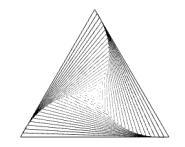


**Enique**

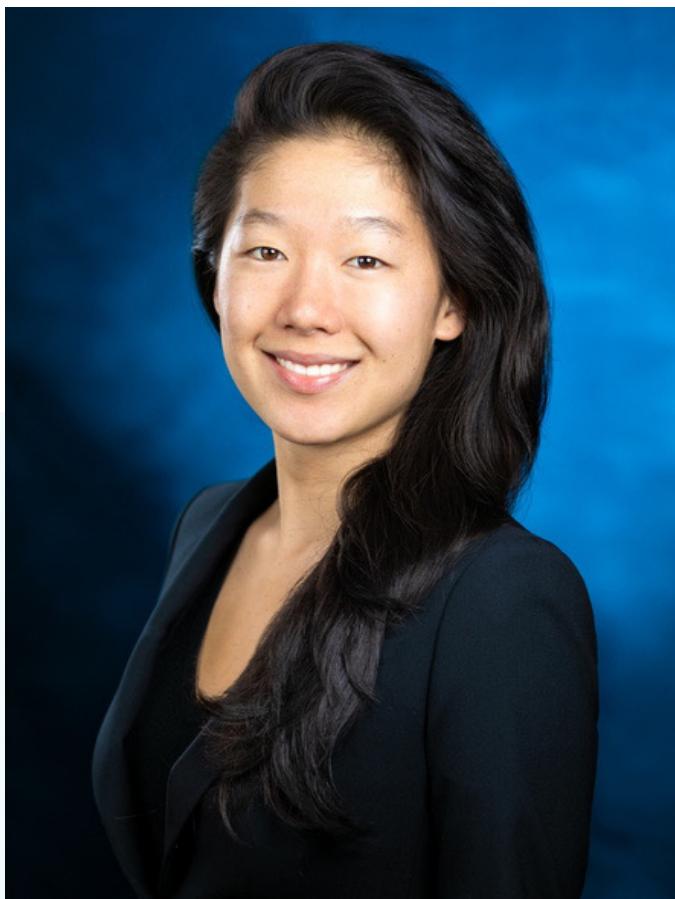
# AUTONOMOUS INVESTMENT ADVISOR

Anna Han, Mu Mio, Esther Xu  
University of Chicago. MScA 2024



Enique

## OUR TEAM



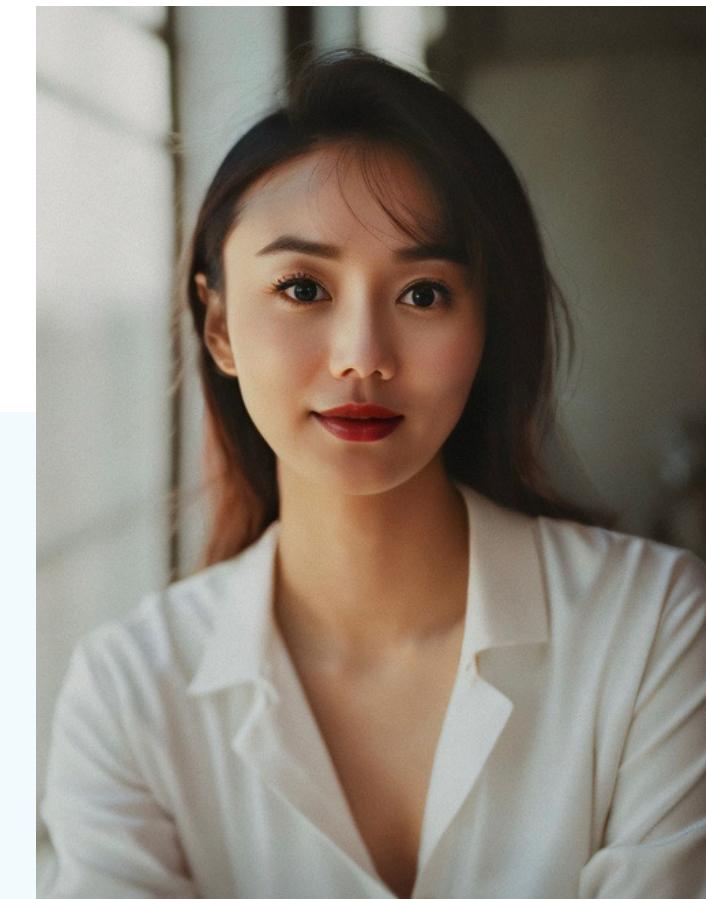
**ANNA HAN**

[ahan92@uchicago.edu](mailto:ahan92@uchicago.edu)



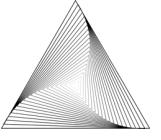
**MU MIO**

[airc@uchicago.edu](mailto:airc@uchicago.edu)



**ESTHER XU**

[estherxu@uchicago.edu](mailto:estherxu@uchicago.edu)



## EXECUTIVE SUMMARY

Enique is a conversational AI investment advisor integrated with a proprietary price prediction model.

Enique runs autonomously in real-time.



# TABLE OF CONTENTS

- 01 Purpose
- 02 Data
- 03 Methodology
- 04 Findings
- 05 Conclusion
- 06 Appendix





Purpose

# PROBLEM STATEMENT



An expensive economy has intensified the struggle to afford simple pleasures.

Investing in financial assets can alleviate this burden, but the path is fraught with challenges.



**INVEST ALONE**

Daunting, elusive,  
time consuming.



**OUTSOURCE**

Costly, inaccessible.



**PLAY IT SAFE**

Misaligned with  
immediate needs.

