ETH
Eidgenössische Technische Hochschule Zürich
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TIK
Institut für Technische Informatik
und Kommunikationsnetze
Computer Engineering and
Networks Laboratory

Prof. L. Thiele

Semester Thesis:

NiMH Battery State-of-Charge Approximation

Background Information: Increasingly complex application scenarios have led to higher energy demands of wireless sensor networks. For this reason, energy harvesting is commonly employed to achieve continuous operation. However, simply enhancing the system with harvesting capability by itself does not guarantee increased system lifetime. Rather, the system needs runtime information of the time varying state of the energy store.

Your Thesis: For this thesis we have two different aspects in mind. First, you will implement a battery State-of-Charge (SoC) approximation algorithm on the TinyNode184 WSN node platform [2]. Recently published work [1] will provide the basis, which you will adjust for NiMH batteries. Second, you will modify a prototype of an energy harvesting system [3] depicted in Figure 1, so that it can be used as testbed for the SoC approximation algorithm you implement.

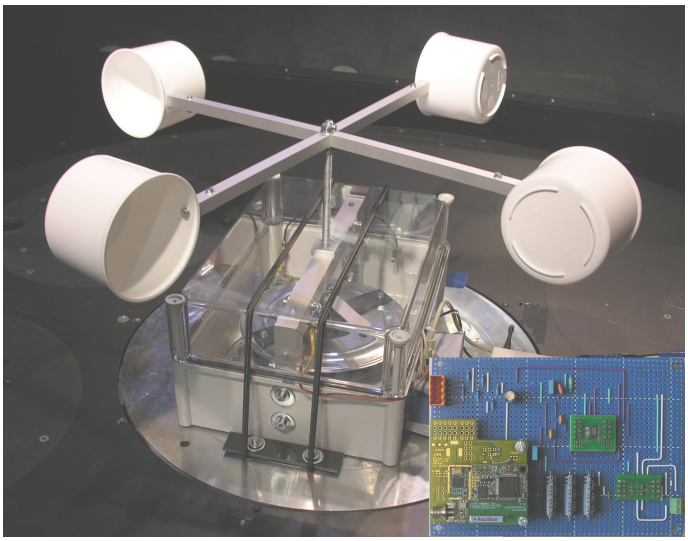

Figure 1: The prototype electronics (bottom right), and complete anemometer set-up in the wind-tunnel.

Requirements: C-Programming skills, experience with Matlab, preferably experience with electronic circuits.

Interested? Please have a look at our research page (www.tec.ethz.ch/research.html) and contact us for more details!

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References

[1] B. Buchli, D. Aschwanden, and J. Beutel. Battery state-of-charge approximation for energy harvesting embedded systems. In *Proc. of 10th European Conference on Wireless Sensor Networks (EWSN 2013)*, Ghent, Belgium, 2013. Springer.

[2] Shockfish SA. Tinynode 184. http://www.tinynode.com/?q=product/tinynode184/tn-184-868.

[3] F. Sutton. Energy harvesting wireless anemometer. In *Semester Thesis*. ETH Zurich, Zurich, Switzerland, 2011.