

Evidence Evaluation Using Argument Schemes

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Evidence Evaluation

Motivation

- QA systems like Statement Map, NazeQA, et al. can detect evidence for user queries
- How should we evaluate the contents of the detected evidence?

Goal

- Determine the logical structure connecting the query and evidence
- Recover implicit assumptions of the evidence not present in its text
- Evaluate the amount of factual support for the evidence argumentation

Approach

Relation Extraction

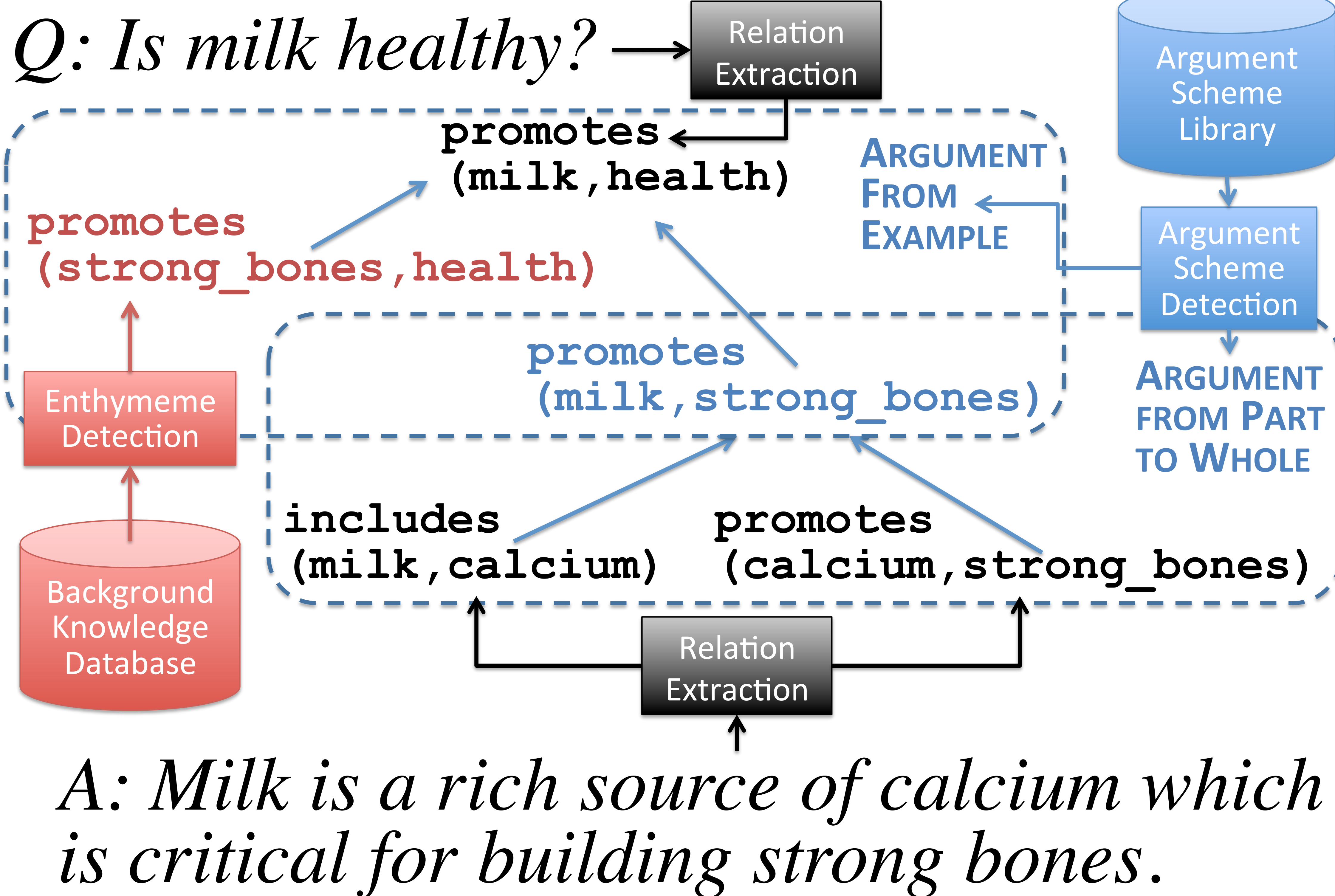
- extract semantic relations from Query and Text

Enthymeme Detection

- detect omitted premises with background knowledge

Argument Scheme Detection

- detect argument schemes with semantic relation templates



Argument Schemes

- A framework for understanding the structure of arguments using *informal logic* [Walton+ 2008]
- Templates that show the relationship between premises and consequences

ARGUMENT FROM VERBAL CLASSIFICATION

Premise : a has a particular property F
[property (a, F)]

Premise : For all x, if x has property F, then x can be classified as having property G
[$\forall x \text{ property}(x, F) \Rightarrow \text{property}(x, G)$]

Conclusion: a has property G
[property (a, G)]

CRITICAL QUESTION 1: Does a definitely have F, or is there room for doubt?

CRITICAL QUESTION 2: Can the verbal classification be said to hold strongly, or is it a weak classification that is subject to doubt?

Semantic Relations

Semantic Relations

- Represent the core meaning of health texts
- Predicates are aligned to premises and conclusions of argument schemes during classification

Relation Extraction

- BioNLP inspired approach: identify entities and events into text, then classify into target semantic relations

Background Knowledge

- WordNet, ReVerb, NELL and medical ontologies

Relation	Definition
promotes (A, B)	A causes B
inhibits (A, B)	A causes $\neg B$
linked-to (A, B)	A is positively correlated with B
is-a (A, B)	A is a hyponym of B
includes (A, B)	B is a meronym of A
condition (A, B)	A is a necessary condition for B
not (A)	Negation of A