**New Multi-Hop Clustering Algorithm for Vehicular Ad Hoc Networks**

**Abstract:**

 As a hierarchical network architecture, the cluster architecture can improve the routing performance greatly for vehicular ad hoc networks (VANETs) by grouping the vehicle nodes. However, the existing clustering algorithms only consider the mobility of a vehicle when selecting the cluster head. The rapid mobility of vehicles makes the link between nodes less reliable in cluster. A slight change in the speed of cluster head nodes has a great inﬂuence on the cluster members and even causes the cluster head to switch frequently. These problems make the traditional clustering algorithms perform poorly in the stability and reliability of the VANET. A novel passive multi-hop clustering algorithm (PMC) is proposed to solve these problems in this paper. The PMC algorithm is based on the idea of a multihop clustering algorithm that ensures the coverage and stability of cluster. In the cluster head selection phase, a priority-based neighbor-following strategy is proposed to select the optimal neighbor nodes to join the same cluster. This strategy makes the inter-cluster nodes have high reliability and stability. By ensuring the stability of the cluster members and selecting the most stable node as the cluster head in the N-hop range, the stability of the clustering is greatly improved. In the cluster maintenance phase, by introducing the cluster merging mechanism, the reliability and robustness of the cluster are further improved. In order to validate the performance of the PMC algorithm, we do many detailed comparison experiments with the algorithms of N-HOP, VMaSC, and DMCNF in the NS2 environment.

**SYSTEM REQUIREMENTS:**

**HARDWARE REQUIREMENTS:**

* System : Pentium Dual Core.
* Hard Disk : 120 GB.
* Monitor : 15’’ LED
* Input Devices : Keyboard, Mouse
* Ram : 1 GB

**SOFTWARE REQUIREMENTS:**

* Operating system : Windows XP/UBUNTU.
* Implementation : NS2
* NS2 Version : 2.28
* Front End : OTCL (Object Oriented Tool Command  Language)
* Tool : Cygwin (To simulate in Windows OS)