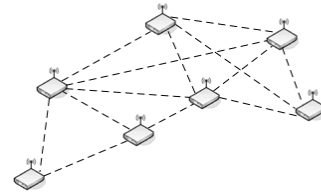


Semester or Master Thesis “Development/Simulation Of Algorithms For Wireless Networks”

Motivation and Informal Description

We are already surrounded by wired (sensor) networks - checking whether an elevator has to stop closing its door to avoid someone’s leg being squeezed or watching for burglars or to detect fire. In many cases connecting devices via cable is not feasible (e.g. tracking animals, monitoring glaciers) and even when it is doable, wiring remains a labor intensive process costing a lot of money and being cumbersome to change. For these and other reasons the future belongs to wireless networks.



However, sending information via multiple hops (from one wireless device to the next wireless device a.s.o.) is a challenging task, since the number of frequencies for wireless devices is usually very limited and if two devices transmit at the same time, a third one receiving both signals simultaneously only hears noise and cannot decode the sent messages. A common and reliable solution is allowing each device to transmit at a certain time according to some schedule, such that no other device nearby will transmit concurrently. Deriving such a schedule in a decentralized fashion, that is only by the wireless devices themselves, without prior knowledge of the actual structure of the network is a necessary and difficult task. It remains hard even when we assume that the device is at least able to distinguish whether some transmission occurred or not in its neighborhood, e.g. it has a collision detection facility. Even performing a simple broadcast in reasonable time is demanding.

Offered thesis

The student can choose between a more practical and a more theoretical thesis. The practical task would involve designing, improving on algorithms and verify their performance through simulation (written in the student’s favorite programming language). This requires interest in algorithms, understanding the model for wireless networks and programming skills. The goal of the theoretical work is to derive and analyze algorithms. The student should have some knowledge of randomized algorithms and should be interested in theory.

In either case, good results are likely to become part of a publication (paper).

Interested? Please contact us for more details!

Contact

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