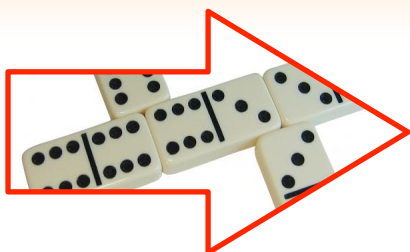# The Circumstantial Event Ontology (CEO.owl) and ECB+/ CEO Evaluation Corpus

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We do semantic event domino!

"Three months ago, Mary B. arsoned the cottage to punish her ex-husband."
"The insurance company made sure the house was restored by an expert builder."

So, why was the house restored?

What it is:
CEO.owl is an event ontology that:
a) types events and identifies the roles of the entities related to the event;
b) models what situation is true before, during and after an event;
c) allows for chaining event mentions with semantic circumstantial relations, based on shared properties in the situation assertions.

What it does:
The model allows to infer semantic circumstantial relation chains between event mentions in natural language text.

What it needs:
- Minimally: the vocabulary mappings and basic chaining heuristics;
- For full expressivity: FrameNet based SRL output and a Reasoner.

Domain:
Calamities in newswire: murders, earthquakes, theft, cyber attacks, etc.

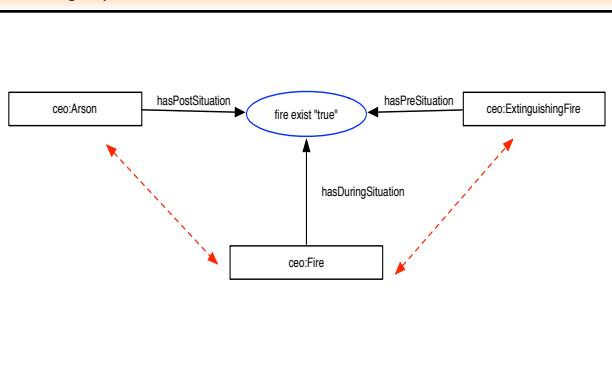**What is a circumstantial event relation?**
A weak causal relation. Event A gives rise to event B, but not necessarily so:

X being hit — X being injured — X dying;
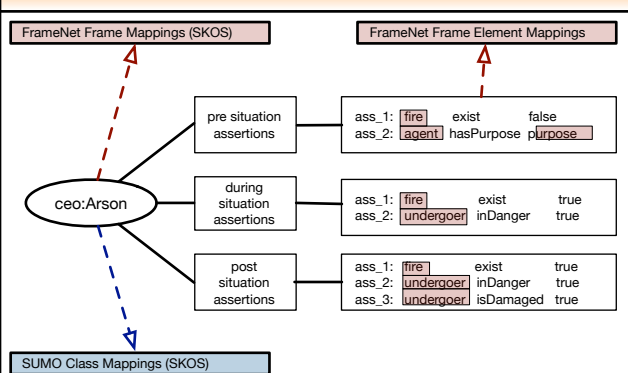*Z damaging Y— Q rebuilding Y — Y repaired*

How do we infer those relations?
WHEN two event mentions appear in the same textual context, we infer a circumstantial relation;
ONLY IF the ceo event classes the mentions pertain to share properties in the situation assertions.

Inferring implicit circumstantial relations

The CEO metamodel and mappings

Available: http://github.com/newsreader/eso-and-ceo

Publicly available (CC-BY-SA):
CEO.owl
- 223 event classes
- 121 properties
- 79 roles
- 456 situation rule assertions
- skos mappings to SUMO (195) and FrameNet Frames (265) and Frame Elements (263)

ECB+/CEO, the manually annotated evaluation corpus
- 508 articles
- 2494 CEO links annotated, related to ± 9500 event mentions
- 3448 new coreference sets

CEO vocabulary (version 1)
- 650 unique surface forms expressing events mapped to CEO.

First evaluation results

Evaluation 1: based on event **mentions**		Evaluation 2: based on event **instances**	
Baseline:	System:	Baseline:	System:
P 0.28	P 0.42	P 0.28	P 0.64
R 0.99	R 0.11	R 0.99	R 0.24
F1 0.43	F1 0.18	F1 0.43	F1 0.24

recall: - 35% of annotated relations is NOT circumstantial but episodic
- additional heuristics needed to connect mention to mention B
- extension needed of ceo event assertions

precision: - annotators missed relations, but correctly retrieved by the system (10%!)
- vocabulary mapping issues: polysemy

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