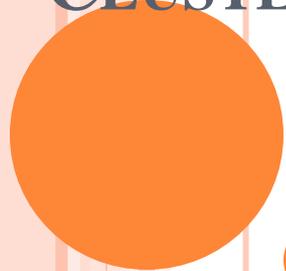


**A COALITION FORMATION GAME FOR DISTRIBUTED
NODE
CLUSTERING IN MOBILE AD HOC NETWORKS**



MICANS INFOTECH

ABSTRACT

- In the context of wireless mobile ad hoc networks, node clustering is a well known solution for handling the scalability issue. While existing work focused on unstructured (i.e., flat) networks, this paper investigates a clustering algorithm to handle stable size-restricted clusters for structured (i.e., groupbased) networks. In addition, we have identified that the ad hoc network clustering literature lacks a theoretical framework.
- This paper fills this gap by proposing to use coalition game theory, identifying coalitions to clusters and players to nodes. This theoretical framework allows us to derive a novel generic distributed node clustering algorithm. The algorithm is proved to converge to Nash-stable partitions.



CONT...

It is based on the concept of switch operations, where nodes take decision whether to leave or not their current coalition based on the coalition values. These decisions are made independently on any node individual payoff, meaning that the coalition formation game has a transferable utility. This generic algorithm is then tailored to both structured and unstructured networks, by defining judiciously the value functions and the heuristics dedicated to selecting suitable switch operations. Based on extensive simulations, we show that our proposed solutions outperform the existing ones especially in terms of cluster size and stability.



EXISTING SYSTEM

- Most existing works about ad hoc network clustering have focused on unstructured networks. For example in the authors propose the lowest identifier (LID) and highest degree clustering (HC) algorithms where nodes with the lowest identifier, respectively the largest degree within their neighborhood, become cluster head (CH).
- To form the clusters, non-CH nodes affiliate to their neighbor CH with the lowest identifier, respectively the largest degree. The stability of the clusters formed with LID or HC, has been improved with the least cluster change (LCC) mechanism that only performs reclustering when multiple CH nodes become neighbors.



PROPOSED SYSTEM

- This process is fully distributed and thus much less efficient than the intracluster RRA. In addition to the lack of results identified for the structured networks in the literature, the clustering algorithms proposed for unstructured networks do not take into account all our constraints at the same time.
- Finally, the availability of the node locations and velocities is often a key underlying assumption of the most recent proposals, which cannot always be guaranteed. We will thus not rely on such assumption in our work.



HARDWARE REQUIREMENTS

- Processor - Pentium-IV
- Speed - 1.1 Ghz
- RAM - 256MB(min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA



SOFTWARE REQUIREMENTS

- Tool - Network Simulator-2
- Operating system - LINUX
- Front end - OTCL (Object Oriented Tool Command Language)



REFERENCES

- [1] D. Baker and A. Ephremides, "The architectural organization of a mobile radio network via a distributed algorithm," *IEEE Transactions on Communications*, vol. 29, no. 11, pp. 1694–1701, Nov. 1981.
- [2] C. Cooper, D. Franklin, M. Ros, F. Safaei, and M. Abolhasan, "A comparative survey of VANET clustering techniques," *IEEE Communications Surveys Tutorials*, 2016.
- [3] A. Asterjadhi, N. Baldo, and M. Zorzi, "A cluster formation protocol for cognitive radio ad hoc networks," in *IEEE European Wireless Conference*, Apr. 2010, pp. 955–961.

