IROS 2014 Workshop:

Taxonomies of Interconnected Systems: Topology in Distributed Robotics

http://asimov.usc.edu/~rkwillia/ws/iros14/

** CALL FOR CONTRIBUTIONS for the Interactive Session **

IMPORTANT DATES:

- Poster abstract submission: September 1st, 2014

- Workshop: September 14th, 2014 (half day - morning)

MOTIVATION AND OBJECTIVES:

Interconnected systems have become the recent focus of intense investigation, particularly in the context of autonomous collaboration, yielding significant advantages in adaptability, scalability, and efficiency compared to classical single-agent solutions. These systems can be effectively applied in a vast range of applications, ranging from environmental monitoring to collaborative transportation.

As a matter of fact, the study of interconnected systems is remarkably complex and highly susceptible to fragmentation primarily due to the diversity of the research communities involved. To provide an overall understanding of the key research aspects of interconnected systems, a high level view of the fundamental topics driving interconnected systems, as well as a fine-grained understanding of each topic, is mandatory. To this end, we plan to organize a series of workshops, each addressing specific topics at the forefront of interconnected system research. For each of these research topics, our goal is to identify those properties that underlie crucial, and yet common, aspects of theory and application. We believe that such a taxonomic approach may lead towards a stronger understanding of the open problems in each topic and the fundamental properties that relate them.

In this first workshop, we will focus on the typical topological assumptions that are found in distributed robotics, i.e., those properties defining interaction between robots in a network. Properties such as graph connectivity and network rigidity will be highlighted, with emphasis on communicated, sensed, and physical robotic interaction. The workshop will aim to identify the theoretical possibilities when topological assumptions are satisfied, the real-world barriers, and the current efforts to enforce topological properties in theory and in practice. It has been shown that topological assumptions have vast impact in various multi-robot behaviors,

from information consensus, to formation control, and localization. Therefore, we hope that a taxonomic methodology will advance capabilities in achieving promising multi-robot behaviors in practice, and importantly, the application contexts under which topological assumptions can be achieved.

Finally, the workshop will be structured in a manner that itself serves the taxonomy. We will solicit brief position-style submissions both from the community and the scheduled speakers, from which we will derive a targeted roundtable discussion on the taxonomy formulation. The roundtable will then aid in identifying topics for future workshops in related or relevant subareas, allowing a community-driven, self-building taxonomy to hopefully emerge.

CONFIRMED INVITED SPEAKERS:

1. Vijay Kumar (keynote), University of Pennsylvania, USA

2. Gaurav S. Sukhatme (keynote), University of Southern California, USA

3. Lorenzo Marconi / Roberto Naldi, University of Bologna, Italy

4. Gonzalo López-Nicolás / Carlos Sagüés, University of Zaragoza, Spain

5. Daniel Zelazo, Technion, Israel

6. Lorenzo Sabattini, University of Modena and Reggio Emilia, Italy

PROGRAM:

Workshop program will be available soon, please refer to the workshop web page

http://asimov.usc.edu/~rkwillia/ws/iros14/program.html

SUBMISSION:

Authors are required to submit Extended Abstracts (1-2 pages) in PDF format, following the standard IROS style for the layout (https://ras.papercept.net/conferences/scripts/start.pl).

Contributions should be sent to rkwillia@usc.edu and gasparri@dia.uniroma3.it by September 1st, 2014. All contributions will be refereed.

ORGANIZERS:

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- Andrea Gasparri, Roma Tre University, Italy

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