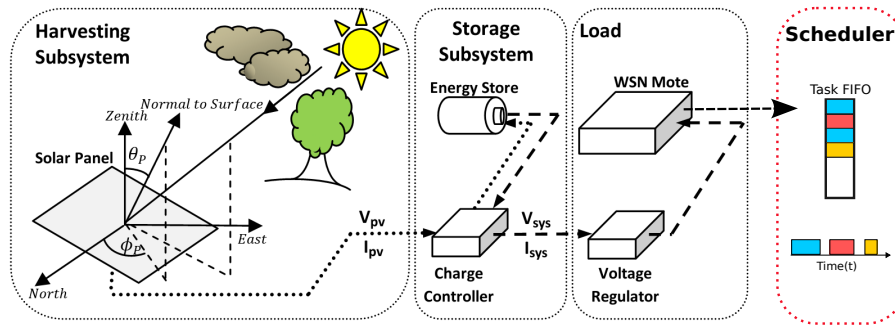


Semester Thesis:

Scheduling strategies for energy harvesting systems

Making energy harvesting systems tick.



The Background: 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 holy-grail for such systems is energy autonomy; where you can deploy a device and it can perform its function indefinitely by using only the energy that it harvests. However, the challenging part of reaching energy-autonomy is that most energy harvesting sources (such as solar, wind) are very variable in nature. Therefore, the variability of the sources has to be taken into account to ensure/guarantee long-term operation.

The Thesis: In this thesis, we will explore scheduling strategies for energy harvesting systems. The scheduling approaches will be tied with energy availability: e.g. the system can execute more tasks in periods of high energy availability, and less tasks in periods of energy scarcity. As an end result, we would like to have scheduling schemes with some form of scheduling guarantees. Depending on your interest, we can work on transient energy systems. These systems do not have large energy buffer/storage; therefore the energy consumed by tasks closely tracks the energy available through the energy harvesting source. Your tasks will be the following:

- Devise realistic models for energy harvesting sources.
- Explore heuristic scheduling algorithms that maximize the work performed/tasks completed.
- Explore energy prediction schemes and integrate them with scheduling strategies.

What you will get? You will get an in-depth understanding of the design and operation issues concerning energy harvesting systems.

Requirements:

Courses: Embedded System, Hardware software co-design

Programming: C/C++/Python, Matlab/Mathematica

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