

# When Do Answers Change? Estimating Question Recency Demands in QA with Multi-Events

Recency-aware QA dataset, pipeline, and results

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[https://github.com/Fabianstw/RecencyQA\\_MultiEvent](https://github.com/Fabianstw/RecencyQA_MultiEvent)

# Agenda

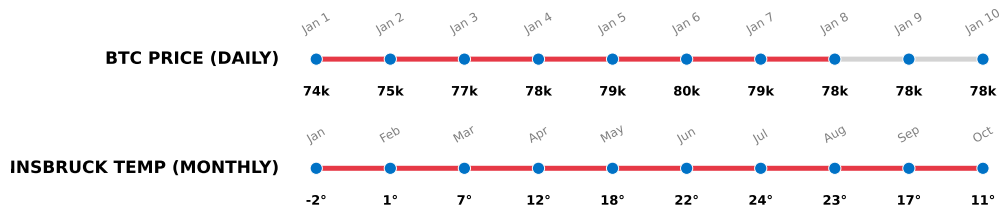
## ► **Motivation and Prior Work**

- Dataset Creation
- Testing Pipeline
- Results
- Fine-Tuning
- Conclusion and Outlook

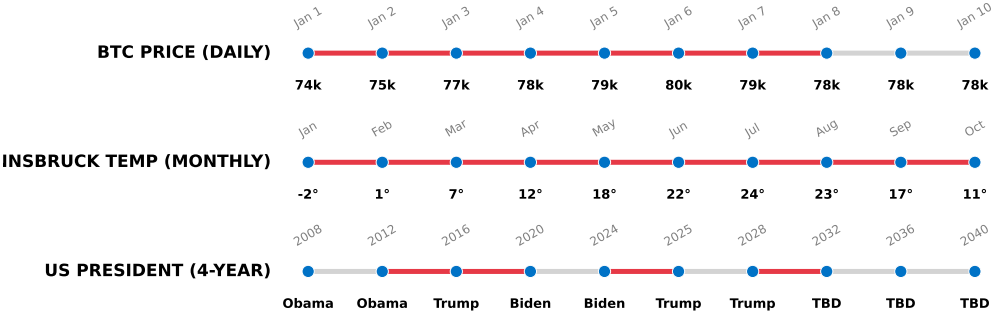
# Motivation



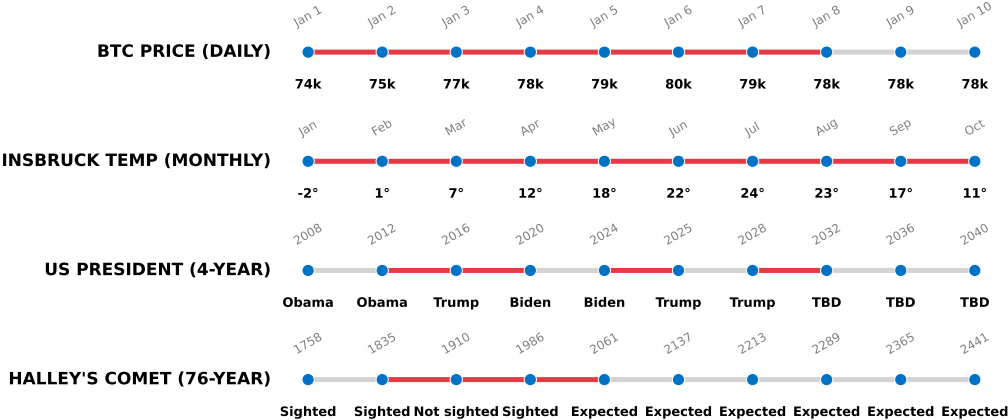
# Motivation



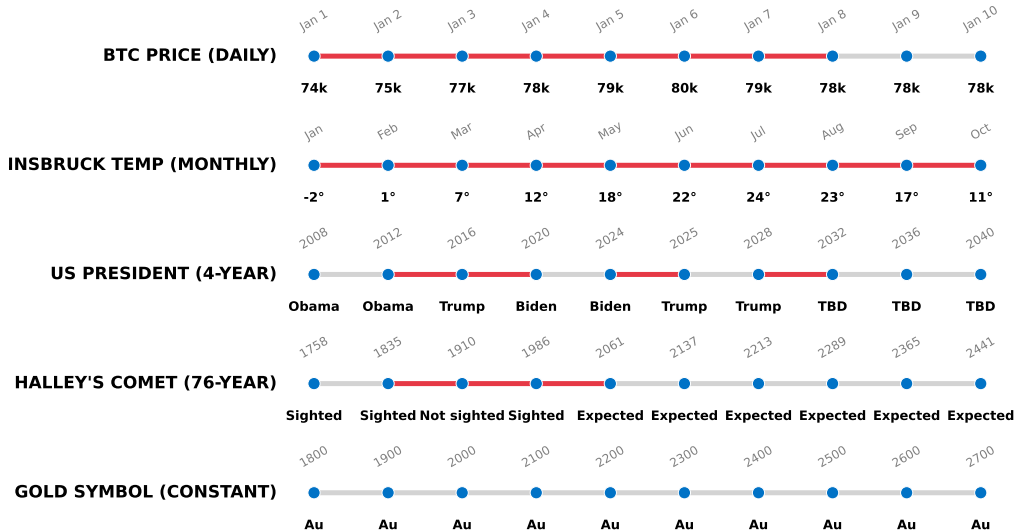
# Motivation



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# Why recency demand?

- Answer to questions change
- **Recency demand**: refresh rate; to keep answer up-to-date

## Goal

Build datasets that stress temporal reasoning and evaluate **LLM** performance on recency demand.



