

TempEL: Linking Dynamically Evolving and Newly Emerging Entities

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1. Ghent University

2. University of Copenhagen



Entity Linking task links anchor mentions to target entities

Entity mentions

The talented soccer player was praised as the "new Sheva" by journalists ...

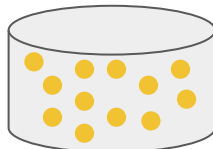
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Knowledge Base (KB)



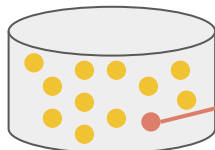
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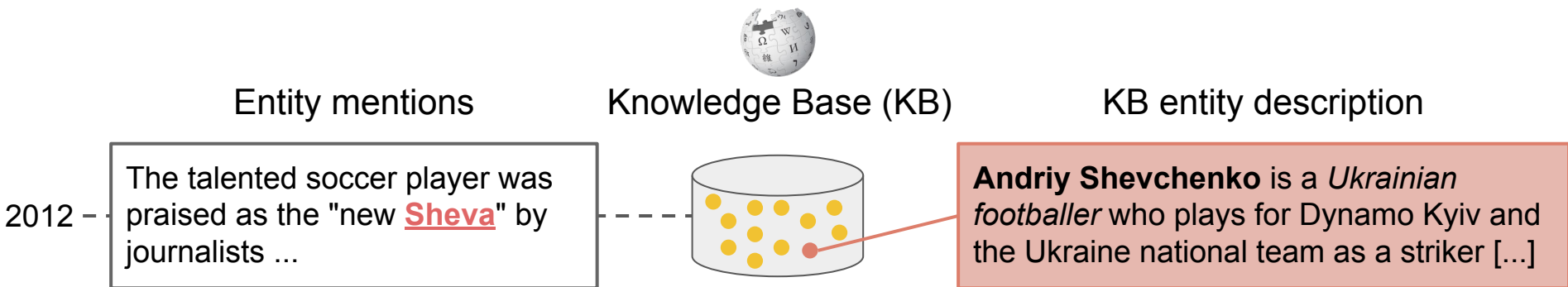
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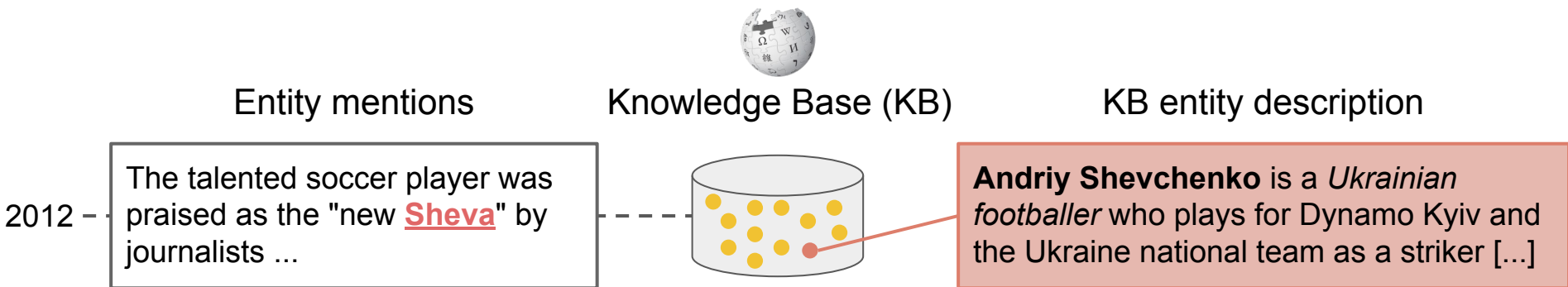
KB entity description

Andriy Shevchenko is a *Ukrainian* *footballer* who plays for Dynamo Kyiv and the Ukraine national team as a striker [...]

Mentions and entities exist in time

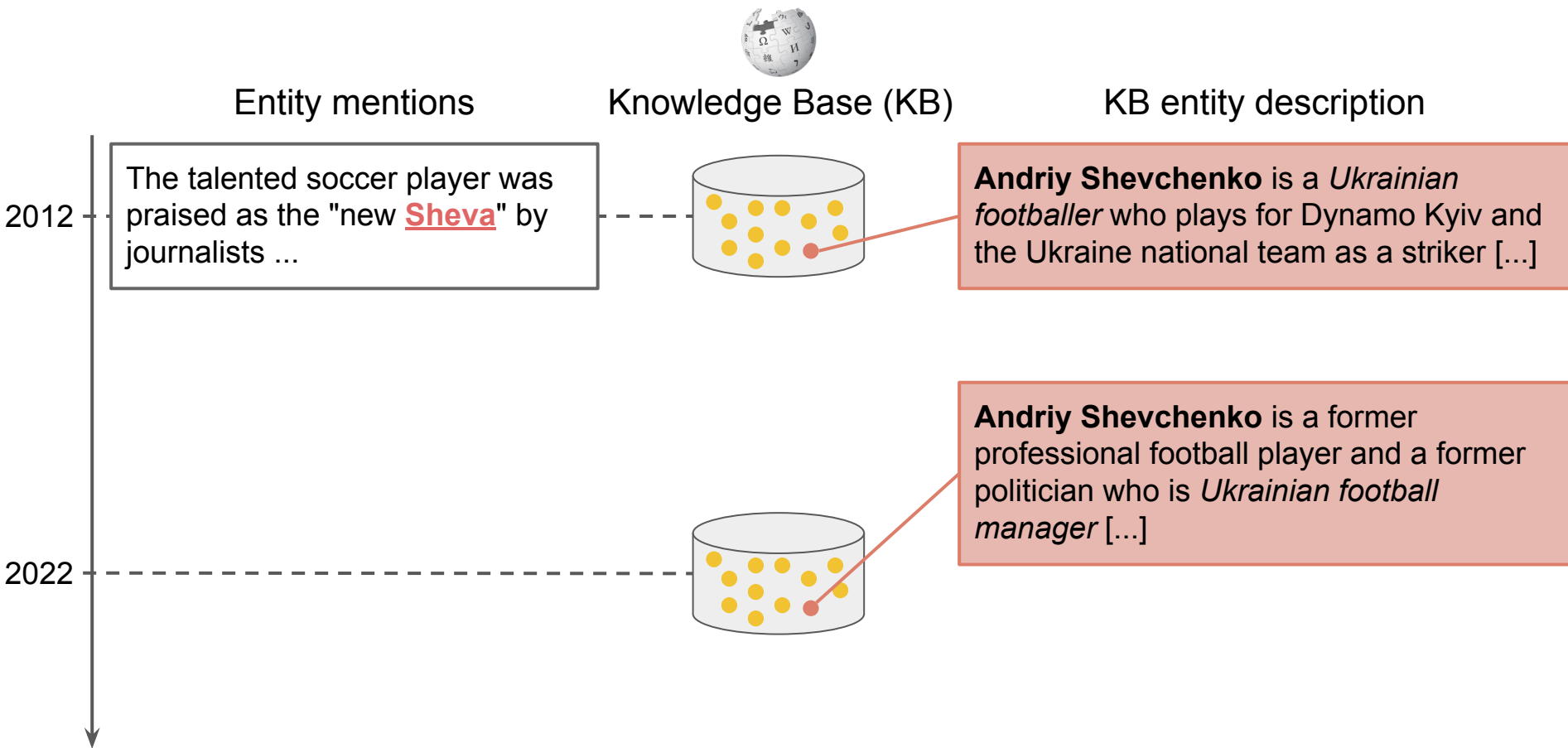


Mentions and entities exist in time



Key research question: How temporal evolution in KB entities and entity mentions affects entity linking task?

Continual entities evolve over time



Continual entities evolve over time



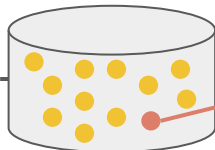
Entity mentions

Knowledge Base (KB)

KB entity description

2012

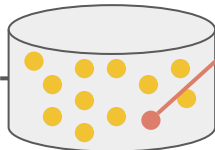
The talented soccer player was praised as the "new Sheva" by journalists ...



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2022

Ukraine coach Shevchenko announced that he had formally asked FIFA to switch ...



