ETH
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Swiss Federal Institute of Technology Zurich

TIK
Institut für Technische Informatik
und Kommunikationsnetze
Computer Engineering and
Networks Laboratory

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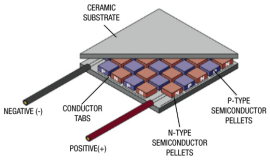
Semester Thesis:

Prediction strategies for energy harvesting sources



Motivation and Informal Description: : Energy harvesting systems have recently received extensive attention. This is because these systems have pervasive applications; from wearables and inter-of-things to remotely deployed sensor motes. Energy harvesting can greatly enhance the working lifetime of a device; without need of a charging cycle. The challenging part of making these systems perform useful tasks is that most energy harvesting sources (such as solar, wind) are very variable in nature. Therefore, an important research problem in making these systems tick, is the ability to accurately predict future energy availability. Energy predictions can be used to make scheduling decisions or for giving certain quality-of-service guarantees.

This Thesis: In this thesis, we will study prediction strategies for energy harvesting sources. We will consider three different source types: 1) solar, 2) wind, and 3) thermal. We will first conduct a literature survey of existing prediction strategies (e.g. [1]) and determine the strategies that work best for a given source type. Based on the understanding gained in this first step, we will then propose new prediction strategies that potentially work better than State-of-the-Art. The new strategies will likely employ use of historical data of environmental conditions and/or stochastic analysis.

What you will get: You will get in-depth understanding of energy harvesting sources. Depending on the results of this thesis and your interest, this thesis may lead to a scientific publication.

Requirements

Expertise: Probability/Stochastic analysis
Programming: C/C++/Python, Matlab/Mathematica

Contacts

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References

[1] A. Cammarano, C. Petrioli and D. Spenza, "Pro-Energy: A novel energy prediction model for solar and wind energy-harvesting wireless sensor networks," MASS 2012.