A source of knowledge for Role and Reference Grammar: FunGramKB

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Introduction

Natural Language Understanding =

common-sense knowledge base

+ reasoner

→

FunGramKB
Reasoning

Input

Conceptual logical structure

COREL representation

Extended Meaning Postulates

Propositional Semantic Network

Presupposition Builder

MicroKnowing

Reasoner
Betty asked Bill for an apple.

\[
\begin{align*}
&<_{\text{IF DECL}}<_{\text{TNS PAST}}[\text{do (}%\text{BETTY}_00\text{Theme, +REQUEST}_01
\text{(}%\text{BETTY}_00\text{Theme, }%\text{BILL}_00\text{Goal})])\text{] PURP [do (}%\text{BILL}_00\text{Goal, 0})] \\
&\text{CAUSE [BECOME +REQUEST}_01\text{(}%\text{BETTY}_00\text{Theme, +APPLE}_00\text{Referent})]}>>
\end{align*}
\]

\[
+(e1: \text{past +REQUEST}_01 (x1: %\text{BETTY}_00)\text{Theme} (x2: +\text{APPLE}_00)\text{Referent} (x3: %\text{BILL}_00)\text{Goal})
\]
+(e1: past +REQUEST_01 (x1: %BETTY_00)Theme (x2: +APPLE_00)Referent (x3: %BILL_00)Goal)

**PRESUPPOSITION BUILDER**

*(e1: past +THINK_00 (x1: %BETTY_00)Theme (x2: (e2: past +HAVE_00 (x3: %BILL_00)Theme (x4: +APPLE_00)Referent))Referent)

*(e3: +INGEST_00 (x1)Agent (x4)Theme (x5)Location (x6)Origin (x7)Goal (f1: (e4: +BE_01 (x1)Theme (x8: +HUNGRY_00)Attribute))Reason)

*(e3: ........)

**WORKING MEMORY**
Young Lucy petted a black dog.

+((e1: past +STROKE_00 (x1: %LUCY_00)Agent (x2)Theme (x3: +DOG_00)Location (x4)Origin (x5)Goal)
+e2: +BE_01 (x1) (x6: +YOUNG_00)Attribute)
+e3: +BE_01 (x3)Theme (x7: +BLACK_00)Attribute))
Reasoning

* Oriented to reasoning

Semantic networks
Reasoning

* Oriented to reasoning
* More natural
* More expressive adequacy

Semantic networks

First-Order Logics
Reasoning

- Oriented to reasoning
- More natural
- More expressive adequacy

COREL representations

Semantic networks

* More consistent and direct
Reasoning

Input

Conceptual logical structure

COREL representation

Reasoner

Extended Meaning Postulates

Propositional Semantic Network

MicroKnowing

Presupposition Builder
Reasoning: the MicroKnowing

MICROconceptual-KNOWLEDge spreading

INHERITANCE INFERENCE

Metaconcept

Nuclear Concept
MICROKNOWING IN FUNGRAMKB ONTOLOGY

MICROconceptual-KNOWledge spreading

INHERITANCE

INFERENCE
MICROKNOWING IN FUNGRAMKB ONTOLOGY

+TURKEY_00

+(e1: +BE_00 (x1: +TURKEY_00)Theme (x2: +POULTRY_00)Referent)
*(e2: +BE_01 (x1)Theme (x3: +BIG_00)Attribute)
MICROKNOWING IN FUNGRAMKB ONTOLOGY

Metaconcept

Nuclear Concept
MICROKNOWING IN FUNGRAMKB ONTOLOGY

+TURKEY_00

+(e1: +BE_00 (x1: +TURKEY_00)Theme (x2: +POULTRY_00)Referent)
*(e2: +BE_01 (x1)Theme (x3: +BIG_00)Attribute)

$WATTLE_00

....
*(e2: +COMPRISE_00 (x3: +TURKEY_00 ^ +CHICKEN_00)Theme (x1)Referent
(f1: +NECK_00)Location)
Extended Meaning Postulate (Spreading Level #1)

+TURKEY_00

+(e1: +BE_00 (x1: +TURKEY_00)Theme (x2: +POULTRY_00)Referent)
*(e2: +BE_01 (x1)Theme (x3: +BIG_00)Attribute)
*(e3: +COMPRISE_00 (x1)Theme (x4: $WISHBONE_00)Referent)
*(e4: +COMPRISE_00 (x1)Theme (x5: $WATTLE_00)Referent (f1: +NECK_00)Location)
*(e5: +COMPRISE_00 (x1)Theme (x6: $TURKEY_00)Referent)
MICROKNOWING IN FUNGRAMKB ONTOLOGY

+POULTRY_00

+(e1: +BE_00 (x1: +POULTRY_00)Theme (x2: +BIRD_00)Referent)
*(e2: +BE_01 (x1)Theme (x3: +TAME_00)Attribute)
*(e3: +LIVE_00 (x1)Theme (f1: +FARM_00)Location)
*(e4: +OBTAIN_00 (x4: +HUMAN_00)Theme (x5: +EGG_00 | +FOOD_00)Referent (f2: x1)Origin)
Extended Meaning Postulate (Spreading Level #2)