Andriy Shevchenko is a former professional football player and a former politician who is *Ukrainian football manager* [...]

Continual entities evolve over time



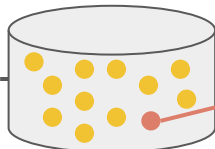
Entity mentions

Knowledge Base (KB)

KB entity description

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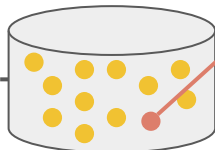
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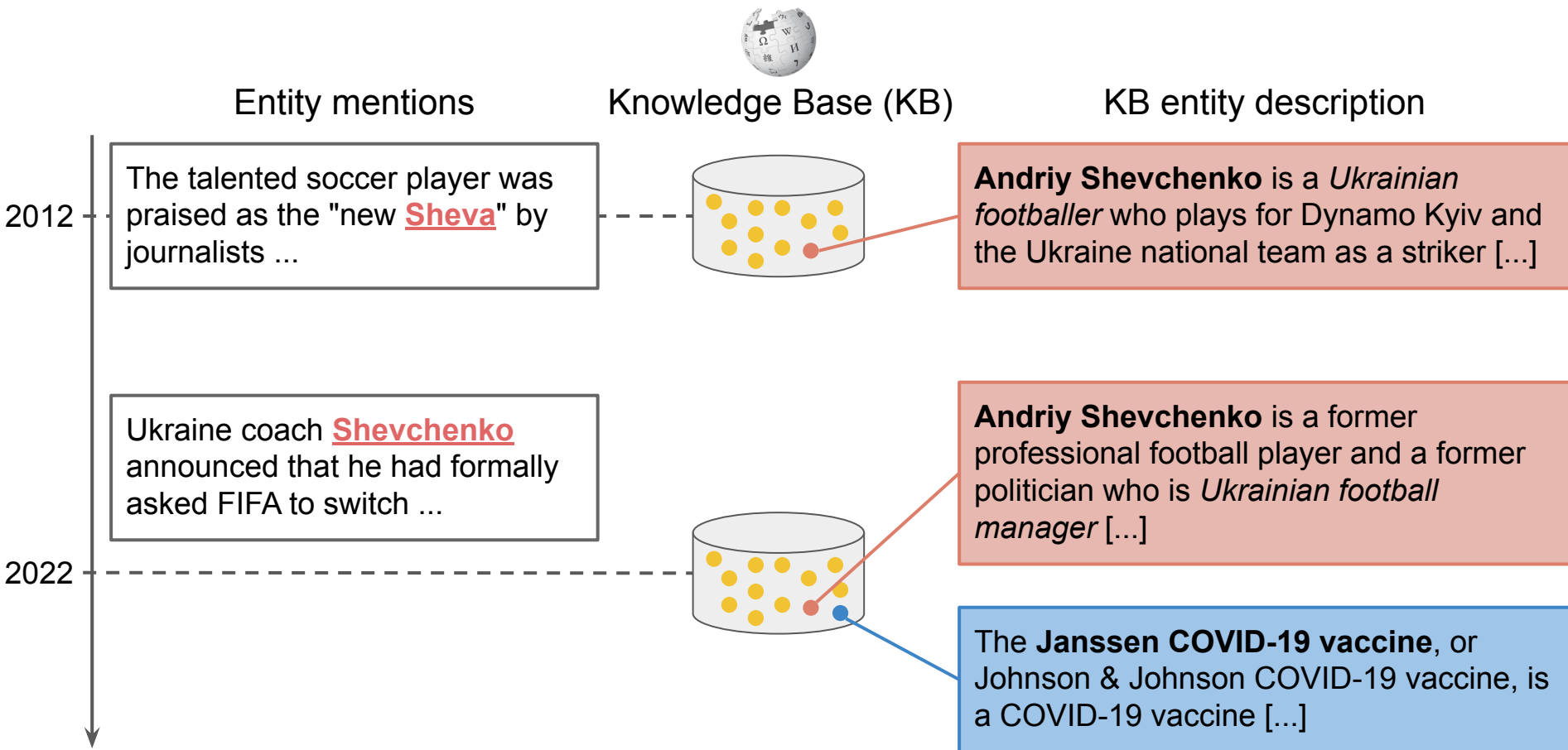
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Continual entities evolve over time and *new* entities appear



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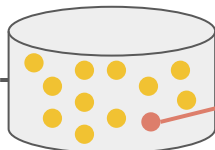
Entity mentions

Knowledge Base (KB)

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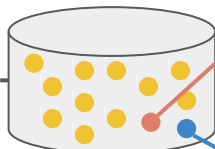
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2022

The company has played a key role in distributing the Johnson & Johnson vaccines ...

The **Janssen COVID-19 vaccine**, or Johnson & Johnson COVID-19 vaccine, is a COVID-19 vaccine [...]

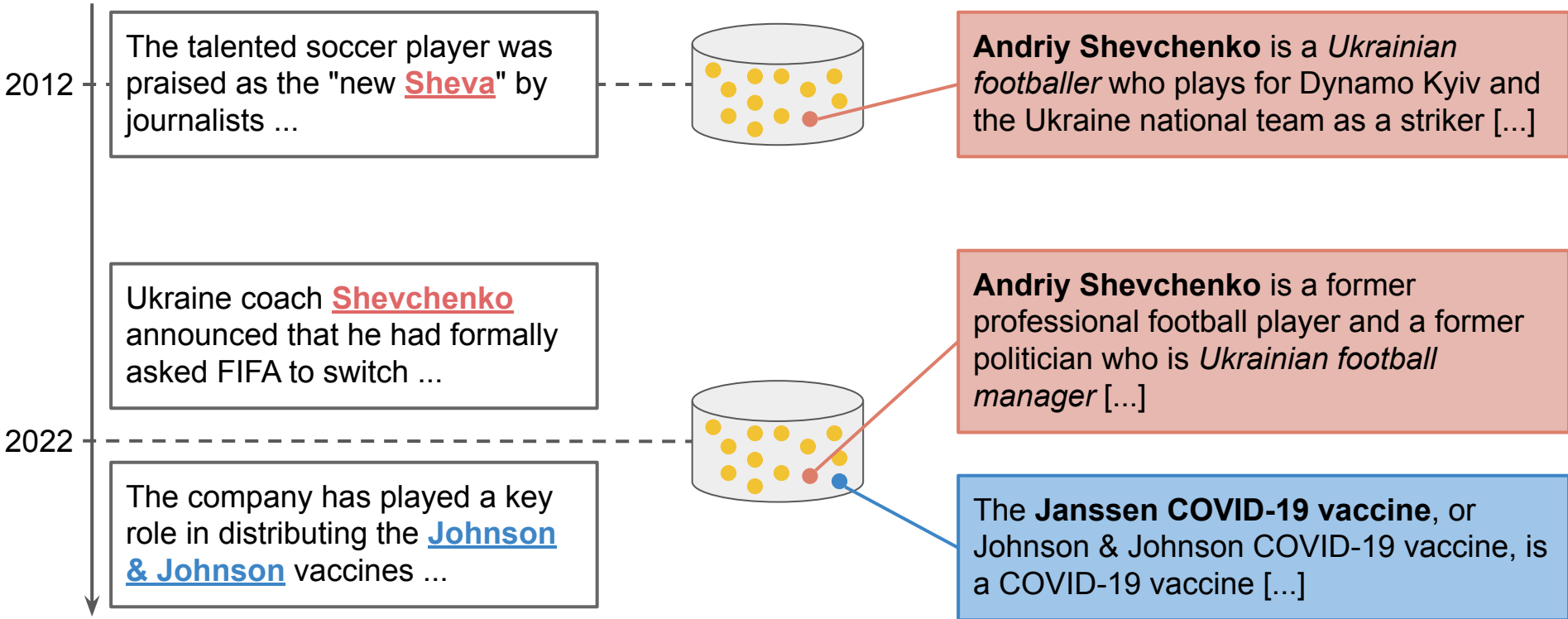
How time evolution affects entity linking?



