

Steps Towards Building a Story Understanding Engine

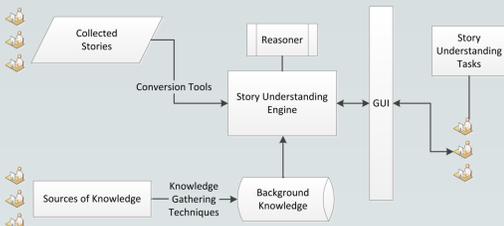
Christos T. Rodosthenous and Loizos Michael
Open University of Cyprus, Computational Cognition Lab

Objective

Develop an engine that can understand stories like Humans do.

➤ Methodology and Tools for knowledge acquisition, representation, reasoning and question answering.

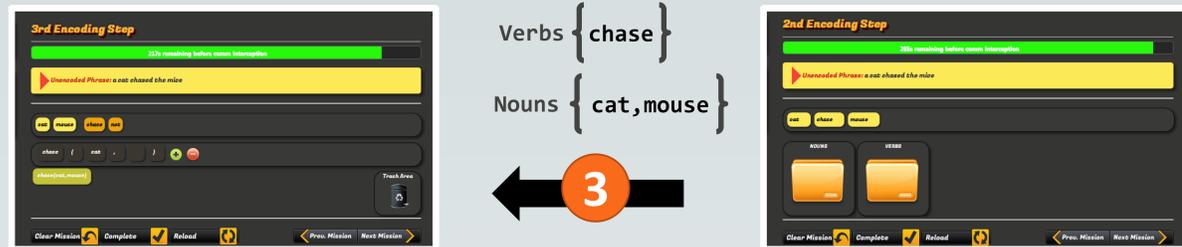
- 1 Convert stories to formal representation
- 2 Reason by integrating story information with background knowledge
- 3 Gather background knowledge and represent it formally



“Knowledge Coder” – GWAP 3

We adopt the use of Games with A Purpose (GWAPs) for the crowdsourcing of knowledge acquisition as a way of motivating people to participate. “Knowledge Coder” game was developed.

⚙ Story snippet: A cat chased the mice. The mice managed to hide in a nearby hole.



Knowledge Representation 2

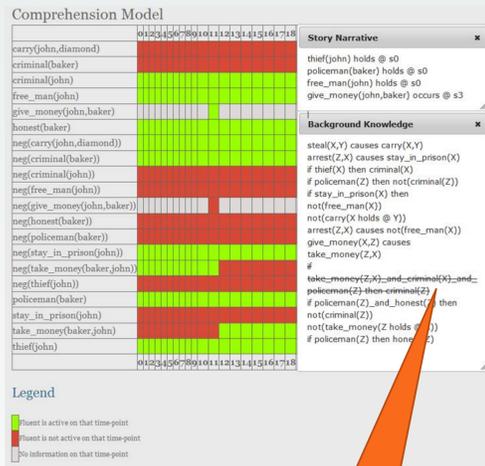
High-level version of the Event Calculus [2].

⚙ Φ implies L
e.g., person(X) implies can(X,think)

⚙ Φ causes L
e.g., attack(X,Y) causes war(X,Y)

➤ Rule preference for conflict resolution.

➤ Tool for reasoning and visualizing a comprehension model.



Applying preferred rule.

4 chase(cat, mouse)

chase(cat, mouse) causes fear(mouse, cat)
chase(cat, mouse) implies can(cat, run)

6 cat(X) and chase(X, Y) implies can(X, run)
chase(X, Y) implies can(cat, run)

5

👍 Applicability (the conditions in the body of the rule are met in the context of the selected sentence)

👍 Validity (the head of the rule follows from the selected sentence)

Knowledge Gathering Experimental Results

Experimental Setup		Experimental Output	
Number of participants	5	Number of rules generated	93
Number of Aesop's Fables	2	Number of causality rules	15
		Number of implication rules	78

Typos are common in GWAPs. Solutions?

Rule 1: beast(X) and throw(Y, mouth, X) implies kill(X, Y)

Rule 2: beast(X) and man(Y) and doe(Z) and exclame(Z) and escape(Z, Y) and throw(Z, X) implies kill(X, Z)

➤ Background knowledge gathered from our developed game offers some initial encouraging results in terms of the feasibility of our methodology. More experiments are needed though.

Contact

URL: <http://cognition.ouc.ac.cy>
Email: christos.rodosthenous@ouc.ac.cy

References

[1] Irene-Anna Diakidoy, Antonis Kakas, Loizos Michael, and Rob Miller. Story Comprehension through Argumentation. In *Proceedings of the 5th International Conference on Computational Models of Argument (COMMA'14)*, Scottish highlands, UK, 2014.

[2] Loizos Michael. Computability of Narrative. In *Proceedings of the 2nd Symposium on Computational Models of Narrative (CMN'10)*, Arlington, Virginia, USA, 2010.

Ongoing and Future Work

- Extend “Knowledge Coder” with new “mission” for rule preference selection.
- Integrate “Knowledge Coder” with reasoning module.
- Move towards a more psychologically oriented comprehension reasoning module [1].
- Develop a module for converting stories to formal representations.

Join our efforts to acquire background knowledge

Join the Earth resistance forces by registering on the “Knowledge Coder” game. The game is accessible online using any modern web browser at:

<https://cognition.ouc.ac.cy/narrative/>