+TURKEY_00

+(e1: +BE_00 (x1: +TURKEY_00)Theme (x2: +POULTRY_00)Referent)
*(e2: +BE_01 (x1)Theme (x3: +BIG_00)Attribute)
*(e3: +COMPRIZE_00 (x1)Theme (x4: $WISHBONE_00)Referent)
*(e4: +COMPRIZE_00 (x1)Theme (x5: $WATTLE_00)Referent (f1: +NECK_00)Location)
*(e5: +COMPRIZE_00 (x1)Theme (x6: $TURKEY_00)Referent)
+(e6: +BE_00 (x1)Theme (x7: +BIRD_00)Referent)
*(e7: +BE_01 (x1)Theme (x8: +TAME_00)Attribute)
*(e8: +LIVE_00 (x1)Theme (f2: +FARM_00)Location)
*(e9: +OBTAIN_00 (x9: +HUMAN_00)Theme (x10: +EGG_00 | +FOOD_00)Referent (f3: x1)Origin)
<table>
<thead>
<tr>
<th>Level</th>
<th>Meaning Postulate</th>
<th>Activator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Φ₀</td>
<td>*(e₂: BE (x₁: VERTEBRATE)_Theme (x₂: POULTRY)_Referent)</td>
<td>TURKEY</td>
</tr>
<tr>
<td></td>
<td>*(e₂: BE (x₁)_Theme (x₂: BIG)_Attribute)</td>
<td>TURKEY</td>
</tr>
<tr>
<td></td>
<td>*(e₃: n HAVE (x₁)_Theme (x₄: FEATHER)_Referent)</td>
<td>TURKEY</td>
</tr>
<tr>
<td>Φ₁</td>
<td>+(e₄: HAVE (x₁)_Theme (x₅: WATTLE)_Referent)</td>
<td>WATTLE</td>
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<tr>
<td></td>
<td>+(e₂: GOBBLE (x₁)_Theme)</td>
<td>GOBBLE</td>
</tr>
<tr>
<td></td>
<td>+(e₆: OBTAIN (x₆: PERSON)_Agent (x₇: TURKEY_01)_Theme (f₂: x₁)_Origin)</td>
<td>TURKEY_01</td>
</tr>
<tr>
<td>Φ₂</td>
<td>+(e₂: BE (x₁)_Theme (x₅: BIRD)_Referent)</td>
<td>POULTRY</td>
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<tr>
<td></td>
<td>*(e₆: BE (x₁)_Theme (x₆: DOMESTIC)_Attribute)</td>
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<tr>
<td></td>
<td>*(e₉: KEEP (x₁₀: PERSON)_Theme (x₁₁)_Referent (f₅: FARM)_Location)</td>
<td>POULTRY</td>
</tr>
<tr>
<td>Φ₃</td>
<td>+(e₁₀: BE (x₁)_Theme (x₁₁: VERTEBRATE)_Referent)</td>
<td>BIRD</td>
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<tr>
<td></td>
<td>*(e₁₁: HAVE (x₁)_Theme (x₁₂: FEATHER)_Referent)</td>
<td>BIRD</td>
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<tr>
<td></td>
<td>*(e₁₂: HAVE (x₁)_Theme (x₁₃: LEG)_Referent)</td>
<td>BIRD</td>
</tr>
<tr>
<td></td>
<td>*(e₁₃: HAVE (x₁)_Theme (x₁₄: WING)_Referent)</td>
<td>BIRD</td>
</tr>
<tr>
<td></td>
<td>*(e₁₄: LAY (x₁)_Agent (x₁₅: EGG)_Theme)</td>
<td>BIRD</td>
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<tr>
<td></td>
<td>*(e₁₅: FLY (x₁)_Theme (f₄: WING)_Instrument)</td>
<td>BIRD ⋃ WING</td>
</tr>
<tr>
<td>Φ₄</td>
<td>*(e₁₆: CHIRP (x₁)_Theme)</td>
<td>CLAW</td>
</tr>
<tr>
<td></td>
<td>*(e₁₇: HAVE (x₁)_Theme (x₁₆: CLAW)_Referent (f₃: TOE)_Location)</td>
<td>CLAW</td>
</tr>
<tr>
<td></td>
<td>*(e₁₈: PECK (x₁)_Agent (x₁₇: THING)_Theme)</td>
<td>PECK</td>
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<td></td>
<td>*(e₁₉: HAVE (x₁)_Theme (x₁₈: BEAK)_Referent)</td>
<td>BEAK</td>
</tr>
<tr>
<td></td>
<td>*(e₂₀: PREEN (x₁)_Theme)</td>
<td>PREEN</td>
</tr>
<tr>
<td>Φ₅</td>
<td>+(e₂₁: BE (x₁)_Theme (x₁₉: ANIMAL)_Referent)</td>
<td>VERTEBRATE</td>
</tr>
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<td></td>
<td>+(e₂₂: CONTAIN (x₁)_Theme (x₂₀: SKELETON)_Referent)</td>
<td>VERTEBRATE</td>
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<td>+(e₂₃: CONTAIN (x₁)_Theme (x₂₁: BACKBONE)_Referent)</td>
<td>VERTEBRATE</td>
</tr>
<tr>
<td></td>
<td>*(e₂₄: HAVE (x₁)_Theme (x₂₂: TAIL)_Referent (f₆: BACK)_Location)</td>
<td>VERTEBRATE</td>
</tr>
</tbody>
</table>
Thank you!

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