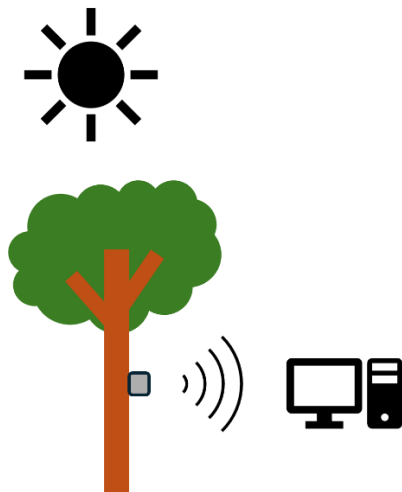


Spectral Matching and Solar Energy Harvesting under Diffuse-Light Conditions for Tree-Based Sensor Nodes

Bachelor's Thesis

Background

Power management is a major challenge in developing tree-based sensor systems. Multiple sensors operating in real-time, wireless data transmission, and on-edge computation all place tight constraints on the power budget. To ensure continuous and uninterrupted operation, such system must include an energy harvester. One of the most straightforward approaches is the use of solar cells. However, the light available under tree canopies is highly diffuse and spectrally modified, which significantly reduces the performance of conventional solar cells. This makes it necessary to adapt or optimize the solar cell structure for diffuse-light conditions.

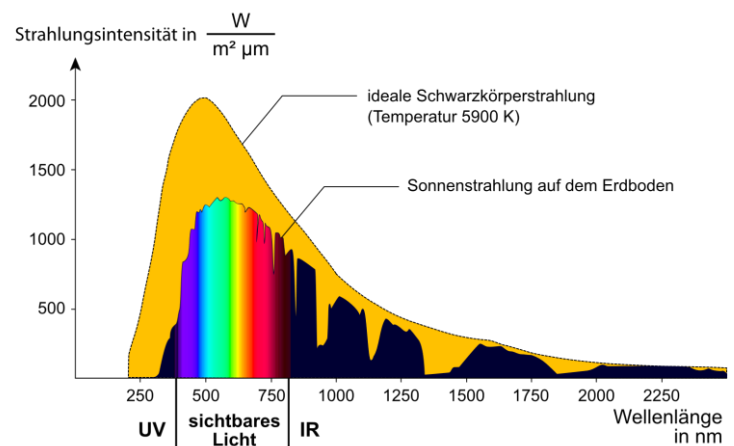


Project Description

The goal of this project is to design and evaluate a solar energy harvester optimized for diffuse-light conditions typically found under tree canopies. The work includes analyzing spectral characteristics of diffuse light, reviewing existing solar cell technologies, and identifying designs that offer improved performance. Afterwards, a prototype will be implemented and validated.

Requirements

- Enrolled in a Bachelor's program in Electrical Engineering, Physics or a related field
- Good programming skills (e.g. Python)
- Good command of English
- Experience in microcontrollers and embedded programming is welcome



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How to Apply

If you are interested in this topic, send your CV and grade report to:

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