A Survey on File Sharing in Mobile Network by using ACO

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Abstract— The increasing communication capabilities in wireless mobile networks provide the high-bandwidth required by these multimedia services. Virtual communities making use of users common characteristics such as interest and interaction to describe the boundary of sharing content and objects are a promising avenue for high-efficiency resource sharing. Proposed system based on social network based content of common files sharing in mobile network and Ant Colony Optimization (ACO) algorithm is used to constructs the static and dynamic connections between communities in terms of user interactivity to support fast content discovery.

Keywords— Ant colony optimization, interactivity ,Mobile Ad hoc Network (MANET), mobile peer-to-peer, object sharing ,Virtual community.

I. INTRODUCTION

In recent year, it has become highly popular to access rich information using multimedia services via the internet from mobile devices with computation and communication resources. Internet is the highly evolving towards the complex systems which comprises and integrates a number of wired and wireless networks covering the needs of different community of users. Mobile multimedia is one of the mainstream systems for communications, multimedia applications and high-speed mobile data services. Mobile multimedia is defined as a set of protocols and standards for multimedia information exchange over wireless networks.

A mobile ad-hoc network (MANET) is a set of mobile nodes which communicate over a wireless medium over single or multiple and do not need any infrastructure such as access points or base stations. Therefore, mobile ad-hoc networks are suitable for temporary communication links. Nodes not only have to fulfil the functionality of hosts, but also each node has also to be a router, forwarding packets for other nodes.

One interesting application for mobile ad-hoc networks beside multimedia applications. The biggest challenge in this kind of networks is still, the finding of a route between the communication end-points, which is aggravated through the node mobility.
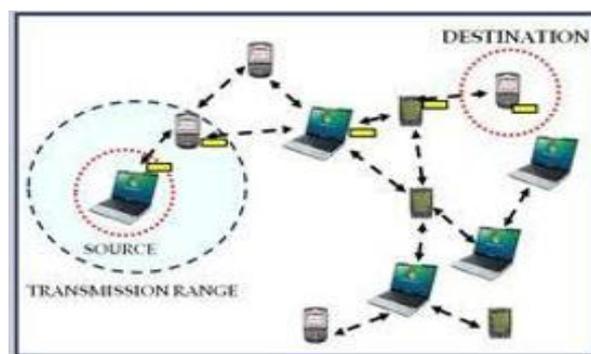

Fig. 1. Mobile Adhoc Network

A MANET is an autonomous collection of mobile systems that communicate over relatively bandwidth constrained wireless links. Since the nodes are mobile, the network topology may change rapidly and unpredictably over time. The network is decentralized, where all network activity including discovering the topology and delivering messages must be executed by the nodes they, i.e., routing functionality has to be incorporated into mobile nodes. In recent years, a large number of MANET routing algorithms have been proposed. These algorithms all deal with dynamic aspects of MANETs in their own way, using reactive or proactive behavior or a combination of both. The demand for real time and quality of services (QoS) in the network has been increased as the internet expands.

The highly dynamic characteristics of wireless mobile networks and user viewing behavior, including topology, the use of multi-hop communications and random access of data, affect the data sharing performance. Different from Internet-based P2P technologies, mobile peer-to-peer (MP2P) networking focuses on improving the performance in wireless mobile networks. However, enabling efficient mobile peer to peer based data sharing with user interactivity, while providing high user quality of experience is very challenging in the resource-constraint wireless mobile environments.

The virtual community concept is a promising avenue for resource sharing; it makes use of innovative algorithms, which based on user common characteristics such as interest and interaction with the information, describe the boundary between shared resources, enhance sharing efficiency and reduce the unnecessary energy consumption. Proposed system will be based on social network based content of common object sharing in mobile network & achieves fast location of available resources and reduces the duration of the search process. However, the existing common resource sharing solutions are unsuitable for constructing Virtual Community. This is because their resource sharing approaches not only cannot handle the dynamic user playback behavior, but also are associated with high maintenance cost for user.
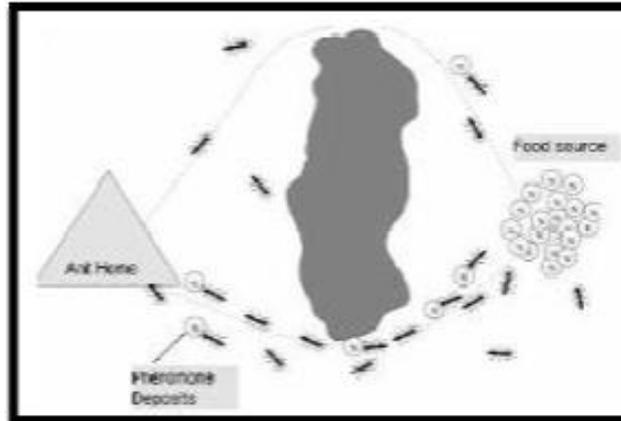

Fig 2. Ant colony behavior

Ant Colony Optimization (ACO) based solutions rely on a relatively new concept which is inspired from closely observing the foraging behavior of ants. While discovering the shortest paths from the source nodes to the base node using swarm intelligence based optimization technique called ACO.