# Related datasets

Dataset	Creation	Knowledge	KC	Recency	Multi-Event	#Q
TimeQA	Templ.	Wikipedia	✗	✗	✗	20 000
StreamingQA	Man.+Gen.	News	✓	✗	✗	410 000
RealTimeQA	News	News	✓	✗	✗	5000
PATQA	Templ.	Wikipedia	✓	✗	✗	6172
FreshQA	Manual	Web	✓	✗	✗	600
RecencyQA (orig.)	Man.+Gen.	Wiki	✓	✓	✗	6115
RecencyQA-Multi (ours)	Man.+Gen.	RecencyQA+LLM	✗	✓	✓	1432

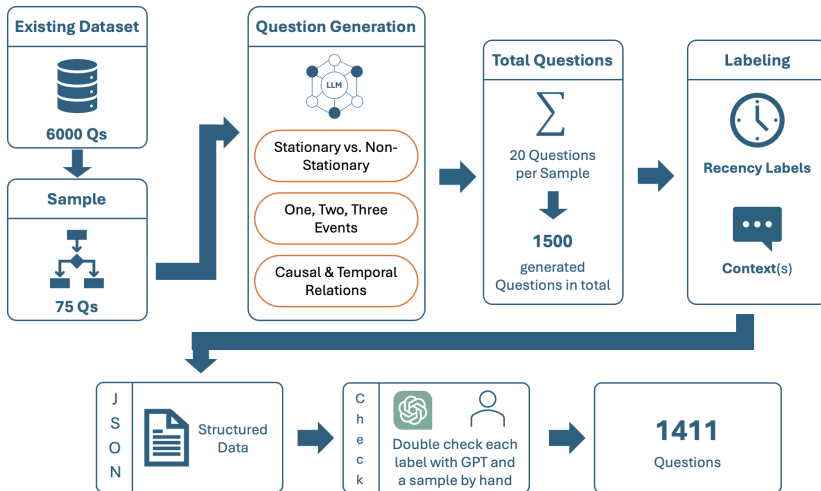
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# Pipeline overview



# Question taxonomy

- Recency Classes (12)

**12 Recency Classes**

Class	Time to change
An-Hour	Within an hour
A-Few-Hours	Within a few hours
A-Day	Within a day
A-Few-Days	Within a few days
A-Week	Within a week
A-Few-Weeks	Within a few weeks
A-Month	Within a month
A-Few-Months	Within a few months
A-Year	Within a year
A-Few-Years	Within a few years
Many-Years	After many years
Never	No change

