

The Research Group

Artificial Intelligence Lab

has the honor to invite you to the public defense of the PhD thesis of

Paul VAN EECKE

to obtain the degree of Doctor of Sciences

Title of the PhD thesis:

Generalisation and specialisation operators for computational construction grammar and their application in evolutionary linguistics research

Promotors:

Prof. dr. em. Luc Steels
Prof. dr. Katrien Beuls

The defence will take place on

Thursday October 4 2018 at 16:00h

in Auditorium D.2.01 at the Campus Humanities, Sciences and Engineering of the Vrije Universiteit Brussel, Pleinlaan 2 - 1050 Elsene, and will be followed by a reception.

Members of the jury:

Prof. dr. Coen De Roover (chairman)
Prof. dr. Geraint Wiggins (secretary)
Prof. dr. Bart Jansen
Prof. dr. Luc De Raedt (KU Leuven)
Prof. dr. Freek Van de Velde (KU Leuven)
Prof. dr. Laura Kallmeyer
(Heinrich-Heine Univ. Düsseldorf)

Curriculum vitae

Paul Van Eecke (°1990) obtained a Master of Science in Artificial Intelligence (summa cum laude) from the Engineering Science Faculty of the KU Leuven and a Master of Arts in Linguistics (summa cum laude) from the Arts Faculty of the KU Leuven. From 2014 until 2017, he worked as an assistant researcher at the Sony Computer Science Laboratories in Paris. Since 2017, he works as a research assistant at the Artificial Intelligence Lab of the Vrije Universiteit Brussel. His research has been published in multiple peer-reviewed journals and in proceedings of major international conferences.

Abstract of the PhD research

The natural languages that underlie human communication are remarkably expressive, robust and well-adapted to the communicative needs of their users. However, the question of how these languages have emerged and through which mechanisms they continue to evolve remains heavily debated. A modern methodology for studying this question is to simulate the emergence and evolution of language using agent-based models. In these models, a population of autonomous agents, which are either physical robots or software entities, participates in a series of communicative interactions, during which they develop their own language. The goal of the models is to determine the exact mechanisms that need to be present in the individual agents, so that a communication system with human language-like properties can emerge and evolve. This dissertation presents three major contributions to the field of research that models the emergence and evolution of grammatical structures.

The first contribution consists in the implementation of a higher-level notation for Fluid Construction Grammar (FCG), a computational grammar formalism that is often used in evolutionary linguistics experiments. The second contribution presents powerful mechanisms for introducing, adopting and aligning grammatical structures through local interactions. The third contribution consists in a case study that demonstrates how the representations and mechanisms introduced by the first two contributions can be applied in a concrete agent-based experiment. The case study investigates how early syntactic structures can emerge and evolve in a population of agents. More specifically, the experiment models how shared word order patterns can emerge and evolve, and reduce the referential ambiguity of the language.