The Ant Colony Optimization (ACO) is a family member of the Swarm Intelligence based approaches applied for optimization problems. Ants started from nest in the search of food which is away from nest. Each ant follow different path to reach to the food source and secrete pheromone liquid at the path as a mark to attract other ants. Ants choose the path depending upon the pheromone and path is marked after collecting food. So at the end shortest path has the highest probability. When they complete their search to find out best result or to reach final destination, they update their trail to attract other ants.

The remaining paper is organized as follows: Section II describes the previous work. Section III presents problem definition Section IV presents the proposed work. Lastly section V presents the conclusion.

II. RELATED WORK

Changqiao Xu et all [1], focuses on constructing an MP2P-based video content sharing solution in wireless mobile networks, which supports user interactivity and efficient management and search for resources. We used the ACO, by extracting the common characteristics from the movement behavior of community members, & an ACO-based community communication strategy which formulates the construction and regulation approaches of connection between communities to balance the maintenance cost of community connection and movement rate of members between communities.

Kang Chen et all [2], has three main components: 1) interest extraction, 2) structure construction including community structure and node role assignment, and 3) interest-oriented file searching and retrieval based on components 1 and 2. Interest extraction identifies nodes interests; Community construction builds common-interest nodes with frequent contacts into communities. The node role assignment component exploits nodes with tight connection with community members for intercommunity file searching and highly mobile nodes that visit external communities frequently for intercommunity file searching; the interest-oriented file searching scheme selects forwarding nodes for queries based on interest similarities.

Chia-Hung Hsu and Chia-Feng Juang,[3] , discuss on ACO, technique. The ACO technique is a multi-agent approach inspired by real ant colony observations. Discrete and continuous ACO algorithms have been proposed to solve discrete combinatorial optimization problems and continuous optimization problems, respectively. On the basis of this concept, this paper proposes the SDE-CACO for IT2FC design The SDE-CACO uses two phases to generate new solutions at a new iteration. In first Phase, This method ensures that a path segment with a higher pheromone level is selected with a higher probability. This result shows that the SDE-CACO achieves a smaller average cost value than the various MDE-CACO algorithms used for comparison. It can also be seen that the majority of the MDE-CACO algorithms achieve smaller average cost values than those of CACO and the various DE algorithms.

Some works related to ACO and OLSR are found in the literature. In [4], the authors described a hybrid routing algorithm for MANETs based on ACO and zone routing framework of bordercasting. A new QoS routing protocol combined with the flow control mechanism has been done in [5]. This proposed routing solution is modeled by ant systems. The proposed routing protocol in [5] uses a new metric to find the route with higher transmission rate, less latency and better stability. P.Deepalakshmi. et.al [6] proposed a new on demand QoS routing algorithm based on ant colony metaheuristic. An algorithm of ant colony optimization for mobile ad hoc networks has been described in [7].

Ying Lin, Jun Zhang, et all [8], focus on ACO-based approach for maximizing the number of connected covers (ACO-MNCC) first transforms the search space of the problem into a construction graph.Chun-Ying Liu [9], focus on the P2P network structure searching technology is different. The P2P search methods include the centralized search, the structured P2P and unstructured P2P search. However, unstructured P2P networks suffer from the poor performance, therefore improving searching algorithm is one important major research area for unstructured P2P network. As a swarm intelligent technology, it has strong ability of global optimization and parallelism. It can get results quickly and have obvious advantages in the dynamic network optimization, so it is more suitable for resource searching in dynamic networks.

III. PROBLEM DEFINATION

The file sharing schemes have attracted increasing research interests from various researchers, which have used them to balance the system scalability and resource search performance. Hence, proposed system using the ant colony optimization technique. The ant colony algorithm has the slow convergence and is easy to fall into local optimal. The particle swarm optimization algorithm has the strong global search ability, and the search efficiency and speed has very advantage. In proposed system of static and dynamic connection established to collaborative content fetching by grouping the mobile users which will fetch the same contents and will be near to each other.

IV. PROPOSED SYSTEM

Mobile ad hoc network routing is a difficult problem because network characteristics such as traffic load and network topology may vary stochastically and in a time varying nature. The distributed nature of network routing is well matched by the multi agent nature of ACO algorithms.

The given network can be represented as a construction graph where the vertices correspond to set of routers and the links correspond to the connectivity among routers in that network. Now network route finding problem is just finding a set of minimum cost path between nodes present in the corresponding graph representation which can be done easily by the ant algorithms.

When a source node has to pass data to a destination node with QoS requirements it starts with the route discovery phase. Once the route is found, the data transfer will take place. While data transmission is going on, it is also required to maintain the path to the destination. This is very much desirable and required in mobile ad hoc networks and hence is done in the route maintenance phase.

