Text Generation in the SmartWeb Multimodal Dialogue System

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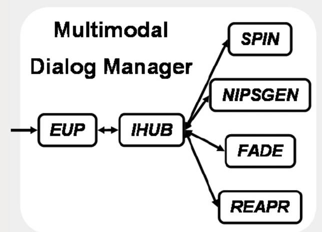
Smartweb Requirements

- Multimodal dialogue with question answering functionality.
- Speech is dominant input modality for interaction.
- Multimodal recognition for speech or gestures.
- Result rendering for Semantic Web data content: text, images, videos, graphics, and synthesis of speech.
- Control the message flow in the system.
- Develop a context-aware, mobile, multimodal user interface.
- Use a smartphone as interaction device.

Text Generation

- Generates full utterances for the speech synthesiser and typography-enriched texts and tables presented on the mobile device.
- Generates a semantic paraphrase representing how the system has interpreted the user input in a human readable manner.
- Module called NipsGen is responsible for text generation.
- Input are RDF/S instances based on the SmartWeb ontology (SWintO).
- Interface layer integrates NipsGen into the information hub (IHUB) and translates between SWintO and NipsGen's own internal representation.



- Outlook: (1) Tool that generates automatically the types needed for the TAG derivation tree. (2) Multiple alternative texts which are tested against layout and presentation constraints.

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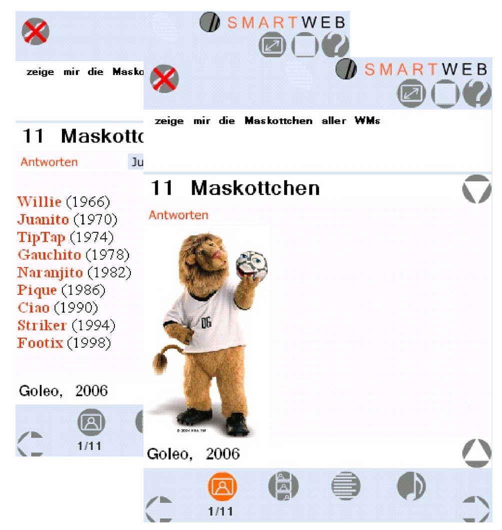
"Show me the mascots of the Football World Cup"



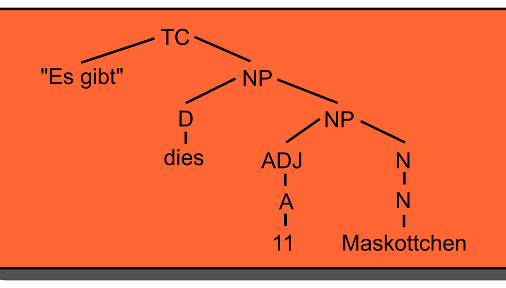
NipsGen module

- Transforms ontology instances into text
- Combines existing components:
  - SPIN parser (essentially a rewriting system for TFS)
  - a TAG framework for German (based on XTAG)
- Allows combination of dynamically generated and canned text

Result(target: synthesis,
number: 11,
type: Mascot(...))

TC(c: ["Es gibt" ,
NP(det: dies, num: pl,
adj: AdjP(lex: 11),
lex: Veranstaltung)])

TC(c: ["Es gibt",
aN(I_11: Maskottchen,
a_0: bDnx(I_11: dies),
a_1: bADJnx(I_111: 11),
fvp: Fvp(num: pl))])



Es gibt diese 11 Maskottchen.

Step 1: Construction of the intermediate syntactic representation

SPIN rules (exemplary)

Result(target: synthesis,
type: $T)
-> TC(c: ["Es gibt",
NP(o: $T)])

NP(o: Mascot())
-> NP(lex: Maskottchen)

Step 2: Transformation to the extended TAG derivation tree

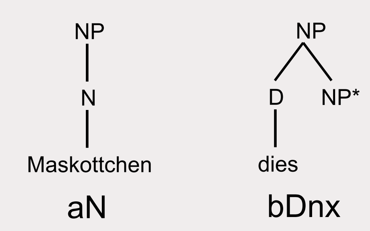
SPIN rule (exemplary)

NP(lex: $L,
%det: $D,
%adjP: $AdjP)
-> aN(I_11: $Lex,
a_0: bDnx(
I_11: $Det),
a_1: $AdjP)

Step 3: Construction of the derived TAG tree

Elementary trees of TAG grammar are combined and features are propagated

Elementary trees (exemplary)



Step 4: Morphosyntactic adaptations of the lexical leafs and linearization

- Full form lexicon
- Support for HTML tags with features *formatBegin* and *formatEnd*

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