# BUSINESS VALUE

Financial Literacy

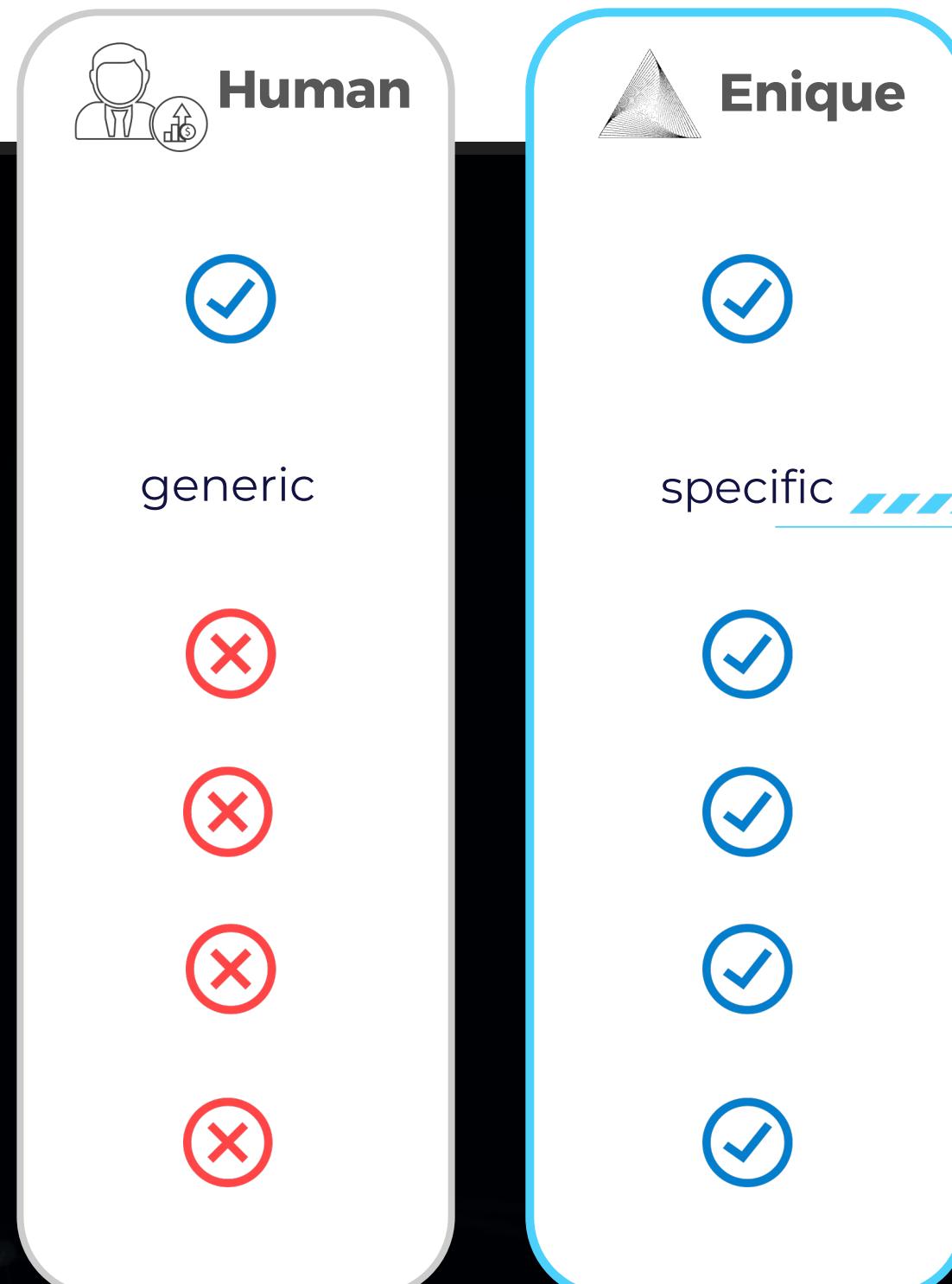
Investment Strategy

Bespoke Analyses

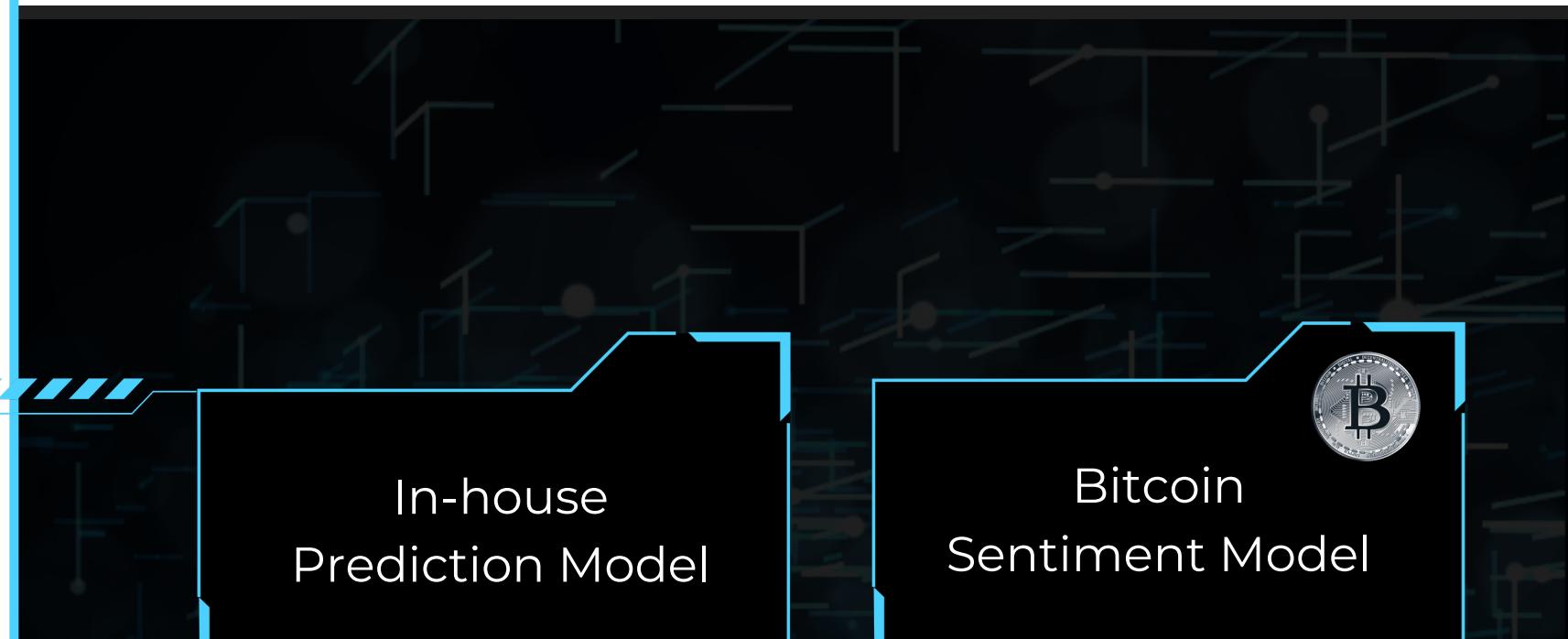
Real-time Adaptability

Available 24/7

Deposit Agnostic



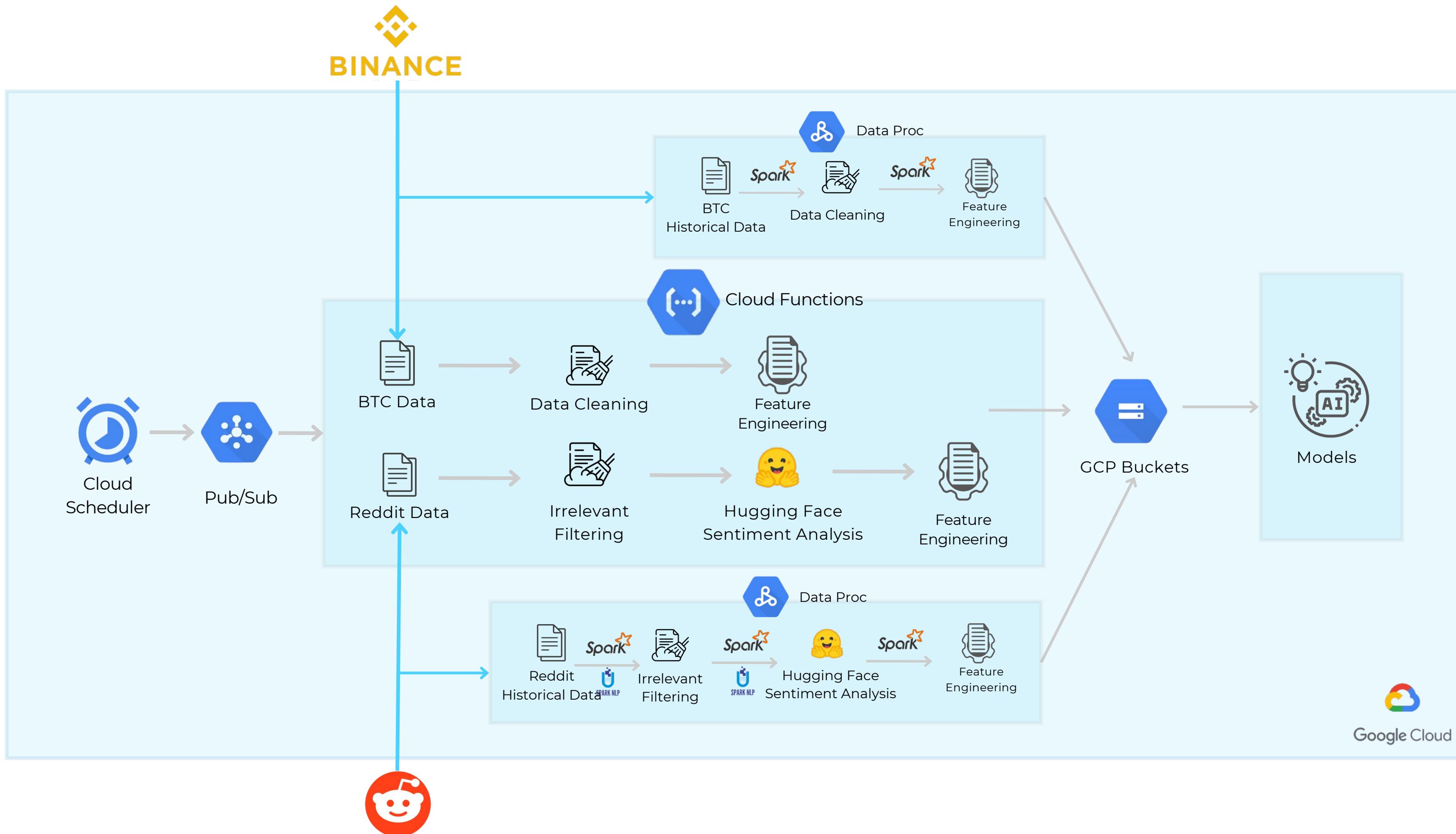
More earning and learning;  
less spending and tending.





