ABSTRACT

As a human nature, we have the tendency to explore new technologies to make life easier for us. In this regard sensors were developed; they convert a physical quantity into a signal which can be read by an observer or by an instrument. One of the fundamental issues in sensor networks is the coverage problem, which reflects how well a sensor network is monitored or tracked by sensors.

Mobile Sensors are the new trend in sensor networks where they determine their location via communicating with each other, and this is done by message passing among them. Message passing requires radio communication which is an expensive task as they consume maximum energy of a sensor. Since sensors have limited power supply, we use a new approach to reduce the number of messages among them so that they can have a longer lifetime. Mobile Sensor Networks are important for several strategic applications devoted to monitoring critical areas. In some hostile scenarios, sensors cannot be deployed manually and are either sent from a safe location or dropped from an aircraft. Mobile sensors permit a dynamic deployment reconfiguration that improves the coverage by coordinating sensor movements to reach a satisfactory deployment in terms of completeness and uniformity.

The basis for these new approaches are the Push & Pull algorithm where movement decisions are made by each sensor on the basis of locally available information and do not require any prior knowledge of the operating conditions or any manual tuning of key parameters.

In this report we propose two different ways to do away with the *Pull* activity of the Push & Pull algorithm. In the first algorithm we use the Parent-Child List activity to fill the holes that may arise because *Snap* and *Push* activity alone cannot provide full coverage and uniformity. Parent-Child List activity uses a list to store the parent of a snapped sensor which allows them to send request for slaves directly to their parent, thus reducing the message count of the network. The second algorithm requires message passing only in the *Push* activity, thus the total number of message passed to establish the network is reduced significantly as compared to the base algorithm and the first proposed algorithm. The effectiveness of the proposed algorithms are studied through extensive simulations.

Keywords: Coverage Completeness · Coverage Uniformity · Distributed Algorithm ·Mobile sensor networks