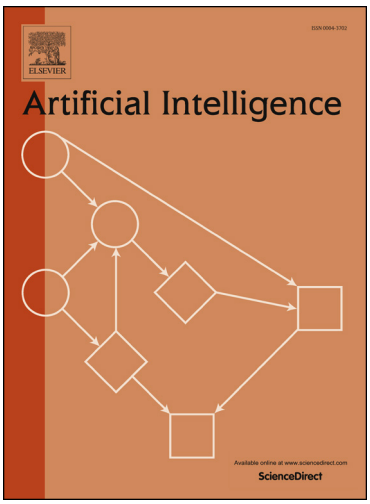
Accepted Manuscript



A model of language learning with semantics and meaning-preserving corrections

Dana Angluin, Leonor Becerra-Bonache

PII: S0004-3702(16)30115-1
DOI: http://dx.doi.org/10.1016/j.artint.2016.10.002
Reference: ARTINT 2980

To appear in: *Artificial Intelligence*

Received date: 25 August 2015
Revised date: 30 September 2016
Accepted date: 4 October 2016

Please cite this article in press as: D. Angluin, L. Becerra-Bonache, A model of language learning with semantics and meaning-preserving corrections, *Artif. Intell.* (2016), http://dx.doi.org/10.1016/j.artint.2016.10.002

A Model of Language Learning with Semantics and Meaning-Preserving Corrections

Dana Angluin[a], Leonor Becerra-Bonache[b]

[a]*Department of Computer Science, Yale University, New Haven, CT, USA*
[b]*Univ Lyon, UJM-Saint-Etienne, CNRS, Laboratoire Hubert Curien UMR 5516, F-42000, Saint-Etienne, France*

Abstract

We present a computational model that takes into account semantics for language learning and allows us to model meaning-preserving corrections. The model is constructed with a learner and a teacher who interact in a sequence of shared situations by producing utterances intended to denote a unique object in each situation.

We test our model with limited sublanguages of 10 natural languages exhibiting a variety of linguistic phenomena. The results show that learning to a high level of performance occurs after a reasonable number of interactions. Comparing the effect of a teacher who does no correction to that of a teacher who corrects whenever possible, we show that under certain conditions corrections can accelerate the rate of learning.

We also define and analyze a simplified model of a probabilistic process of collecting corrections to help understand the possibilities and limitations of corrections in our setting.

Keywords: Semantics, Corrections, Language Learning, Grammar Learning

1. Introduction

Children acquire their native language easily, quickly and without any specific training. However, *interaction* with other human speakers is crucial

Email addresses: dana.angluin@yale.edu (Dana Angluin), leonor.becerra@univ-st-etienne.fr (Leonor Becerra-Bonache)