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Editorial: Applications of Future Internet

Oscar Mayora [1] · L. Enrique Sucar [2]

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The Future Internet will make possible a wide range of novel applications, such as interconnecting all the physical devices so that they can interact and collaborate (Internet of Things), delivering a wide range of services for all the citizens (Smart Cities), providing access to different tools for monitoring and improving our health (e-Health), among many others. The AFI360 Summit was unique event bringing a 360-degree perspective on the Future Internet and its Applications.

After the event an open call was made to extend the works presented at AFI 360 and submit them to this special issue; this was also open to other works related to the applications of the future internet. Seventeen papers were received and after a rigorous review process, the articles in this issue were selected for publication. These present different tools and applications providing a perspective on the future of Internet.

In her paper "Community-based Localized Disaster Response through Temporary Social Overlay Networks" Jung [1] presents the Hybrid Disaster Response System (HyDRS) that consists of localized communities dealing with short-term needs and a centralized disaster management system addressing long-term needs. By using the HyDRS, distressed people are able to immediately obtain vital information from people and sensors nearby and cooperate with each other within localized communities even when a centralized system is unavailable. The HyDRS provides connectivity among mobile devices for users who are in a disaster area using P2P virtual private network links driven by temporal social network relationships. The HyDRS feasibility is demonstrated by measuring the overhead to run SocialVPN on mobile platforms and thus the experiment developed in this research evaluates the end-to-end overhead of SocialVPN for mobile-to-mobile communication in a successful way.

✉ Oscar Mayora
omayora@fbk.eu

1 Fondazione Bruno Kessler, Trento, Italy

2 INAOE, Puebla, Mexico

Roncalli and his co-authors [2] present in their paper "Decentralized Power Distribution in the Smart Grid with Ancillary Lines: an approach based on Distributed Constraint Optimization" an extension of previous work by Zdeborov and colleagues [3]. In their paper, Roncalli presents a formalization of the problem of meeting the demand of the whole network, where backup power lines connect a subset of loads to generators based on the Distributed Constraint Optimization Problem (DCOP) framework and a solution approach based on the min-sum algorithm. In their work they present a strategy to minimize CO2 emissions related to energy production. The outcome of their work suggests that min-sum favorably compares against competitors, hence providing a promising method for a distributed implementation of the power distribution model that the authors considered for this research.

Fadi Al-Turjman proposes in the paper "Cognitive-Node Architecture and a Deployment Strategy for the Future WSNs." [4] the use of Cognitive Nodes (CNs) in sensor networks to provide intelligent information processing and knowledge-based services to the end-users. Cognitive Nodes provide enhanced capabilities to deal with the network connectivity and node dynamics in large-scale deployments. They also maintain their availability at intermediate locations, other than their points of publication (i.e. the sensor nodes) for ease of access. These CNs include knowledge representation, reasoning and learning elements. The paper presents simulation experiments that demonstrate that the proposed approach significantly outperforms alternative techniques in terms of the network lifetime due to the added CNs in the network, which adapt transmission powers according to the data-request's source and the current communication link conditions.

F. Lezama and collaborators describe in their paper "Agent-Based Microgrid Scheduling: An ICT Perspective" [5] a novel agent-base model to address the long-term scheduling of distributed energy resources in microgrids as a distributed constraint optimization problem (DCOP). To solve this complex problem efficiently, they propose to split the problem into small time windows that can be effectively solved sequentially by off-the-shelf DCOP algorithms, including: synchronous branch and bound (SynchBB), distributed pseudotree Optimization

Procedure (DPOP), memory-bounded DPOP (MB-DPOP) and asynchronous forward bounding (AFB). The reported results consider the Budapest Tech case study. This scenario considers a microgrid with one wind generator, one solar generator, one fuel cell generator, and one battery. In the experiments they show that the proposed distributed approach drastically reduces the computational requirements without sacrificing much in optimality.

Oscar Mayora and L. Enrique Sucar, Guest Editors.

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