Upgrading the BV-SSPA DPC through automation and remote control. Working on open hardware: Arduino & Shields

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Introduction
Rising energy demand and Information and Communications Technology (ICT) strong push, together with the BV-SSPA adverse environment and its Data Processing Center (DPC) special location have forced during the last year the pursuit of energy-saving technical solutions provided with power consumption efficiency and optimum performance and reliability.

Objectives
The aim of the present project is to develop an open-source hardware and software based platform, built with Arduino and Raspberry Pi and also a web interface to remotely manage control functions and monitoring tasks for server cabinets over the Internet, in order to upgrade them into an autonomous and automated ‘Intelligent DPC’.

Method
A comparative study of the available technologies is necessary to build the appropriate solution up. The sensors needed are designed and implemented, both hardware and software, to achieve the full system to function properly.

A web-based interface system, continuously, feeds a database with the whole bunch of collected data from the controllers and sensors for further analysis, in order to monitor the DPC performance and behavior. Most of these functions are verified in parallel with a real-time alarm system, through mobile devices which may, if necessary, act within the running algorithm that controls the DPC intelligent functions.

Conclusions
The wide set of sensors and actuators, controlled by Arduino boards and managed by a Raspberry Pi, allows to create an infrastructure for the automation and remote control of a DPC, enabling us to manage it from everywhere, through a Human Machine Interface (HMI) with different implementations, such as web-based ones, smartphone apps and even portable Raspberry Pi-based HMI consoles.

Uninterruptible Power Supply (UPS)

Air Conditioner

Fire extinguisher in case of fire

Monitoring and measuring temperature inside the DPC. If high levels of toxicity, turns and turn off the extractors and actuators DPC doors in case of very critical levels of toxicity.

Activates the webcam to record any intrusion DPC.

Controls the humidity and the temperature inside the DPC. Controls the air quality inside the DPC. If high levels of humidity and temperature inside the DPC.

Controls the humidity and inside temperature. Collect information to create predictive situations affecting the DPC and implement preventive algorithms to control temperature and humidity.

Activates the webcam to record any intrusion DPC.

Record any intrusion in the vicinity of the DPC on specific time slots. It also lets you see in real time what happens in the data center remotely.

Access control. It allows control from your screen all the DPC and automated processes, execute them manually. The Human Machine Interface can be accessed remotely.

Activates the webcam to record any intrusion DPC.

Open doors of the DPC by fingerprint recognition in case of extreme emergency or only authorized personnel.

Activates the second pump water from evacuation of ACs, if the principal fails.

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