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Self-Organizing Systems

5th International Workshop, IWSOS 2011
Karlsruhe, Germany, February 23-24, 2011
Proceedings

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Preface

This book contains research articles from the International Workshop on Self-Organizing Systems (IWSOS), held in Karlsruhe, Germany, in February 2011. This was the fifth workshop in a series of multidisciplinary events dedicated to self-organization in networked systems with the main focus on communication and computer networks.

The concept of self-organization is becoming increasingly popular in various branches of technology. A self-organizing system may be characterized by global, coordinated activity arising spontaneously from local interactions between the system's components. This activity is distributed over all components, without a central controller supervising or directing the behavior. Self-organization relates the behavior of the individual components (the microscopic level) to the resulting structure and functionality of the overall system (the macroscopic level). Simple interactions at the microscopic level may give rise to complex, adaptive, and robust behavior at the macroscopic level.

The necessity of self-organization in technological networks is caused by the growing scale, complexity, and dynamics of future networked systems. This is because traditional methods tend to be reductionistic, i.e., they neglect the effect of interactions between components. However, in complex networked systems, interactions cannot be ignored, since they are relevant for the future state of the system. In this sense, self-organization becomes a useful approach for dealing with the complexity inherent in networked systems.

The workshop series brings together leading international researchers to create a visionary forum for discussing the future of self-organization. It addresses theoretical aspects of self-organization as well as applications in communication and computer networks and robot networks.

The IWSOS 2011 committee received 25 submissions from 16 countries. Two papers were immediately rejected due to incomplete author information. Each of the 23 submissions found to be eligible was reviewed by at least three members of the technical program committee. In total, 83 reviews were performed. Based on these reviews, nine papers were accepted. Five of these papers underwent a shepherding process by one of the TPC members to ensure revisions for the final version. One additional publication was invited for the workshop. The authors of the papers are from Germany, Finland, Canada, Belgium, Austria, Greece, Italy, and Japan.

Key topics include the following:

- Design and analysis of self-organizing and self-managing systems
- Techniques and tools for modeling self-organizing systems
- Robustness and adaptation in self-organizing systems, including self-protection, diagnosis, and healing
- Self-configuration and self-optimization

- Self-organizing group and pattern formation
- Self-organizing synchronization
- Self-organizing resource allocation
- Self-organizing mechanisms for task allocation and coordination
- Structure and dynamics of self-organizing networks
- Applications of self-organizing networks and networked systems
- Peer-to-peer networks, vehicular networks, zeroconfiguration protocols

The workshop also features two keynote talks given by Hermann Haken (Stuttgart University) and Hod Lipson (Cornell University) as well as a poster session with a student research competition.

January 2011

Christian Bettstetter
Carlos Gershenson

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IWSOS 2011 was organized by the Institute of Telematics, Karlsruhe Institute of Technology (KIT).

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