

GROUPING OF MOBILE NODES IN MANET BASED ON LOCATION AND MOBILITY INFORMATION USING AN ART NETWORK

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ABSTRACT. *A mobile ad-hoc network (MANET) is a technology to form a network autonomously with no infrastructure. This technology enables the establishment of impromptu networks for communication between mobile nodes with communication devices in disaster zones, and other various circumstances. MANET has great potential as a means of realizing a new communication environment not available through conventional networks. In the MANET, each mobile node not only operates as a communication node but also as a relay node to maintain the communication environment under a network topology that changes dynamically. In this paper, we propose a grouping scheme of mobile nodes in MANET using an adaptive resonance theory network. Through numerical simulations, we show effectiveness of our method and discuss its development potential.*

Keywords: Mobile ad-hoc networks, ART networks, Node distribution, Grouping

1. Introduction. Various communication services, such as inter-vehicle communications, which are communication services in intelligent transport systems, natural environmental monitoring using sensor networks, and emergent communications between mobile nodes in such the case of emergency as disaster have been provided. Recently, as a means of realizing communication services stated above, a mobile ad-hoc network (MANET) has been intensively researched with a significant amount of interest [1]-[4]. MANET, which is a network formed autonomously with no infrastructure, has great potential as a new communication form not available through conventional networks. If direct communication is not possible between communication nodes far away from each other, MANET realizes information exchange by multi-hop communication using intermediate nodes. Each mobile node not only operates as a communication node but also as a relay node to maintain the information communication environment. This technology enables the establishment of impromptu communication networks for communication between mobile nodes with communication devices in disaster zones and other various circumstances with no infrastructure. However, it is not easy to maintain the information communication environment under a network topology that changes dynamically.

In this paper, we propose a grouping scheme of mobile nodes in MANET using an adaptive resonance theory (ART) network [5]-[8]. In the proposed scheme, each category in the ART network has not only location information of mobile nodes but also mobility information of them. The mobility of each category is characterized by the average mobility of mobile nodes. Introducing the mobility choice function and mobility vigilance parameter to the ART network, mobile nodes having the same mobility are classified