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What it Boils Down to...The Case for Event Analogies to Combat Complexity in Digital Libraries

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20 years ago...

- ... the 9/11 attack happened – the aftermath is still palpable
- How to **make sense** of (not only) such events?
 - Create a mental model of the event
 - What happened?
 - What is the event context?
 - How is this event comparable to other events I already understood?





Analogies (I)

- Analogies try to transfer some high-level meaning from a **base** to a **target**
 - Often cited as analogy to 9/11: the Pearl Harbor attack in 1941
- In a DL context with vast amounts of information reg. events: analogies can reduce the complexity by offering a ‘*mental hook*’ for the user



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Analogies (II)

- Most research in computer science has been performed on 4-term analogies
 - E.g. Paris::France \sim_a Berlin::Germany
 - Mostly by utilizing statistical models based on the distributional hypothesis... with minor success

$$[\text{Norway}] - [\text{Oslo}] + [\text{Havanna}] \approx [\text{Cuba}]$$



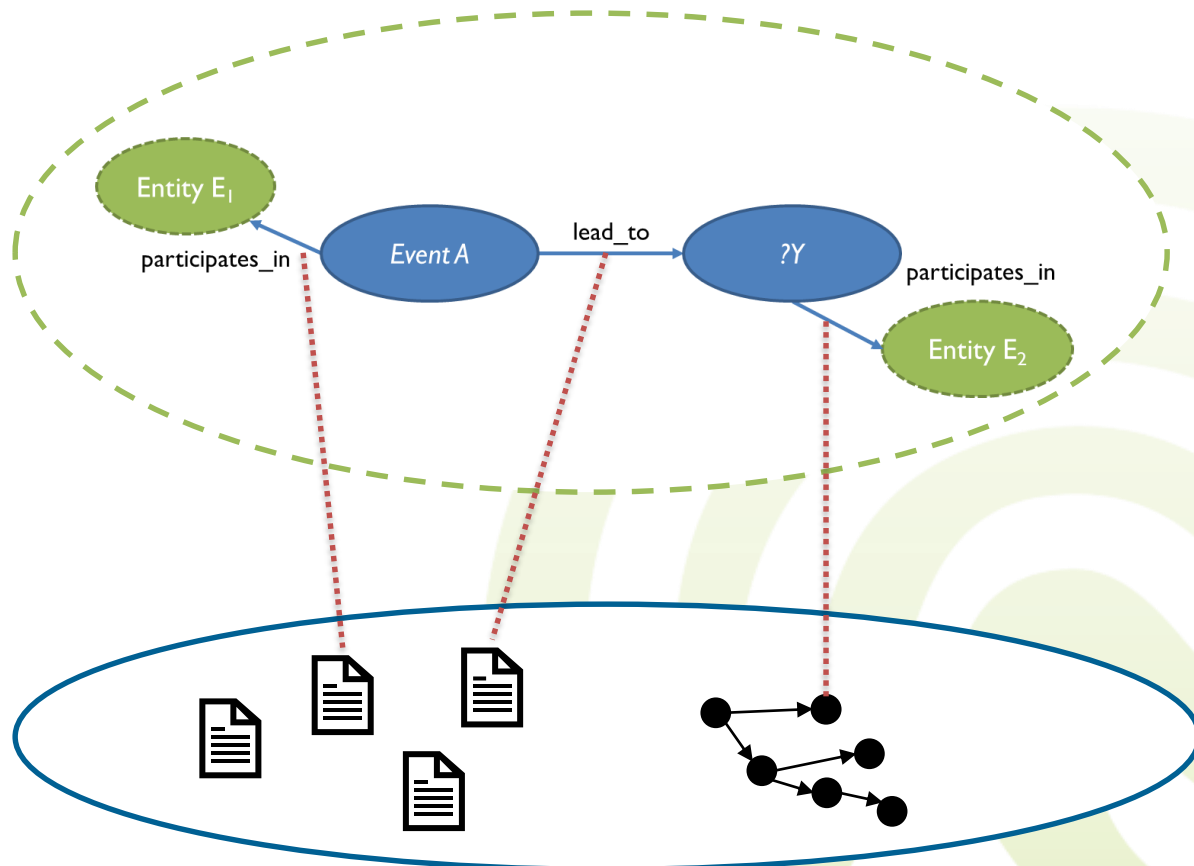
Analogies (III)

- Based on psychology we identified **two components** for finding event analogies
 - **Event Structure Similarity (ESS):** Two events should share a common *prototype*, i.e. a battle between two countries and a competition between sport teams are both *confrontations*
 - **Event Perception (EP):** How are participants of a certain event are *perceived*? E.g. as an aggressor in a conflict or an underdog in a football game



Narrative Overlay

- Kroll et al. (2020) introduced the narrative overlay for heterogeneous knowledge repositories
 - We enhance this work by ESS and EP

