Applying OPERAS$_{XC}$ to NASA's Small Aircraft Transportation System

Ioanna Stamatopoulou[1], Petros Kefalas[2], Marian Gheorghe[3]

[1]*SEERC, 17 Mitropoleos Str, Thessaloniki, Greece, istamatopoulou@seerc.org*

[2]*City College, Dept. of Computer Science, 13 Tsimiski Str, 54624 Thessaloniki, Greece, kefalas@city.academic.gr*

[3]*The University of Sheffield, Dept. of Computer Science, Regent Court, 211 Portobello Str, Sheffield S1 4DP, UK, marian@dcs.shef.ac.uk*

Most non-trivial multi-agent systems are characterised by a dynamic structure in the sense that during their evolution new agents may appear in the system, others cease to exist while the communication channels between existing agents are constantly changing. On the contrary, however, most multi-agent modelling methods assume a fixed configuration that is not realistic. This paper presents OPERAS$_{XC}$, a formal approach targeted to the modelling of dynamic multi-agent systems that captures the appealing modelling characteristics of Communicating X-machines and Population P Systems. We aim to build on existing work by further exploring the practicability of the method on NASA's Small Aircraft Transportation System.

Keywords

Formal modelling, Multi-Agent Systems, dynamic structure, X-machines, Population P Systems.

1. Introduction

An agent can be generally defined as a software component, which acts autonomously by making its own decisions based on own knowledge and percepts of a local environment. Multi-agent systems (MAS) development may turn out to be a rather cumbersome task even for small-scale systems. As size increases so does complexity making the process excessively demanding. Size can be related to the number of participating agent types and instances, the amount of rules that govern the agents' behaviour, the inter-agent communication overhead etc.