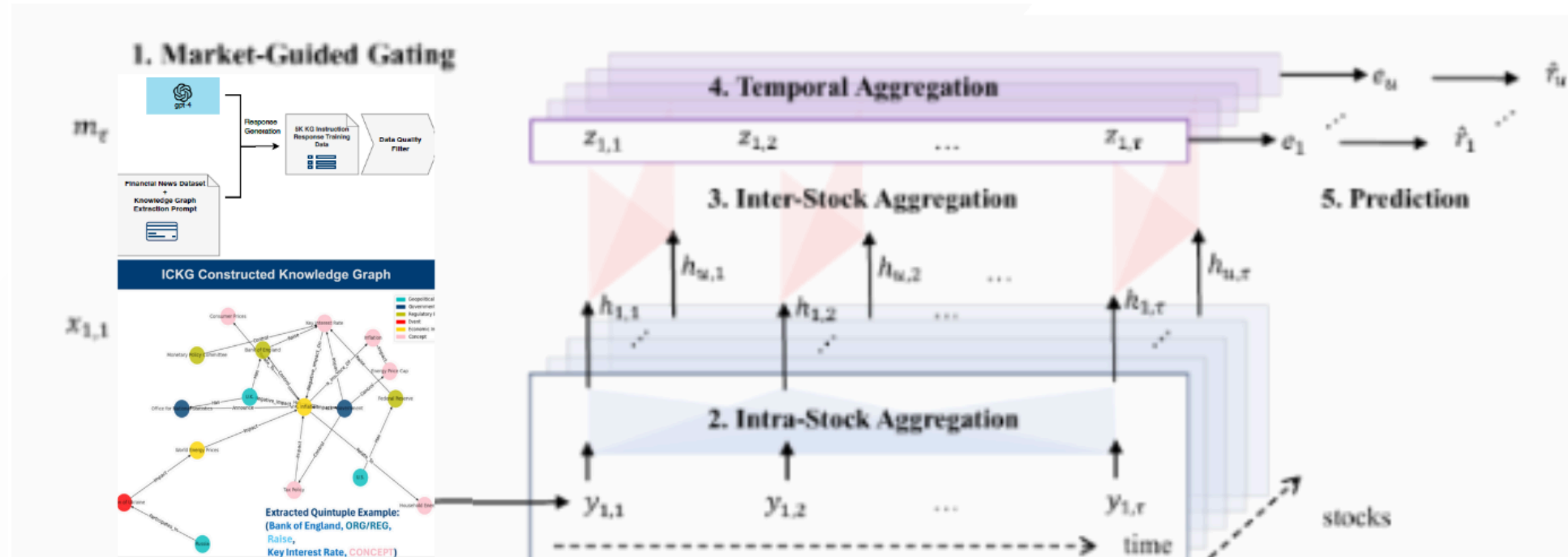
Stock price forecasting methods face significant limitations in capturing the complete financial ecosystem:

Isolated data sources:

Models typically rely on either technical indicators or news events

- Supply chain relationships between companies
- Cross-company news undetected influence
- Industry-wide effects
 - **approach incorporating cross-company dynamics**

Innovation



- **MASTER:** dynamic stock correlations with market-guided feature
- **FinDKG:** company relationships to identify business partners

Problem Definition

Given a set of stocks S with features $x_{u,t} \in \mathbb{R}^F$ collected at time steps $t \in [1, \tau]$:

For each stock, we consider:

- Technical features (price, volume)
- News-derived features
- Causal relationships with other stocks

The normalized return ratio $r_u = \text{Norm}_S((c_{u,\tau+d} - c_{u,\tau+1})/c_{u,\tau+1})$ is prediction target.

Data Description

The dataset for input of this study consists of the following data:

- **Stock prices**
- **Industry**
- **Market index**
- **Economic indicator**
- **Sentimental scores**

Data Description (cont.)

- **Stock Price:**

Using the S&P 500 constituents as our base, we classify stocks into 12 categories following the Fama-French industry classification [3].

From each category, 8 companies are selected based on market capitalization, resulting in a total of 96 firms.

For each selected company, we collect daily stock data, including open, high, low, and close prices and trading volume.

Data Description (cont.)

- **Industry:**

The industry returns are derived from the Fama-French 12 industry classification dataset.

- **Market Index:**

S&P 500 market index

- **Economic Indicators:**

We use interest as our economic indicator.

