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Editorial

Algorithmic Methods in Wireless Sensor Network

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Wireless sensor network (WSN) is characterized by dense node deployment, unreliable sensor, frequent topology change, and severe power, computation, and memory constraints. These unique characteristics pose considerable challenges on the design of large-scale WSN. The problems in different scenarios require different analytical models as well as algorithms to achieve optimal performance. This special issue provides some researches to resolve the issues in sensor networks such as traditional wireless sensor network, delay tolerant mobile sensor network, and vehicular sensor network.

The paper "*A cluster-based consensus algorithm in a wireless sensor network*" proposes an average connectivity degree cluster (ACDC) scheme gossip algorithm to improve the convergence speed and the accuracy of the consensus. A utility function is developed based on two parameters, iteration and relative error, to help the network designers make an optimal decision based on their requirements. An irregular sensor model which is based on the degree of irregular (DOI) radius is also introduced to evaluate the robustness of the algorithm.

The paper "*nonparametric bootstrap-based multihop localization algorithm for large-scale wireless sensor networks in complex environments*" presents a nonparametric bootstrap multihop localization algorithm for large-scale wireless sensor networks (WSNs) in complex environments. Authors integrate the interval analysis method with bootstrap approach for ordinary nodes localization. To reduce the computational complexity, boxes approach is utilized to approximate the irregular intersections.

The paper "*An energy distribution and optimization algorithm in wireless sensor networks for maritime search and rescue*" proposes a new method of maritime search and rescue based on wireless sensor networks. An energy dynamic distribution and optimization (EDDO) algorithm is presented to solve the problems of dynamic adaptability and life cycle limitation at sea.

The paper "*A hybrid energy- and time-driven cluster head rotation strategy for distributed wireless sensor networks*" proposes a hybrid cluster head rotation strategy which combines the advantages of both energy-driven and time-driven cluster head rotation strategies. In the hybrid rotation strategy, the time-driven strategy or energy-driven strategy will be selected according to the residual energy.

The paper "*An efficient data evacuation strategy for sensor networks in postdisaster applications*" introduces data evacuation (DE), an original idea that takes advantage of the survival time of the WSN, that is, the gap from the time when the disaster hits and the time when the WSN is paralyzed, to transmit critical data to sensor nodes in the safe zone in order to preserve "the last snapshot" of the whole network.

The paper "*Study on routing protocols for delay tolerant mobile networks*" gives a tutorial to routing protocols for delay tolerant mobile networks and investigates the state-of-the-art routing protocols for DTMNs. Some research issues are also discussed.

The paper "*Power control in distributed wireless sensor networks based on noncooperative game theory*" presents a game theoretic method to adaptively maintain the energy efficiency in distributed wireless sensor networks. The utility function was formulated under a proposed noncooperative framework, and then the existence of Nash Equilibrium (NE) has been proved to guarantee system stability. To pursue NE, an NPC algorithm was proposed to regulate heterogeneous nodes with various communication demands given the definition of urgency level.

The paper "*IPARK*: *location-aware-based intelligent parking guidance over infrastructureless VANETs*" taps into the unused resources offered by parked vehicles to perform parking guidance. In IPARK, the cluster formed by parked vehicles generates the parking lot map automatically, monitors the occupancy status of each parking space in real time, and provides assistance for vehicles searching for parking spaces.

The paper "*You take care of the drive*, *i take care of the rule*: *a traffic-rule awareness system using vehicular sensors and mobile phones*" proposes a novel traffic-rule awareness system using vehicular sensors and mobile phones. It translates traffic rules into combinations of vehicular sensors, GPS device, and Geography Information System (GIS); the system can tell whether a driver violates the traffic rules and can help him to amend his driving behavior immediately.

The paper "*Do not stuck at corners*: *a data delivery algorithm at corners in vehicular sensor networks*" proposes a data delivery algorithm called distribution-based data delivery to handle the corner problem with the help of some vehicular sensors like accelerometer, in which the big amounts of data are stuck at corners or crossroads and are transmitted back and forth with very few data packets being delivered.

The paper "*Distributed intrusion detection of byzantine attacks in wireless networks with random linear network coding*" develops a distributed algorithm to effectively detect, locate, and isolate the Byzantine attackers in a wireless ad hoc network with random linear network coding (RLNC).

The paper "*Public-transportation-assisted data delivery scheme in vehicular delay tolerant networks*" presents a destination-gathering-based driving path prediction method for taxis, which can make taxis' driving paths prescient in the initial stage of carrying passengers every time. Then a novel public-transportation-assisted data delivery (PTDD) scheme is proposed to improve the performance of data delivery of Vehicular Delay Tolerant Networks (VDTNs).

The paper "*Ant-based transmission range assignment scheme for energy hole problem in wireless sensor networks*" investigates the problem of uneven energy consumption in large-scale many-to-one sensor networks (modeled as concentric coronas) with constant data reporting. In view of the effectiveness of ant colony algorithms in solving combinatorial optimization problems, an ant-based heuristic algorithm (ASTRL) is proposed to address the optimal transmission range assignment for the goal of achieving life maximization of sensor networks.

The paper "*Application-oriented fault detection and recovery algorithm for wireless sensor and actor networks*" proposes an application-oriented fault detection and recovery (AFDR) algorithm, a novel distributed algorithm to reestablish connectivity. AFDR algorithm identifies critical actors and designates backups for them. A backup actor detects the critical node failure and initiates a recovery process via moving to the optimal position.

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