- Stationarity

- Event structure

- Inter-event relation

- Recency classes

- Contextual conditions

**Prompt Families**

St.	#Ev.	Rel.	Prompt template
S	1	-	Stationary single
S	2	C	Stationary 2-event causal
S	2	T	Stationary 2-event temporal
S	3	C	Stationary 3-event causal
S	3	T	Stationary 3-event temporal
NS	1	-	Non-stationary single
NS	2	C	Non-stationary 2-event causal
NS	2	T	Non-stationary 2-event temporal
NS	3	C	Non-stationary 3-event causal
NS	3	T	Non-stationary 3-event temporal

## 12 Recency classes

Class	Time to change	Example
An-Hour	Within an hour	Current Apple stock price
A-Few-Hours	Within a few hours	Traffic on A9 highway
A-Day	Within a day	Today's weather in Munich
A-Few-Days	Within a few days	Trending movies on Netflix
A-Week	Within a week	Top Billboard songs this week
A-Few-Weeks	Within a few weeks	FIFA ranking of Germany
A-Month	Within a month	Unemployment rate in Italy
A-Few-Months	Within a few months	Inflation rate in Eurozone
A-Year	Within a year	Current Java version
A-Few-Years	Within a few years	President of the US
Many-Years	After many years	Population of Germany
Never	No change	Chemical symbol for gold

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# Prompt families for generation

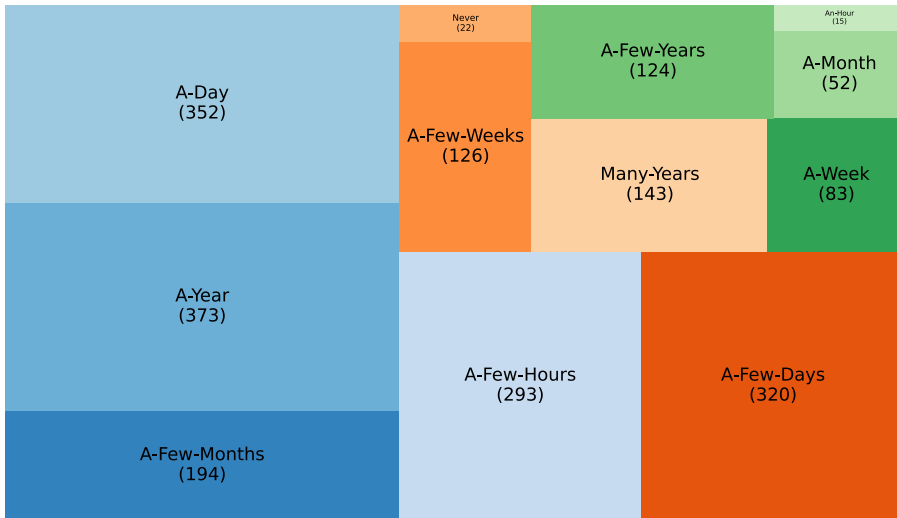
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S	1	–	Stationary single
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NS	3	T	Non-stationary 3-event temporal

# Dataset statistics

Metric	Value
Total questions	1411
Stationary / Non-stationary	725 / 686
Single / Two / Three events	286 / 555 / 570
Multi-event (causal / temporal)	565 / 560
Avg. question length (tokens)	22.2
Avg. context length 1 / 2	11.2 / 12.6
Total recency labels	2097
Top labels	A-Year, A-Day, A-Few-Days



# Recency label distribution



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## ► **Testing Pipeline**

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# Testing pipeline

- Flatten dataset: each question-context-label pair becomes one instance.
- Testing on three models:
  - *Kimi-K2-Instruct-0905*
  - *Qwen2.5-72B-Instruct-Turbo*
  - *DeepSeek-V3*
- Collect predictions per model into JSONL
- Summarize accuracy and tolerant ( $\pm 1$  label) accuracy.
- Slice metrics:
  - Stationary vs. non-stationary
  - Single-event vs. multi-event
  - Causal vs. temporal-only