A. Ant colony optimization.

In this proposed system we are using the ant colony optimization technique for searching the shortest path to source and destination. Ant Colony Algorithms are inspired by the behavior of natural ant colonies, in the sense that they solve their problems by multi agent cooperation using indirect communication through modifications in the environment. Ants release a certain amount of pheromone while walking, and each ant prefers probabilistically to follow a direction which is rich of pheromone. This simple behavior explains why ants are able to adjust to changes in the environment, such as new obstacles interrupting the currently shortest path.

The nodes with resources are self-organization, and a node seeks firstly the resources in the local in P2P network. The query packet is produced if the goal doesn't exist in the local, and transmit it to the neighbor node. The neighbor continues to the others until the request file is found or traverse all the nodes. The process is very similar to the foraging ant. The undirected graph of the self-organization nodes in the network is equivalent to the ant living environment which is the foraging physical space. The initial node is similar to ant nest, and the requested resource node is the food source. The search in P2P network is that the request packet finds the optimal path from the initial node to the storage nodes. The same query request in the network may have many. The pheromone's the positive feedback mechanism can guide the request packet to transmit the road, and improve the query efficiency.
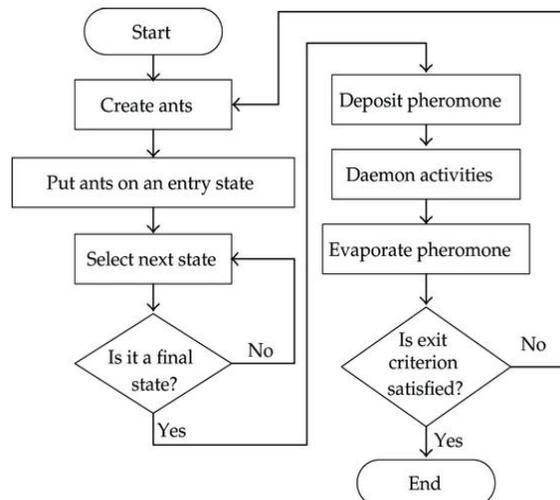

Fig. 3 Flow chart of Ant Colony Optimization

In the Fig.3 shows the main procedure of the ant colony algorithm is as follows.
1. Generate ant (or ants).
2. Loop for each ant (until complete scheduling of tasks).
   a. Select the next task with respect to pheromone variables of ready tasks.
3. Deposit pheromone on visited states.
4. Daemon activities.
5. Evaporate pheromone.

Hence, the pheromone accumulation will build up more rapidly on shorter pathways than on longer ones. Consequently, the fast accumulation of pheromone on the shorter pathways will cause ants to quickly choose the shortest routes. However, the solutions were generated by each ant in the basic ant colony algorithm by random, and those solutions may be the optimal solutions.

B. Proposed system flow

In proposed system static connection and dynamic connection established using ant colony optimization technique. In static connection shows source to destination shortest path calculates using distance. In dynamic connection shows source to destination shortest path calculates using hope count.
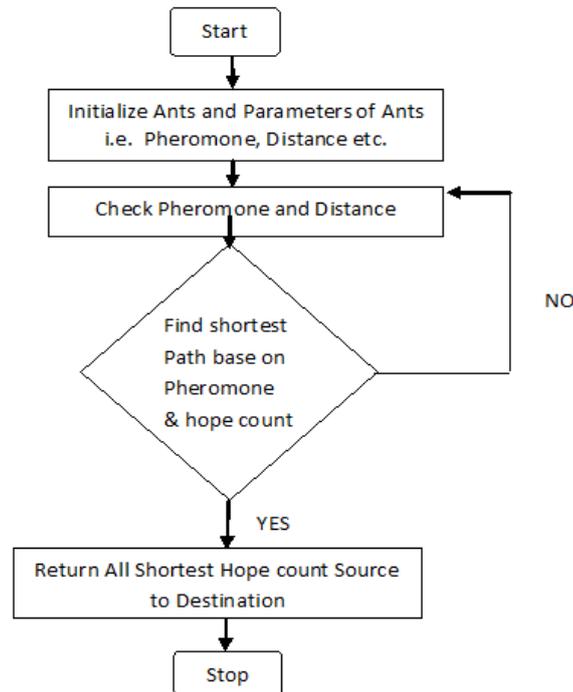

Fig. 4 Flow chart of Proposed System

In the Fig.4 shows the main procedure of proposed system is as follows.
1. Initializes ant (or nodes) & parameters ant.
2. Check pheromone and distance.
3. If check the shortest path base on pheromone & hope count then
   Return all shortest hope count source to destination. Otherwise go to the step2.
4. Stop.
   .

V.   CONCLUSION

Proposed system shows on social network based content of common file sharing in mobile network. Ant Colony Optimization (ACO) algorithm discovering the shortest paths from the source nodes to the base node using swarm intelligence based optimization technique after proposed system of static and dynamic connection established using distance and hope count to calculate shortest path then collaborative content fetching by grouping the mobile users which will fetch the same contents and will be near to each other.

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