

Semantic Patterns to structure Timeframes in Text

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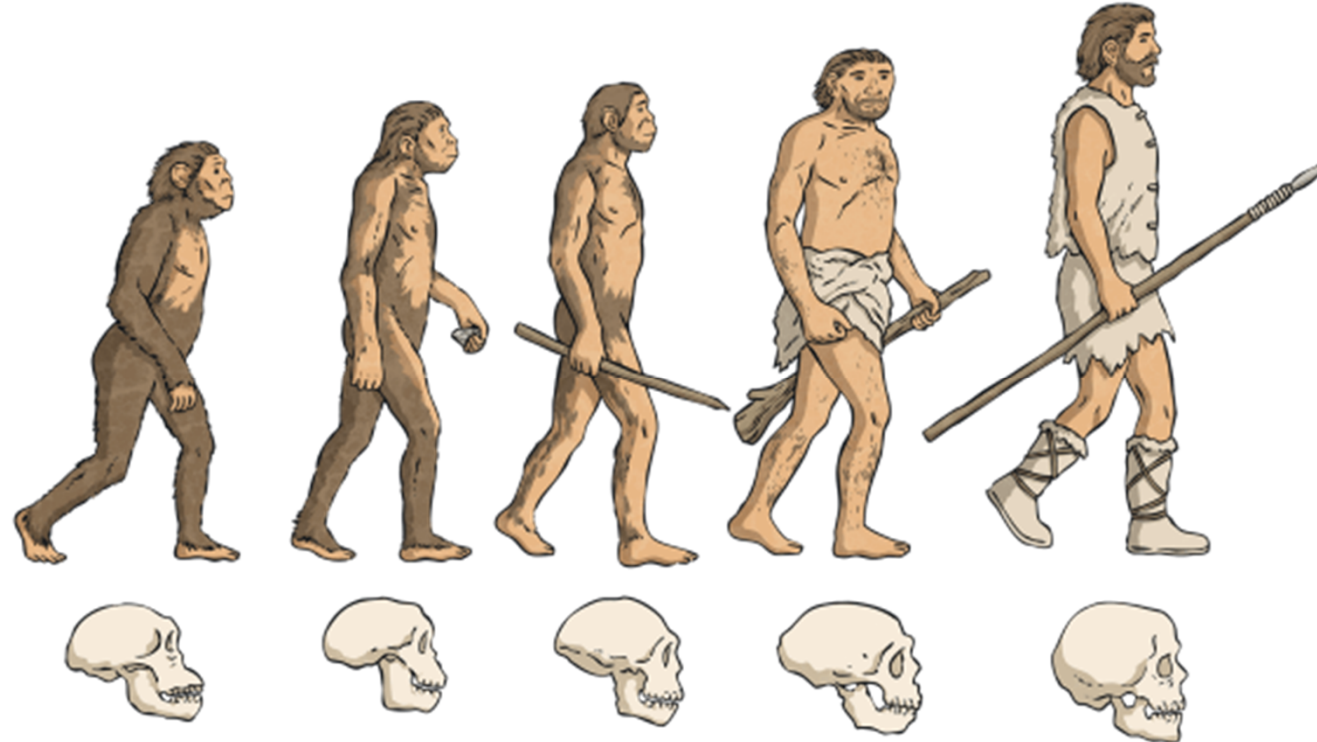
Evolution

Traditional

Ordered change in species, individuals, or social systems.

Selected

Change in the **state** of an organism, organisation, technology, or society at any particular time in a **historical path**.