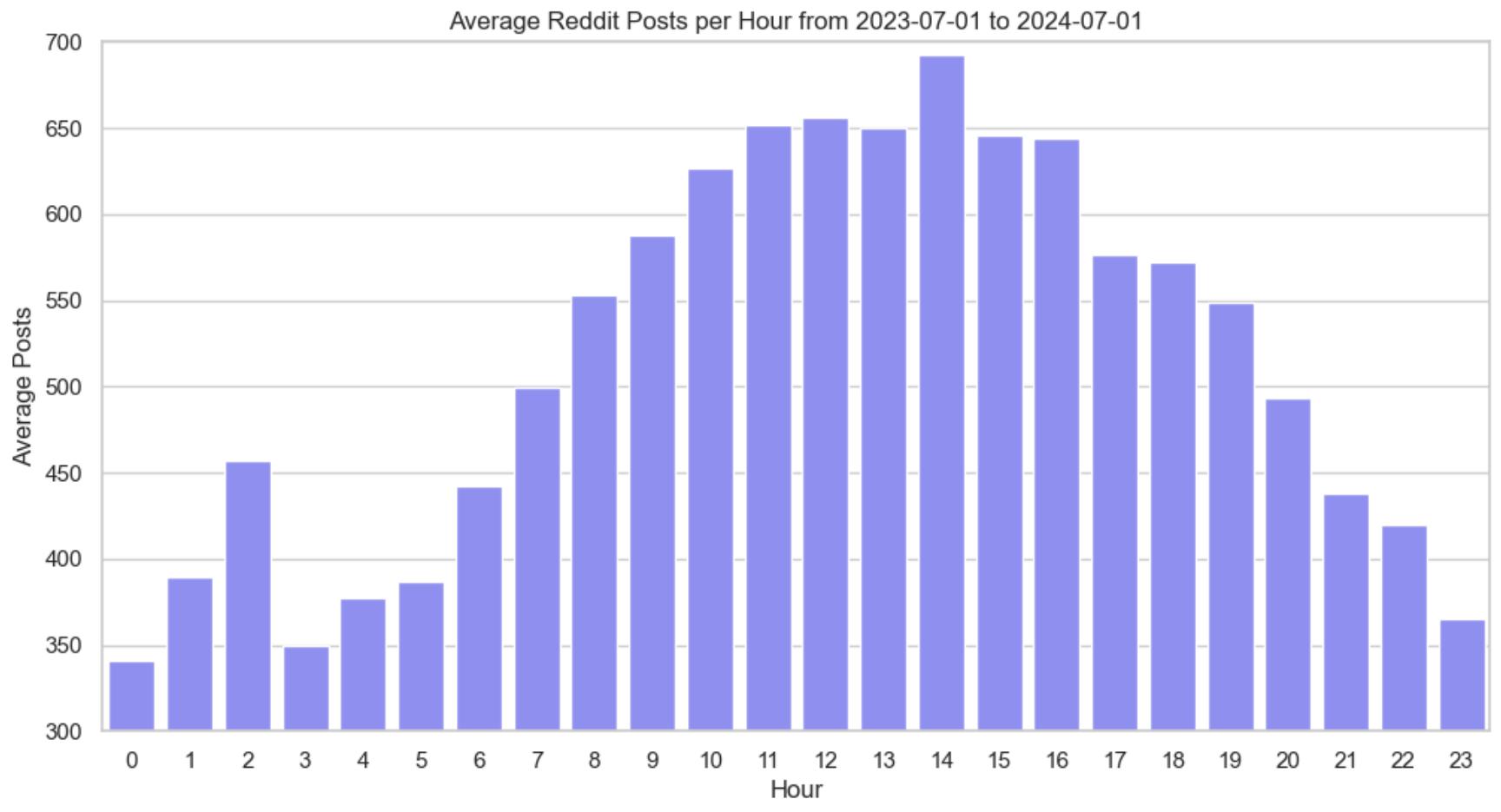
Data

# DATA FLOW DIAGRAM (DFD)



