

# **A reconfigurable energy storage architecture for energy-harvesting devices**

Battery-free, energy-harvesting devices operate using energy collected exclusively from their environment. Energy-harvesting devices allow maintenance-free deployment in extreme environments, but requires a power system to provide the right amount of energy when an application needs it. Existing systems must provision energy capacity statically based on an ...

The PV energy harvesting systems are comprised of a PV cell array, a load device, and a power converter between the PV cell array and the load device. There is an optional energy storage element between the PV cell array and the load device, and a power converter between the energy storage element and load device.

A Reconfigurable Energy Storage Architecture for Energy-harvesting Devices. ASPLOS '18 . Battery-free, energy-harvesting devices operate using energy collected exclusively from their environment. ... Energy-harvesting devices allow maintenance-free deployment in extreme environments, but requires a power system to provide the right amount of ...

A Reconfigurable Energy Storage Architecture for Energy-harvesting Devices. Authors: Alexei Colin, Emily Ruppel, ... This work presents Cappybara: a co-designed hardware/software power system with dynamically reconfigurable energy storage capacity that meets varied application energy demand. The Cappybara software interface allows ...

A Reconfigurable Energy Storage Architecture for Energy-harvesting Devices. In Proceedings of the Twenty-Third International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS '18). ACM, New York, NY, USA, 767-781. ... energy harvesting sensing devices enable new applications and deployment ...

Abstract. Battery-free, energy-harvesting devices operate using energy collected exclusively from their environment. Energy-harvesting devices allow maintenance-free deployment in extreme environments, but requires a power system to provide the right amount of energy when an application needs it.

A Reconfigurable Energy Storage Architecture for Energy-harvesting Devices Alexei Colin Carnegie Mellon University Pittsburgh, U.S.A. acolin@andrew.cmu Emily Ruppel ... A Reconfigurable Energy Storage Architecture ASPLOS '18, March 24-28, 2018, Williamsburg, VA, USA longer than discharge times. During active operation, the

In order to maintain the operating point at the MPP regardless the load current, we commonly use the architecture in Fig. 1b for the MPTT of the PV cell array though the load device does not have to operate

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when there is no solar irradiance. The energy storage element in Fig. 1b is, of course, useful to make the PV energy harvesting system functional even if there is solar ...

Alexei Colin, Emily Ruppel, and Brandon Lucia. 2018. A reconfigurable energy storage architecture for energy-harvesting devices. In Proceedings of the Twenty-Third International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS'18). 767-781.

A Reconfigurable Energy Storage Architecture for Energy-harvesting Devices Alexei Colin, Emily Ruppel, Brandon Lucia ASPLOS 2018 Best Paper Award and IEEE MICRO Top Picks 2018 Hon. Mention . Alpaca: Intermittent Execution without Checkpoints Kiwan Maeng, Alexei Colin, Brandon Lucia OOPSLA 2017

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This work presents Cappybara: a co-designed hardware/software power system with dynamically reconfigurable energy storage capacity that meets varied application energy demand. The Cappybara software interface allows programmers to specify the energy mode of ...

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Energy insecurity poses a global challenge with far-reaching social equity and health implications. This paper provides a comprehensive perspective on the relationship between energy insecurity and health outcomes in developed countries.

Figure 1. Cappybara hardware prototype. The solar panels, microcontroller, radio, and, five sensors are on the

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front side (left), and the power system with five capacitor banks and four switches is on the back side (right). -  
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... In energy storage devices, materials evolve from their initial state either due to electrochemical reactions or instabilities at interfaces, and such transformations must be understood and controlled for improved electrochemical behavior ...

The results show that the PHASE model helps understand end-to-end latency in an energy harvesting device, yielding PHASE architectures that complete up to more work on a fixed energy budget than typical energy-harvesting architecture. Energy-harvesting devices are the key to enabling future ubiquitous sensing applications, because they are long lived and require ...

Let  $P_{hj}(t)$  be the instantaneous power of harvesting 2071 W. Housseyni et al.: Multiagent Architecture For Distributed Adaptive Scheduling of Reconfigurable Real-Time Tasks  $i \in \{1, \dots, N\}$ , is characterized by: i)  
Worst case energy consumption (WCEC)  $E_{ni}$  expressed in Joules, the energy consumption of  $t_i$  is considered at the worst case and ...

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