

When will robots speak like you and me? - Luc Steels, on Friday 30 May at 9:00

The incredible growth in language resources has led to unprecedented opportunities for language research and a lot can still be done by exploiting existing corpora and statistical language processing techniques. Nevertheless we should also remain ambitious. We should try to keep forging ahead with fundamental research, trying to tackle new application areas and improving existing applications by more sophisticated linguistic theories and language processing systems.

This talk reports on work in our group on grounded language interaction between humans and robots. This problem is extraordinarily difficult because we need to figure out how to achieve true language understanding, i.e. deep language parsing coupled to a semantics grounded in the sensori-motor embodiment of robots, and true language production, i.e. planning what to say, conceptualising the world for language and translation into utterances. We also need to figure out how artificial agents can cope with highly ungrammatical and fragmentary input by full exploitation of the context. On top of that, we can no longer view language as a static system of conventions but as a living system that is always changing and evolving, with new or shifting word senses and new or shifting usage of grammatical constructions. This implies that artificial speakers and listeners need to constantly learn, expand their language when needed, align themselves to the language use of others, and act as tutors to help others understand and acquire language.

I will present some of the key ideas that we are currently exploring to tackle these enormously challenging issues. They include a novel computational formalism called Fluid Construction Grammar, which is an attempt to operationalise key insights from construction grammar, cognitive linguistics and embodied semantics. Flexible language processing and learning is implemented using a meta-level in which diagnostics detect anomalies or gaps and repair strategies try to cope with them by ignoring ungrammaticalities or expanding the language system. We have also developed techniques for studying language as a complex adaptive system and done several experiments how vocabularies and grammars can emerge in situated embodied interactions between robotic agents. The talk is illustrated with live demos and videoclips of robots playing language games.