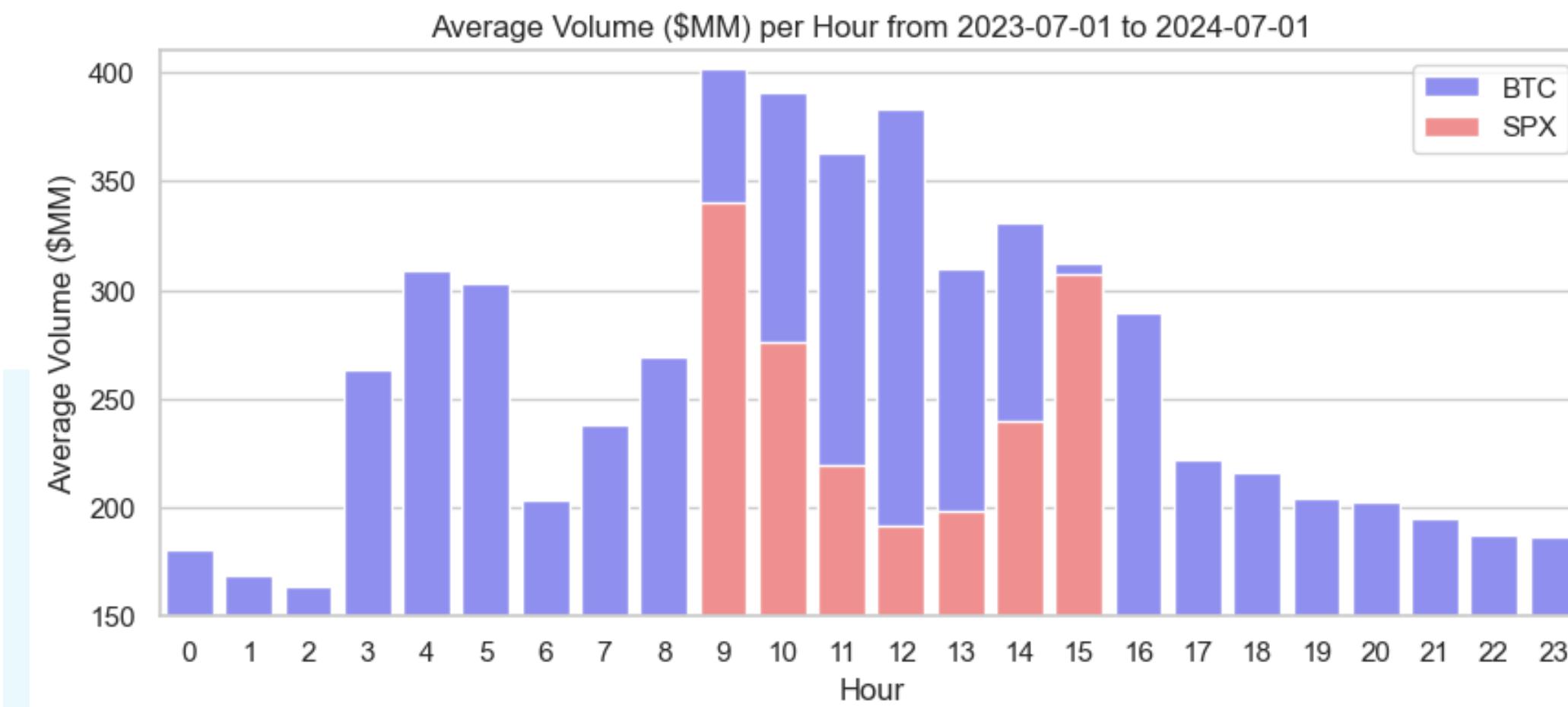
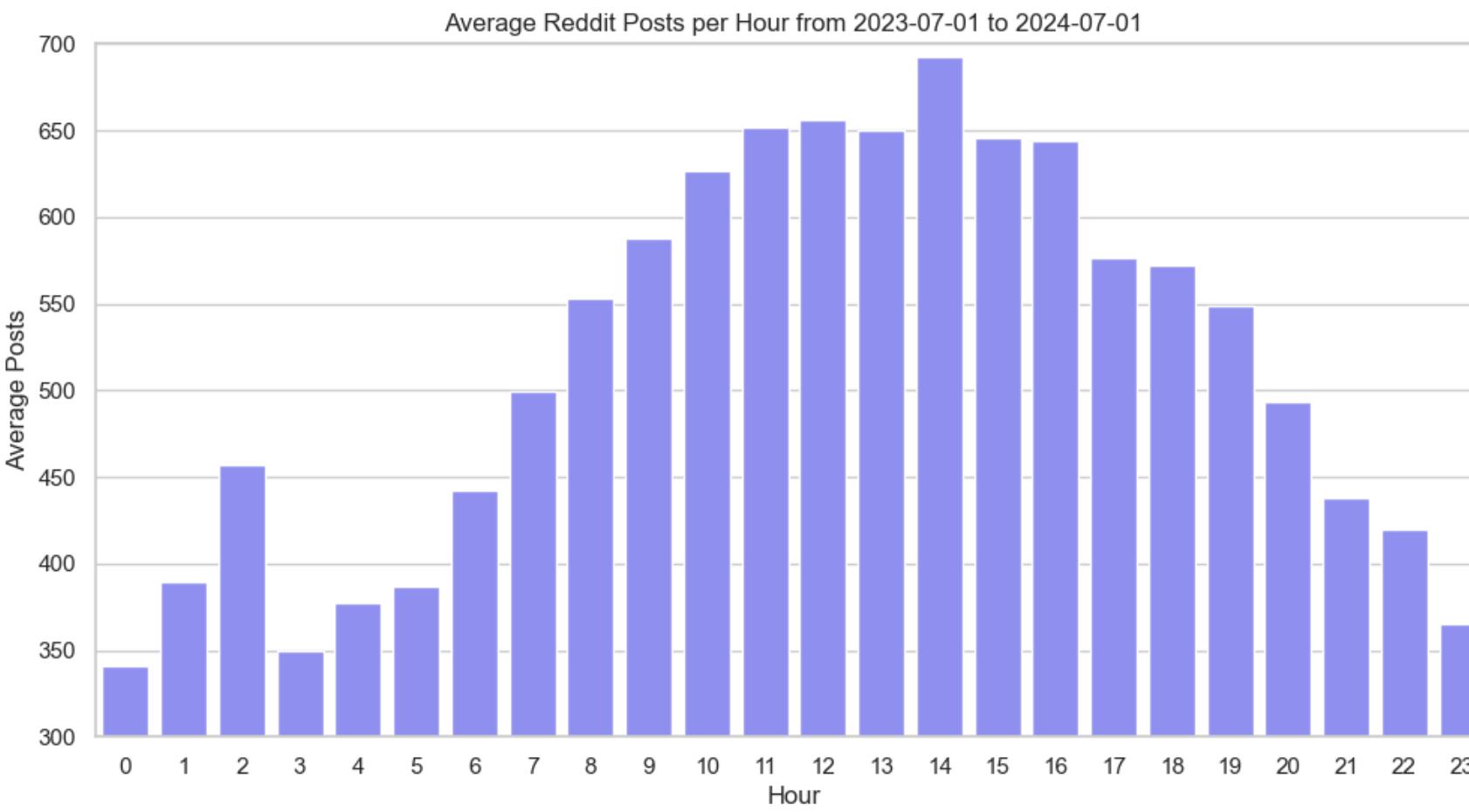
# DATA TREND