Historical sequence is not arbitrary

Related Work

Event Extraction

Event Ordering

Timeframe

TF Extraction

Results

Conclusion

Introduction

Related Work

Event Extraction

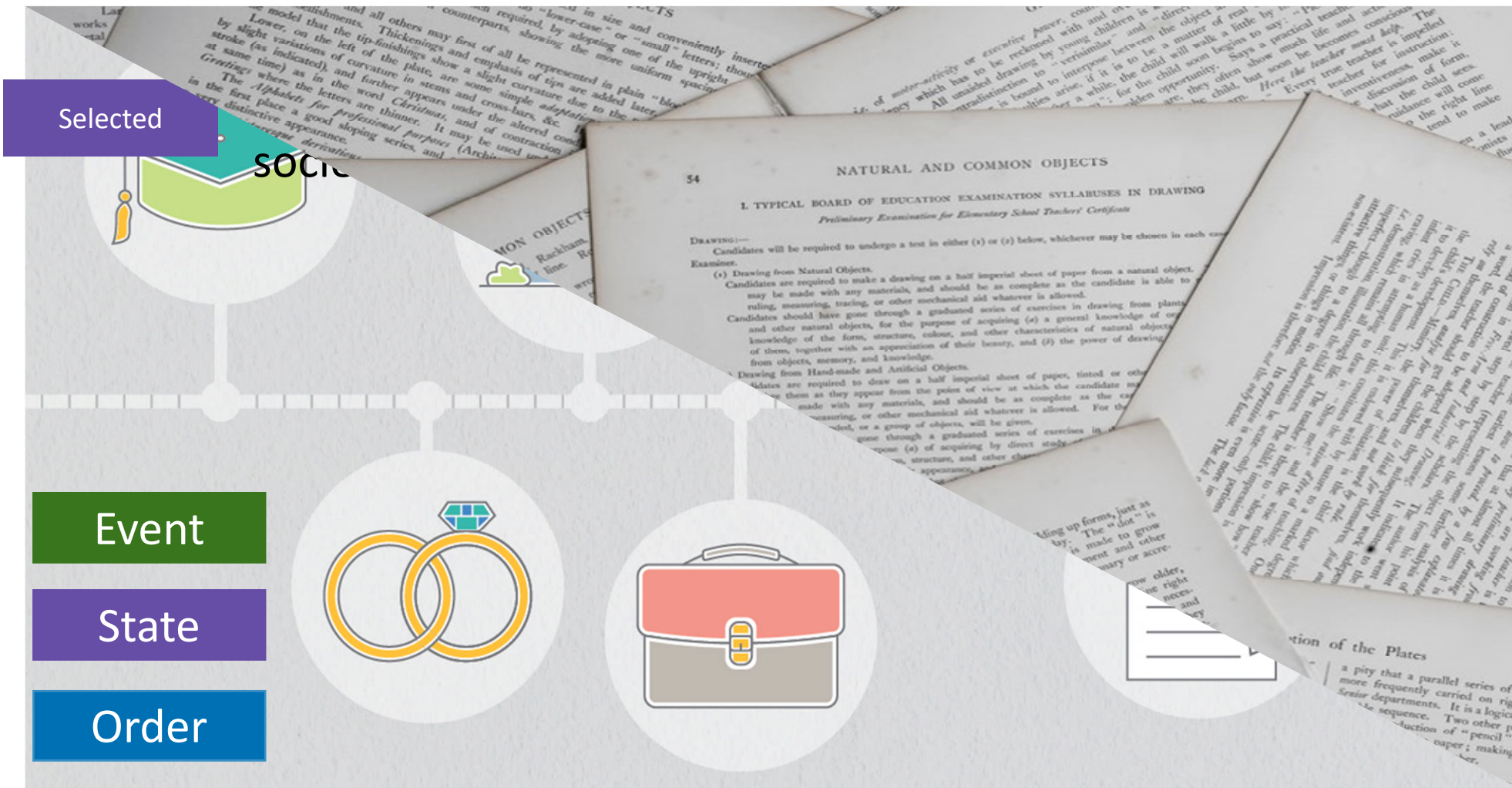
Event Ordering

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Timeframe

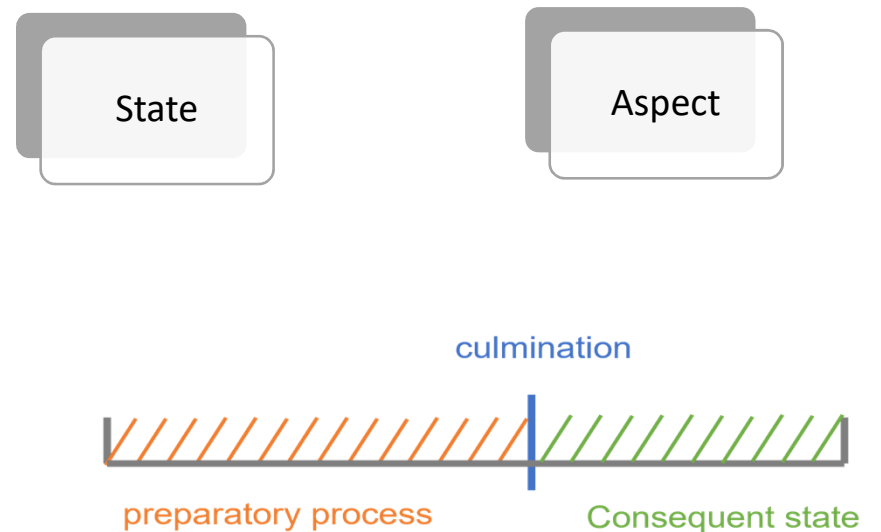
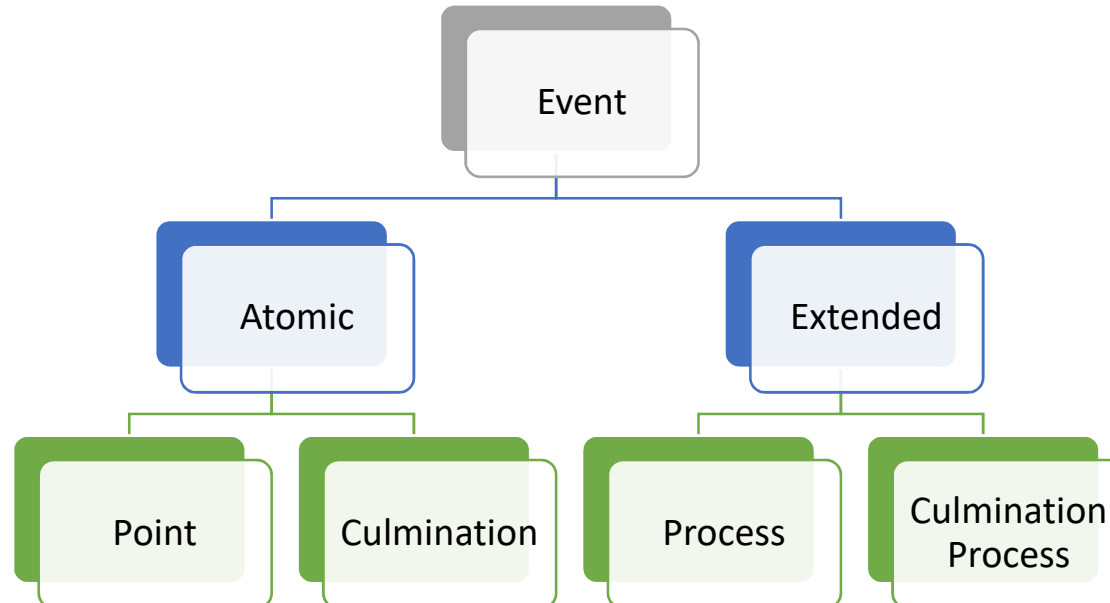
