

Biblioteca Virtual

del Sistema Sanitario Público de Andalucía

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

Arduino Central Processing Unit

Electrical Connection 220V AC

Uninterruptible

Power Supply

(UPS)

AC Transformer 220v

to 5V, 12V, 24V DC

Air Conditioner

to DPC

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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.

Objetives

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

Second reinforcement AC

to be active in extremes of

Carboy firefighting, if flame

detection within the DPC. It

fires the flame sensor,

manually and remotely via

Extractors air, which is

Turns on and turn off with

the inside temperature

sensor, in case of extreme

temperature and turns on

and turn off with the air

quality sensor in case of

high toxicity levels inside

the cab.

the HMI.

temperature.

A comparative study of the available technologies is necessary to build the appropriate solution up. The elements 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.

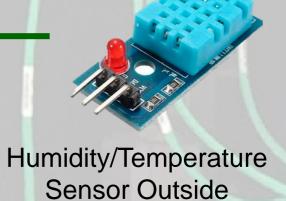
Exterior LED lights to Relays Shields illuminate the vicinity of DPC when it is night and want to see in real time with the webcam happens.

Humidity/Temperature Sensor Inside

Controls the humidity and the temperature inside the DPC. Controls the air quality 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.

2009 2010 2011 2012 2013

Controls the air quality inside the DCP. If high levels of toxicity, Turns and turn off the extractors and actuators DPC doors in case of very critical levels of toxicity.

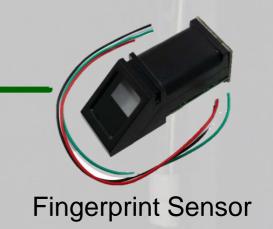


Air Quality Sensor

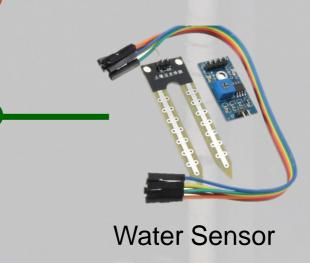
Controls humidity and outside temperature. Collect information to create predictable situations affecting the DPC implement preventive algorithms to control temperature and humidity.



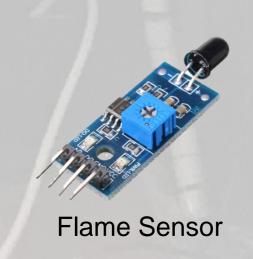
Activates the webcam to record any intrusion DPC.



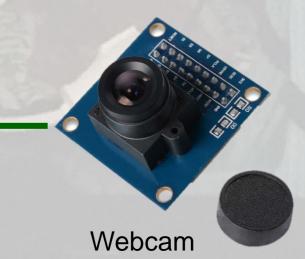
Open doors of the DPC by fingerprint recognition index finger to work inside the cabin, only authorized personnel.



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



Flame sensor that triggers the fire extinguisher in case of fire the DPC



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



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

Human Machine Interface

Line 5V DC

Arduino Connections Line 12 / 24V DC

Line 220V AC

Electrical Connection 220V AC www.juntadeandalucia.es/salud/bibliotecavirtual

that open to release heat if high levels with internal temperature sensor and which is also activated by the air quality sensor if high levels of toxicity in the cab.

Actuators of the two cab doors

Second emergency pump that

is activated in case of failure

the extractor pump water from

the main ACs of the two Acs.

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.