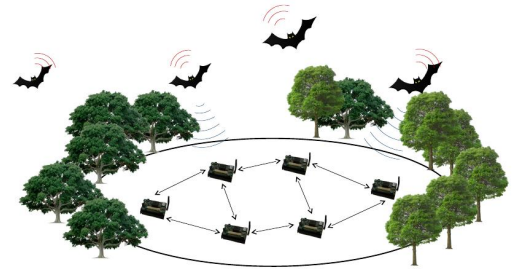


Master's Thesis

Node Selection for Cooperative Decoding in Wireless Mesh Networks

In the BATS project, we aim to support biologists studying the social and foraging behavior of bats. In this project, bats will be equipped with ultra-low power sensor nodes for combined data communication and ranging in the 868 MHz band. Bats that carry sensor nodes continuously exchange information of the contacts between individuals and appear in communication range of a ground network on an irregular basis. The ground network is composed of multiple stationary base nodes deployed in hunting areas of bats for ranging purposes. If in communication range of at least one of these base nodes, the bats are also supposed to upload the collected information. The very limited energy budget and heterogeneous environment makes the communication challenging.



Since the ground network is dense, there is a high chance that copies of the signal transmitted by a bat will be received by multiple base nodes. These distributed nodes can now act as an antenna array to receive that signal. Hence, diversity techniques can be employed to improve the reception process. We have already implemented several diversity combining techniques to study the performance in our scenario. To apply diversity combining, received signals are forwarded to a central node in the ground network. The central node receives copies of the detected signal from several base nodes and applies diversity combining. Using a dedicated central node, however, increases the load in network and is not very efficient. Therefore, there is a need for an algorithm to identify the base nodes in the network receiving a particular bat signal at some given time. Diversity combining techniques can then be realized locally at one of the involved nodes. This fully distributed diversity combining also reduces the load in the ground network.

■ Goals of the thesis

The goal of this thesis is to investigate algorithmic solutions to identify nodes in the ground network that receive the bat signal and select a potential node out of these nodes to perform diversity combining locally.

First, the student has to get familiar with the methods already available in the literature and develop basic understanding of the OMNeT++. In a second step, the selected algorithms will be implemented to compare the performance. The implementation will also have to be verified by practical tests on Linux based ground nodes.

■ Keywords

Networks, Routing Protocols, C, C++