Poster: Power Saving Mechanisms in Wireless Sensor Networks

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Abstract:
Current trends in the domain of Wireless Sensor Networks (WSN) require efficient and sensible use of the available energy resources. On the CC1010 Module, which is used throughout this research, the RF component and the high-speed 14MHz oscillator are significantly responsible for the overall current consumption. Both require approximately 20mA of the 26mA current in active mode. All other components, such as the real time clock, the ADC and the integrated sensors consume 6mA. Thus, a step towards lower power consumption is to turn off all unused components. However, permanently stopping the RF component will interfere the whole network. Therefore, the use of periodic active and idle phases can help to achieve both, lower power consumption and a serviceable network. During the idle phase the current consumption is as low as 0.7mA. The integrated real time clock determines the transition between active and idle mode and vice versa. When the system switches back to active mode, the RF component is powered up and the node is operational. The results show, that depending on the ratio between active and idle periods, the life time of a sensor node can be extended significantly. For example, a ratio of Tactive/Tidle = 10s/50s = 0.2 can increase the lifetime of the node by a factor of 12. Current research at the Institute of Applied Microelectronics tries to integrate this approach in the actual sensor network installed at Celisca. Further efforts are directed to synchronizing aspects and the evaluation of the robustness of this mechanism.