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## ► **Results**

- Fine-Tuning
- Conclusion and Outlook

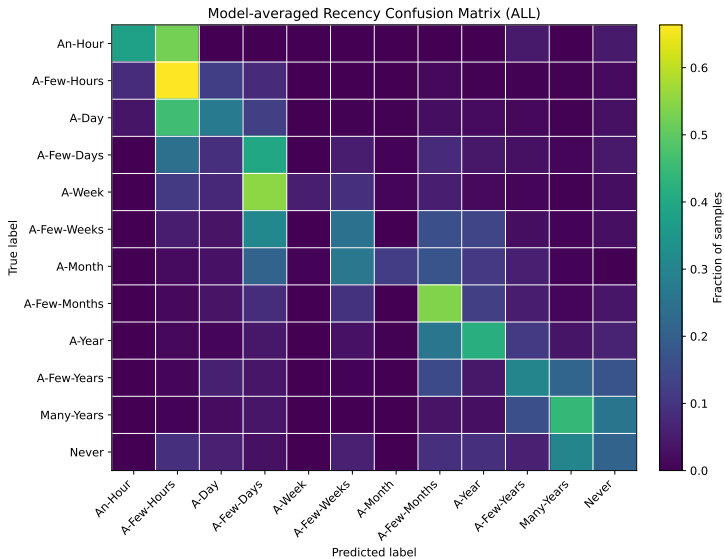
# Model overview

Model	Overall		St.		Non-St.		# Events Acc			Multi-event Acc	
	Acc	Tol.	Acc	Tol.	Acc	Tol.	1	2	3	C	T
Kimi-K2-0905	33.0	62.2	42.1	66.3	28.3	60.0	35.0	31.1	33.6	34.9	29.8
Qwen2.5-72B	45.6	77.4	62.8	81.8	36.7	75.1	45.4	44.6	46.6	47.8	43.5
DeepSeek-V3	40.8	71.9	52.2	73.2	34.9	71.1	44.9	38.1	41.1	43.9	35.6
Average	39.8	70.5	52.4	73.8	33.3	68.7	41.7	37.9	40.5	42.2	36.3

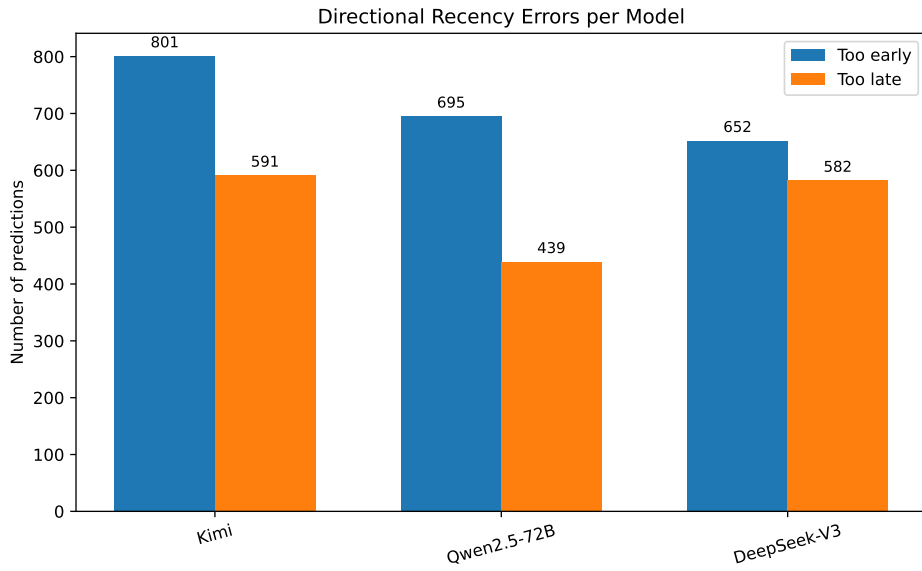
# Findings by slice

- Biggest drop: stationary  $\rightarrow$  non-stationary ( $-13$  to  $-26$  pts)
- Multi-event hurts slightly ( $\sim$ )4 pts)
- Causal is easier than temporal-only
- Tolerant scores  $+20$  to  $+30$  pts  $\rightarrow$  many near-misses

# Confusion across recency labels



# Directional errors





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- ▶ **Fine-Tuning**
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# Fine-tuning setup

- Smaller Qwen model (14B)
- Split Dataset 70/15/15
- Finetuned via Together AI
- Compared to previous models

The screenshot displays the 'Fine-tuning' section of the Together AI dashboard. The breadcrumb navigation shows '< Fine-tuning jobs / recency\_QWEN2\_5\_14B'. Below this, a message states 'All information and output model details for this job.' The interface is divided into two main panels. The left panel lists job details in a table-like format, and the right panel lists training hyperparameters.

