

Semester Thesis:

Wireless Yet Reliable Patient Notification System

Motivation and Informal Description: People suffering muscular dystrophy are wheelchair-bound 24/7 and can not change their position during the night themselves. If they need assistance, they usually use push-buttons to call a caretaker on duty. When organizing annual summer camps for such people (mostly kids and teenagers), the camp facilities often lack notification systems. Thus, we need a system, which could be easily installed, used for several weeks and removed. The main requirements on such a notification system are reliability and ease of use.

Wired notification systems, commonly used in hospitals, provide a reliable service. However, their installation and removal is time consuming, involves lots of cabling, and depends on the locations of outlets and on the overall geometry of the camp facilities. For example, some camp locations architecturally prohibit to have a night caretaker's room in the same building as the people with muscular dystrophy. In this setup, a cable installation between the buildings would be needed. On the other hand, it is difficult to achieve reliable performance in wireless solutions due to the lossy nature of wireless communication links.

Our research group has recently developed a communication scheme [?] that allows for multi-hop communication, synchronization, fast node mobility and provides certain guarantees on wireless communication. As part of this semester thesis, you will use this communication scheme to build a wireless yet reliable patient notification system. This includes extending the communication scheme by means of end-to-end acknowledgements to ensure dependability of the complete system from a patient to a caretaker, connecting push-buttons to the system and implementing a simple set of notification functions. The system will be implemented on the Tmote Sky platform, a hardware commonly used in wireless sensor networks.

While working on the project, you will be in touch with organizers of summer camps for people with muscular dystrophy. They will help you to extract requirements on the notification system.

Requirements: You should be familiar with C/C++ or Java programming language and like working independently on the project.

Interested? Please have a look at <http://www.tec.ethz.ch/research.html> and contact us for more details!

Contacts: Marco Zimmerling: zimmerling@tik.ee.ethz.ch, Federico Ferrari: ferrari@tik.ee.ethz.ch, Roman Lim: lim@tik.ee.ethz.ch, Olga Saukh: saukh@tik.ee.ethz.ch

References

- [1] F. Ferrari, M. Zimmerling, L. Thiele, and O. Saukh. Efficient Network Flooding and Time Synchronization with Glossy. In IPSN 2011. <ftp://ftp.tik.ee.ethz.ch/pub/people/ferrari/FZTS2011.pdf>

