

Abstract of Lecturers

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Decision Support Systems and Integrated Platforms:

New Approaches for Managing Systems of Systems

Nowadays, in different contexts of strategic relevance there is the increasing need of integrating and coordinating previously autonomous elements and systems, in order to reach a common goal otherwise not achievable. Such a challenge requires competences from many heterogeneous domains, leading to very complex and often ineffective management processes. Thus, the need to formalize a structured and unifying framework to support decision makers leads to the introduction of the Systems of Systems (SoS), i.e., “large-scale integrated systems that are heterogeneous and independently operable on their own, but are networked together for a common goal”.

This talk aims at presenting an efficient approach for modeling and managing SoS with different purposes based on the concepts of Decision Support Systems (DSSs) and Integrated Platforms (IP).

Moreover, some practical applications of the DSS and IP approaches in different SoS of great interest, such as smart cities, smart grids and health systems, but also traditional domains of research like transportation, logistics and automated manufacturing systems.

Quantized Consensus Algorithm for Distributed Task Assignment:

Results and Applications

The distributed coordination problem for networks of dynamic agents is an active research field, which attracts a significant interest due to the need to exploit the capabilities of large-scale networks and systems of the near future.

This talk deals with a constrained distributed task assignment problem in which a set of different tasks has to be assigned to a group of agents by minimizing the maximum cost (typically the execution time) under communication, assignment and capacity constraints. To solve this problem, we provide a gossip-based discrete consensus algorithm that, starting from a random assignment of tasks, is able to reach a feasible solution while minimizing the global objective function by only local interactions among agents. The convergence properties and performances of the proposed gossip algorithm are characterized for two distinct network configurations, i.e., peer-to-peer networks and proximity networks. A simulation based study validates the theoretical analysis by considering more general and complex scenarios.

Finally, an application proposing a solution for the distributed dynamic assignment of a

set of electric vehicles to a network of charging stations is presented.

Statement

I guarantee my availability for delivering the lectures.

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