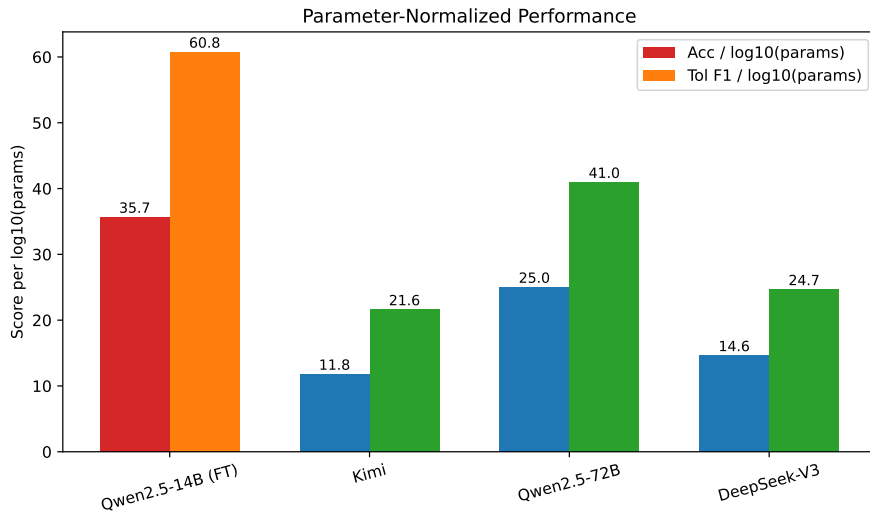
Job Details	
Job ID	
Status	COMPLETED
Base model	Qwen/Qwen2.5-14B-Instruct
Output model	
Suffix	recency_QWEN2_5_14B
Training file	train.jsonl
Validation file	dev.jsonl
Training type	LoRA
Training method	SFT
Created at	1/7/2026, 11:39 PM
Runtime	8m 42s

Hyperparameters	
Epochs	2
Checkpoints	1
Evaluations	1
Batch size	8
LoRA rank	8
LoRA alpha	16
LoRA trainable modules	all-linear
Train on inputs	auto
Learning rate	0.00002
Learning rate scheduler	cosine
Warmup ratio	0.05

# Fine-tuning results (reduced test set)

Model	Overall		St.		Non-St.		Single-event		Multi-event	
	Acc	Tol.	Acc	Tol.	Acc	Tol.	Acc	Tol.	Acc	Tol.
Qwen2.5-14B (FT)	40.9	69.6	55.1	72.9	33.5	68.0	41.5	78.5	40.7	67.3
Kimi	35.5	64.9	46.3	70.4	29.8	62.0	29.7	65.6	36.9	64.7
Qwen2.5-72B	46.5	76.1	63.9	82.4	37.4	72.8	46.2	87.7	46.6	73.1
DeepSeek-V3	41.4	69.7	50.9	71.3	36.4	68.9	38.5	70.8	42.2	69.5

# Parameter efficiency



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# Key takeaways

- 1411 questions, 12 classes, controlled stationarity & events
- Tolerant >70%, strict accuracy remains low
- Hard cases: non-stationary, mid-horizon; “too-early” bias

# Next steps

- Fine-tuned 14B: 40.9% acc, 69.6% tol.  $F_1$
- Best per-parameter performance (normalized view)
- Adaptation beats scale alone

Questions?





# Labeling and verification

- Label recency classes:
  - Stationary: single label + context
  - Non-Stationary: two labels + contexts
- Use *Llama-3.3-70B-Instruct-Turbo* for labeling
- Enforce structured JSON
- LLM screening (*GPT-5.1 Codex Max*) for label-question consistency
- Manual audit of flagged items; remove or fix ambiguous cases
  - Sample 75 items for manual verification