

Collective Adaptive System SynThesis with Non-zero-sum Games

From 2013-04-01 **to** 2016-04-30, closed project | [CASSTING Website](#)

Project details

Total cost: EUR 2 737 964 EU contribution: EUR 2 007 358 Coordinated in: France	Topic(s): ICT-2011.9.10 - FET Proactive: Fundamentals of Collective Adaptive Systems (FOCAS) Call for proposal: FP7-ICT-2011-9 See other projects for this call Funding scheme: CP - Collaborative project (generic)
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Objective

CASSTING will develop a novel approach for analysing and designing collective adaptive systems in their totality, by setting up a game theoretic framework. Here components are viewed as players, their behaviour is captured by strategies, system runs are plays, and specifications are winning conditions.

The design of collective adaptive systems, as they occur, for example, in home automation, health care, and many scenarios of mobile communication, raises fundamental challenges: These systems are distributed, with heterogeneous components interacting continuously among each other and with their environments, components may work collaboratively or as adversaries, they have to adapt over time, they are dynamic in the sense that components can come into existence or vanish, and their specification usually involves multi-dimensional quantitative objectives. Available methods (such as model-based verification and quantitative model-checking) only address selected aspects of collective adaptive systems.

The game theoretic approach of CASSTING is comprehensive and has already proved very successful in simpler scenarios such as automatic controller synthesis. The CASSTING research will lift this method to the level of collective adaptive systems and provide efficient algorithmic analysis methods as well as tools for the automatic synthesis. In particular, the simple scenario of zero-sum games is extended to cover a large variety of non-zero-sum games, and concepts of algorithmic game theory are generalised to infinite-duration games.

The CASSTING teams have made essential contributions in the area and are thus uniquely qualified for this project. The CASSTING research will strengthen the leading role that Europe already has in this field. The proof of concept will focus on the paradigmatic application areas of home automation and smart houses, based on case studies provided by the two internationally recognised industrial partners of the consortium.

Related information

Documents and	Solutions concepts for collective adaptive systems
Publications	CASSTING web site Robustness of collective adaptive systems Multi-player quantitative games

Events

Final CASSTING workshop and event

Multimedia

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Subjects

[Information and Media](#)

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