*Reddit posts tend to occur during US daytime hours.*

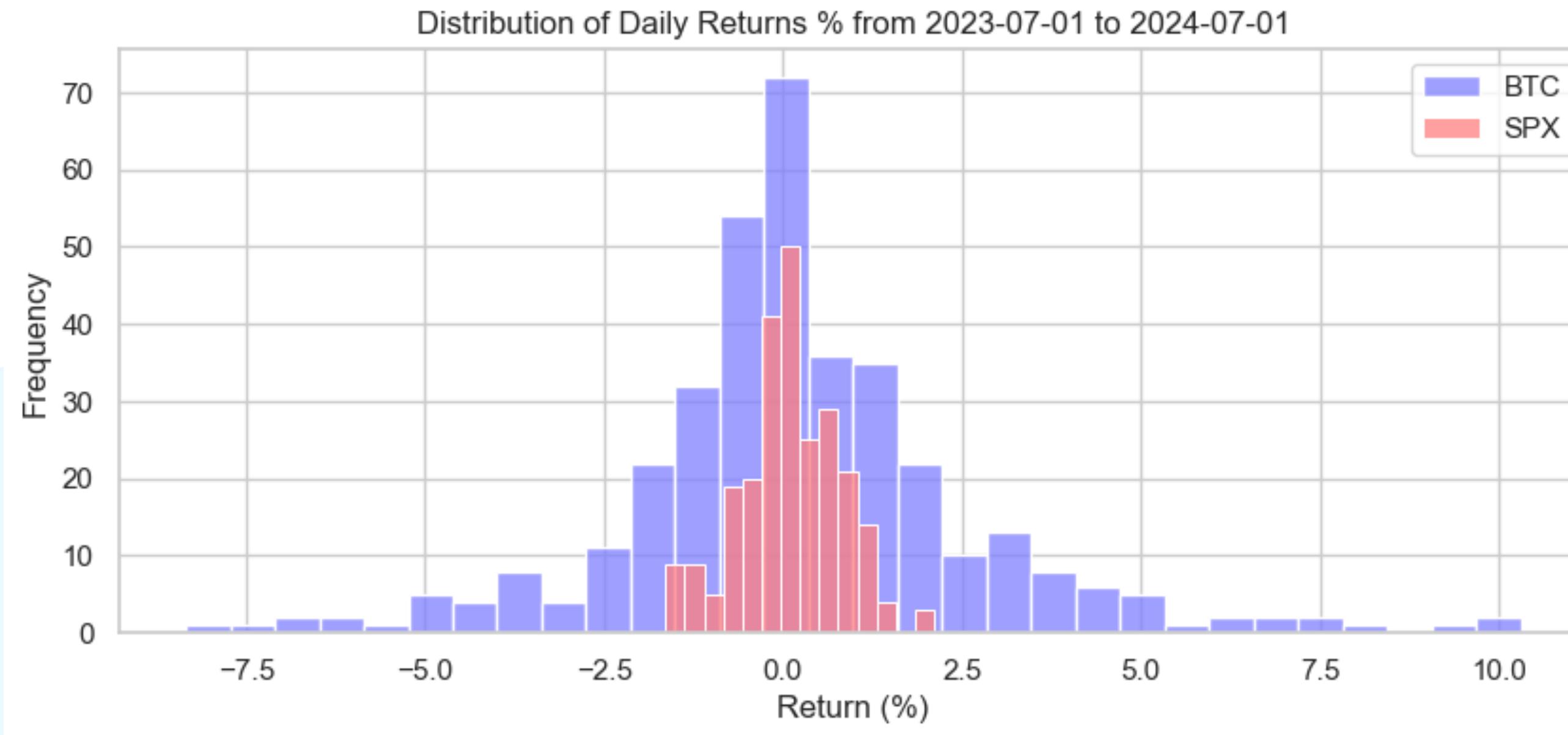


# DATA TREND

*Reddit Volumes overlap with busy times in Bitcoin markets.*

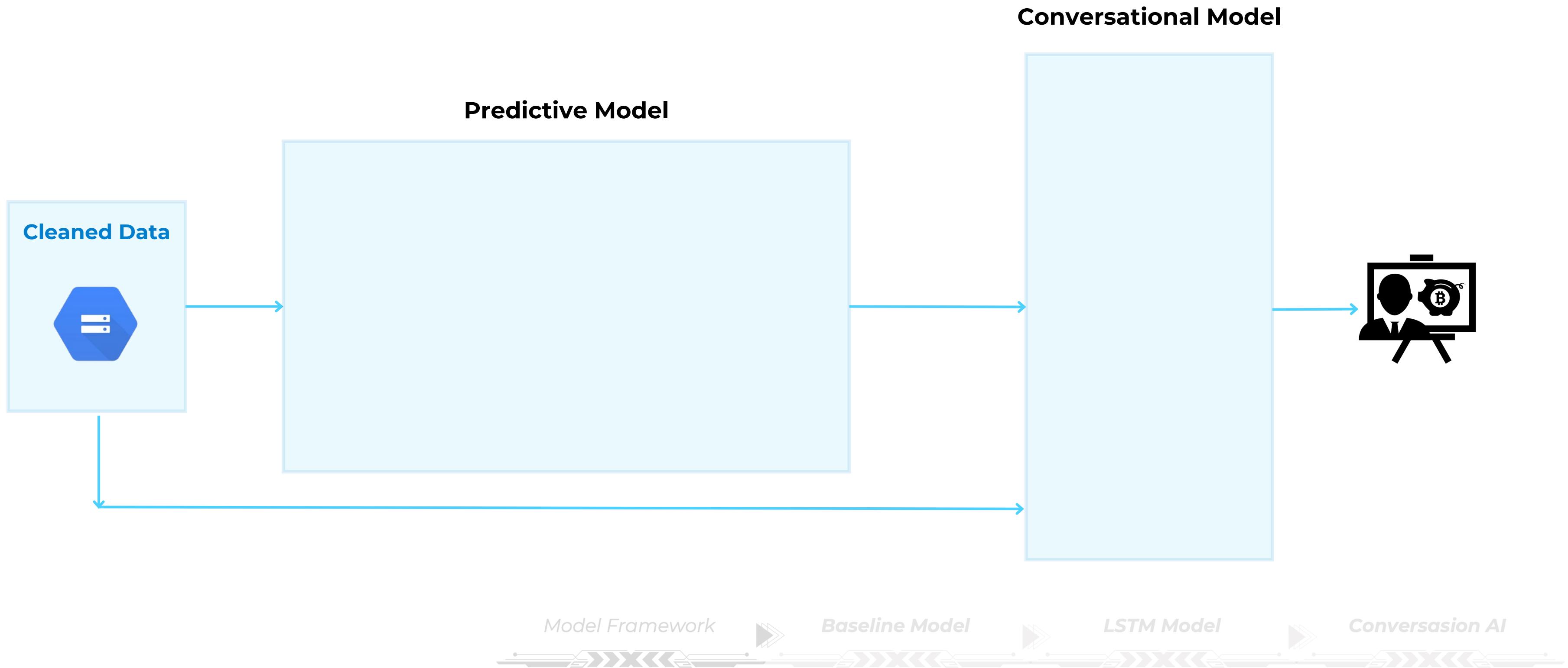


# DATA TREND



# Methodology

# MODEL FRAMEWORK



# MODEL FRAMEWORK

Historical BTC Price



Cleaned Data

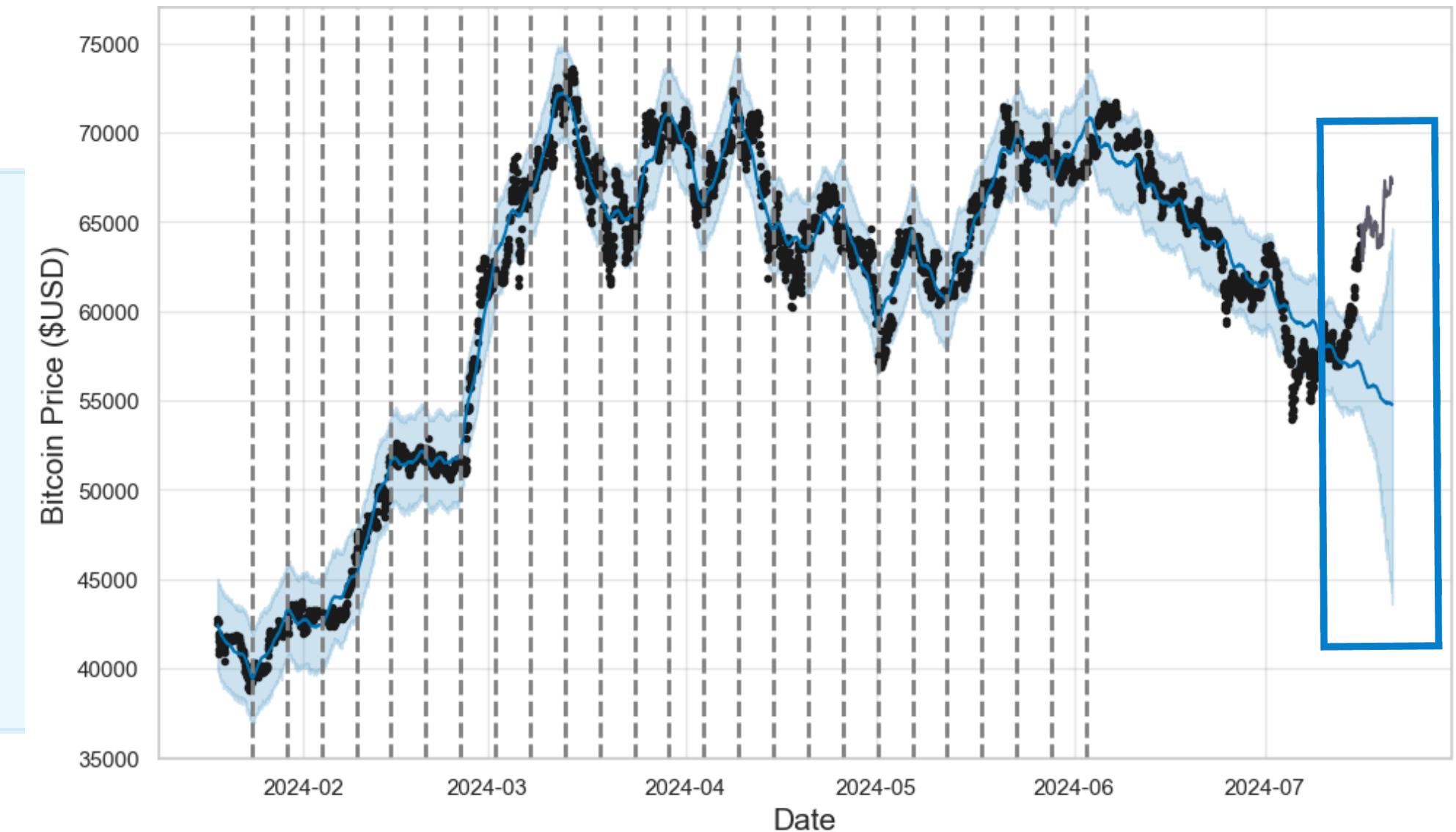


Predictive Model

Baseline  
Prophet

Capture systematic  
seasonalities

Baseline Bitcoin Price Prediction (\$USD)



