Science and Engineering Education for Infrastructure Transformation (SEEIT)

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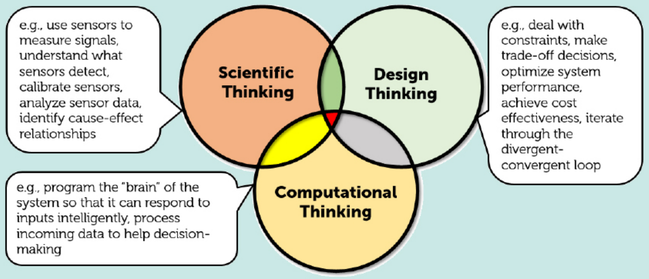
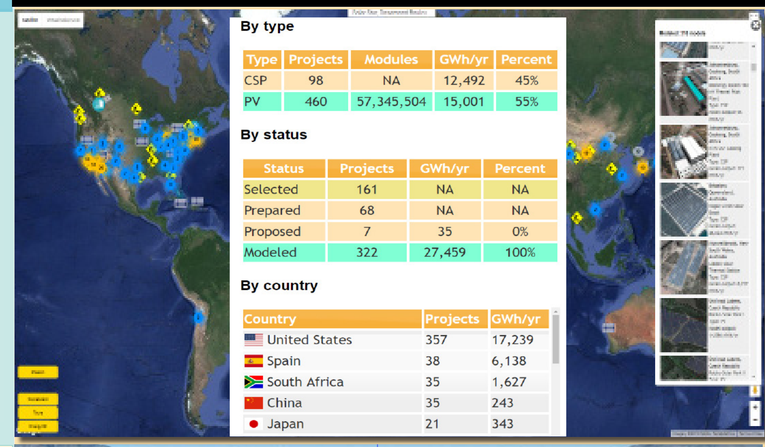
The Engineering Computation Laboratory

Future sustainable and resilient infrastructure will be powered by renewable energy, be able to respond intelligently to changes in the environment, and support smart and connected communities. The goal of this project is to create cyber-physical system (CPS) technologies and curricula through design-based research to support constructionist learning of STEM concepts and skills underlying the "smart" and "green" aspects of the infrastructure in order to raise next generation engineers who will rebuild America's infrastructure. The project is developing two innovations: 1) The *Smart High School* is an engineering platform for designing Internet of Things (IoT) systems for managing the resources, space, and processes of a school based on real-time analysis of data collected by various sensors collaboratively deployed by students on campus; and 2) the *Virtual Solar Grid* is a computational modeling platform for students to model, design, and connect virtual solar power solutions for their homes, schools, and regions to create smart micro and macro grids of tomorrow based on increasing use of green energy.

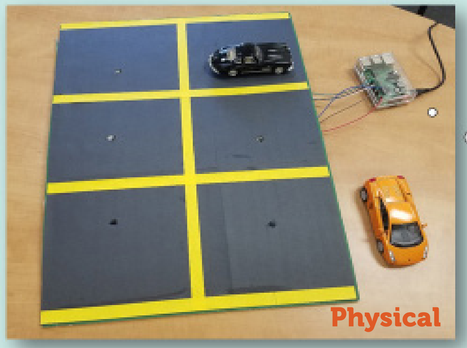
A Technology-Based Model for Integrated STEM Learning to Prepare Students for the Future of Work



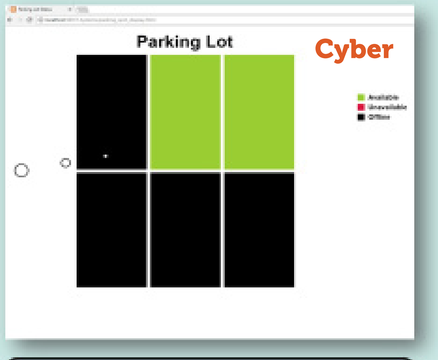


The Smart High School: An IoT Platform for Teaching Students How to Make a Place in School Smart and Connected

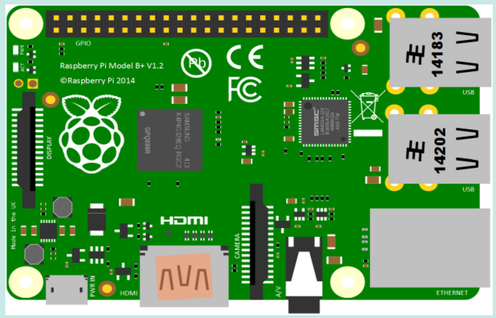
(Demos: Smart Parking Lot and Smart Cafe Based on Raspberry Pi)