Entity mentions

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KB entity description



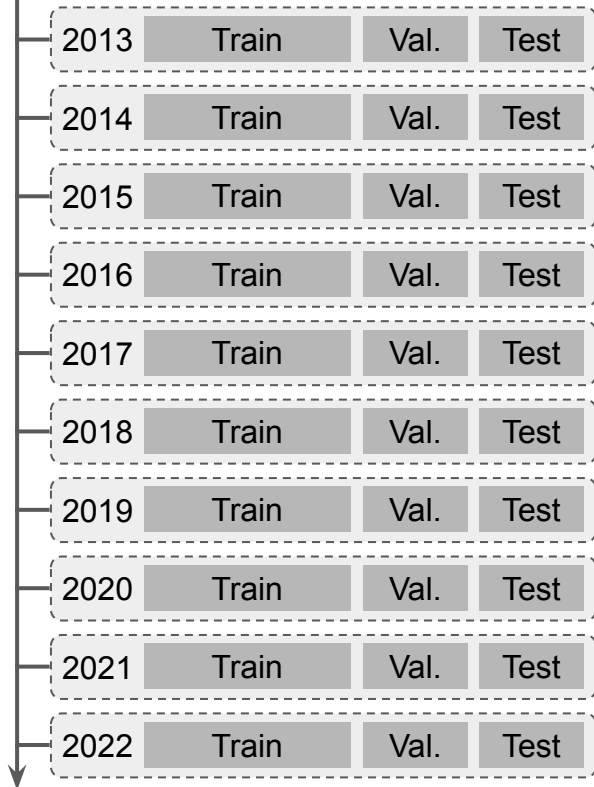
TempEL: 10 yearly temporal snapshots from Wikipedia



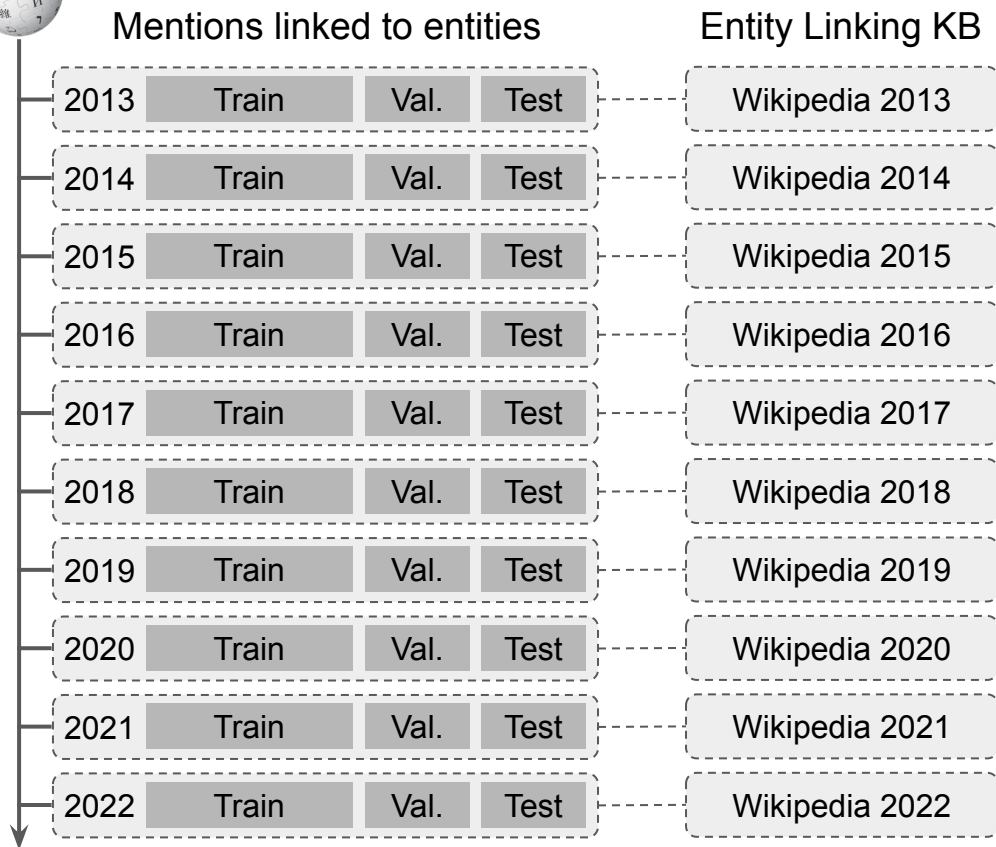
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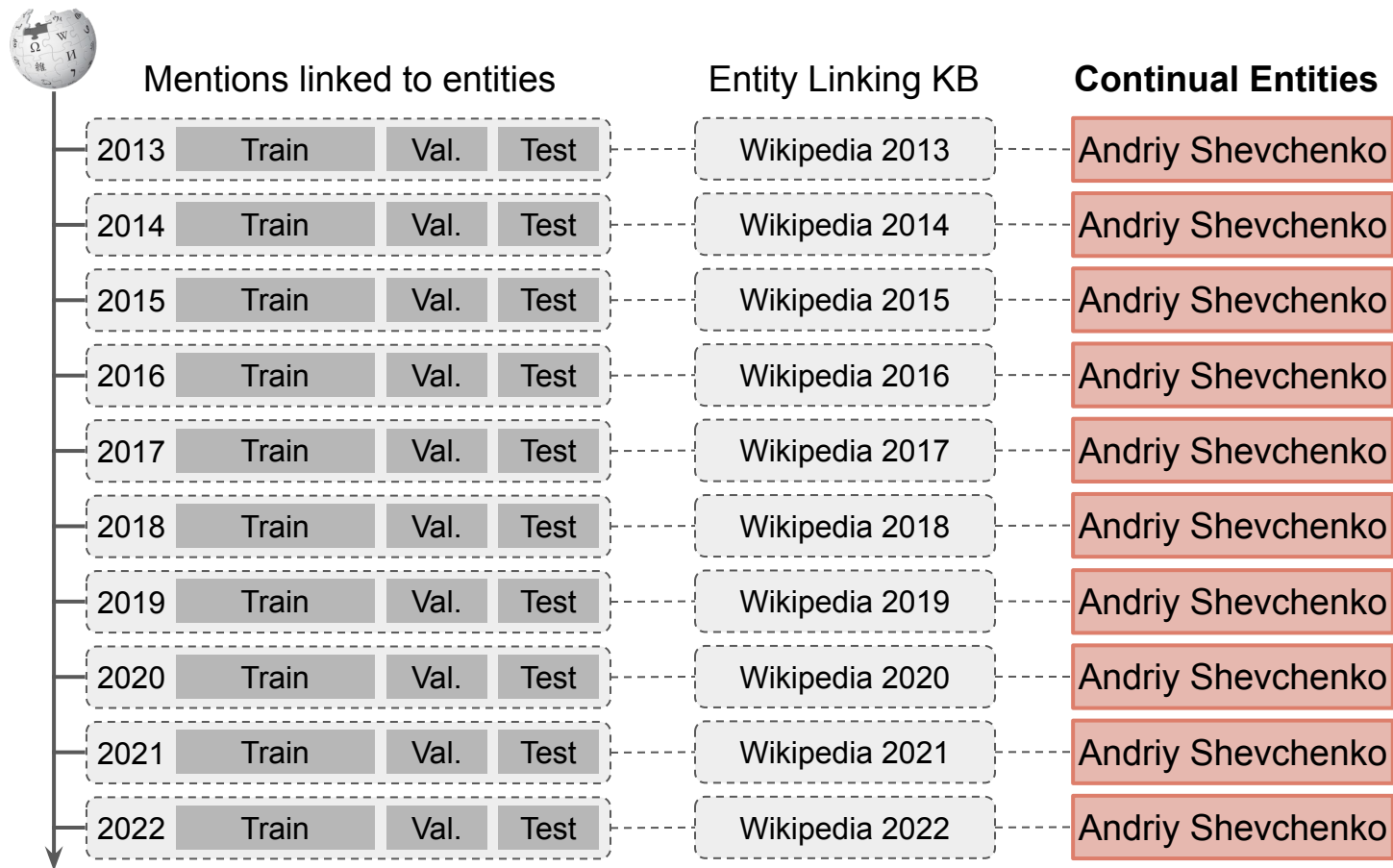
Mentions linked to entities