Model Framework



Baseline Model



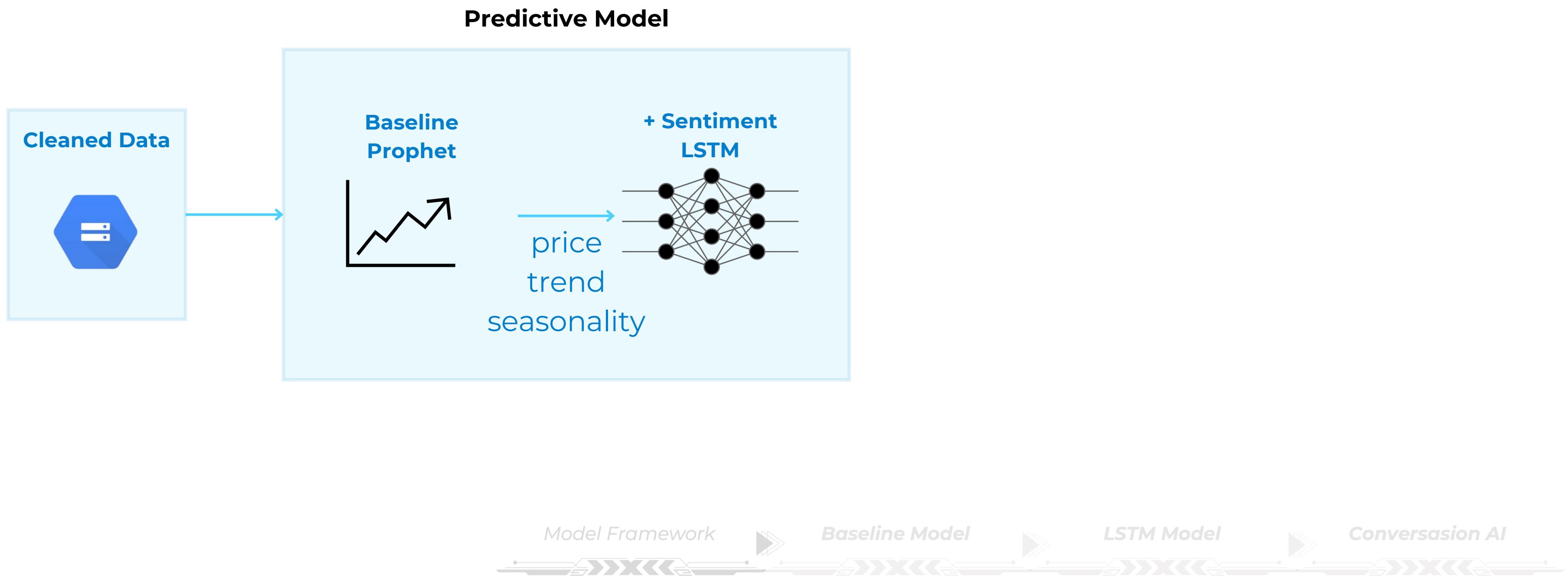
LSTM Model



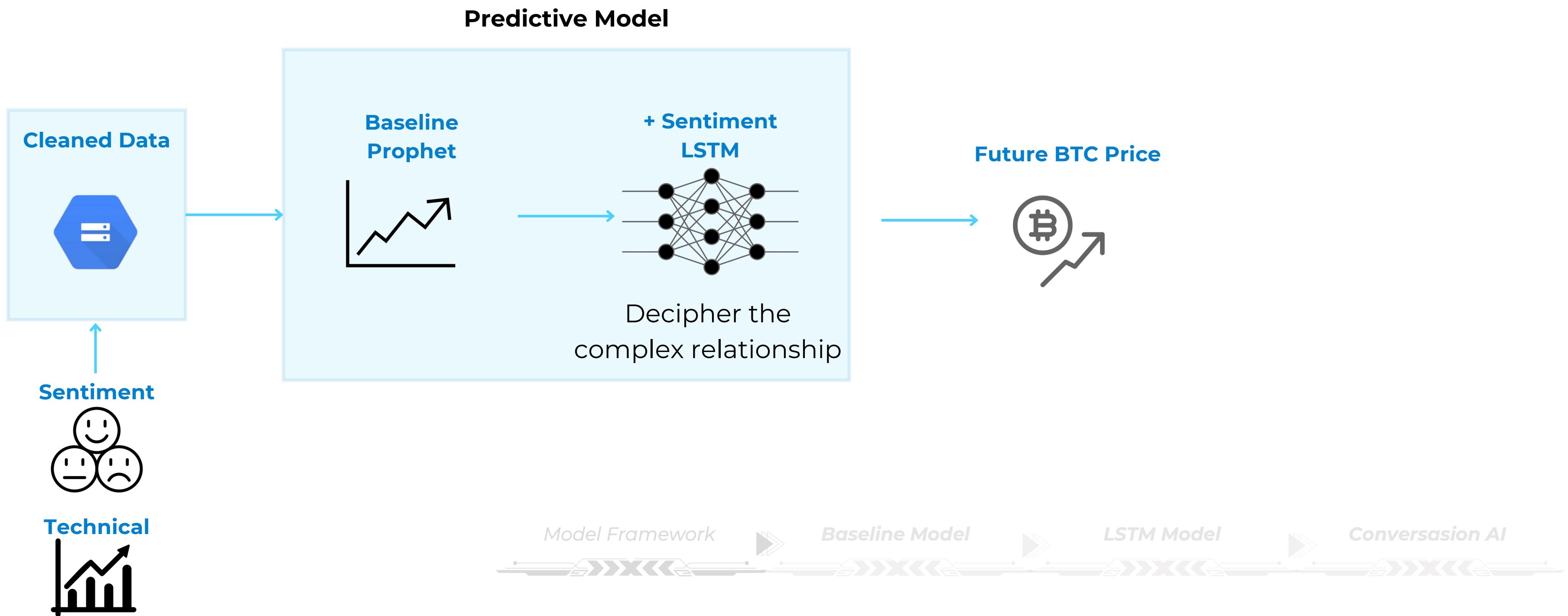
Conversation AI



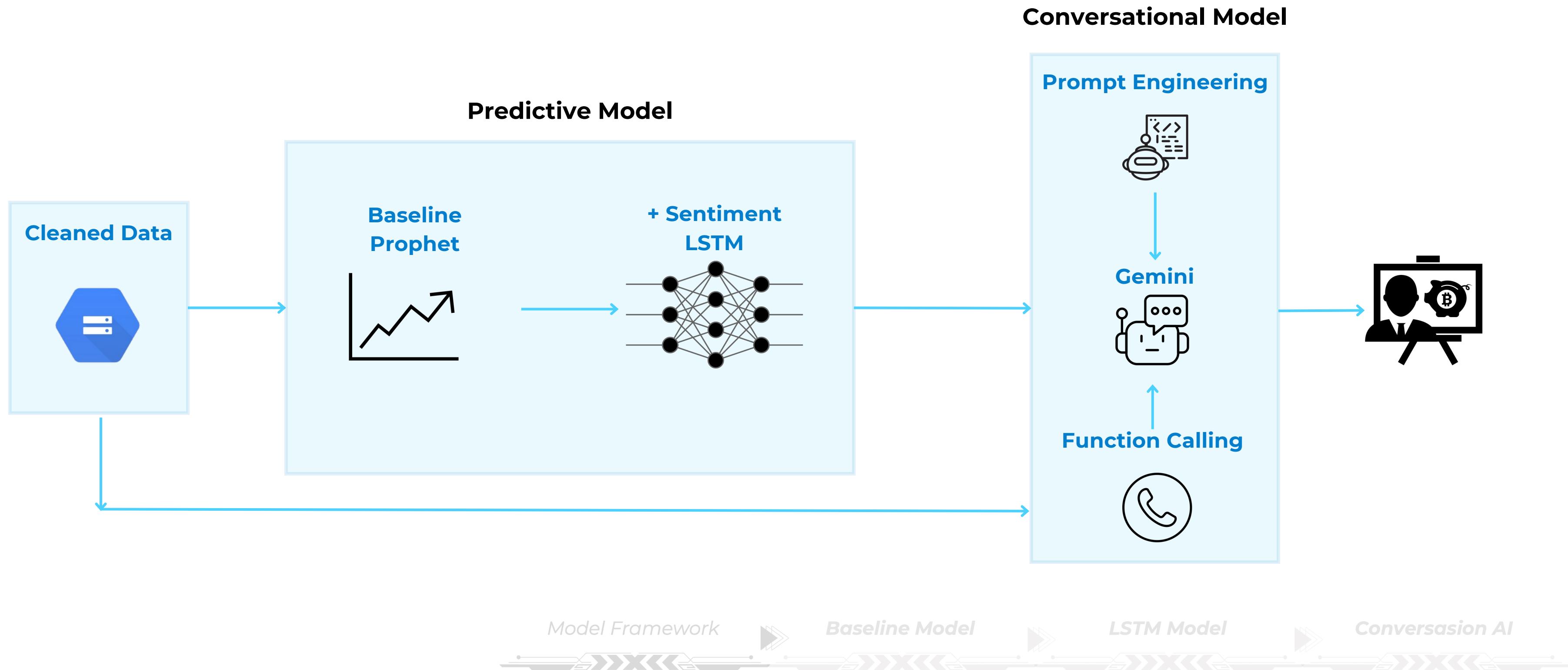
# MODEL FRAMEWORK



# MODEL FRAMEWORK



# MODEL FRAMEWORK



# Findings

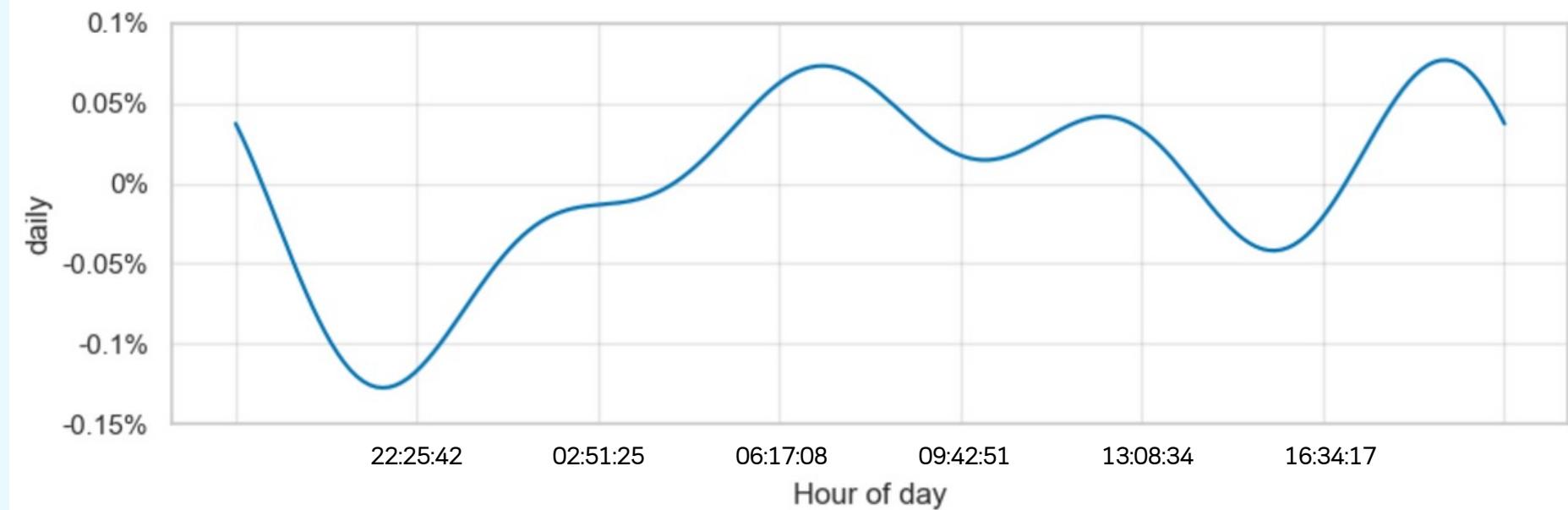
