Journal Watch: TSP-March 1. 2015

Vinuthna
SPC Lab

March 28, 2015

Paper Title: Multiperiod Scheduling for Wireless Sensor Networks: A Distributed Consensus Approach

Authors: Jianping He, Lingjie Duan, Fen Hou, Peng Cheng and Jiming Chen

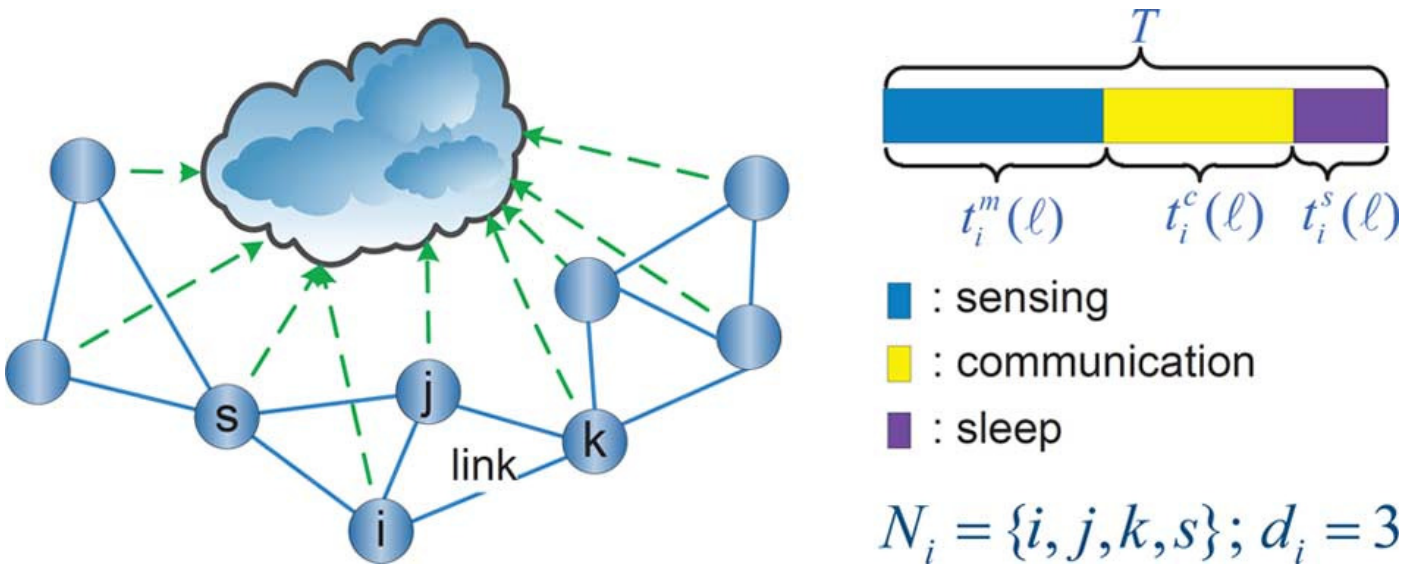

Figure : System Model

Goal: Network utility maximization (NUM) by considering energy constraints using a time-slotted model with periodic sensing

3 work modes-

- Sensing
- Communication
- Sleep

Contributions: Under certain assumptions on the network,

- Proposed a multi-period scheduling for NUM in WSNs formulated as mixed integer programming problem
- Using convex optimization techniques, simplify it as a single-period scheduling problem
- Proposed two methods MCDA and ACDA that converge to global optimum in max network life time and energy constraints respectively
- Convergence guarantees for both MCDA and ACDA are discussed

Limitations: Considers linear energy cost function, approach doesn't work if it is violated.

Paper Title: Robust Recovery of Temporally Smooth Signals From Under-Determined Multiple Measurements

Authors: Zhaofu Chen, Rafael Molina and Aggelos K. Katsaggelos

- **System Model:** $\mathbf{Y} = \mathbf{\Phi X} + \mathbf{E} + \mathbf{N}$: ROBUST MMV
- **Goal:** To find **X**, **E** given **Y** and $\mathbf{\Phi}$
- **Contributions:**
  - Sequential approach: Acts as the bench mark for performance evaluation. Pre-processing module implemented using state of art techniques like ALM and VB algorithm

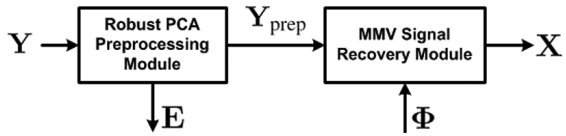

Figure : System Model

  - Simultaneous approach: Jointly remove outlier and recover signal. Solve the problem by formulating it as a Regularized Fitting Problem(RFP) which is solved using two methods namely Augmented Lagrangian Method(ALM) and ADMM iterations.

