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Networking 2011

9-13 May 2011
Valencia, Spain

Workshops

13 May 2011

Sponsored by





Performance Evaluation of Cognitive Radio Networks. Workshop (PE-CRN) 2011 Program

Friday, May 13, 2011

09:00 - 09:15 Registration

09:15 - 09:30 Opening Session

09:30 - 09:45 One Minute Madness Session

09:45 - 11:15 Session 1: Performance Analysis of CRNs

Discrete time analysis of cognitive radio networks with saturated source of secondary users

Attahiru S. Alfa (University of Manitoba, Canada); Vicent Pla (Universitat Politècnica de València, Spain); Jorge Martínez-Bauset (Universidad Politécnica de València, Spain); Vicente Casares-Giner (Universitat Politècnica de València, Spain)

Cross-Entropy Optimized Cognitive Radio Policies

Boris Oklander (Technion, Israel); Moshe Sidi (Technion, Israel)

Greedy versus Dynamic Channel Aggregation Strategy in CRNs: Markov Models and Performance Evaluation

Lei Jiao (University of Agder, Norway); Frank Y. Li (University of Agder, Norway); Vicent Pla (Universitat Politècnica de València, Spain)

11:15 - 11:45 Coffe Break

11:45 - 13:15 Session 2: Capacity and Spectrum Occupancy in CRNs

An Overview of Spectrum Occupancy Models for Cognitive Radio Networks

Miguel López-Benítez (Universitat Politècnica de Catalunya, Spain); Ferran Casadevall (Universitat Politècnica de Catalunya, Spain)

Capacity Limits for a Cognitive Radio Network under Fading Channel

Yuehong Gao (Beijing University of Posts and Telecommunications, P.R. China); Jinxing Yang (Beijing University of Posts and Telecommunications, P.R. China); Xin Zhang (Beijing University of Posts and Telecommunications, P.R. China); Yuming Jiang (Norwegian University of Science and Technology (NTNU), Norway)



Techno-Economic Evaluation of Cognitive Radio in a Factory Scenario

Matthias Barrie (IBBT-SMIT, Vrije Universiteit Brussel, Belgium); Lieven Tytgat (University Ghent, Belgium); Vânia Gonçalves (IBBT-SMIT, Vrije Universiteit Brussel, Belgium); Opher Y Yaron (Ghent University, Belgium); Ingrid Moerman (Ghent University, Belgium); Piet Demeester (Ghent University, Belgium); Sofie Pollin (IMEC / UC Berkeley, USA); Pieter Ballon (Vrije Universiteit Brussel, Belgium); Simon Delaere (IBBT-SMIT, Vrije Universiteit Brussel, Belgium)

13:30 - 15:00 Lunch

15:00 - 16:30 Session 3: Dynamic Spectrum Allocation and Opportunistic Networking

A New Multicast Opportunistic Routing Protocol for Wireless Mesh Networks

Amir Darehshoorzadeh (Universitat Politècnica de Catalunya, Spain); Llorenç Cerdà-Alabern (Universitat Politècnica de Catalunya, Spain)

On Optimal Distributed Channel Allocation for Access Points in WLANs

Tânia Monteiro (Pontifical Catholic University of Paraná, Brazil); Marcelo Eduardo Pellenz (Pontifical Catholic University of Paraná, Brazil); Richard Demo Souza (Federal University of Technology - Paraná (UTFPR), Brazil)

Realizing the Broker based Dynamic Spectrum Allocation through LTE Virtualization and Uniform Auctioning

Yasir Zaki (University of Bremen, Germany); Manzoor Khan (TU Berlin, Germany); Liang Zhao (University of Bremen, Germany); Carmelita Goerg (University of Bremen, Germany)



Network Coding Applications and Protocols Workshop (NC-Pro) 2011 Program

Friday, May 13, 2011

09:00 - 09:15 Registration

09:15 - 09:30 Opening Session

09:30 - 09:45 One minute Madness Session

09:45 - 11:15 Session 1: Applications and Protocols

9.45 – 10.15 Experimental Evaluation of a Robust MAC Protocol for Network Coded Two-Way Relaying