- **Sentimental Scores:**

Daily news sentiment from RavenPack [4] is used to measure its impact on the market and stocks.

Data Description (cont.)

NAME	NUMBER	TRAINING	TEST	SOURCE
Stock Price	96 * 5	2010 - 2022	2023	WRDS - CRSP
Industry	12	2010 - 2022	2023	Fama-French
Market Index	1	2010 - 2022	2023	CRSP
Economic Indicators	1	2010 - 2022	2023	VIX
Sentimental Scores	6	2010 - 2022	2023	Ravenpack

Example of footer

MASTER:Market-Guided Stock Transformer for Stock Price
Forecasting ^[1]

Example of table

OFTIC	ACTDATS	ESTIMID	ALYSNAM	HORIZON	VALUE	ESTCUR
GOOGL	2015-10-23	GOLDMAN	BELLINI, CFA H	12	42.50	USD
2330	2014-10-21	CSCFH	CHEN L	3	140.000	TWD

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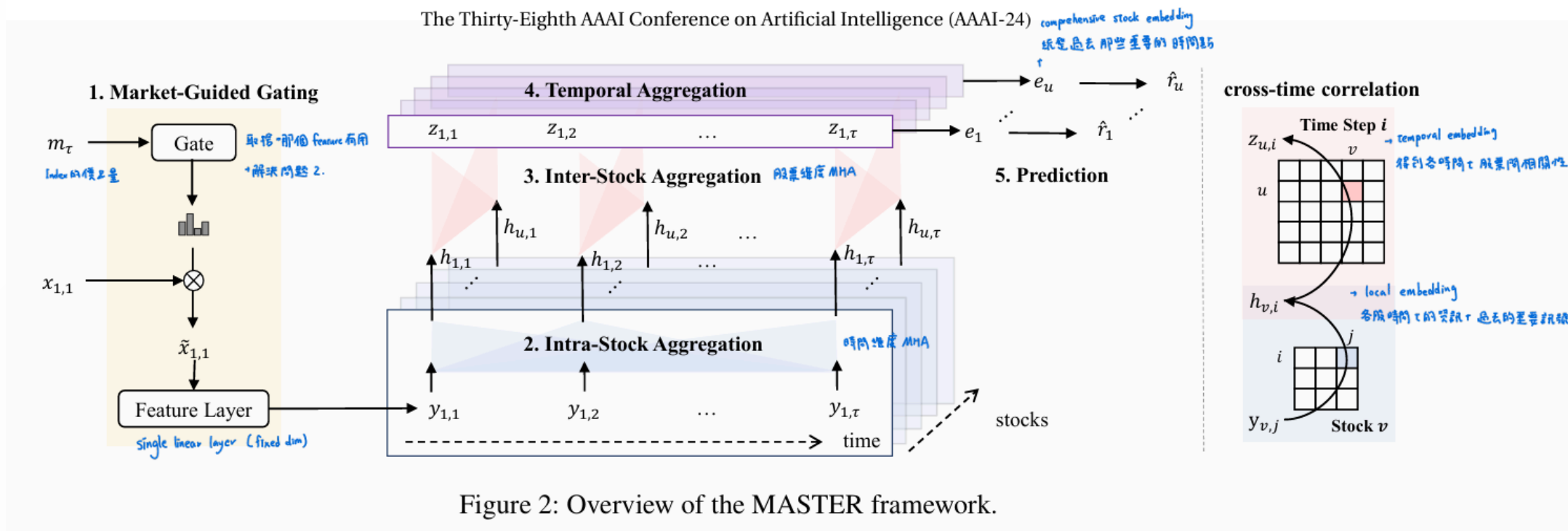


Figure 2: Overview of the MASTER framework.

References

- [1] Li, T., Liu, Z., Shen, Y., Wang, X., Chen, H., & Huang, S. (2024). MASTER: Market-Guided Stock Transformer for Stock Price Forecasting. In Proceedings of the AAAI Conference on Artificial Intelligence, 38(1), 162-170.
- [2] Xie, J., Zhang, Y., Gong, X., Huang, J., Li, Z., Qin, B., & Liu, T. (2023). CausalStock: Deep End-to-end Causal Discovery for News-driven Stock Movement Prediction. In Proceedings of the 46th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR '23) (pp. 2320-2329). ACM.