


Data Acquisition System



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Contents

Introduction

A data acquisition system is a collection of software and hardware that allows open to measure or control physical characteristics of Something in the real world.

Data acquisition System can be classified into two typos

1. Analog Data Acquisition Systems

The data acquisition systems, which can be operated with analog Signal are known as analog data acquisition systems.

2. Digital Data acquisition Systems

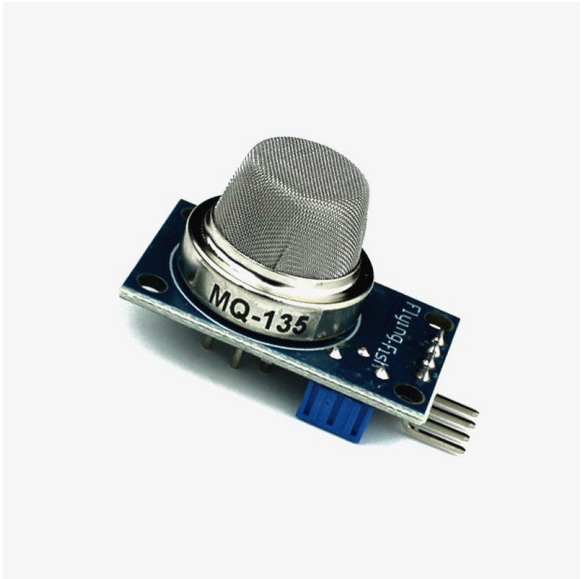
The data acquisition Systems, which can be operated with digital Signals are known as digital data acquisition systems. So, we use digital components for Storing 02 displaying the information.

The components of DAS include

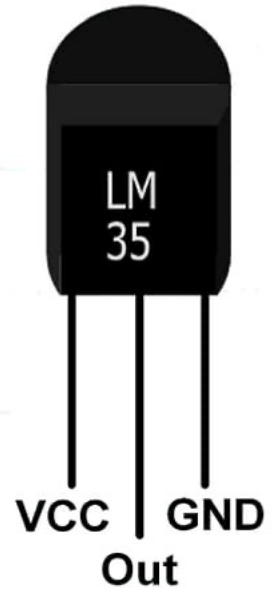
sensors that converts physical parameters to electrical signals.

In this project we use three sensors

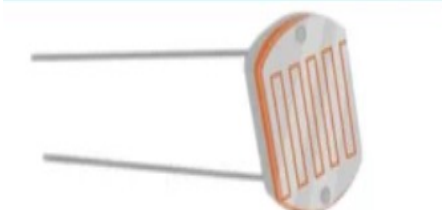
1. Temperature sensor [LM35]



2. Gas Sensor [MQ135].



3. LDR [Light Dependent Resister)



Signal Conditioning Circuitry to convert sensor signals into a form that can be converted into digital values.

Analog to digital Converters that converts Conditioned sensor signal to digital values.

Objectives

→DAS must acquire the necessary data, at correct speed and at Cores time

→ It must monitor the complete plant operation to maintain on line are Safe operation

