International Journal of Emerging Engineering Research and Technology
Volume 2, Issue 3, June 2014, PP 256-260
ISSN 2349-4395 (Print) & ISSN 2349-4409 (Online)

Cooperation of Selfish Nodes using Floyd War Shall Algorithm

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Abstract: *Ad-hoc network contains a network area with nodes. Each node has to rely on others to relay its data packets. Nodes may participates in route discovery and maintenance process but refuse to forward data packets .These nodes are called non cooperative or selfish nodes. In wireless ad- hoc networks, nodes communicate with far off destinations using intermediate nodes as relay. Since wireless nodes are energy constrained, it may not be in the best interest of a node to always accept relay requests. On the other hand, if all nodes decide not to expend energy in relaying, then network throughput will drop dramatically detecting these nodes is essential for network performance. Cooperative communication has brought a new communication paradigm Cooperation can help to reduce energy consumption in an ad-hoc network. This paper present a new algorithm based on ad-hoc network to improve the energy efficiency of non- cooperative nodes and is called Floyd War Shall Algorithm.NS-2 simulator is used for this purpose. This method will help to improve the performance of exiting energy efficiency technique used like game theory as there are only assumptions used in this theory to improve energy efficiency.*

Keywords: *wireless network, selfish nodes, TCP protocol, game theory, Floyd war shall algorithm.*

1. INTRODUCTION

An ad -hoc network typically refers to any set of networks where all devices have equal status on a network and are free to associate with any other ad hoc network device in link range. Ad hoc network often refers to a mode of operation. Wireless network are composed of several nodes with wireless connection .A transmission between a sender and receiver occur through intermediate nodes. In order to enhance network connectivity, a source communicates with far off destinations by using intermediate nodes as relays. However, the limitation of finite energy supply raises concerns about the traditional belief that nodes in ad hoc networks will always relay packets for each other. Cooperation among nodes in an ad hoc network has been previously addressed, nodes Wireless nodes have limited power resources and spend most of their time relay packets rather than sending their own data.lot of power is wasted to serve other nodes. It also affects the overall performance of data to be transferred. A generic node of network has to decide whether to trust or not to trust on other nodes. Cooperation of nodes can help to save the overall amount of energy for data transmission. Each node becomes aware of past behavior of the others which can be either cooperative or defecting. Once the defecting nodes are identified different countermeasures can be adopted. Each node operates as both host and router. Moreover nodes can move freely resulting in changes to the network topology and updated routing in order to forward the packets. Change depends on the node speed etc. packets received from node to node until reaching their final destination. Selfish nodes may attempt to benefit from other nodes but refuse to share its resources.

In this paper, we show how cooperation can be perceived by nodes differently from recent works proposed in the literature. We herein propose a new approach for cooperation in order to improve the

overall energy efficiency of an ad hoc network without modifying the existing routing protocol. Our work is indeed complementary to the above we try and exploit a different perspective on energy efficiency, which is much more related to the behavioral patterns of the nodes. We present in the paper an algorithm called Floyd War Shall Algorithm to identify and isolate defecting nodes. The algorithm takes inspiration from the results of game theory and keeps a local trace of the behavior of the other node. The algorithm is implemented in an existing ad hoc routing protocol and is validated in the ns-2 simulator. The current experimental results highlight the induced reduction of throughput of defecting nodes. The paper is organized in seven Sections. Section 2 deals with related work .Some background about game theory basics.

2. LITERATURE REVIEW

2.1 AD-Hoc Network

Ad-hoc is a meaning derived from word 'for this'. Ad hoc wireless network Composed of several nodes. Transmission occurs from source to destination with the help of nodes that are requested to relay packets according to routing protocols. These wireless nodes are mainly of two types.

- Cooperative nodes-These nodes easily relay their packets from source to destination without saving their resources.
- Non-cooperative or Selfish Nodes-These are the nodes who try to preserve their resources and particular their batteries. Individual mobile node may try to benefit from other nodes but refuse to share its own resources.

2.2 Network Simulator

NS -2 is an event driven network simulator used to implement network protocols. This simulator is mainly based on two languages an object-oriented simulator and OTCL.IT has rich library of network and protocol object. Compiled C++ hierarchy gives efficiency in simulation and faster execution times. With OTCL script provided by user, a network topology is simulated.

2.3 Reputation-Based Techniques

Each node observes the behaviors of others and uses the acquired information for routing.

2.4 Credit-Payment Techniques

Each node gives a credit to others, as a reward for data forwarding. The acquired credit is then used to send data to others

2.5 Game Theory

Game theory is fully dependent on the non cooperation occur between nodes during the sending of packets from source to destination. The game theory is represented in the form of matrix format. It is based upon the common knowledge of the utility function for all players. The basic assumption is that all the players are self interested and rational: given a utility function with the complete vector of payoffs associated with all possible combinations, a rational player is always able to place these values in order of preference even in case they are not numerically comparable. This not necessarily means that the best value will be selected, since the final reward of each player is strongly dependent on the decision of the other players. Each player is then pushed to plan a strategy that is a set of actions aimed at total payoff maximization provided that he is aware that the other players will try to do the same. Prisoner's dilemma is the main problem exit in game theory. Game theory is just a theoretical assumption where we make conduct different test cases to find out the selfish node. In the real environment our nodes may not behave as we are expecting them to behave so.

