Mobility Adaptive Clustering Algorithm for Wireless Sensor Networks with Mobile Nodes

Nasser AL-QADAMI[a], Inas LAILA[b],   Andrey KOUCHERYAVY[a],   Ahmad Saker AHMAD [b]

[a] *Department of Communications Networks, The Bonch-Bruevich Saint - Petersburg State University of Telecommunications, Russia*

[b] *Department of Computer Networks and Systems, Faculty of Informatics Engineering, Tishreen University, Syria*

nas4yemen@gmail.com, enas.le@hotmail.com, akouch@mail.ru, dr-ahmad@scs-net.org

Abstract—**In this study, the authors propose a mobility adaptive clustering algorithm for wireless sensor networks with mobile nodes . In the proposed algorithm, a sensor node selects itself as a cluster head based on a Single Point Predictor for the combined criterion prediction. Here, as a combined   criterion predicting proposed comprising parameters as connectivity, coverage, mobility and residual energy consumption of all the nodes (Distributed Clustering Algorithm). A non-cluster-head nodes declare themselves as members of the cluster based on a new value , that value is related to each cluster head , which is used to indicate its suitability for connecting this cluster head or other (Mobility-Based Clustering protocol). We found in the Distributed Clustering Algorithm the Mechanism to elect the head of the cluster and in   the Mobility-Based Clustering protocol the mechanism for engagement a   non-cluster head nodes to a specific   cluster.**

Thus, the combination of them together   provides a significant increase in the network life-time, availability, stability period   of wireless sensor   networks and reduction of   packet loss in the cluster formed by a simple point predictor for combined criterion prediction and stability value.

Keywords— Mobile wireless sensor networks, Single Point Predictor, Combined criteria, The stability value, Network life-time.

Mr. Nasser Al-Qadami   joined St.Petersburg University of Telecommunication, Russia, as a PhD student in the Department of Communications Networks in 2013. He was born in May 1983 in Sana'a, Yemen. He received his BSc and MSc degree from Odessa National Academy Of Telecommunications   A.S Popov (ONAT),Odessa, Ukraine in 2009 and 2011, respectively. He had worked as a lecturer at Sheba 'a University and Cisco Academy in Sana'a until 2013. His research interests include Communication Systems,   Networks Systems and Wireless Sensor Networks.
.

Dr. Sc. Andrey Koucheryavy   working in St.Petersburg University of Telecommunication as Chief Department of Communications Networks. He was born in 1952 in Leningrad. He graduated Leningrad University of Telecommunication in 1974. A. Koucheryavy received Ph. D from ZNIIS and D. Sc from St.Petersburg University of Telecommunication in 1982 and 1994 respectively. He worked at LONIIS (St.Petersburg research and scientific institute of Telecommunication) as First Deputy General Director up to 2003 From October 2003 he is ZNIIS General Director Advisor. He is is author of 275 scientific papers. A.Koucheryavy is professor of St.Petersburg University of Telecommunication from 1998. He is honorary member of Popov's society. A.Koucheryavy is Vice-Chairman 11 Study Group (2005-2008, 2009-2012) and Chairman WP4 11 Study Group (2009-2012).

Mrs. Inas LAILA   joined Tishreen University, Syria, as a PhD student in the Department Computer Networks and Systems in 2013. she was born in Feb. 1983 in Lattakia, Syria. she received her BCs. and Master degree Department of Computer Networks and Systems, Faculty of Informatics Engineering, Tishreen University, Lattakia, Syria in 2006 and 2011, respectively. She had worked as a lecturer at Tishreen University until 2013. Her research interests in Modeling & Simulation, Networks Systems and Wireless Sensor Networks.

Dr. Sc. Ahmad Saker AHMAD working in Tishreen University, Lattakia, Syria as Professor Department of Communications Networks. He was born in 1960 . He graduated Damascus University in 1985.   A. S. Ahmad received Ph. D from International Institute Of Telecommunications   A.S Popov, Odessa, Soviet Union in 1991. He worked at Tishreen University as Dean of Faculty of Informatics Engineering   2000-2009. He worked at Damascus University up to 2000 From   1986. He is author of   many scientific papers, books.