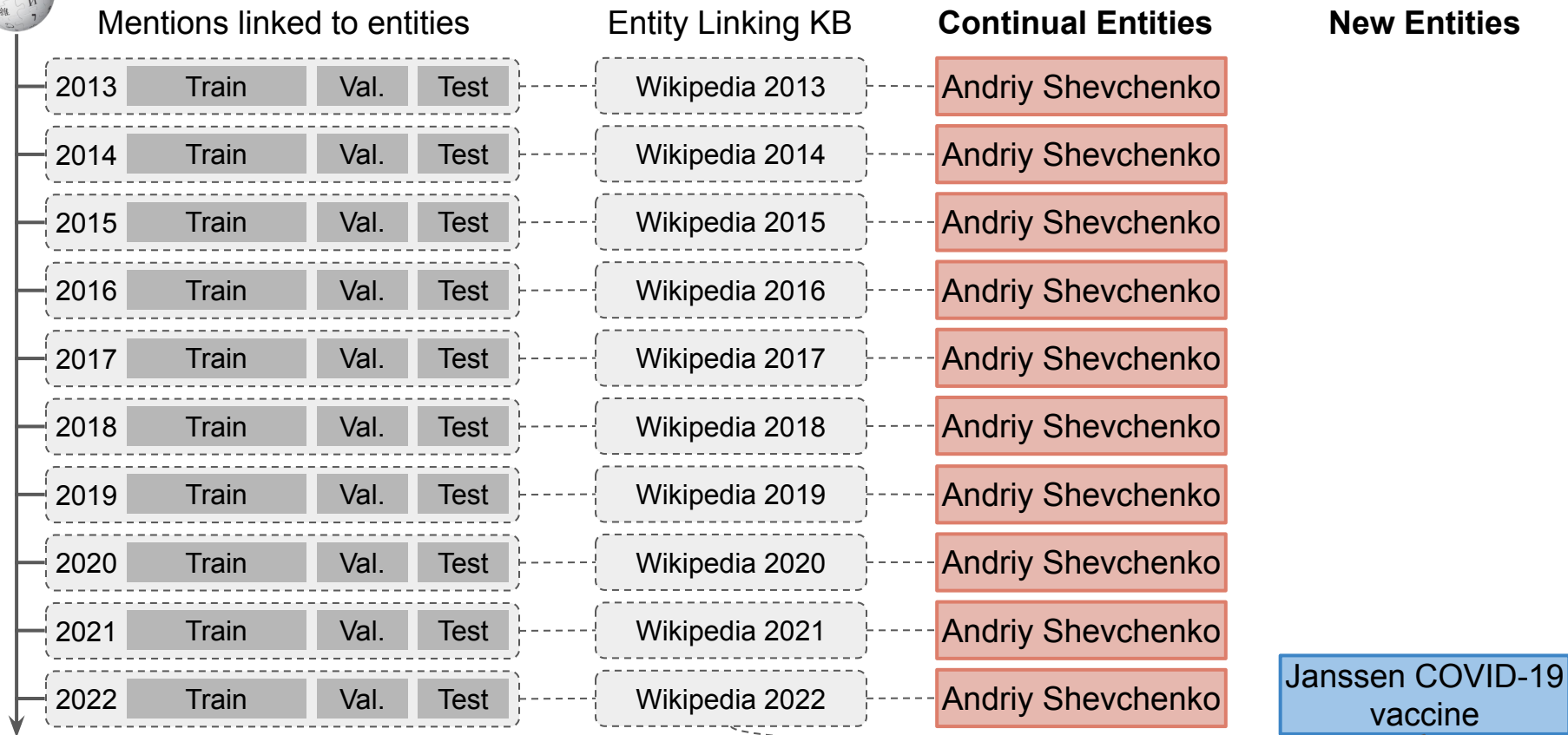
TempEL: 10 yearly temporal snapshots from Wikipedia



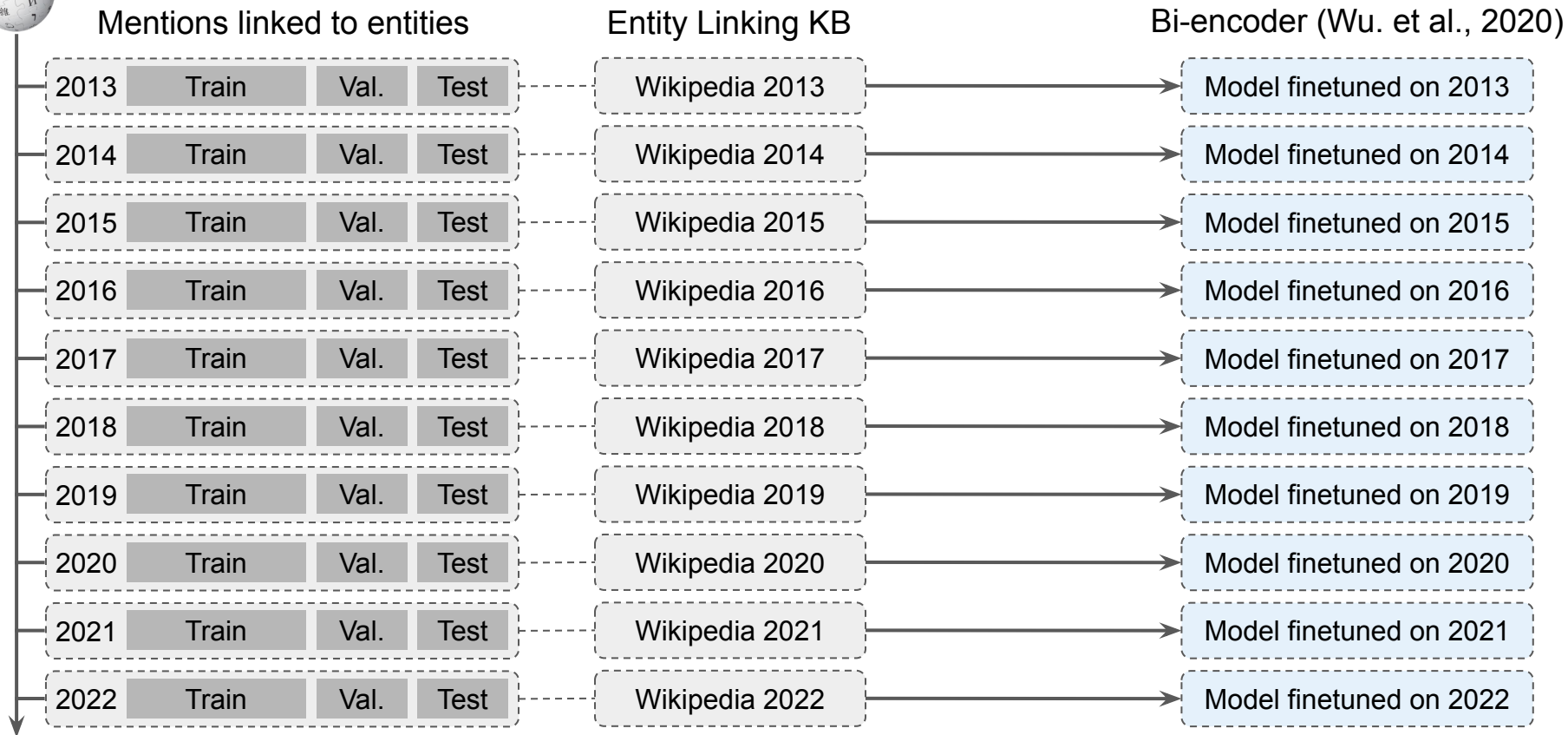
TempEL composed of *continual* and *new* entities