Flow Chart Based on Prisoner's Dilemma Used in Based Theory

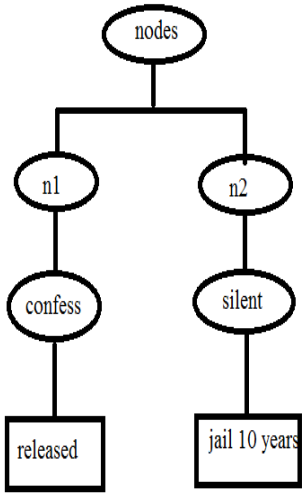


Figure 1.

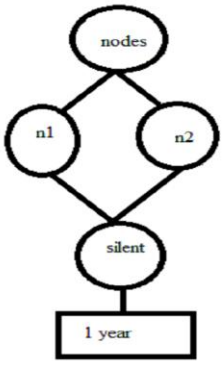
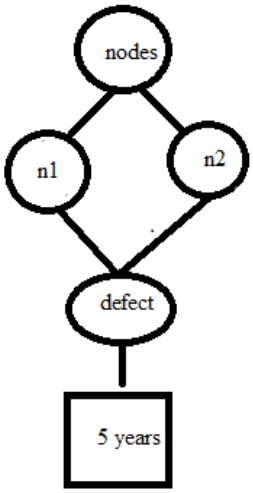


Figure. 2



3. PROPOSED WORK

In the existing paper based theory mechanism there are only assumptions that are used to cooperate the different nodes. No practical method used for proper cooperation. There is no guaranty that each node will act as a cooperate node while sending data from source to destination. This method consumes a more time and also affect on the energy efficiency. We are going to reduce time period by shorten the distance between the nodes. This will also improve the energy efficiency as packets will quickly release as distance will shorten. All our objectives can be easily accomplished by using Floyd War Shall algorithm which implements on existing ad hoc routing protocols and is validated in the ns-2 simulator. Although several dedicated protocols have been designed and implemented to properly manage wireless ad-hoc networks, they still do not support any mechanism to keep trace of nodes past behaviour.

3.1 Floyd War Shall Algorithm takes inspiration from the results of game theory and keeps a local trace of the behavior of the other nodes. The Floyd War shall algorithm works based on a property of intermediate vertices of a shortest path. A single execution of the algorithm will find the lengths of

the shortest paths between all pairs of vertices, though it does not return details of the paths themselves. Shortest path defined Floyd War Shall algorithm.

The algorithm is implemented in an existing ad hoc routing protocol and is validated in the **NS-2 simulator**.The current experimental results highlight the induced reduction of throughput of defecting nodes .NS 2 simulators Event driven network simulator used to Implements network protocols like TCP, UPD. Ns2 is event simulator where the advance of time depends on the timing of events which are maintained by a scheduler. It maintains ordered data structure with the events to be executed and fires them one by one, invoking the handler of the event. NS2 packet is composed of a stack of headers and optional data space

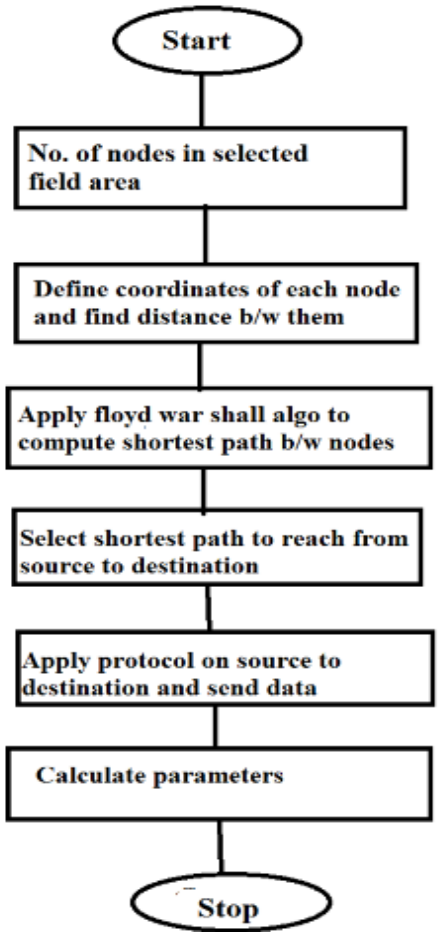
4. TOOLS AND METHODOLOGY

Tool Used

NS-2 simulator

Methodology

We will create a field of wireless nodes using **NS2** simulator. After defined the coordinates of each node we will computes distances among each node then we will apply Floyd War Shall algorithm so that shortest distance between nodes can be found. We will select the shorter path and assign the no. of packets on selected nodes. Then we will send data from source to destination nodes in which source node act as **Agent** and destination node act as **Sink.** We will calculate required parameters and produce values by slotting the graphs.



Flow Chart Based on Floyd Warshall Algorithm

5. CONCLUSION

In this paper we showed how cooperation positively affects the Performance of an ad hoc network, by using the Floyd algorithm we have shorten the distances between nodes. So this paper proposed a new approach to enhance the performance of existing techniques used for cooperation mechanism. Then this enhanced approach is used for improving performance.

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