Wireless Networks for Mobile Applications

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Project Examples

- The following examples represent projects developed for this class in past years

Survey Project 1 [SP1] – D2D interaction

- Several approaches have been presented enabling D2D interaction

  - Doppler, K. and Rinne, M. and Wijting, C. and Ribeiro, C.B. and Hugl, K., "Device-to-device communication as an underlay to LTE-advanced networks". IEEE Communications Magazine 47(12), 2009.

  - Asadi, A. and Qing Wang and Mancuso, V., "A Survey on Device-to-Device Communication in Cellular Networks". IEEE Communications Surveys Tutorials 16(4), 2014.

  - Qualcomm Research, "LTE Direct Overview", url: http://s3.amazonaws.com/sdieee/205-LTE+Direct+IEEE+VTC+San+Diego.pdf

- Objective: Provide a comprehensive survey of state-of-the-art approaches

Survey Project 2 [SP2] – UAV Route Planning

- Several approaches have been proposed depending on mission objective and goal:

    - Myers D. and Batta R. and Karwan M., "A Real-Time Network Approach for Including Obstacles and Flight Dynamics in UAV Route Planning". Journal of Defense Modeling and Simulation, 2014.

    - J. O. Royset, W. M. Carlyle, and R. K. Wood. Routing military aircraft with a constrained shortest-path algorithm. Military Operations Research 14(3):31-52, 2009.

- Objective: Provide a comprehensive survey of state-of-the-art approaches.

Survey Project 3 [SP3] – Body Area Networks

- The goal of this topic project is to provide a study regarding state-of-the-art proposals employing predictive / behavioral algorithms
- Starting material

  - Hanson *et al.*, "Body Area Sensor Networks: Challenges and Opportunities". Computer 42(1) 2009.

  - Kennedy *et al*. "Active Assistance Technology for Health-Related Behavior Change: An Interdisciplinary Review." Ed. Gunther Eysenbach. Journal of Medical Internet Research 14(3) (2012)

Survey Project 4 [SP4] – 2D Vehicular Networks

- Vehicular communications will become a reality in the near future. A research topic spanning from Phy/MAC (propagation) to data dissemination aspects.

- Message forwarding in 1D, platoon scenario is well-understood and optimal schemes have been proposed. However, in the general case, the road topology is **2D** ...

- Starting material

  - Julio *et. al*, "RTAD: A real-time adaptive dissemination system for VANETs". Computer Communications 60(1), 2015

  - Alvaro T. and Carlos T.C. and Juan-Carlos C. and Pietro M. and Yusheng J., "Evaluation of flooding schemes for real-time video transmission in VANETs". Ad Hoc Networks, 24(1), 2015

Survey Project 5 [SP5] – 2D/3D Drone Networks

- Drones and other mobile/statice devices (IoT devices) with communication capabilities are becoming popular

- Objective 1: Provide a comprehensive survey of possible applications and challenges related to 2D/3D Drone networks.
  - Objective 1b: Provide a survey of mobility models for the mentioned applications

- Starting material

  - https://www.sigmobile.org/mobisys/2016/workshops/DroNet/program.html

  - https://www.sigmobile.org/mobisys/2015/workshops/DroNet/program.html

Survey Project 6 [SP6] – Seamless Communic.

- With seamless communication is meant no user interaction is required.

- Pairing process between wireless enabled devices requires initial setup (user intervention). Solutions have been proposed for seamless data transfer. These proposals exploit advertisement frames to exchange data, hence avoid pairing, making the solution user-transparent

- Starting material

  - Bluetooth Low Energy (BLE): Corbellini G. and Schmid S. and Mangold S., "Two-Way Communication Protocol using Bluetooth Low Energy Advertisement Frames", in Proc. Of MobiCom Smartobjects 2015.

  - WiFi: Bhojan A. and Wei T., "mumble: Framework for Seamless Message Transfer on Smartphones". In Proc. of MobiCom SmartObjects 2015.

- Objective: Survey similar proposals

Survey Project 7 [SP7] – Other Topics

- <u>Many interesting topics</u>

  - Information-Centric Networks (ICN) (e.g., general? Specific for smartphones or vehicular?)

  - Green Computing

  - QoS/QoE in multimedia (e.g., specific for smartphones…)

  - Activity Recognition (e.g., from smartwatches… even used for side channel attacks)

  - …