

## **Towards an agent-based tutoring system for Spanish verb conjugation**

Katrien Beuls

Mobile devices such as tablets, smart phones or e-readers have become omnipresent in our daily lives for reading the news, analyzing our latest workout data, checking a cooking recipe, but also to learn the basics of a new language. Language learning applications are becoming an interesting alternative to classroom education because they allow learners to practice anywhere and at any time, often even for free. Yet, the quality of tutoring they offer can usually not be compared with a human tutoring scenario, in which the tutor analyses the learner's language skills and adapts the curriculum accordingly, but they lie closer to programmed instruction systems where every user proceeds through the same sequence of learning steps. To build an artificial tutor that can process the learner's input and react to it in an individualized way three key ingredients are needed: (i) a fully operational grammar of the target language that can parse and produce any learner utterance, even when it is ungrammatical; (ii) a predictive student model that can simulate the real student and is aligned to match the student's linguistic skills after every interaction with the system; (iii) a set of tutoring strategies that is used to guide the student through the learning program. This dissertation presents operational solutions for (i) and partially (ii) for the domain of Spanish verb conjugation and an agent-based tutoring design accompanied by preliminary experiments for (iii). The solutions include a competent language agent that has a complete grammar to conjugate any Spanish verb form and repair learner errors and a runnable student agent that can acquire the target grammar incrementally through situated learning in discriminative contexts. The successful evaluation of these components has led to the constructive design of a tutor agent that incorporates both language and student agents and engages in interactions with the real student, whom he assists on his learning path with carefully tailored tutoring strategies.