# **Lecture Notes on Data Engineering and Communications Technologies**

Volume 29

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The aim of the book series is to present cutting edge engineering approaches to data technologies and communications. It will publish latest advances on the engineering task of building and deploying distributed, scalable and reliable data infrastructures and communication systems.

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# Advances in Internet, Data and Web Technologies

The 7th International Conference on Emerging Internet, Data and Web Technologies (EIDWT-2019)



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# Welcome Message of EIDWT-2019 International Conference Organizers

Welcome to the 7th International Conference on Emerging Internet, Data and Web Technologies (EIDWT-2019), which will be held from February 26 to February 28, 2019, at Higher Colleges of Technology, Fujairah Campus, United Arab Emirates (UAE).

EIDWT is dedicated to the dissemination of original contributions that are related to the theories, practices and concepts of emerging Internet and data technologies yet most importantly of their applicability in business and academia toward a collective intelligence approach.

In EIDWT-2019 will be discussed the topics related to Information Networking, Data Centers, Data Grids, Clouds, Crowds, Mashups, Social Networks, Security Issues and other Web 2.0 implementations toward a collaborative and collective intelligence approach leading to advancements of virtual organizations and their user communities. This is because current and future Web and Web 2.0 implementations will store and continuously produce a vast amount of data, which if combined and analyzed through a collective intelligence manner will make a difference in the organizational settings and their user communities. Thus, the scope of EIDWT-2019 includes methods and practices which bring various emerging Internet and data technologies together to capture, integrate, analyze, mine, annotate and visualize data in a meaningful and collaborative manner. Finally, EIDWT-2019 aims to provide a forum for original discussion and prompt future directions in the area. For EIDWT-2019 International Conference, we accepted for presentation 52 papers (about 30% acceptance ratio).

An international conference requires the support and help of many people. A lot of people have helped and worked hard for a successful EIDWT-2019 technical program and conference proceedings. First, we would like to thank all authors for submitting their papers. We are indebted to Program Area Chairs, Program Committee Members and Reviewers who carried out the most difficult work of carefully evaluating the submitted papers. We would like to give our special thanks to Honorary Co-Chairs of EIDWT-2019, for their guidance and support. We would like to express our appreciation to our keynote speakers for accepting our invitation and delivering very interesting keynotes at the conference.

We would like as well to thank the Local Arrangements Chairs for making excellent local arrangements for the conference. We hope you will enjoy the conference and have a great time in Fujairah, UAE.

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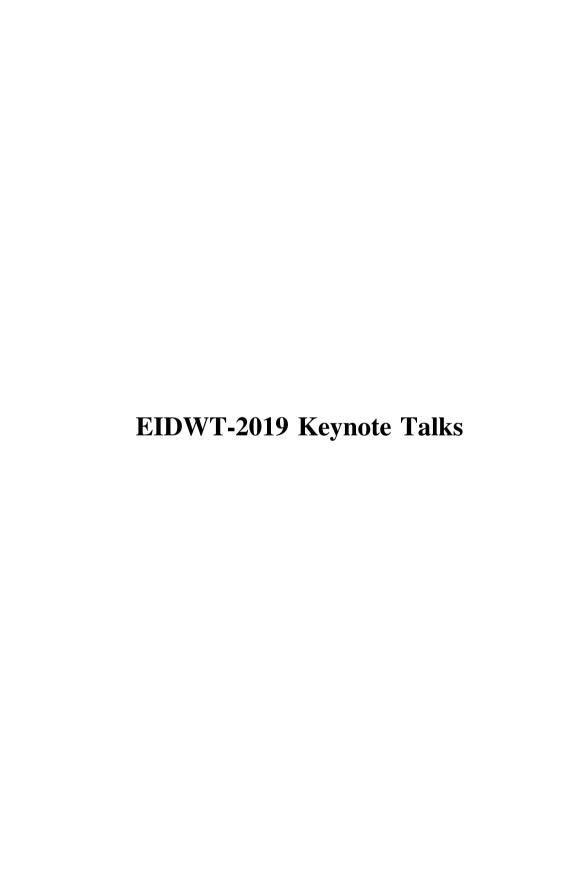
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# How to Build Intelligent Collectives for Prediction Market Tasks

Ngoc-Thanh Nguyen

Wroclaw University of Science and Technology, Wroclaw, Poland

**Abstract.** This talk presents a general framework for building intelligent collectives for prediction market tasks. It will be shown that two aspects play an important role in this process: diversity and independency. Our findings qualify the positive impact of diversity and independence on collective performance. Particularly, collectives with higher diversity and independence levels will lead to better collective accuracy. Subsequently, expanding the collective cardinality that causes an increase in its diversity will also be positively associated with the collective performance. With some restrictions, the hypothesis "The more diverse the collective, the higher the collective performance" is formally proved.

# **Cooperative Wireless Relay Networks**

Jacek Ilow

Dalhousie University, Halifax, Canada

**Abstract.** This talk presents principles involved in designing Multiple-Input-Multiple-Output (MIMO) wireless relay networks with different levels of coordination between communicating terminals in ad hoc networks. In particular, cooperative transmission strategies are contrasted with the approaches where terminals transmit independently resulting in high levels of interference. A unifying framework of power control and signal alignment is adopted to demonstrate better power efficiency in cooperative communication bandwidth compute-and-forward strategies, that exploits interference to obtain significantly higher rates between users in a network. Geometric concepts and abstractions are used to establish the energy-efficient relay choices and to design distributed signal coding to combat fading in networks with randomly distributed nodes such as in Wireless Sensor Networks (WSNs). The benefits of distributed network coding reducing the number of transmissions are examined. While cooperation improves energy efficiency in wireless networks, it introduces a protocol overhead. The balancing of the cooperative gain (in terms of energy and bandwidth efficiency) and the cooperation overhead is also presented in this talk.

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