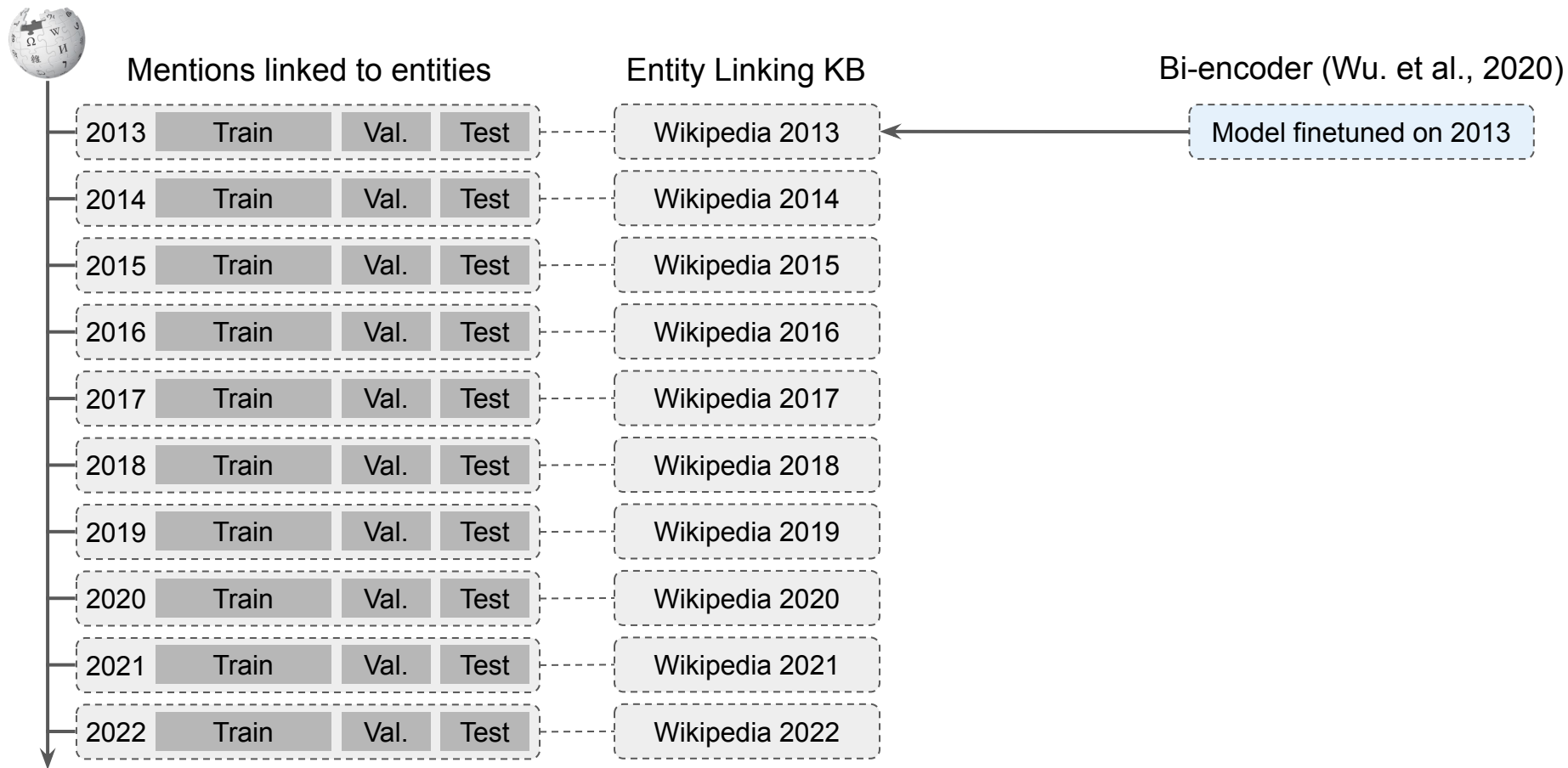
TempEL composed of *continual* and *new* entities



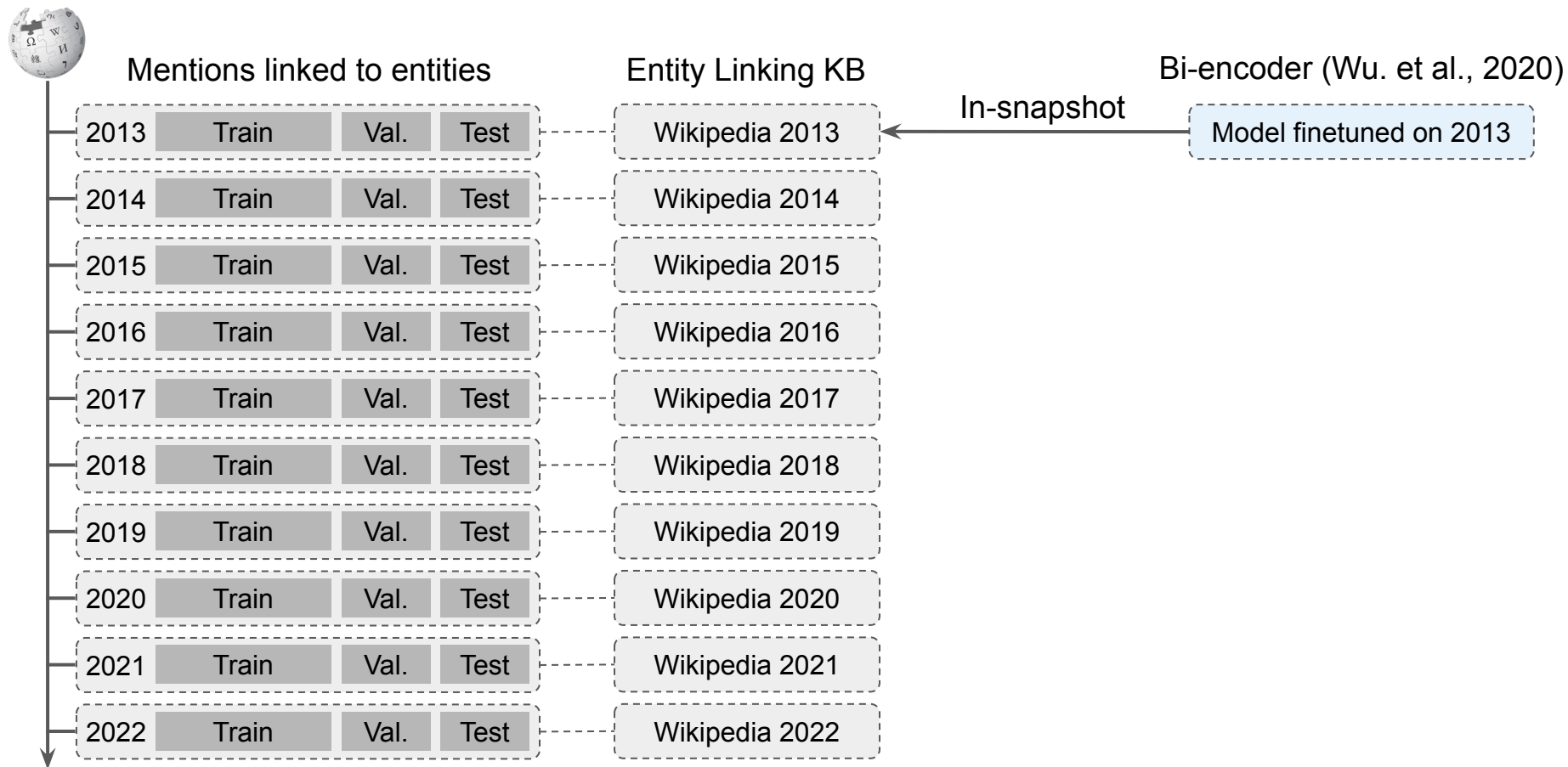
Different model is finetuned on each of the snapshots



