

ON DISTRIBUTED COOPERATION AND SYNCHRONISED COLLABORATION

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ABSTRACT

In CD grammar systems, the rewriting process is distributed over component grammars that take turns in the derivation of new symbols. Team automata however collaborate by synchronising their actions. Here we investigate how to transfer this concept of synchronisation to grammars by defining grammar teams that agree on the generation of shared terminal symbols based on a novel notion of competence. We first illustrate this idea for the case of regular grammars and next propose an extension to the case of context-free grammars.

Keywords: CD grammar systems; Team automata; Synchronisation

1. Introduction

When a scientist encounters difficulties when trying to solve a complex problem, (s)he might try to approach the problem in cooperation or collaboration with other scientist(s). To this aim, modern means of communication like e-mail and skype are used but also blackboards. In Artificial Intelligence, the blackboard model of problem solving was defined as a method of cooperative problem solving. The problem is specified on a blackboard. A number of participants contribute, regulated by a cooperation strategy, to the solution of the problem by editing the blackboard. During this cooperative process, the participants communicate through the blackboard. If their cooperation is successful, the solution will appear on the blackboard.

Together with an expert in AI, Erzsébet Csuhaj-Varjú established a link between this blackboard model of problem solving and formal languages [13]. In [11], so-called Cooperating Distributed (CD) grammar systems have been proposed to formalise this