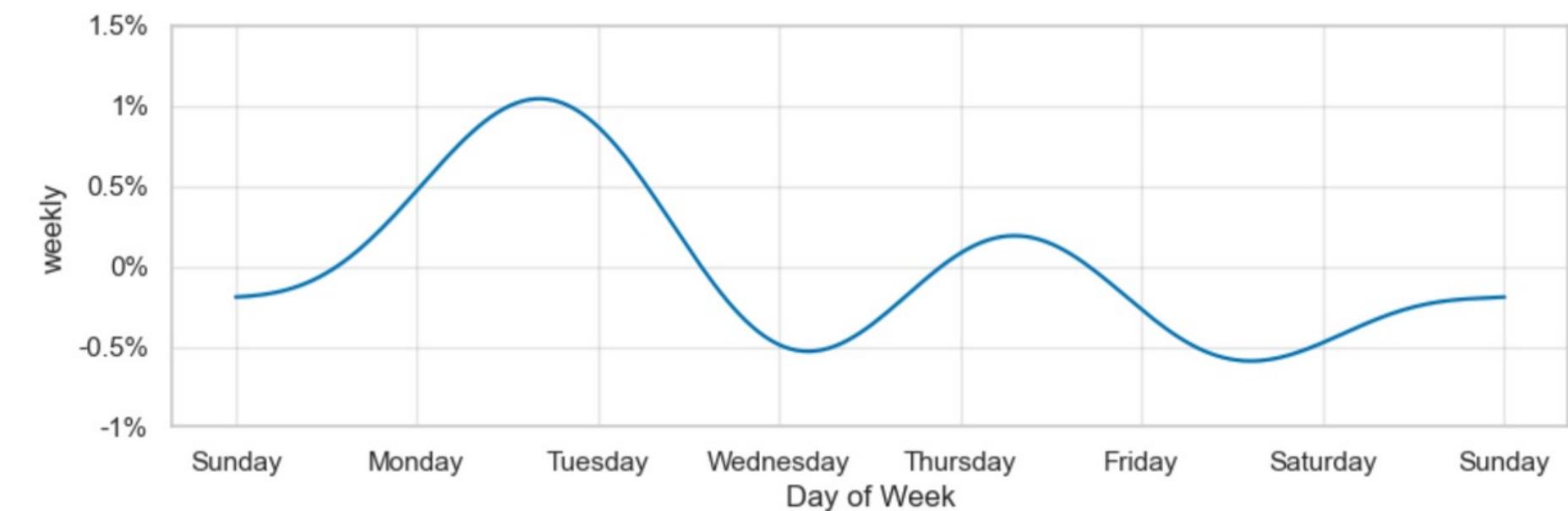
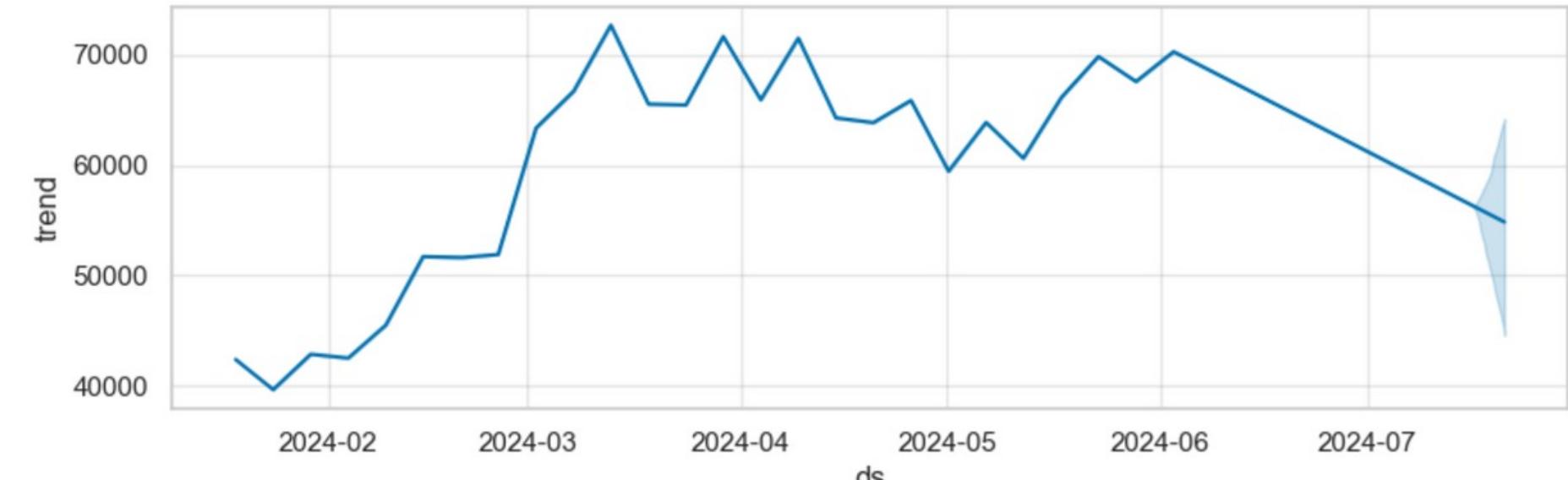
# BITCOIN SEASONALITY



## HYPOTHESES

Systematic trends persist.

Prophet Decomposition Chart



# BITCOIN SEASONALITY



## HYPOTHESES

Systematic trends persist.



## VALIDATED

Upward linear growth trend.