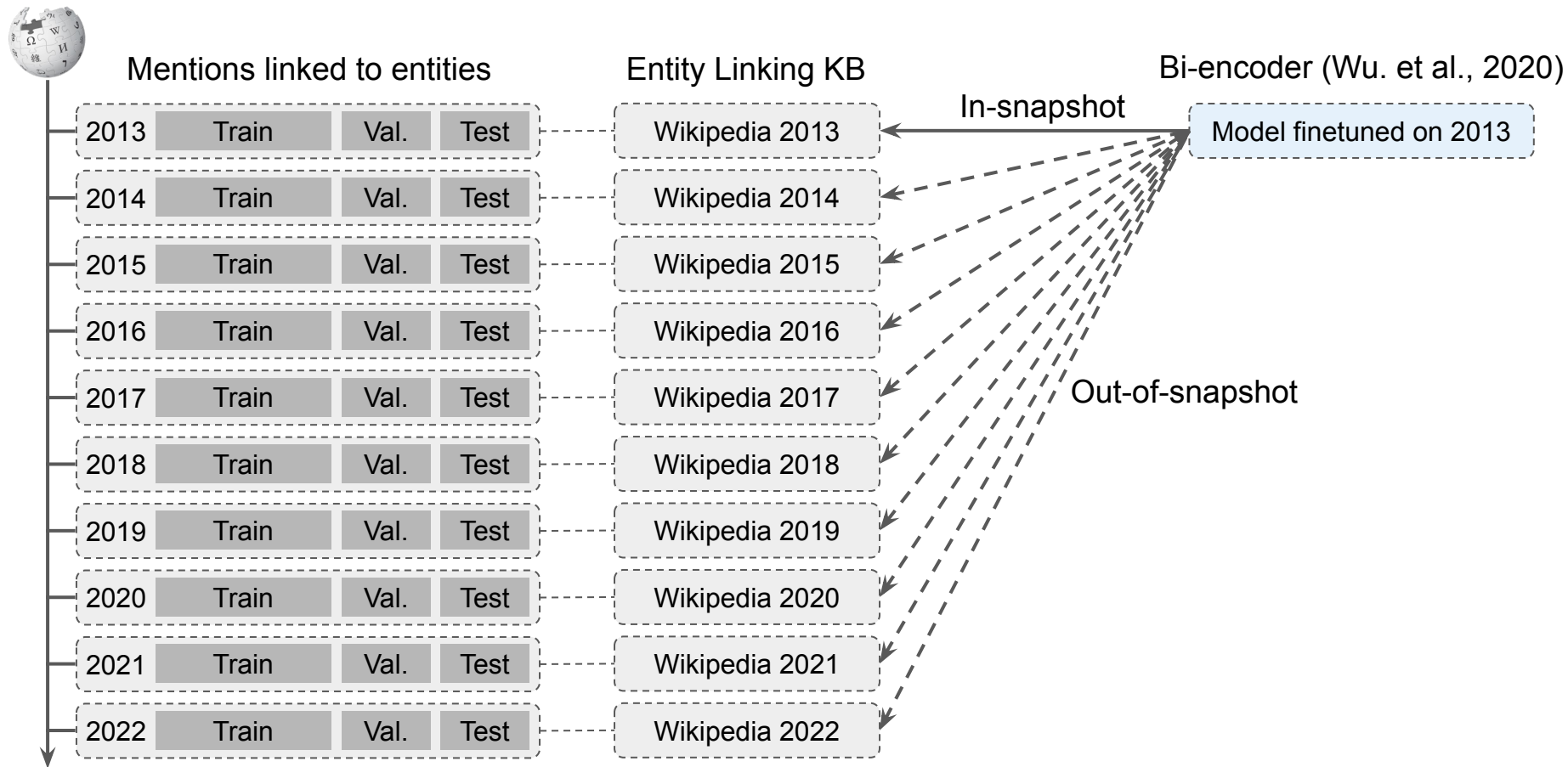
Each model is evaluated on the same or different snapshot



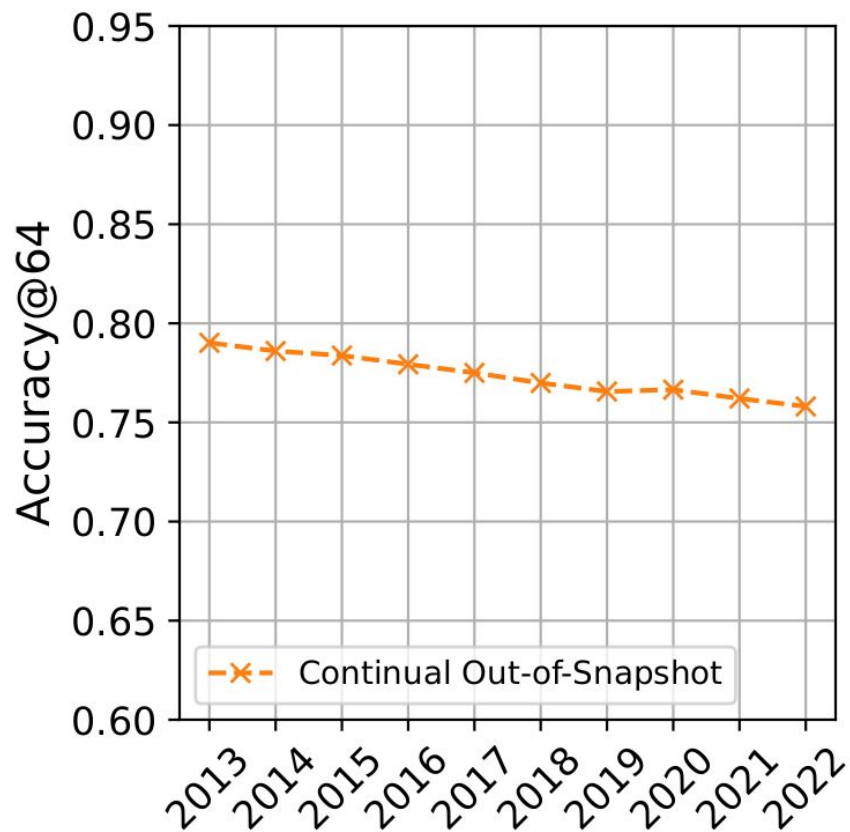
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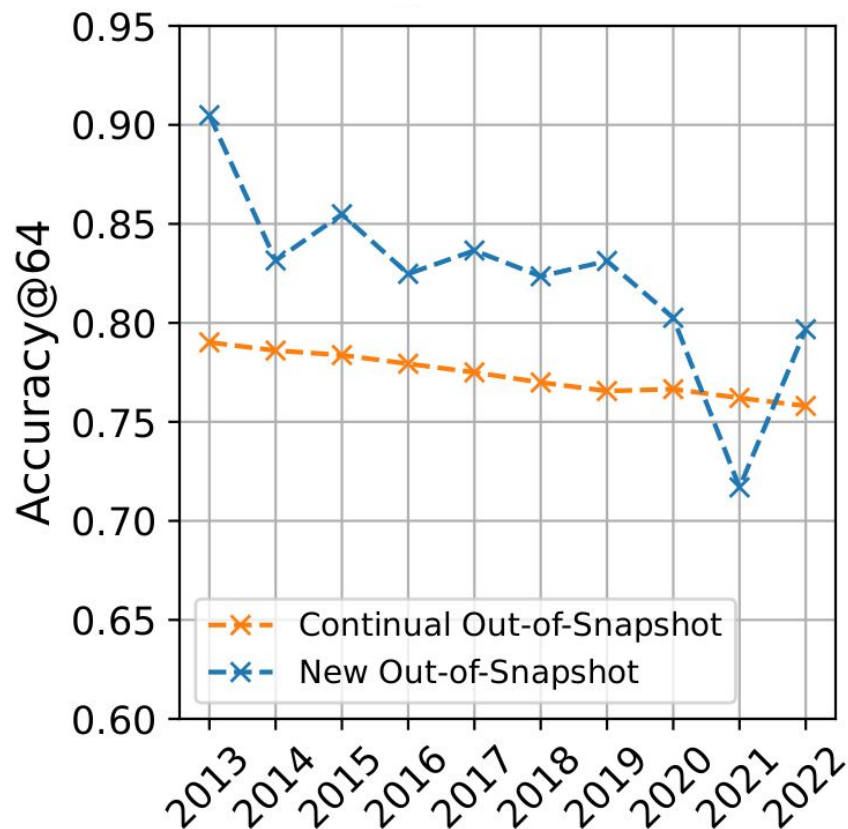
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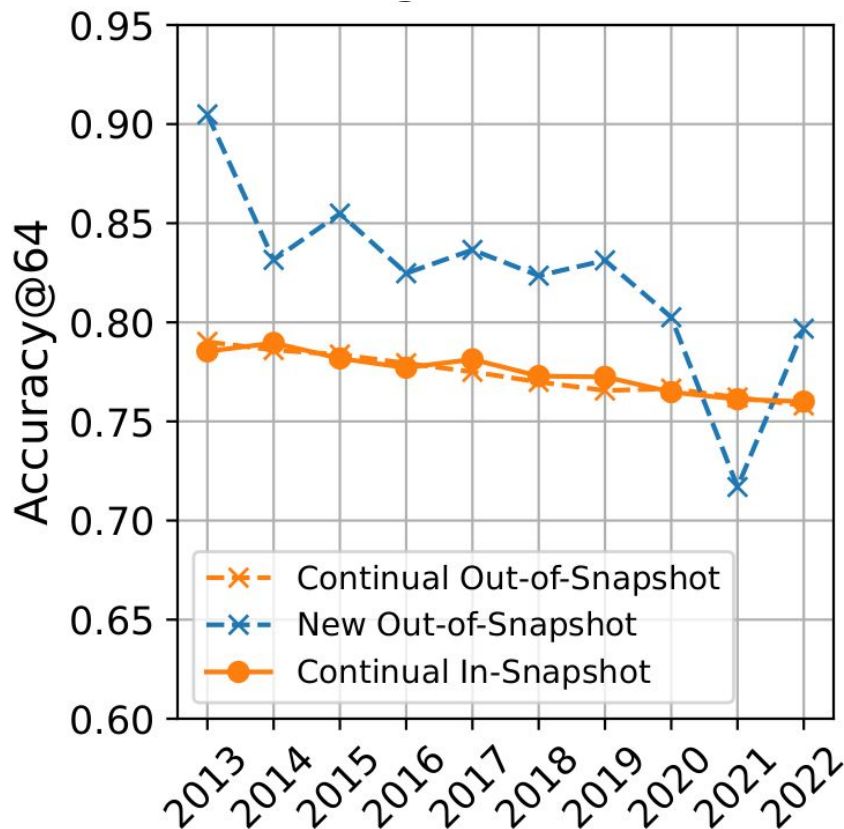
General decrease in performance for continual entities