Sebastian Bittl, Christoph Hausl, Onurcan Iscan (Technische Universität München)

Wireless half-duplex relay communication between two nodes is considered. A two-way decode-and-forward relaying strategy that uses network coding at the relay should be able to increase the data throughput. A specific medium access (MAC) protocol based on a TDD/TDMA scheme is proposed that establishes robust synchronization between the terminals. An experimental evaluation of the proposed MAC protocol is performed using a software-defined radio system consisting of a terminal for each node in the network. It is shown that the proposed protocol realizes the promised throughput-gain of network coding for large burst-lengths. Moreover, the additional amount of processing time, memory and signalling required due to network coding is described.

10.15 – 10.45 An Implementation of Network Coding with Association Policies in Heterogeneous Networks

Ashutosh Bhaskar Kulkarni, Michael Heindlmaier, Danail Traskov (Technische Universität München), Marie-Jose Montpetit, Muriel Médard (Massachusetts Institute of Technology)

This paper presents a wireless network performance study of a modified TCP/IP protocol stack with a network coding layer inserted between the transport and the network layer. The simulation was performed with the OPNET simulation tool and considered a heterogeneous wireless environment where a mobile device could connect to both LTE (Long Term Evolution) and WLAN (wireless LAN) networks. We simulate various user-network association policies in such an environment with the goal of usage cost optimization under a Quality of Service (QoS) constraint. The results show that using a threshold-based online policy the network usage cost can be reduced significantly while remaining within the user's QoS requirements.



10.45 – 11.15 When Both Transmitting and Receiving Energies Matter: An Application of Network Coding in Wireless Body Area Networks

Xiaomeng Shi, Muriel Médard (Massachusetts Institute of Technology), Daniel E. Lucani (Instituto de Telecomunicações, Universidade do Porto)

A network coding scheme for practical implementations of wireless body area networks is presented, with the objective of providing reliability under low-energy constraints. We propose a simple network layer protocol for star networks, adapting redundancy based on both transmission and reception energies for data and control packets, as well as channel conditions. Our numerical results show that even for small networks, the amount of energy reduction achievable can range from 29% to 87%, as the receiving energy per control packet increases from equal to much larger than the transmitting energy per data packet. The achievable gains increase as a) more nodes are added to the network, and/or b) the channels seen by different sensor nodes become more asymmetric.

11.15 – 11.45 Coffee Break

11.45 – 13.15 Session 2: Applications, Algorithms and Implementation

11.45 – 12.15 Decoding Algorithms for Random Linear Network Codes

Janus Heide, Morten V. Pedersen, Frank H. P. Fitzek (Aalborg University)

We consider the problem of efficient decoding, in a random linear code over a finite field. In particular we are interested in the case where the code is relatively sparse, and therefore we use the binary finite field as an example. The goal is to decode the data using fewer operations to potentially achieve a high coding throughput, and reduce the energy consumption. We use an on-the-fly version of the Gauss-Jordan algorithm as a baseline, and provide several simple improvements to reduce the number of operations needed to perform decoding. Our tests show that the improvements can reduce the number of used operations with between 10 and 20% depending on the code parameters.

12.15 – 12.45 Energy-Aware Hardware Implementation of Network Coding

Georgios Angelopoulos, Muriel Médard, Anantha Chandrakasan (Massachusetts Institute of Technology)

In the last few years, Network Coding (NC) has been shown to provide several advantages, both in theory and in practice. However, its applicability to battery-operated systems under strict power constraints has not been proven yet, since most implementations are based on high-end CPUs and GPUs. This work represents the first effort to bridge NC theory with real-world, low-power applications. In this paper, we provide a detailed analysis on the energy consumption of NC, based on VLSI design measurements, and an approach for specifying optimal algorithmic parameters, such as field size, minimizing the required energy for both transmission and coding of data. Our



custom, energy-aware NC accelerator proves the feasibility of incorporating NC into modern, low-power systems; the proposed architecture achieves a coding throughput of 80MB/s (60MB/s), while consuming 22uW (12.5mW) for the encoding (decoding) process.