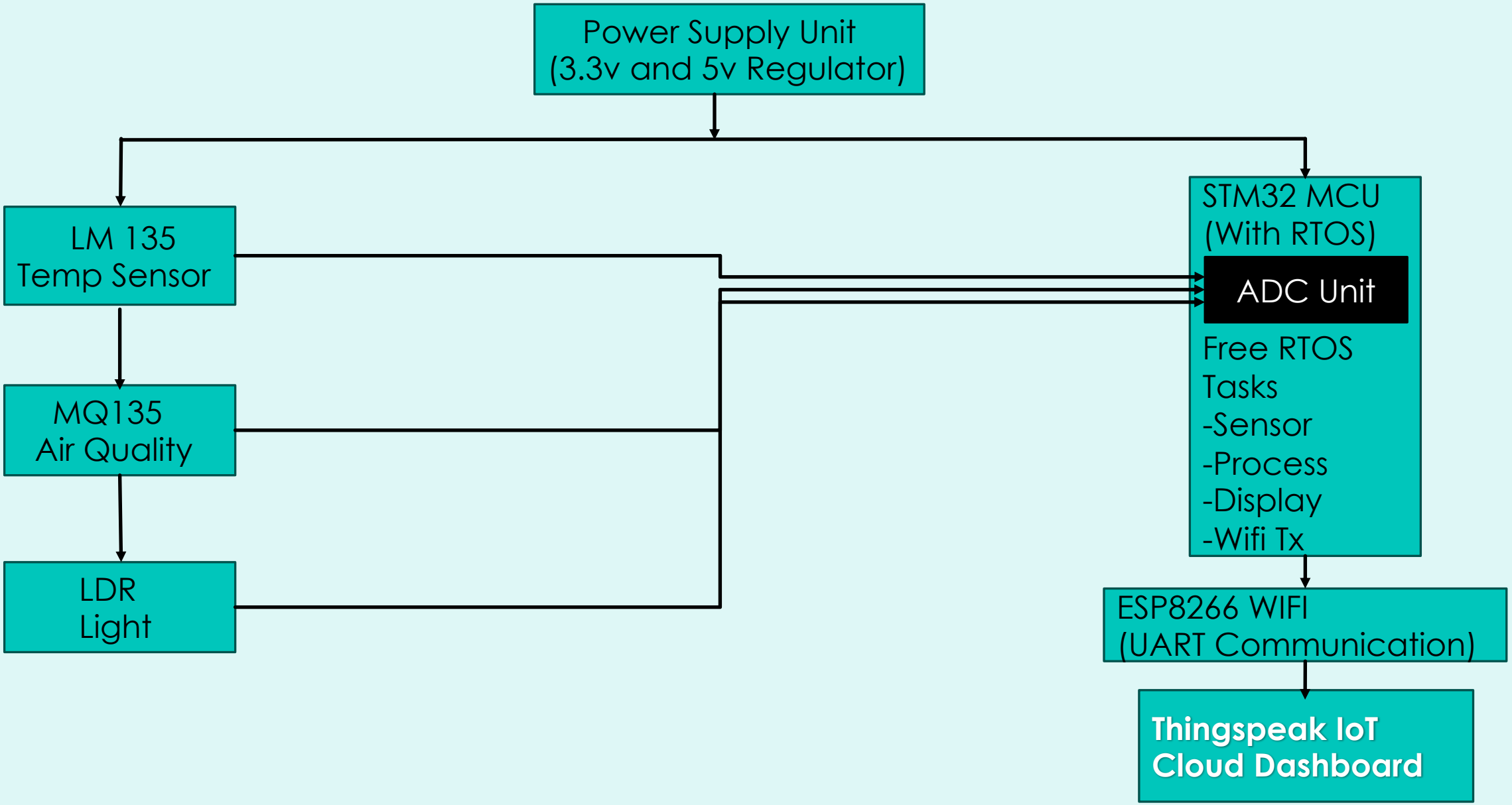
→It must be able to Collect, summaries and store data for diagnosis of Operation and record purpose.

→ It must be flexible and capable of being expanded for future. requite merits.

→ It must be able to compute unit performance indices using of lite real time data

→ It must be reliable, easy to operate and mut be user friendly

Block diagram



Explanation of Components

Components	Functions
LM35	Measures Temperature (Analog o/p to ADC)
MQ135	Measures air quality/gas levels. (analog to ADC
LDR	Measures light Intensity (analog to ADC)
STM32 MCU	Main Controller running. Free RTOS
ADC unit	Converts analog sensor Values to digital.
Free Rios Tasks	Concurrent tasks: sensor read, processing, sending.
ESP8266	Sends data to Thingspeak
Thingspeak	Display Sensor data in real time graphs

MERITS/ADVANTAGES

- ➤ Reduced data redundancy
- ➤ Reduced updating errors and increased consistency
- ➤ Greater data integrity and independence from applications programs
- ➤ Improved data access to users through use of host and query languages
- ➤ Improved data security
- ➤ Reduced data entry, storage, and retrieval costs
- ➤ Facilitated development of new applications program

DEMERITS/DISADVANTAGES

- Database systems are complex, difficult, and time-consuming to design
- Substantial hardware and software start-up costs
- Damage to database affects virtually all applications programs
- Extensive conversion costs in moving form a file-based system to a database system
- Initial training required for all programmers and users

DATA ACQUISITION HARDWARE

➤DAQ hardware interfaces the signal and a PC. It could be in the form of modules that can be connected to the computer's ports or cards connected to slots in the motherboard.

Following are some hardware's

CAMAC Computer Automated Measurement and Control
Industrial Ethernet.
Industrial USB
LAN extensions for Instrumentation
NIM
PowerLab
VME bus
VXI

DATA ACQUISITION SOFTWARE

➤DAQ software is needed in order for the DAQ hardware to work with a PC.

➤Involves the use of a programming language, such as

C++, visual C++
BASIC, Visual Basic + Add-on tools (such as Visual lab with VTX)
Fortran
Pascal
Ladder logic
Lab view

Conclusion

→Data requisition systems typically convert analog physical condition into digital Values for easy processing..

→DAS is advantageous as we can store a lot of physical condition. data in digitized form.

→DAS helps in easy processing of data as well as easy comparison can be done.

→Today DAS is used in almost every field, industry and companies-