- Evaluates performance with and without outliers. In the presence of outliers, ADMM offers very low complexity with good recovery performance
- Analysis on convergence and optimality of ADMM for the RFP is also given along with the complexity comparison of all the state of art techniques

Paper Title: A Cognitive Algorithm for Received Signal Strength Based Localization

Authors: Francesco Bandiera, Angelo Coluccia and Giuseppe Ricci

Goal: Considering statistical path loss model, estimate the power transmitted by each of the nodes and the distance from each of the nodes to every other node using the average power received at each of the nodes. K instantiations of Power recieved at i_{th} sensor node are considered to estimate the power transmitted from each of the nodes.

- **System Model:**
- Assume N nodes slowly moving through known trajectories. Also assume, some blind nodes in the sensor network
- consider two cases-
  - Homogenous network
  - Heterogenous network

- **Contributions:**
- Formulate the problem as Hypothesis testing problem to identify whether it is a homogenous or a heterogenous network. Consider the case where, i_{th} node always transmits the same power, be it a blind node or a sensor node
  - If Homogenous, then identify the locations of anchor nodes only based on the power received by the ith node(H-ML)
  - If Heterogenous, estimate the shadowing factor, power transmitted by the sensor nodes and then using these estimate the positions of the blind nodes(NH-ML)
- Numerical Results compare performance estimates of H-ML and NH-ML with C-ML. H-ML is the best and NH-ML approaches H-ML as L and N increase

Paper Title: Harvest-Then-Cooperate: Wireless-Powered Cooperative Communications

Authors: He Chen, Yonghui Li, Joo Luiz Rebelatto, F. Ucha-Filho, and Branka Vucetic

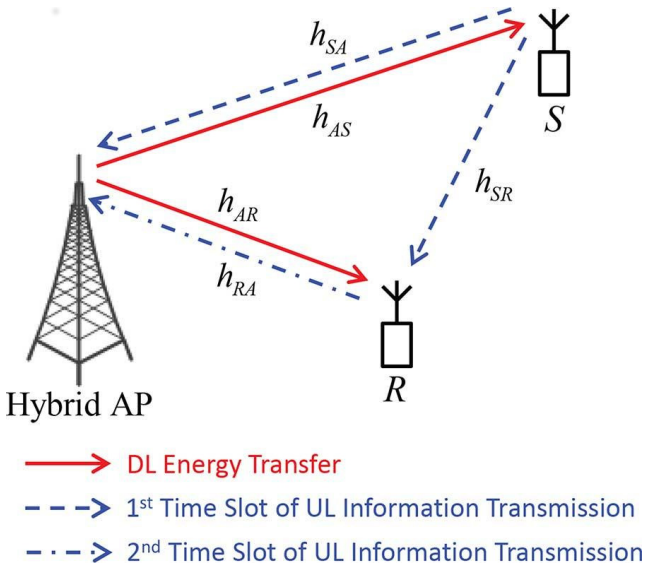

Figure : System Model

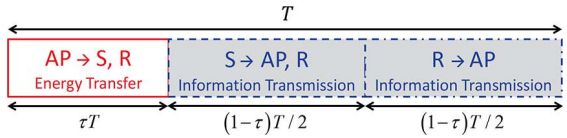

Figure : Scheduling

Goal: Optimal Wireless powered co-operative communications

Contributions:

- Considered a 3 node reference model and proposed a HTC for WPCCN. The AF relaying scheme and selection combining technique are assumed to be implemented at relay and AP respectively
- Also considering delay in transmission, derived an approximately closed form expression for average throughput over Rayleigh fading channels
- Extended to Multi Relay scenario, where select a relay at a time and then use HTC with that relay. 2 popular relay selection schemes are analyzed along with the throughput performances namely opportunistic relaying and partial relay selection
- Impacts of system parameters such as time allocated for each of the operations, number of relays and relay position on throughput performance of considered schemes are thoroughly investigated

Other Papers

- Parallel Selective Algorithms for Non-Convex Big Data Optimization
  F. Facchinei, G. Scutari and S. Sagratella
- Disributed low over head schemes for multi Stream MIMO Interference Channels
  H. Ghauch, T. Kim, M. Bengtsson and M. Skoglund