12.45 – 13.15 Kodo: An Open and Research Oriented Network Coding Library

Morten V. Pedersen, Janus Heide, Frank H. P. Fitzek (Aalborg University)

This paper introduces the Kodo network coding library. Kodo is an open source C++ library intended to be used in practical studies of network coding algorithms. The target users for the library are researchers working with or interested in network coding. To provide a research friendly library Kodo provides a number of algorithms and building blocks, with which new and experimental algorithms can be implemented and tested. In this paper we introduce potential users to the goals, the structure, and the use of the library. To demonstrate the use of the library we provide a number of simple programming examples. It is our hope that network coding practitioners will use Kodo as a starting point, and in time contribute by improving and extending the functionality of Kodo.

13:30 - 15:00 Lunch

Workshop on Wireless Cooperative Networks Security (WCNS) 2011 Program

Friday, May 13, 2011

09:00 - 09:15 Registration

09:15 - 09:30 Opening Session

09:30 - 09:45 One Minute Madness Session

09:45 - 11:15 Session 1. Security in Lightweight and Wireless Systems

BlueSnarf revisited: OBEX FTP service directory traversal

Alberto Moreno and Eiji Okamoto

Short and Efficient Certificate-Based Signature

Joseph K. Liu, Feng Bao, and Jianying Zhou

Privacy-Preserving Environment Monitoring in Networks of Mobile Devices?

Lorenzo Bergamini, Luca Becchetti, and Andrea Vitaletti



11:15 - 11:45 Coffe Break

11:45 - 13:15 Session 2. Wireless Sensor Network Security

Rescuing Wireless Sensor Networks Security from Science Fiction Channel

Dieter Gollmann, Maryna Krotofil and Harald Sauff

Decorrelating WSN Traffic Patterns through Maximally Uninformative Constrained Routing

Juan E. Tapiador, Mudhakar Srivatsa, John A. Clark, and John A. McDermid

Low-Power Low-Rate Goes Long-Range: The Case for Secure& Cooperative Machine-to-Machine Communications

Andrea Bartoli, Mischa Dohler, Juan Hernandez-Serrano, Apostolos Kountouris and Dominique Barthel

13:30 - 15:00 Lunch

15:00 - 16:30 Session 3. Cooperative mechanisms and authentication

Towards a Cooperative Intrusion Detection System for Cognitive Radio Networks

Leon, Rodrigo Roman, and Juan Hernandez-Serrano

Mobile Agent Code Updating and Authentication Protocol for Code-centric RFID System

Liang Yan, Hongbo Guo, Min Chen, Chunming Rong, Victor Leung

Mobility in Collaborative Alert Systems: Building Trust through Reputation

Manuel Gil Perez, Felix Gomez Marmol, Gregorio Martinez Perez, and Antonio F. Gomez Skarmeta



Workshop on Sustainable Networking (SUNSET) 2011 Program

Friday, May 13, 2011

09:00 - 09:30 Registration

09:15 - 09:30 Opening Session

09:30 - 09:45 One Minute Madness Session

09:45 - 10:00 Talk introduction

Laurent Lefevre A General Introduction

10:00 - 10:30 Session 1

"On the Impact of the TCP Acknowledgement Frequency on Energy Efficient Ethernet Performance"

Pedro Reviriego et al.,

11:15 - 11:45 Coffe Break

11:45 - 13:15 Session 2

"The Trade-off between Power Consumption and Latency in Computer Networks"

Matthias Herlich and Holger Karl,

"Characterization of Power-Aware Reconfiguration in FPGA-Based Networking Hardware"

Sandor Plosz et al.,

" Analyzing Local Strategies for Energy Efficient Networking"

Sergio Ricciardi et al.,