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Event

An **event** is a specific occurrence of something that happens in a certain **time** and a certain place involving one or more participants, which can frequently be described as a **change of state**.



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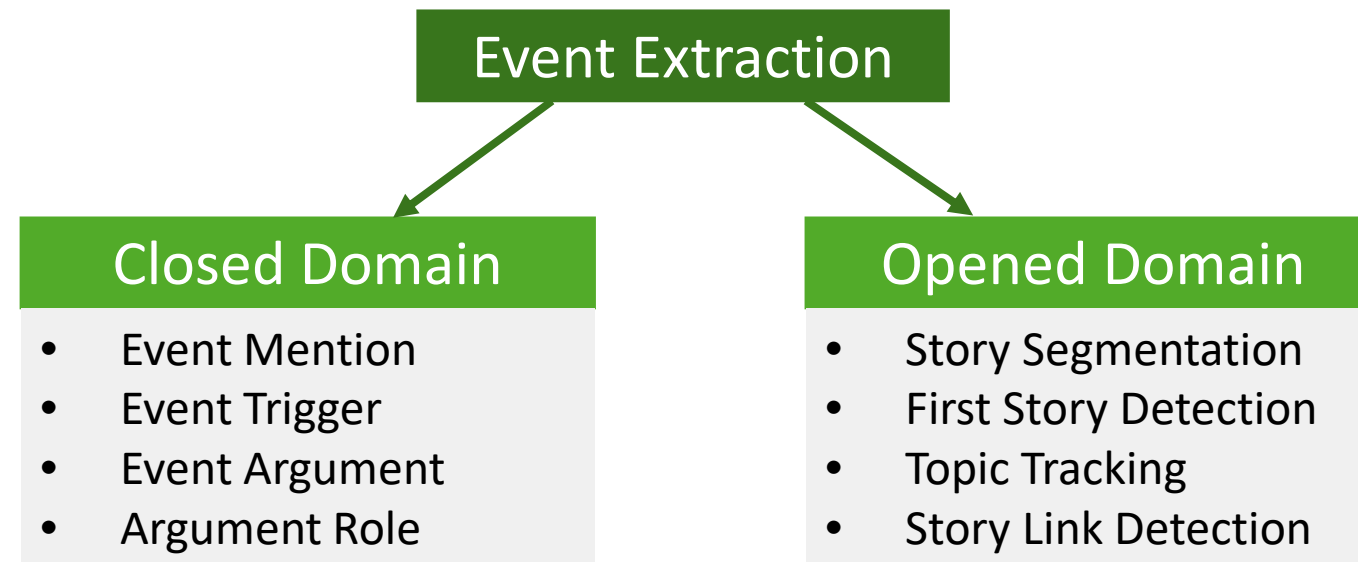
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Event Extraction