Seasonality - daily, weekly,  
monthly.



## DEBUNKED

Multiplicative effect is  
~~realistic~~ **negligible**.

# SENTIMENT SIGNAL



## HYPOTHESES

Relevancy vs. reaction may be exclusive.



## VALIDATED

Discarding {non-relevant n high-reaction} content improves signal quality.

**Does anyone know who the person in this screenshot is?**

Does anyone know who the person in this screenshot is? I'd like to see this full presentation

<https://youtu.be/MeRmVRFaTIY?feature=shared>



[https://www.reddit.com/r/Bitcoin/comments/1egvwsn/does\\_anyone\\_know\\_who\\_the\\_person\\_in\\_this/](https://www.reddit.com/r/Bitcoin/comments/1egvwsn/does_anyone_know_who_the_person_in_this/)

# SENTIMENT SIGNAL



## HYPOTHESES

Relevancy vs. reaction may be exclusive.

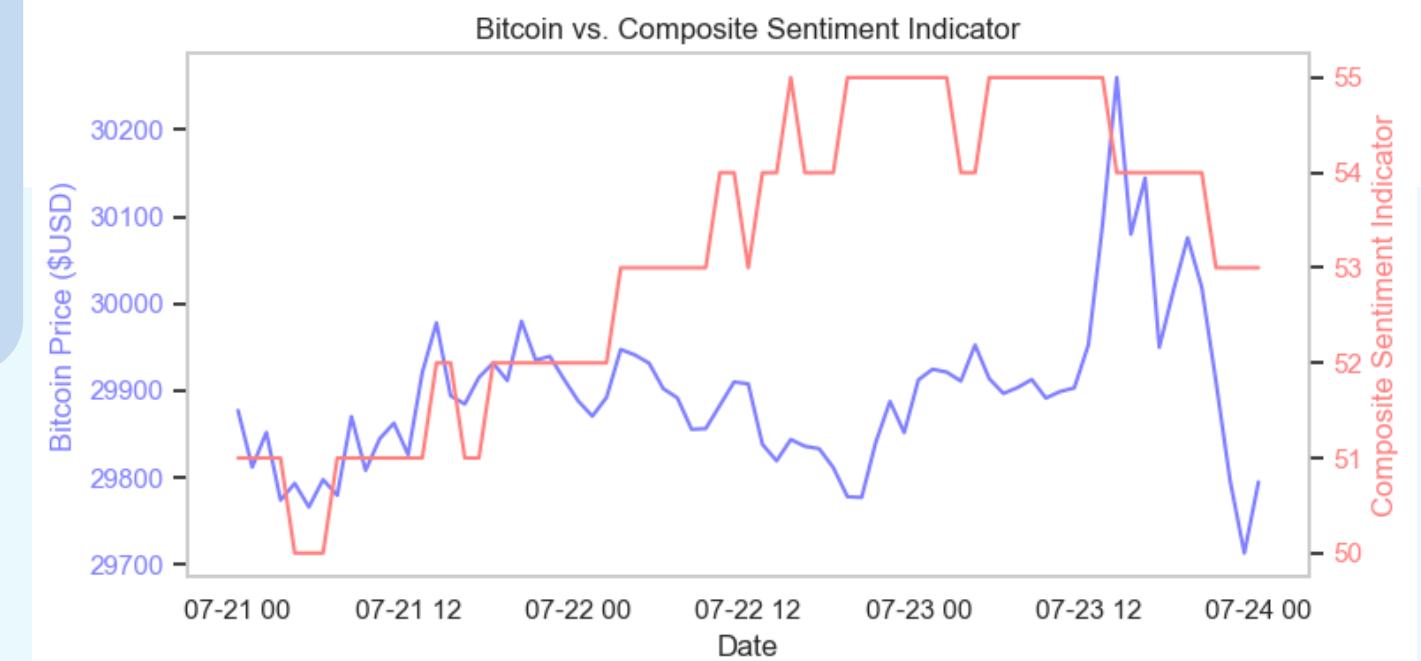
+Consensus promotes directional price action.



## VALIDATED

Discarding {non-relevant n high-reaction} content improves signal quality

{High-consensus n high-activity} reduces prediction error.



# SENTIMENT SIGNAL



## HYPOTHESES

Relevancy vs. reaction may be exclusive.

+Consensus promotes directional price action.



## VALIDATED

Discarding {non-relevant n high-reaction} content improves signal quality

{High-consensus n high-activity} reduces prediction error.



## DEBUNKED

Sentiment is ~~only~~ reactive  
**and proactive.**

Sentiment to price-direction is ~~generalizable~~  
**circumstantial.**

# CONVERSATIONAL AI



## HYPOTHESES

Inherent knowledge suffices.



## VALIDATED

Speaks finance at most ranges of technicality.



Tell me about past prices, what does it tell?



The current Bitcoin price is \$60,372.92. Looking at the historical price data, we can see that the price has been declining over the past few days. This is likely due to a combination of factors, including the recent market volatility and the overall bearish sentiment in the market.

However, my model predicts that Bitcoin will be valued at \$42,626.28 in five days (120 hours). That equates to -29.4% returns from the current level of \$60,372.92. Therefore, I would suggest holding off on investing right now. My prediction range is \$41,790.69 (-30.8%) to \$43,253.84 (-28.4%). Over the five-day investment period, we estimate prices could go as low as \$41,790.69 (-30.8%) and as high as \$43,253.84 (-28.4%). This indicates that the market is currently volatile and could go down further before recovering.



Simplify it



Bitcoin has been declining recently, and my model predicts a further drop in the next five days. I suggest holding off on investing for now.

# CONVERSATIONAL AI



## HYPOTHESES

Inherent knowledge suffices.

Interpret user needs into data call. Translate quantitative results.



past momentum bitcoin



You're asking about past momentum in Bitcoin, and that's a great question! It's one of the factors I consider when making my predictions.

To understand past momentum, we need to look at how Bitcoin's price has been moving over a specific period. For example, if we look at the past 48 hours, we see that the price has decreased from \$59149.53 to \$56456.66. This downward trend indicates a bearish momentum in the short term.

However, it's crucial to consider other factors alongside momentum, such as the current sentiment. While the past 48 hours have shown a downward trend, the overall sentiment towards Bitcoin is currently neutral. This means that while there's some downward momentum, the market isn't overly pessimistic about Bitcoin's future.

# CONVERSATIONAL AI



## HYPOTHESES

Inherent knowledge suffices.

Interpret user needs into data call. Translate quantitative results.



## VALIDATED

Speaks finance at most ranges of technicality.

Direct data integration prevents hallucination.



## DEBUNKED

Integrated data must **need not** be text based.

**Judicious** Avoid restrictive function calling.

# Conclusion

# BUSINESS SUMMARY

**Enique proves highly effective as an autonomous investment advisor.**



**More earning and learning...**

Prediction results apply to user's needs.

Educes any audience.



**...less spending and tending.**

Time efficient and fee-free.

Plug n' play any data or prediction model.

# FUTURE WORK



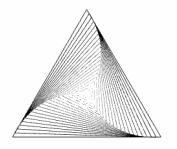
**Brokerage Connection**



**Prediction Bias**



**Data Enrichment**



Enique

SEE YOU  
SATURDAY!

Anna Han, Mu Mio, Esther Xu  
University of Chicago MScA 2024

# Appendix

<b>Scheduler Name</b>	<b>Frequency</b>	<b>Cron Format</b>	<b>Note</b>
get-reddit-data	Every 15 mins	*/15 * * * *	1. Get and save the raw data; 2. Add md5(content) 3. Set secret key as an env variable of get-reddit-data-func
discard-irrelevant-data	Every 30 mins	*/30 * * * *	Combine reddit data, and conduct irrelevancy analysis
sentiment-analysis	Every 30 mins	*/30 * * * *	Sentiment analysis
get-btc-data	Every 1 hour	0 * * * *	Get BTC data from Binance
process-btc-data	Every 1 hour	0 * * * *	Calculate all the indicators and other features for modeling
get-rep-posts	Every 30 mins	*/30 * * * *	Get representative posts
get-senti-indicators	Every 30 mins	*/30 * * * *	Calculate sentiment indicators