

Efficient Data Collection by Mobile Sink to Detect Phenomena in Internet of Things

Abstract

With the rapid development of Internet of Things (IoT), more and more static and mobile sensors are being deployed for sensing and tracking environmental phenomena, such as fire, oil spills and air pollution. As these sensors are usually battery-powered, energy-efficient algorithms are required to extend the sensors lifetime. Moreover, forwarding sensed data towards a static sink causes quick battery depletion of the sinks nearby sensors. Therefore, in this paper, we propose a distributed energy-efficient algorithm, called the Hilbert-order Collection Strategy (HCS), which uses a mobile sink (e.g., drone) to collect data from a mobile wireless sensor network (mWSN) and detect environmental phenomena.

The mWSN consists of mobile sensors that sense environmental data. These mobile sensors self-organize themselves into groups. The sensors of each group elect a group head (GH), which collects data from the mobile sensors in its group. Periodically, a mobile sink passes by the locations of the GHs (data collection path) to collect their data. The collected data are aggregated to discover a global phenomenon. To shorten the data collection path, which results in reducing the energy cost, the mobile sink establishes the path based on the order of Hilbert values of the GHs locations. Furthermore, the paper proposes two optimization techniques for data collection to further reduce the energy cost of mWSN and reduce the data loss.