One of the most popular branch of Knowledge Extraction from textual data, where the main purpose is the identification of events and there related entities.



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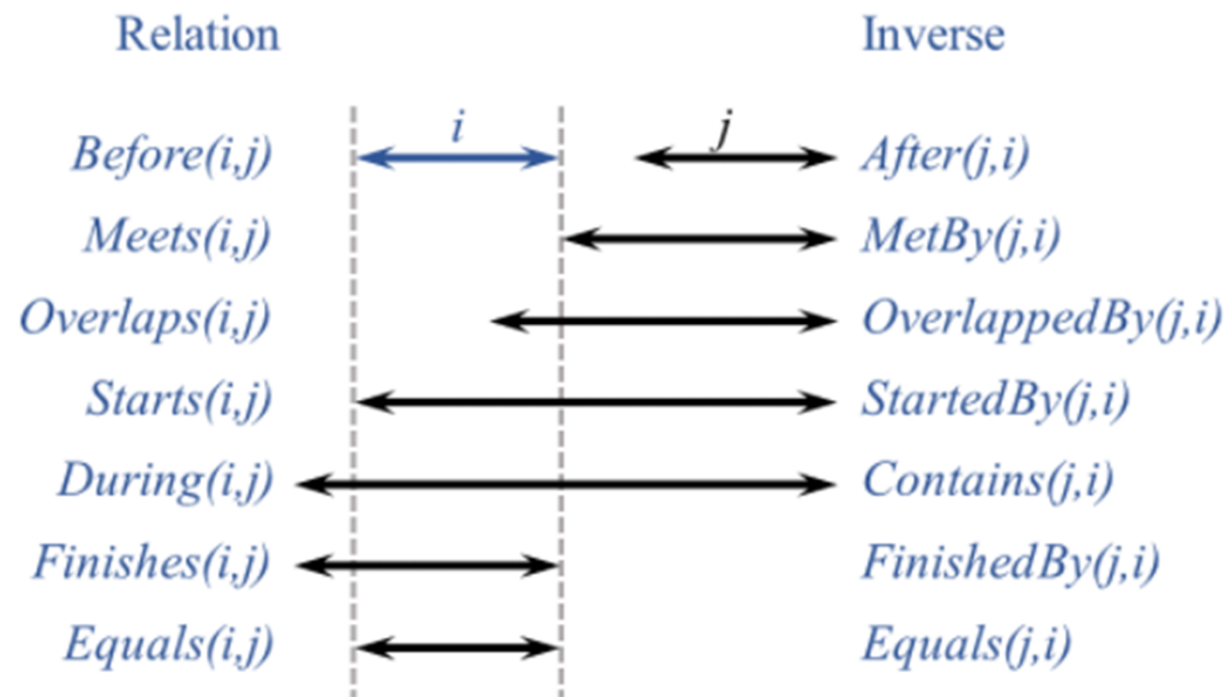
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Event Ordering

A branch in Event Extraction that focuses on the temporal relation analysis of events in a specific text.



Relations differs from a model to another

Approach

- Pre-trained models
- Pre-trained models with inferences

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Model

NavyTime (Chambers, 2013)
ClearTimeTK (Bethard, 2013)
UTTime (Laokulrat et al., 2013)
CAEVO (Chambers et al., 2014)
CATENA (Mirza and Tonelli, 2016)
JRTCR (Nig et al., 2019)
TIMERS (Marthur et al., 2021)

Datasets

EventCausality (Do et al., 2011)
TimeBank 1. 2 (Pustejovsky et al., Lazo)
TimeBank-Dense (Chambers et al., 2014)
TempEval 2010 (Verhagen et al., 2010)
TempEval, 2013 (UzZaman et al., 2013)
Causal-TimeBank (Mirza and Tonelli, 2014)
EventStoryLine (Mostafazadeh et al., 2016)
FinReason (Chen et al., 2021)

The company announced the release of a new version of the product in two weeks. Last year, the very first version had been released and had sold out in a few days. Everyone is anticipating this release.

