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Estimation of Low Transmission Power in Sparse and Disconnected MANETS

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Abstract:

The new trend is to consider node mobility to consist as a major achievement to transfer data forwarding is ***Opportunistic mobile ad hoc networks*** **(MANETs).** This is a special class of growing and disconnected MANETs where data communication exploits at irregular interval, contact opportunities among nodes. Nodes exchange data if they are at a distance at most within each other, where is the *node transmission radius*. To find the speed of data propagation we are using the **flooding time**. This is the simplest broadcast protocol where it used to forward the message. Flooding time is an important measure of how the information can spread into the different networks. By the first upper bound on the flooding time, which is a decreasing function of the maximal speed of the nodes. The bound holds with high probability, and it is nearly tight. By these bounds the network will work efficiently because even though the network disconnected the message can be sent to destination based on the store carry and forward mechanism. Our bound shows that, thanks to node mobility, even when the network is growing and disconnected, information spreading can be fast.

1. Introduction

The impact of node mobility in data propagation is currently one of the major issues in network theory. The new trend is to consider node mobility as a resource for data forwarding rather than a hurdle. This is well captured by the model known as *opportunistic mobile ad hoc networks* (*opportunistic MANETs*), an interesting recent evolution of MANETs. Several emerging application scenarios can be considered as instances of opportunistic MANETs, such as vehicular networks (at least when traffic density is not high), certain types of mobile sensor networks, and pocket switched networks. The latter type of network is formed by powerful handheld devices—able to establish direct wireless communication links through, e.g., a WiFi interface— carried around by humans in their everyday life. In opportunistic MANETs, node density is low, and the network is disconnected at any time. Communication is possible even in such a challenging environment by exploiting the so-called *store-carry-and-forward* mechanism, according to which a packet is *stored* in node's buffer and *carried* around by the node until a communication opportunity with another node arises; at this point, the packet can be *forwarded* from to , and the process is repeated until the packet is eventually delivered to the destination. The expected time between two communication opportunities is called *intermeeting time*. The term *opportunistic* also refers to the fact that the communication protocol does not control node mobility (think about cars, bikes, or pedestrians), however mobility can be exploited. This is the main reason why the energy consumption due to node mobility is not considered in the protocol analysis.

The aim of this work is to investigate the speed of data propagation in opportunistic MANETs: Here, classic *static* concepts like global *connectivity* and network *diameter* are not very meaningful. Previous experimental works in this topic in fact show that data communication can benefit from node mobility even though *all* the *snapshots* of the network are not connected.

In order to investigate the speed of data propagation, we consider the *flooding time*. The flooding is the simple broadcast protocol where every *informed* node sends the source message at every time-step (a node is said to be *informed* if it knows the source message). The flooding time is the first time-step in which all nodes are informed. It is a natural lower bound for any broadcast protocol, and it bounds the maximal speed of data propagation: the same role of the diameter in static networks. Knowing flooding time can help researchers and network designers answer questions such as: "What is the time needed for a warning message issued by a vehicle to reach every other vehicle in the network?," "What is the time needed for a virus generated by a node in a pocket switched network to propagate in the entire network?," and so on. *Our Model: An Informal Definition:* In most of recent analytical works on opportunistic MANETs. the adopted network model is based on the well-known *random-walk* mobility . We consider a set of nodes moving over a square region of the plane: Each node performs, independently from the others, a sort of *Brownian* motion. In our model we make time and space discrete (see Section II for details). The speed parameter is the *move radius* . At every time-step, a node moves uniformly at random to any point that is within distance from its current position. It can be interpreted as the maximum speed of a node (i.e., the maximal distance a node can run in a time unit). At any time, there is an edge (i.e., a communication opportunity) between two nodes if they are at a distance not larger than a fixed *transmission radius.* This model is called *geometric Mar kovian evolving graphs*, i.e., *geometric- MEG.*

2. Literature Review

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2.1 Existing System

Previous experimental works in this topic in fact show that data communication can benefit from node mobility even though *all* the *snapshots* of the network are not connected.

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Disadvantages of Existing System:

- The term opportunistic also refers to the fact that the communication protocol does not control node mobility (think about cars, bikes, or pedestrians), however mobility can be exploited. This is the main reason why the energy consumption due to node mobility is not considered in the protocol analysis.
- Data communication can benefit from node mobility even though all the snap shots of the network are not connected.

Proposed System:

The aim of this work is to investigate the speed of data propagation in opportunistic MANETs: Here, classic *static* concepts like global *connectivity* and network *diameter* are not very meaningful.

In order to investigate the speed of data propagation, we consider the *flooding time*. The flooding is the simple broadcast protocol where every *informed* node sends the source message at every time-step (a node is said to be *informed* if it knows the source message). The flooding time is the first time-step in which all nodes are informed. It is a natural lower bound for any broadcast protocol, and it bounds the maximal speed of data propagation: the same role of the diameter in static networks.

ADVANTAGES OF PROPOSED SYSTEM:

Our flooding analysis does not consider the *interference* problem in message transmissions: This is typically managed at the MAC layer of a wireless network architecture.

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3.Implementation

Modules

1. Node Mobility model
2. Bounding the Flooding time

Module Description

1. Node Mobility Model:

In our model, we discretize time and space. We choose to keep the density constant (i.e., the ratio between the number of nodes and the area) as the number of nodes grows. The region in which nodes move is a square of side length , and the density equals 1.We remark that this choice is only for clarity's sake, and all our results can be scaled to any density .

4. Problem Definition

A Software Requirements Specification (SRS) – a requirements specification for a software system is a complete description of the behaviour of a system to be developed. It includes a set of use cases that describe all the interactions the users will have with the software. In addition to use cases, the SRS also contains non-functional requirements. Non functional requirements are requirements which impose constraints on the design or implementation (such as performance engineering requirements, quality standards, or design constraints).

System requirements specification: A structured collection of information that embodies the requirements of a system. A business analyst, sometimes titled system analyst, is responsible for analysing the business needs of their clients and stakeholders to help identify business problems and propose solutions. Within the systems development lifecycle domain, the BA typically performs a liaison function between the business side of an enterprise and the information technology department or external service providers.

5. Conclusion

Some interesting issues concerning the flooding time on geometric- MEG are still open. There is a logarithmic gap between our upper bound and the known lower bound when the move radius is very large. Closing this gap is an open problem. Observe that our upper bound can be easily extended to the gossiping task (i.e., the all-to-all communication). It would be interesting to extend our analysis to other basic communication tasks such as data gathering and routing. Finally, we remark that our flooding analysis does not consider the *interference* problem in message transmissions: This is typically managed at the MAC layer of wireless network architecture. The impact of message interferences in geometric-MEG is a further interesting issue, which is out of the scope of our work that instead focused on *dynamic-topological* properties of MEG. However, it is known that the slowdown due to interference is proportional to the node degree of the network: In particular, if the node degree is constant, the slowdown is constant as well. Thus, in the case of sparse opportunistic MANETs, interference does not play a crucial role in the flooding time analysis.

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