Volume 4, Issue 11, November 2014 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

A Comparative Survey of Epidemic, Prophet and Beeinfo

Miss. Priyanka Lonkar, Miss.Sonali Oval
Assistant Professor, Sahakar Maharshi Shankarrao Mohite Patil Institute of Technology & Research,
Shankarnagar, Akluj, India

Abstract: Socially-aware networking provides a promising paradigm for data forwarding by exploiting the involved nodes' social properties in mobile social networks. However, individuals' learning capability and awareness to the dynamic environment have not been well explored in the literature. In this paper, we give a comparison study between Epidemic, PRoPHET and BEEINFO.SAN takes the social properties into consideration to solve problems in routing, forwarding, and information dissemination. Socially-Aware Networking (SAN) is an emerging paradigm to solve problems of networks consisting of mobile nodes with social properties, e.g. social relationship, and mobility patterns. These characteristics can be utilized to design efficient data forwarding protocols in e.g. mobile social networks. SAN is to improve the adaptability to dynamic environments. It is essential to find an appropriate method to detect the changes of environment context and adapt to them in a timely fashion. BEEINFO is designed as an artificial BEE colony inspired Interest-based Forwarding scheme under the framework of SAN. BEEINFO takes advantage of mobile users' social properties, mobility regularities and learning capability to detect the dynamic environment, including density and social tie. Additionally, it classifies the community based on personal interests, eliminating the cost by community detection and construction. Environment awareness and social tie awareness provide density and social tie information separately, which are essential to make decisions in forwarding, scheduling message, and managing buffer.

Index Terms—epidemic, prophet, Socially-aware networking; Forwarding; Interest; Swarmintelligence.

I. INTRODUCTION

In particular, social relations of mobile nodes have generally long-term features and they are more stable than node mobility patterns. Community, interest, social tie, etc. are the commonly used social concepts in SAN. For instance, people are usually interested in some files or data in specified categories. Moreover, people with the same interest tend to meet frequently, bonding each other with social tie and forming a community. Additionally, individuals' regular mobility pattern is important to predict the future mobility. Many experiments proved the high efficiency of socially-aware methods, involving the above properties. However, SAN is faced with some challenges, including how to conduct community construction and detection, predict future encounters, and calculate social relationship efficiently. These are correlated with some facts, such as the changing network topology, the constrained resources, the threat of potential congestion caused by information exchange. These challenges are due to the lack of adaptability to dynamic environments. It is essential to find an appropriate solution. Fortunately, swarm intelligence has provided some clues to detect and adapt to the changes of environment context in a timely fashion. For example, Artificial Bee Colony (ABC) algorithm [2] imitates the bees' behaviors to search for nectar, as well as their ability to detect the changing density of nectar sources.

Classification of Routing Protocols:

The existing routing protocols in DTNs are classified with respect to their strategies for controlling message copies and making the forwarding decision.

- ✓ **Number of destination**
  According to the number of destination nodes of a message, routing protocols can be classified into three categories: unicast routing, multicast routing, and broadcast routing.
  i) Unicast routing: Single destination for each message.
  ii) Multicast routing: Group of destination nodes for each message.
  iii) Broadcast routing: All the nodes in the network are destination nodes for each message.

- ✓ **Number of copy**
  Depending on the number of message copies utilized in the routing process, protocols can be classified into two categories single-copy and multiple-copy.
  i) Single-copy routing protocols: only a single copy for each message exists in the network at any time.
  ii) Multiple-copy routing protocols: multiple copies of same message can be generated and distributed into the network.

Moreover, multiple copy routing protocols can be further divided into flooding-based and quota based.
a) Flooding-based routing protocol: dissemination a copies of each message to as many nodes as possible.
b) Quota-based routing protocol: intentionally limit the number of message copies.

✓ **Available Network knowledge**

In addition, according to whether the forwarding decision is based on the knowledge derived from the nodes' encounters or not, protocols can as well be classified into two categories: Deterministic and Non-deterministic (Opportunistic).

II. EXISTING SYSTEM

Epidemic Routing-

- Mobile ad hoc routing protocols allow nodes with wireless adaptors to communicate with one another without any pre-existing network infrastructure.
- Existing ad hoc routing protocols, while robust to rapidly changing network topology, assume the presence of a connected path from source to destination.
- Given power limitations, the advent of short-range wireless networks, and the wide physical conditions over which ad hoc networks must be deployed, in some scenarios it is likely that this assumption is invalid.
- A technique to deliver messages in the case where there is *never* a connected path from source to destination or when a network partition exists at the time a message is originated. To this end, we introduce Epidemic Routing, where random pair-wise exchanges of messages among mobile hosts ensure eventual message delivery.
- The goals of Epidemic Routing are to: i) maximize message delivery rate, ii) minimize latency, and iii) minimize the total resources consumed in message delivery.