Event
Ordering

The company announced the release of a new version of the product in two weeks. Last year, the very first version had been released and had sold out in a few days. Everyone is anticipating this release.

Flash-back

Flash-forward

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Published May 2022, NM

A few month ago, XXX CEO announced: "Today a new era will start".

In his statement he have talked about the acquisition of XYZ.

"We are pleased to announce that XYZ will be merging with
XXX in three month".

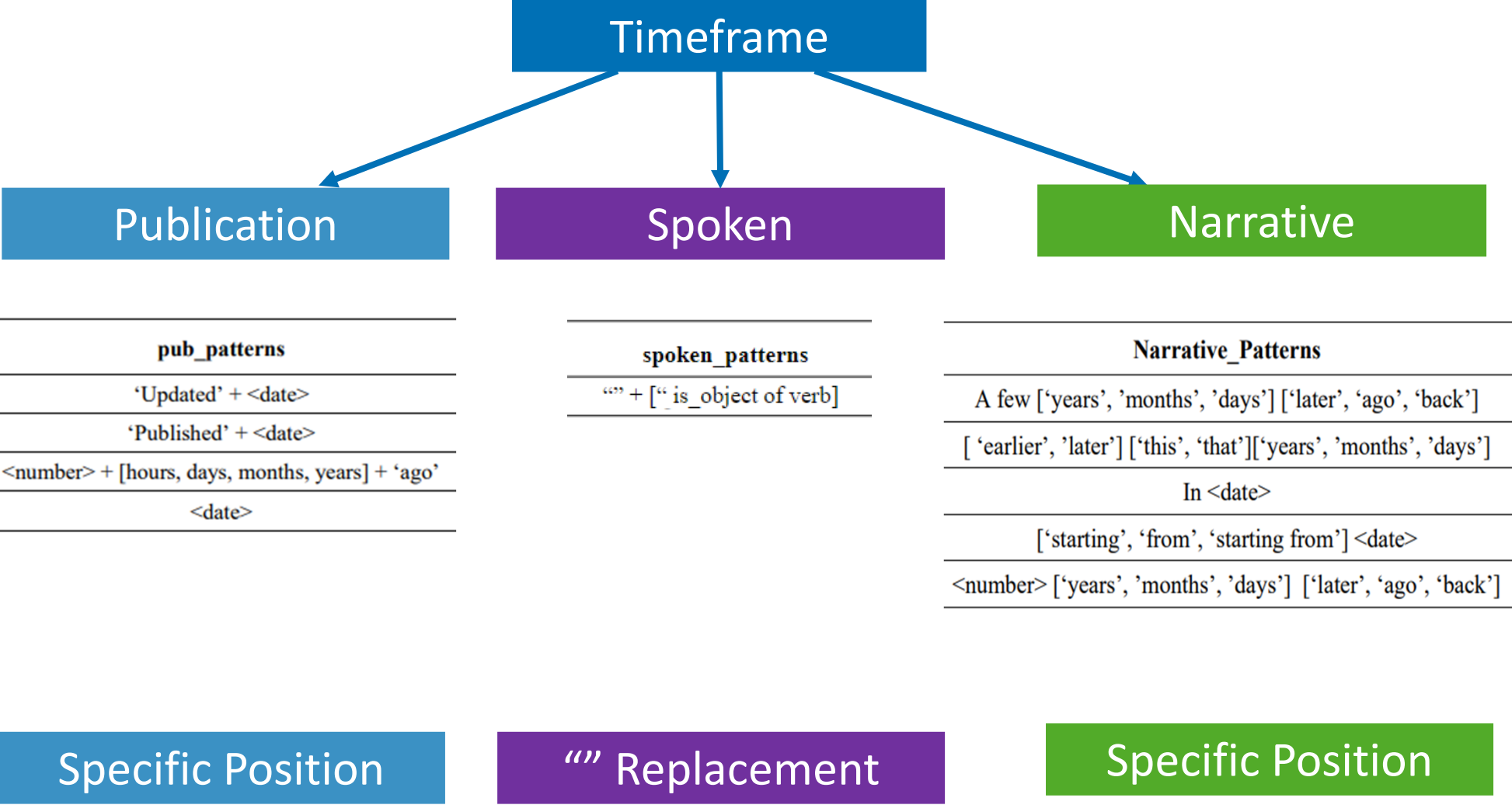
"The contract has finally, been signed", he added.

