

An Improved Agent-Based AODV Routing Protocol for MANET

Van-Hau Nguyen, Vi Hoai Nam, Dao Manh Linh and Vu Khanh Quy*

Hung Yen University of Technology and Education, Vietnam

Email: hauvn@utehy.edu.vn, vihoainam@utehy.edu.vn, daomanhlinh@utehy.edu.vn, quyvk@utehy.edu.vn

Abstract

The mobile ad-hoc network (MANET) is a special mobile network that has self-configuration and self-establish abilities to communicate conveniently. MANET is forming mobile devices such as mobile phones, personal digital assistants (PDAs), laptops, etc. As a result of the rapid, flexibility, and facilitate in communication, nowadays, MANET has revolutionized many real-life applications, ranging from smart agriculture and smart cities to forest fire detection systems, and expected to have vital contributions into the future of the Internet. However, due to the mobile nature of network nodes combined with the network architecture that without relying on central devices pre-installed such as base stations, the high-performance routing problem is one of the most significant challenges in the MANET environment. In this study, we propose a high-performance routing protocol, namely agent-based ad-hoc on-demand distance vector (A-AODV), to select the optimal route with high throughput and low latency. Through the developed routing algorithm, we explain how the suitable route with the lowest cost based on agents. To demonstrate the effectiveness of the proposed protocol, we compared A-AODV's performance with two well-known traditional protocols on NS2. Simulation results show that A-AODV improves superior performance over the traditional protocols.

Keywords: Network protocols, Mobile ad hoc network, MANET, Routing protocol, Mobile agent.

Received on 21 May 2021, accepted on 18 June 2021, published on 23 June 2021

Copyright © 2021 Van-Hau Nguyen *et al.*, licensed to EAI. This is an open access article distributed under the terms of the [Creative Commons Attribution license](https://creativecommons.org/licenses/by/4.0/), which permits unlimited use, distribution and reproduction in any medium so long as the original work is properly cited.

doi: 10.4108/_____

1. Introduction

In recent years, along with the powerful development of science and information technology, Mobile ad-hoc networks (MANET) have been studied and deployed in a wide range of areas, such as intelligent transport systems, rescue, health care, smart homes, and smart cities [1-2] (Figure 1). MANET is expected to be one of the technologies that will meet the connectivity needs of the future Internet thanks to its ability to set up flexible networks and not rely on fixed network infrastructure, low operating costs, fast deployment, and high mobility [2-3].

In a mobile ad-hoc network, the environment has a high dynamic network structure [2]. As a result, system performance is quite low. Some typical protocols introduced for MANET by IETF organizations are Ad-hoc

On-demand Distance Vector (AODV) [15] and Dynamic Source Routing (DSR) [16]. For some applications that require high mobility and massive traffic, the responsiveness of on-demand routing protocols such as AODV and DSR has a lot of limits [4]. In order to effectively exploit the system resource, the study of routing protocols is necessary.

Therefore, many studies have been done to improve availability and reliability in MANET [2, 5]. Through the related studies [6-19, 21-25] showed that how to use mobile agent technology with the intention of improving the performance of MANET becomes an increasingly exciting research topic. The specific solution is to integrate mobile agents into the control of routing protocols in MANET to improve the overall performance of the system.

In this study, we propose a routing protocol, namely A-AODV (Agent-based AODV). Inspired by the AODV protocol, our proposed solution is to use mobile agents to

*Corresponding author. Email: quyvk@utehy.edu.vn