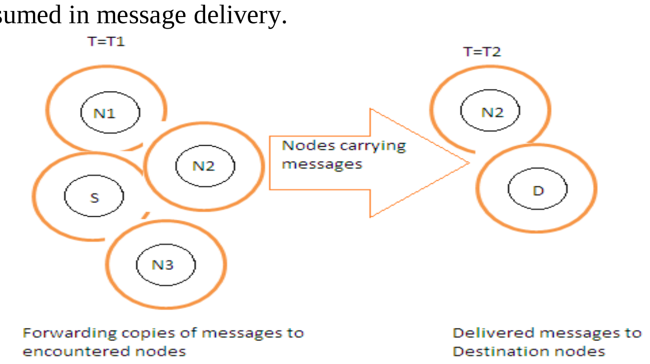

Fig. 1. Epidemic Routing

- In DTNs routing scheme, the node receiving a message, forwards a copy of it to all nodes it encounters. Thus, the message is spread throughout the network by mobile nodes and finally all nodes will have same data. Although no delivery guarantees are provided. This algorithm can be seen as the best-effort approach to reach the destination. Each message and its unique identifier are stored in the node's buffer.
- The list of them is called the summary vector. Whenever two adjacent nodes get contact with each other, they exchange and compare their summary vector to identify which messages they do not have and subsequently request them. When the counter of a packet reaches zero, the packet is discarded. Another approach is to set Time-To-Live (TTL) for each packet as in Epidemic routing. The packet will keep on getting copied from one node to the other node till its *TTL* expires.

PRoPHET Routing-

- PROPHET, a Probabilistic Routing Protocol using History of Encounters and Transitivity makes use of observations that real users mostly move in a predictable fashion.
- If a user has visited a location several times before, there is more probability to visit that location again. PROPHET uses this information to improve routing performance.
- To accomplish this, PROPHET maintains delivery predictability metric at every node. This metric represents message delivery probability of a host to a destination.
- PROPHET is similar to Epidemic Routing but it introduces a new concept of delivery predictability. Delivery predictably is the probability for a node to encounter a certain destination. When two nodes meet, they also exchange delivery predictability information with summary vectors.
- This PROPHET scenario, initially estimate the probabilistic metriccalled delivery predictability (a,b) ∈ [0,1] at every node A for each known destination B.Whenever a node encounter with other nodes in the network, they exchange summary vectors as it is in epidemic routing. Summary vector contain the delivery predictability values for destinations known by each node. The operation of the PROPHET protocol could be calculated by delivery predictabilities and then forwarding strategies.
- The calculations of delivery predictabilities of nodes have three parts. Nodes update their delivery predictability metrics whenever meet each other. Visiting more nodes results in higher delivery predictability values.

III. OVERVIEW OF BEEINFO

- **Drawback of Epidemic and PRoPHET**
- ✓ They are all lack of end-to-end routes from source node to destination node due to the dynamic topology induced by the mobility of nodes. Thus, they generally utilize meeting opportunities to implement transmission in multihop mode.
- ✓ They all adopt a store-carry-and-forward paradigm in pair-wise fashion to provide communication between mobile devices with the absence of the infrastructure, relying on short range communication technologies such as Wi-Fi and Bluetooth. Therefore, to predict the meeting opportunity is a key problem for them with the assumption that the mobility process is ergodic and stationary.

- **Why BEEINFO**
- ✓ In contrast to previous works, we pay more attention to the awareness capability to environment (nectars) of bees.
- ✓ BEEINFO combines the social properties and take into account awareness to t environment inspired by artificial bee colony. To the best of our knowledge, BEEINFO and its previous version are the first efforts that take environment factor as the motive to solve the routing protocol problem in socially-aware networking.
- ✓ BEEINFO is designed as an artificial BEE colony inspired INterest-based FOrwarding scheme under the framework of SAN. BEEINFO takes advantage of mobile users' social properties, mobility regularities and learning capability to detect the dynamic environment, including density and social tie. Additionally, it classifies the community based on personal interests, eliminating the cost by community detection and construction. Furthermore, the interest information is small enough to predict density and social tie, saving resources, e.g. buffer and energy.

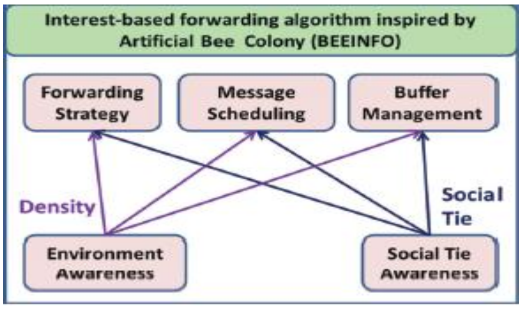

Fig. 2.Components of BEEINFO.