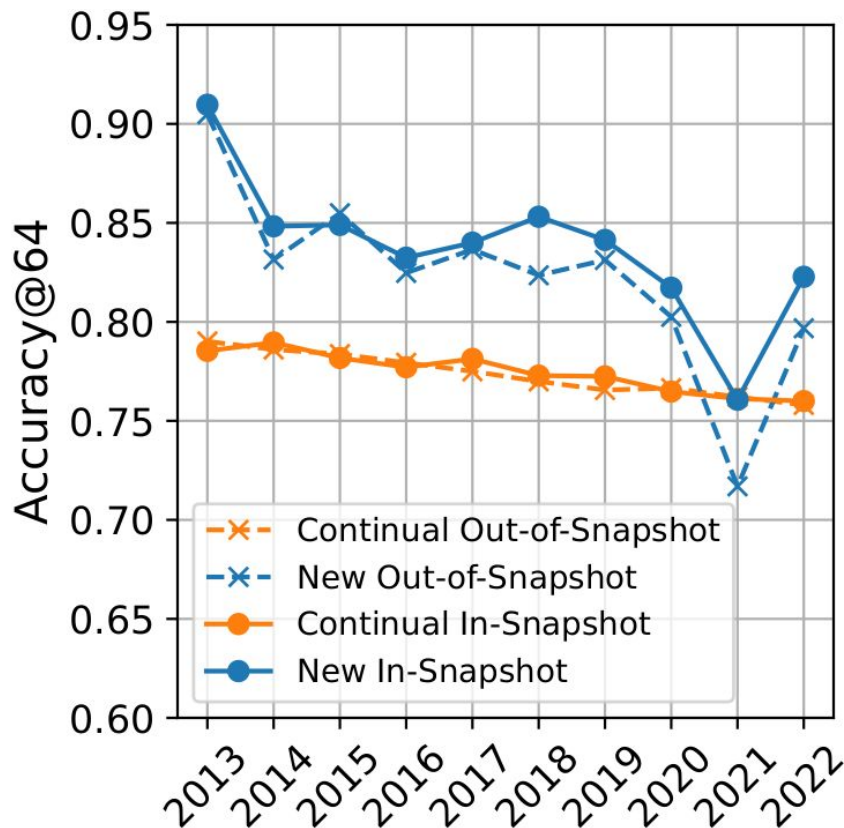
Irregular decreasing trend in performance on new entities



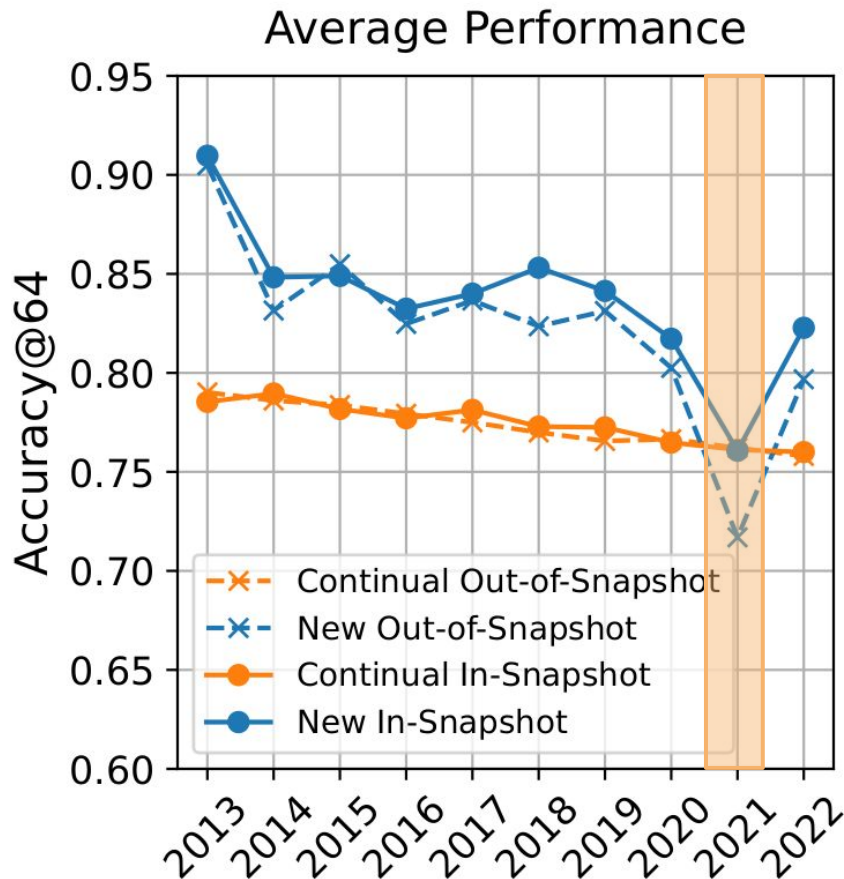
Marginal difference between in and out-of-snapshot for continual entities



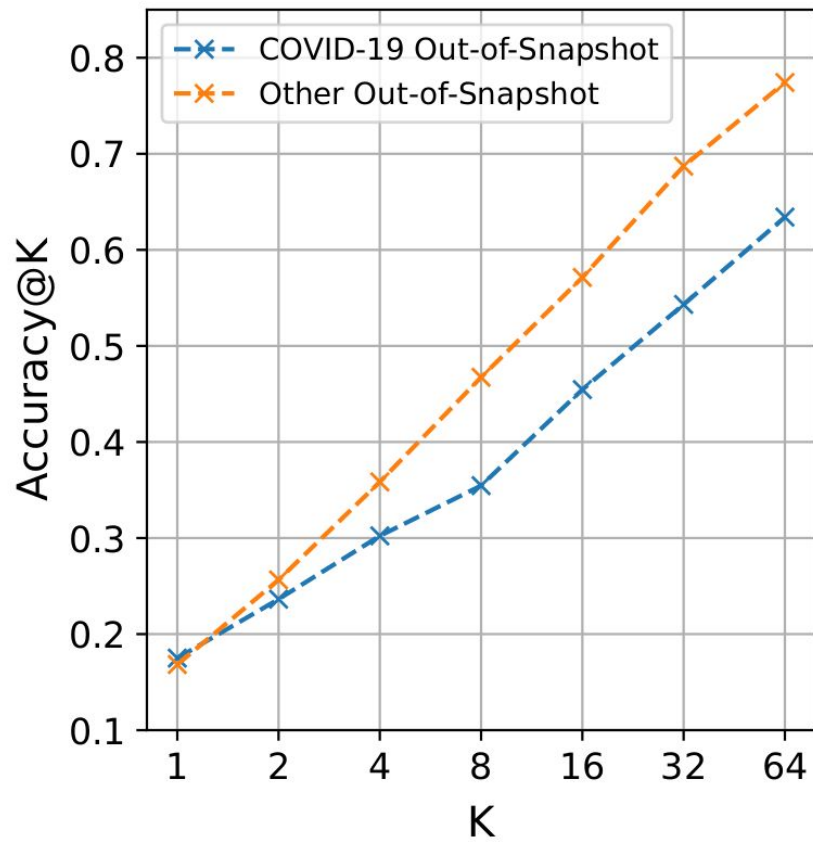
In-snapshot significantly superior to out-of-snapshot for new entities