Yesterday, in a final word, XYZ' director declared his retirement.

Direct Speech

Publication

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Publication

News
Source
Extraction



Algorithm
Input

```
1 The US makes its case against Russia
2 Analysis by Zachary B. Wolf, CNN
3 Updated 0302 GMT (1102 HKT) February 18, 2022
4 US Secretary of State Antony Blinken, with US
5 (CNN)Far from a de-escalation, the standoff bet
6 President Joe Biden warned on Thursday that an
```

Algorithm
Output

```
[ ["0302",
  "Updated 0302 GMT (1102 HKT) February 18, 2022"],
  ["US secretary of State ...." ] ]
```

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Spoken

"They have nothing to worry about," Musk said. "I would do the right thing."

Musk's comments came after CNBC contacted him regarding fresh reporting that Biden and the White House have no immediate plans to invite Musk to potential upcoming meetings with corporate leaders. The people who spoke to CNBC about how the White House regards Musk declined to be named in order to speak freely about private conversations.

"The notion of a feud is not quite right. Biden has pointedly ignored Tesla at every turn and falsely stated to the public that GM leads the electric car industry, when in fact Tesla produced over 300,000 electric vehicles last quarter and GM produced 26," Musk said in the email.

```
[
  [
    "spoken_1",
    [" "They have nothing to worry about," Musk said. "I would do the right thing." "]],
    "spoken_2",
    [" "The notion of a feud is not ... Musk said in the email."]],
  ]
  ["spoken_1.Musk's comments came after CNBC contacted him regarding fresh reporting
  that Biden and the White House have no immediate plans to invite Musk to potential
  upcoming meetings with corporate leaders. The people who spoke to CNBC about how
  the White House regards Musk declined to be named in order to speak freely about
  private conversations.spoken_2"]
]
```

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Narrative

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Timeframe
extraction

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	TIMEFRAME_TYPE	ID	TEXT	TENSE
0	pub	NaN	11 Mar 2022ByJordan Winter\n	NaN
1	spoken	tf_speech_0	"This ingenuity has led to a busy year for AB ...	NaN
2	narrative	tf_nar_0	ST. LOUIS — AB InBev, the global brewing giant... {"', 'Present', 'Past'}	
3	narrative	tf_nar_1	Just last month, EverGrain announced that its ... {'Past'}	
4	narrative	tf_nar_2	The Upcycled Certified mark, which UFA launch...	{'Future'}

	TIMEFRAME_TYPE	ID	TEXT	TENSE
0	pub	NaN	Posted: 6 January 2021\n	NaN
1	spoken	tf_speech_0	Alex Kuperman, CEO of ABI, said: "With TMG and...	NaN
2	spoken	tf_speech_1	He added: "ABI's know-how for integrating robo...	NaN
3	narrative	tf_nar_0	TMG, parent company of bakery equipment busine... {"', 'Past', 'Present', 'Future'}	

30 Article from 3
different News
websites

Publication
(100%)

Spoken
(100%)

Narrative
(87%)

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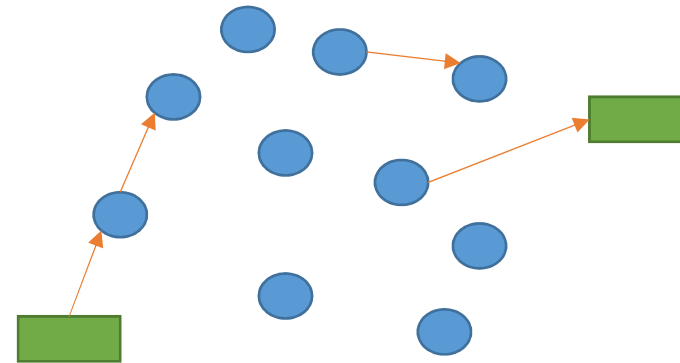
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Temporal relation
in event extraction



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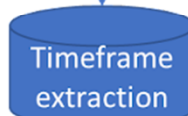
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References

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