<u>Need OF BEEINFO</u>

- ✓ BEEINFO takes advantage of individuals' awareness and learning capability by imitating bees' behaviors. Mobile nodes perceive and record information (e.g. densities) of passing communities. In transmission range, nodes exchange their interest information. According to exchanged interest information, every node records or updates the density of communities.
- ✓ The density information indicates the number of nodes belonging to a community. The higher the density is, the more nodes the community has. Every node stores a list of passing communities and their densities, which provides a guideline to select better forwarders for inter-community phase. Additionally, mobile nodes do not need to search the exact density values, but to perceive their passed community densities. Therefore, there is no extra cost
- ✓ Virtual social community and social tie are the most usually used concepts in SAN. Community is inspired from gregarious property of society, in which mobile nodes contact frequently. While social tie indicates the relationship strength among nodes. Mobile nodes can be departed into different communities according to contact frequencies. The community members can meet more often than others out of the community. Consequently, when a source node generates a message for another node, it can select an appropriate forwarder to deliver the message to destination community where the destination node belongs. This phase is called inter-community forwarding. Afterwards, the intra-community forwarding phase starts in the destination community. In this phase, the central node is used for its highest centrality value, meaning that it is able to encounter more nodes.
- ✓ Except central node, social tie can helps to estimate the strength of social relationships among nodes. Specifically, the stronger the tie connecting two nodes, the more similar they are.

Table 1: Comparison of Epidemic, Prophet & BEEINFO

Sr. No	**Epidemic**	**Prophet**	**BEEINFO**
1	It is a simple flooding routing.	It is a prediction-based routing	It is a multiple copy based routing
2	It copies the message to everyone who has not received the copy.	It copies and forwards the message depend on history records	It takes into consideration the future density and social tie

4	It usually produces lots of copies and brings heavy overhead	It is based on nodes' mutual history contact records	It selects appropriate forwarders and it can effectively reduce the number of copies

IV. CONCLUSION

- In this paper, we have proposed a set of interest-based forwarding schemes inspired by artificial bee colony, namely BEEINFO, in the context of socially-aware networking.
- From a conceptual perspective, BEEINFO takes advantage of both bio-inspired networking and socially-aware networking. It is characterized with the strong adaptability to the dynamic environment by fully harnessing the cooperation of individuals, making it suitable to mobile (social) networks.
- BEEINFO perceives densities of passing communities and social tie according to interests, instead of the change of individuals' interests. Mobile nodes maintain this information for distinct aims: density for inter-community forwarding and social tie for intra-community process.
- Here, extensive simulations on BEEINFO and compare their performance against PRoPHET and Epidemic. The results have shown that BEEINFO outperforms PRoPHET and Epidemic with higher delivery ratio, less overhead and less hop counts

REFERENCES

[1] "BEEINFO: Interest-based Forwarding Using Artificial Bee Colony for Socially-aware Networking"Feng Xia, Senior Member, IEEE, Li Liu, Jie Li, Ahmedin Mohammed Ahmed, Laurence Tianruo Yang, and JianhuaMaInIEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY

[2] J. Li, L. Liu, and F. Xia, "Beeinfo: Data forwarding based on interest and swarm intelligence for socially-aware networking," in Proc. ACM MobiCom'13, to appear, (Miami, FL, USA), Sept./Oct. 2013.

[3] F. Warthman, "Delay-tolerant networks (dtns) - a tutorial," tech. rep., Warthman Associates, 2008.

[4] L. Pelusi, A. Passarella, and M. Conti, "Opportunistic networking: Data forwarding in disconnected mobile ad hoc networks," Communications Magazine, IEEE, vol. 44, pp. 134–141, Nov. 2006.

[5] A. Lindgren, A. Doria, and O. Schelen. Probabilistic routing in intermittently connected networks.SIGMOBILE MobileComput. Commun. Rev., 7(3), 2003

[6] A. Vahdat and D. Becker. Epidemic routing for partially connected ad hoc networks. Technical report, Technical Report CS-200006, Duke University, 2000.

[7] E. Bonabeau, M. Dorigo, and G. Theraulaz, Swarm Intelligence: From Natural to Artificial Systems. Oxford University Press, 1999.

[8] Feng Xia, Senior Member, IEEE, Li Liu, Jie Li, Ahmedin Mohammed Ahmed, Laurence Tianruo Yang, and JianhuaMa"BEEINFO: Interest-based Forwarding Using Artificial Bee Colony for Socially-aware Networking".Manuscript received April 30, 2013