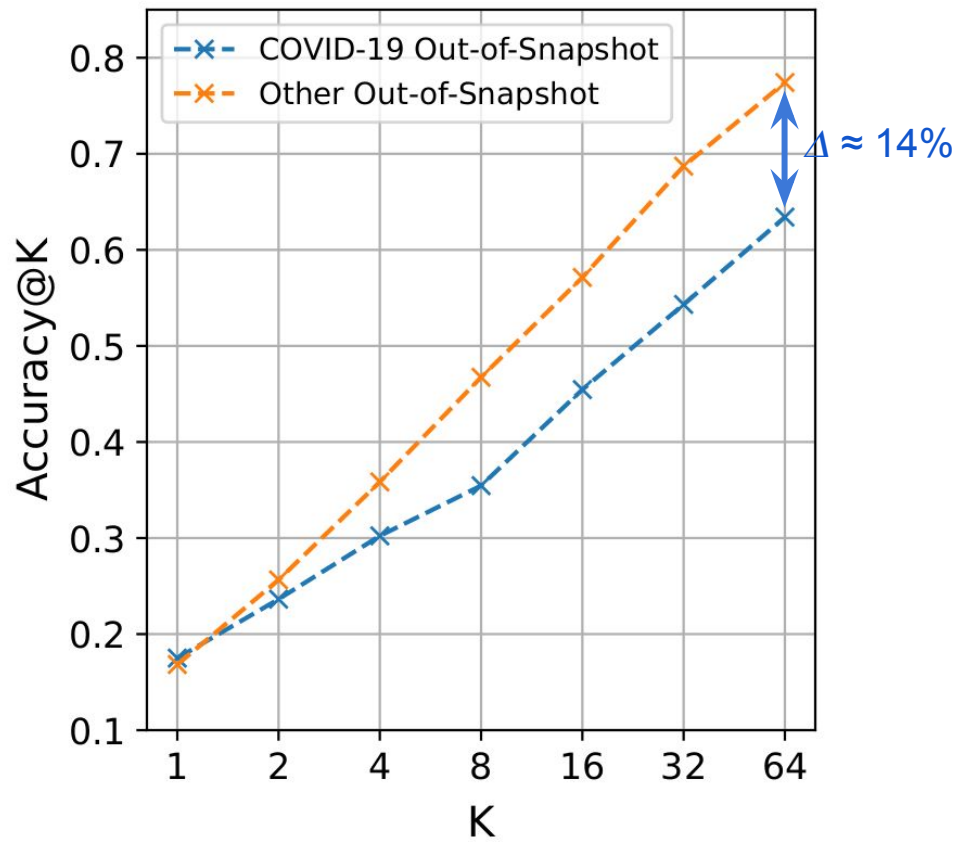
Sharp decrease in performance for new entities of 2021



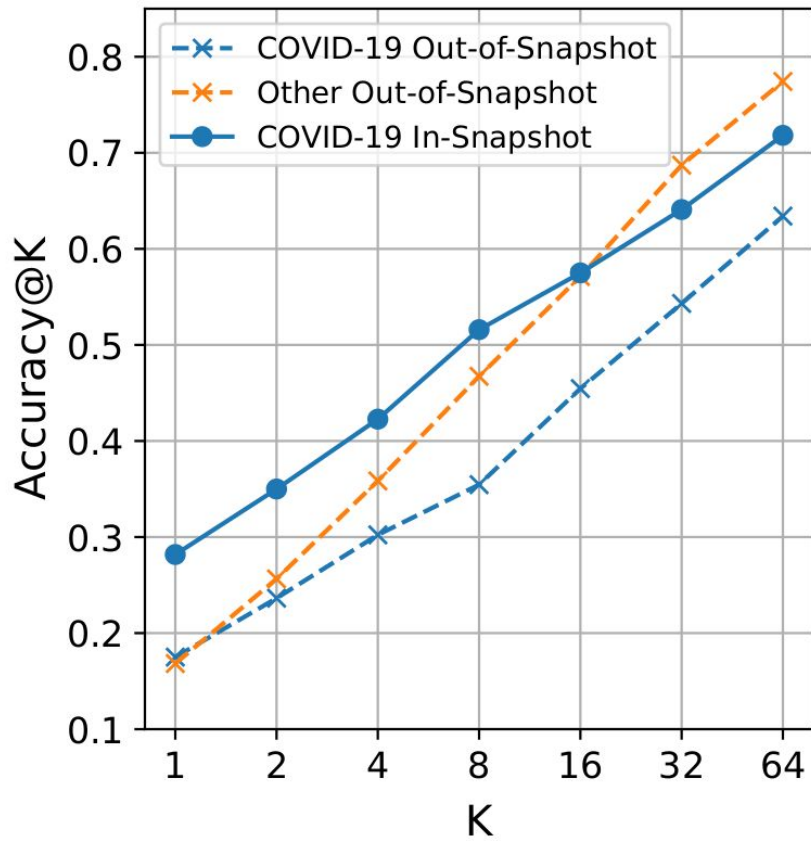
Low performance on COVID-19 new entities



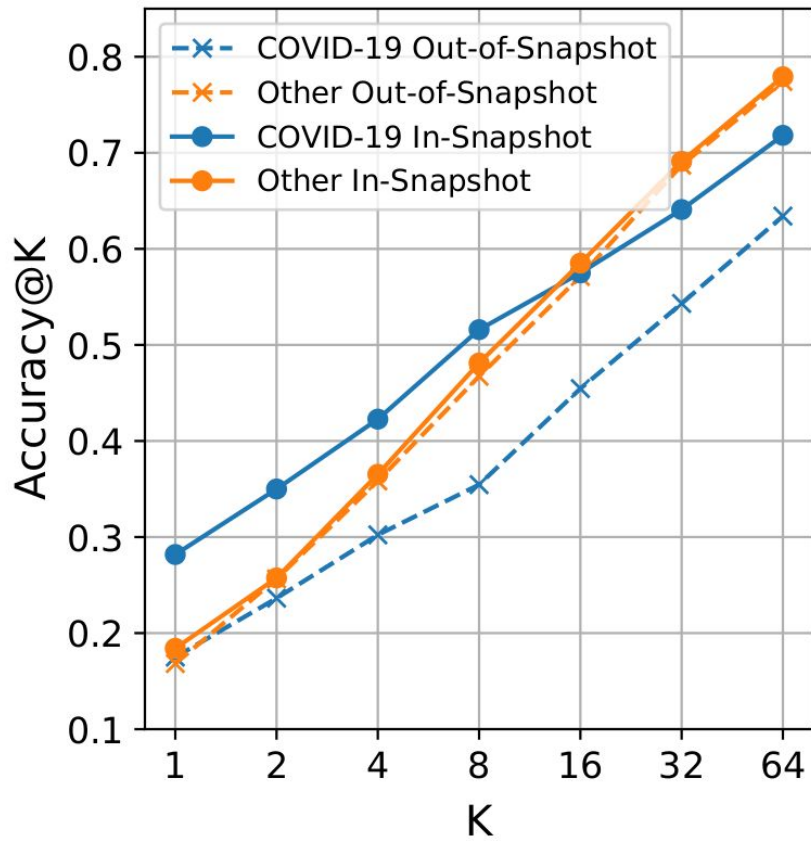
Low performance on COVID-19 new entities



Superior impact of in-snapshot finetuning on COVID-19 new entities



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Conclusion

- TempEL, a new large-scale temporal entity linking dataset composed of 10 yearly snapshots.

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- Data - <https://github.com/klimzaporjets/TempEL>.

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