

Abduction for Discourse Understanding

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Background

- Texts related to “Engines”
- Duration :Jan 2007 – Current
- Learning concepts and theories by reading text
- Preexisting domain knowledge available for performing learning
- Axioms extracted semi-automatically & Manually
- Example provided for Manual Set

Problems

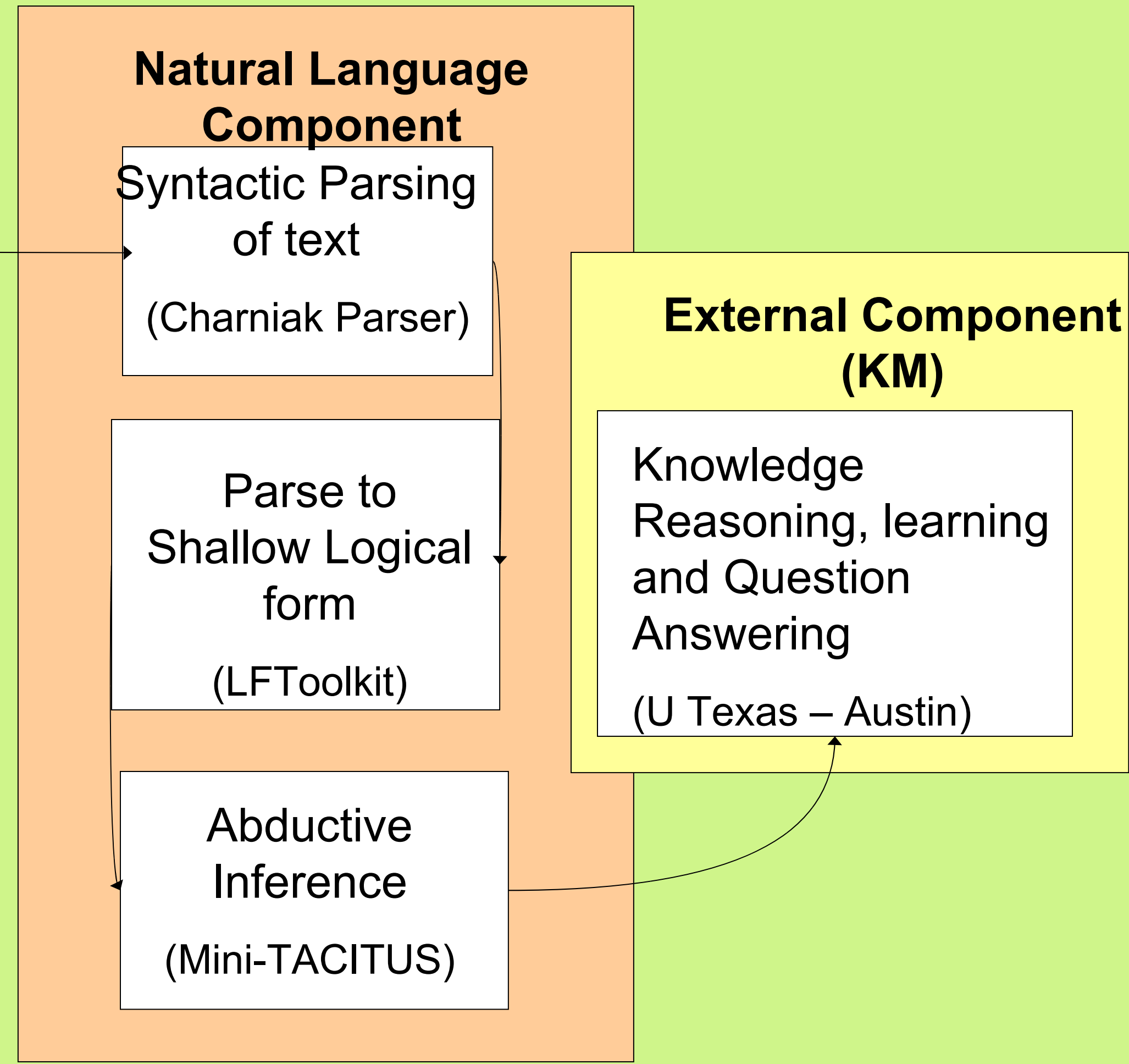
Causes for Missing Linkages

- Incorrect parse
- Missing rules in LFToolkit

Effect of missing linkages

- KM could not comprehend NL inputs
- Failure to recognize simple actions and events
- Loss of Information

Functional Overview and Components



Example Outputs

Sentence

An engine burns gasoline.