A simulated smart parking lot based on light sensor arrays

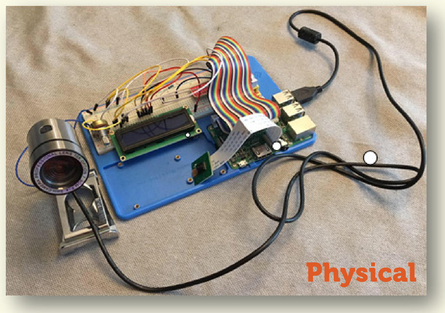


A Web-based dashboard of the parking information system

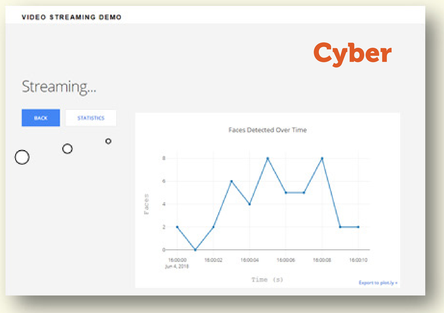


Under development

- An IoT emulator for virtualizing Raspberry Pi, sensors, and actuactors supported by Smart High School
- A visual programming environment for designing IoT apps collaboratively



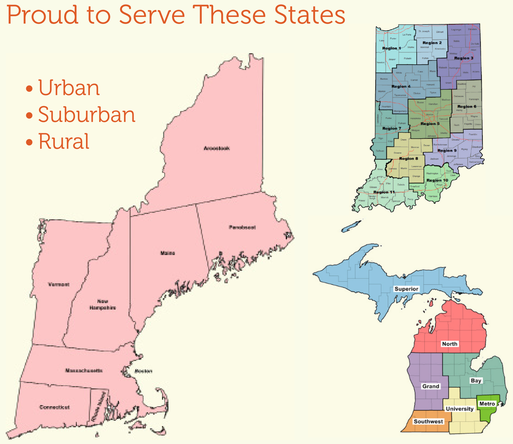
Tracking moving objects using a camera and computer vision software

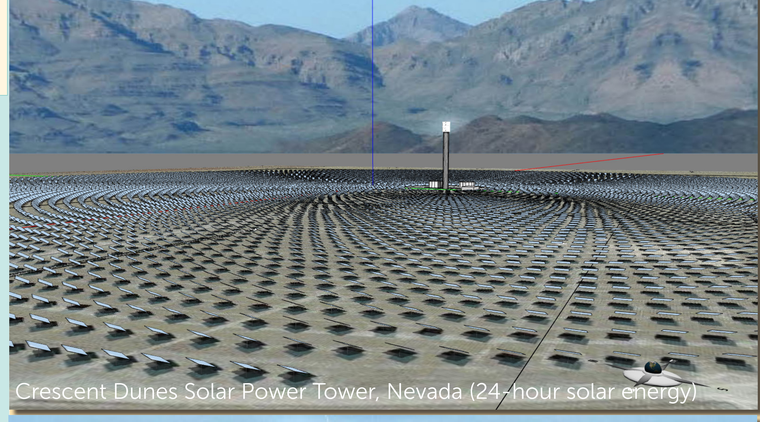


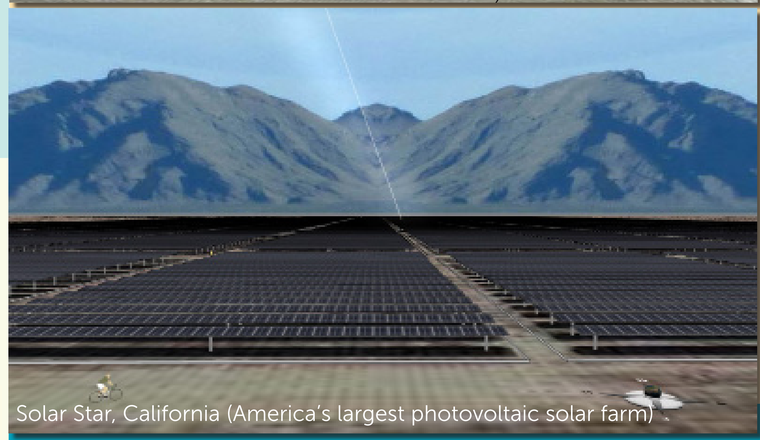
Displaying tracking information on a Web-based dashboard

Proud to Serve These States

- Urban
- Suburban
- Rural




Crescent Dunes Solar Power Tower, Nevada (24-hour solar energy)


Solar Star, California (America's largest photovoltaic solar farm)

Virtual Solar Grid: http://vsg.concord.org

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