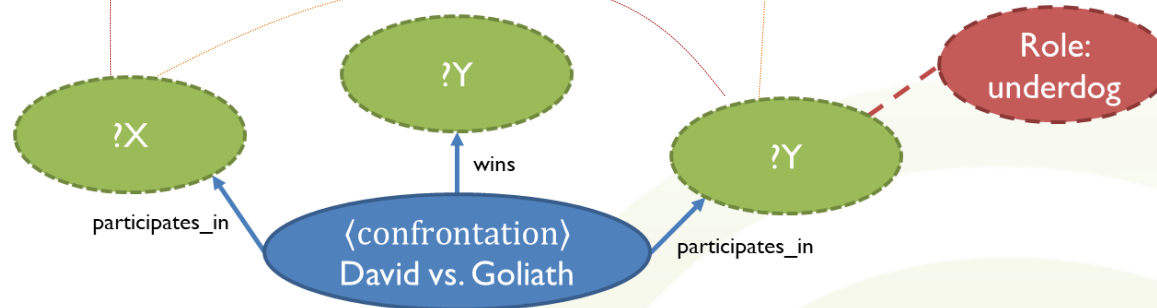




Narrative Prototypes

UEFA Euro Final (1992)		
Participant 1	Participant 2	Winner
Denmark	Germany	Denmark

UEFA Euro Final (2004)		
Participant 1	Participant 2	Winner
Greece	Portugal	Greece

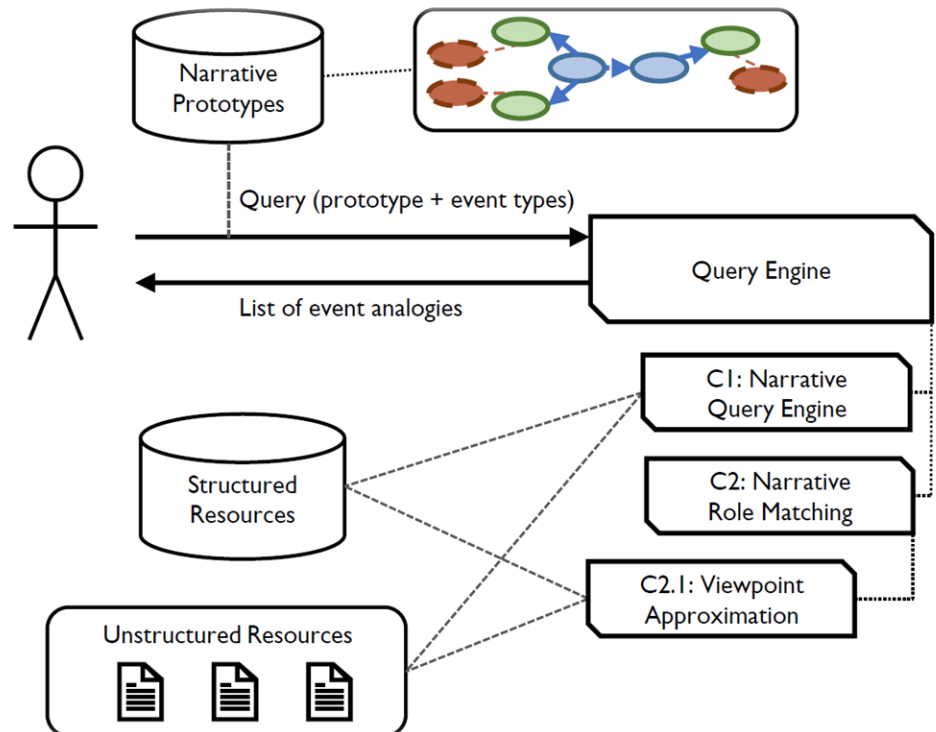


- A narrative prototype can be bound against an event instance if the event prototypes and the perceived roles fit
 - Two instances matching the same n. prototype are considered to be *analogous*



System Architecture

- Given the structure of narrative prototypes a analogy-enabled query engine can be sketched





Future Work

- Open questions:
 - How can event prototypes be defined and how to measure distances between prototypes and events in respective taxonomies?
 - How can narrative roles and event participants be matched and substituted?
 - What is the exact connection between narrative roles and viewpoints in a narrative prototype?



Thank You!



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- [\[https://en.wikipedia.org/wiki/September_11_attacks#/media/File:WTC_smoking_on_9-11.jpeg\]](https://en.wikipedia.org/wiki/September_11_attacks#/media/File:WTC_smoking_on_9-11.jpeg)

- Pearl Harbor

- Public Domain

- [\[https://en.wikipedia.org/wiki/Attack_on_Pearl_Harbor#/media/File:USS_West_Virginia2.jpg\]](https://en.wikipedia.org/wiki/Attack_on_Pearl_Harbor#/media/File:USS_West_Virginia2.jpg)