Parse Tree

(S1 (S (NP (DT An) (NN engine))
(VP (VBZ burns) (NP (NN gasoline)))) (. .)))

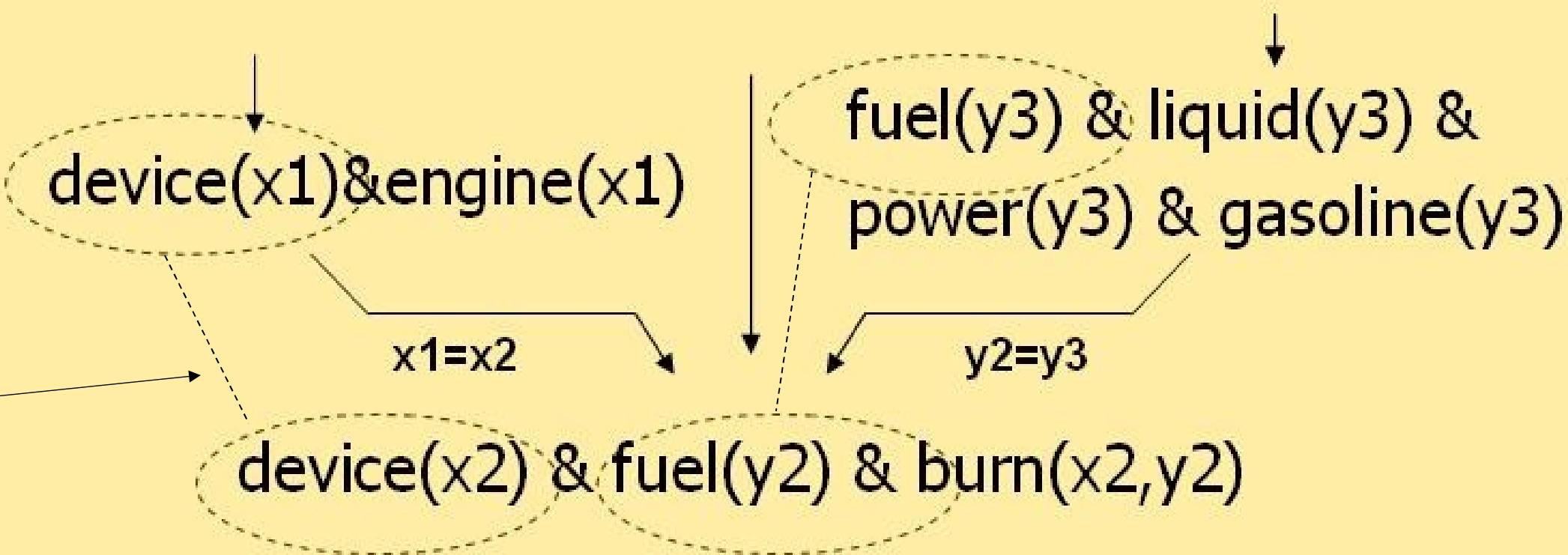
Logical Form

an'(e5,x0,e4) & Present-tense'(e1,e0) & burn-vb'(e0,x0,x1)
& engine-nn'(e4,x0) & gasoline-nn'(e6,x1)

Disambiguation using Abduction

- Axioms are created by adding features of each word
- Axioms are chosen to create greater connectivity in the logical form (Factoring)
- Cost reduces as factoring takes place, lower cost implies higher probability of occurrence

“...engine(x1)....burn(x2,y2).... gasoline(y3)...”



Results

Increase in the linkages in the text sent to KR. This improved the total model and concept creation by KR. The interpretation space in Mini-TACITUS decreased due to classification of nouns and verbs