Escuela Universitaria
Politécnica - La Almunia
Centro adscrito
Universidad Zaragoza

NUM TFG: 424.17.112
Noviembre 2017

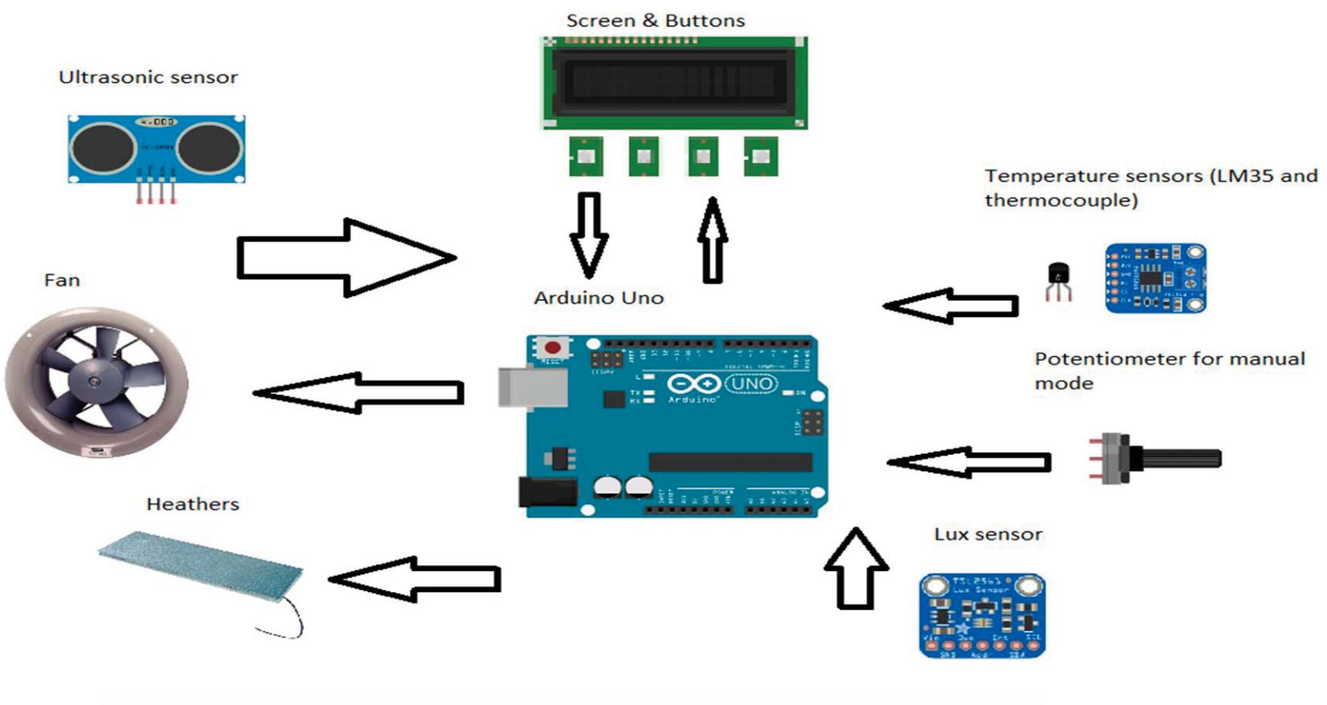
Automation of a pig farm (Automatización de una granja porcina)

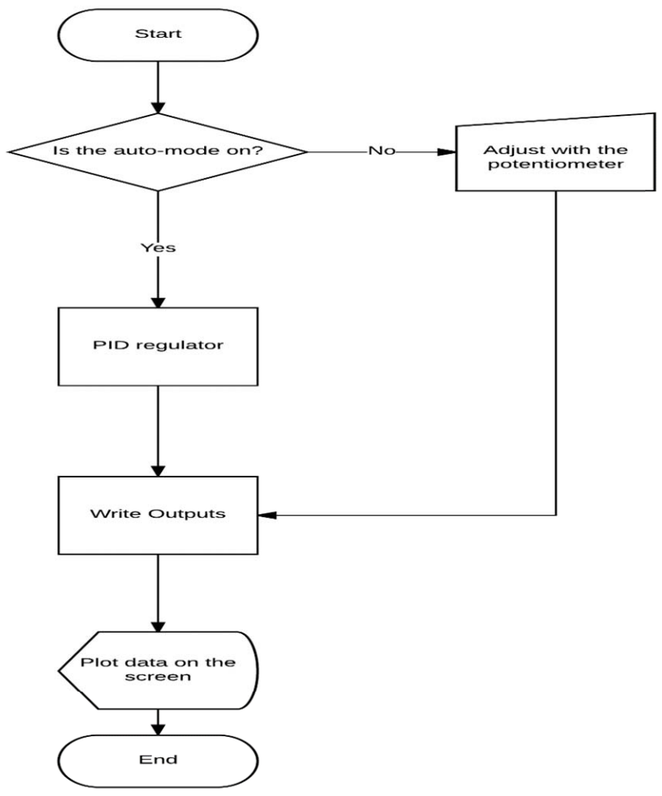
Grado de Ingeniería en Mecatrónica

Autor: ***Sergio Baquedano Aisa***
(Director: Martin Ekstrom)

This project aimed to investigate and develop a control system for a pig farm with an Embedded System as Arduino Uno. An experiment was realized at a lab to test the viability of the system. The findings of this study found that the system could monitor surrounding weather, illuminance, level of the grain storage, fan control and heaters control. The system was found to be easy to use for people without any experience and could effectively control the farm anywhere at any time, resulting in cost reduction and production increases.

The system plots the data on the screen and it is possible to navigate through the different pages of the menu with the help of the buttons. It is shown the inside temperature, outside temperature, level of the grain deposits, power of the fans and the configuration menu, where it is possible to switch between auto and manual mode for the fans and set the value of all the set points.





The Arduino IDE was used to code the program for the system, and the sketch was divided in three main parts: the data acquisition, the regulation process and the screen menu navigation.
The data acquisition function is called every second in the main program to update the data from the sensors. Every time the function is called the inside and outside temperature is copied to the variables, as the Lux value. The ultrasonic sensor gives a distance value, so this distance is mapped to store a value from 0% to 100 %.
The regulation process function is called on every cycle of the loop, and it write the values of the different outputs.

The model developed was tested at the laboratory to check that all the sensor and actuators were working as they should. After several supervised tests, the conclusion was that the system was functional and reliable. With the data stored at the EEPROM the system was prepared for a supply cut, and in case of malfunction the alarm was displayed. The conclusion is that a functional, low-cost and reliable Arduino based system was designed, coded and satisfactory tested. For a future project, it will be interesting to develop a wireless communication for the Arduino and a Raspberry Pi. Once this connection is made, the next step would be developing an app for the smart phone where you can check on real time the parameters of all the farm and modify the set values.