

EE-MAC: Energy Efficient-Medium Access Control for Periodic Applications in Border Surveillance Wireless Sensor Networks

Sam Nguyen-Xuan, Semin Oh, and Sunshin An
School of Electrical Engineering, Korea University Seoul, Republic of Korea
{ samnx,smoh,sunshin}@dsys.korea.ac.kr

Abstract—This paper propose the energy saving algorithms for medium access control in wireless sensor network to improve energy saving and increasing packet delivery ration for periodic applications in border surveillance wireless sensor networks. Since the data dissemination is periodic, the data update can be scheduled so that all nodes in virtual cluster must tightly synchronize their transmission to avoid collision. S-MAC [1] and D-MAC [2] schedules should be modified to satisfy the power cost of data delivery. Our implementations of this paper proposed the wake-up algorithm, the delay wakeup algorithm, and topology based the virtual group schedules. The results show that our proposed algorithms perform better than S-MAC and D-MAC in terms of energy efficiency and packet delivery ratio.

Keywords— medium access control (MAC), border surveillance wireless sensor networks (BSWSNs), energy efficiency (EE), and packet delivery ratio (PDR).



Sam Nguyen-Xuan received the B.S. degree in Electronics and Telecommunications Engineering from Posts and Telecommunications Institute of Technology (PTIT), Hanoi, Vietnam in 2002, and the M.S. degree in Information and Communications Engineering from the Andong National University, Republic of Korea, in 2009. He is currently pursuing the Ph.D. degree in Electrical and Computer Engineering at Korea University, Republic of Korea. His research interests include information theory, wireless sensor networks and ad-hoc networks.



Semin Oh received the B.S. degree in Electronic Engineering from Sangmyung University, Korea, in 2012. Currently, he is pursuing for M.Sc. degree in Electronic and Computer Engineering at Korea University, Korea. His research interests include the information theory and wireless sensor networks.



Sunshin An was born in Seoul, Korea in 1950. He received the B.Eng degree from Seoul National University, Korea in 1973, and the M.S degree in electrical engineering from KAIST (Korea Advanced Institute of Science and Technology), Korea in 1975 and the Doctor degree in electric and information from ENSEEIHT, France in 1979. He joined the faculty of Korea University in 1982, where he is currently a Professor of Electronic Engineering. Prior to joining Korea University, he was Assistant Professor of Electronic Engineering in Ajou University, Suwon, Korea. He was with NIST(National Institute of Standards and Technology) in U.S.A., as a visiting scientist in 1991.His research interests include the distributed system, communication networks and protocols, information network, intelligent network and multimedia communication system.

Dr.An was an advisory committee of ETRI (Electronics and Telecommunications Research Institute) and Chairman of IEEE Seoul Section. He is a member of the ACM and IEEE.