**Maestría en Ingeniería en Automatización de Procesos Industriales**

Title

**Greenhouse automation type double tunnel**

**through a PC with Labview and PLC**

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# Greenhouse automation type double tunnel through a PC with Labview and PLC

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### Maestría en Automatización de Procesos Industriales
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## 1. Introduction

Greenhouse cultivation is a specialized agricultural system which performs a control means altering soil and climate conditions (soil, temperature, solar radiation, wind, humidity and atmospheric composition). Using this cultivation technique the plants grown by modifying their natural environment to extend the collection period, altering conventional cycles, increase yields, stabilize production and dispose of products when the outdoor production is limited.

The aim of these systems is to obtain the protected crop production with high added value such as vegetables, fruits, ornamental flowers and nursery plants.

## 2. Objectives

### 2.1. General objective

Automating processes spray, access, irrigation and ventilation in a double tunnel greenhouse through a PC and PLC system to establish a new methodology for cultivating plants.

### 2.2. Specific objectives

➤ To develop the instrumentation system for the greenhouse installed at the Technological Institute of Serdan City to measure temperature and humidity and generate statistical report.

➤ To develop an automatic system with graphical interface through a PC and PLC to control processes of ventilation, sprinkler, access and watered inside the greenhouse.

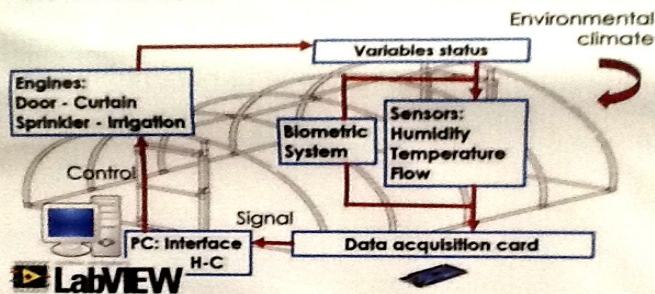➤ To carry out a culture to validate the system.

## 3. Method
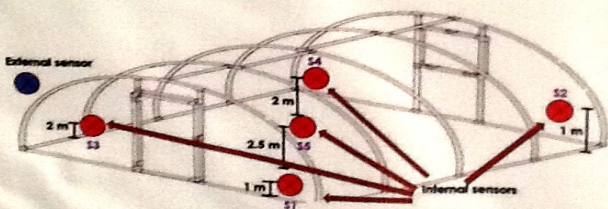


Figure 1. Project Methodology



Figure 2. Location of sensors

## 4. Implementation

### 4.1 Construction of a sensing module.

Develop and configure a module for sensing the internal temperature and humidity condition.
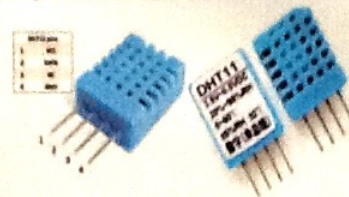


Figure 3. DHT11 Sensor.

### 4.2 Automating access.

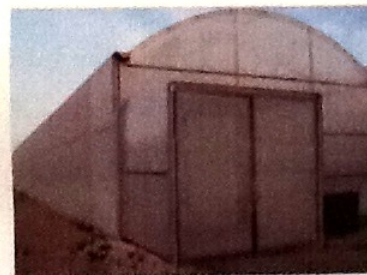Prevent the access of strange people that can contaminate the crop.



Figure 4. Front of the greenhouse

### 4.3 Automation closing and opening the side curtains.

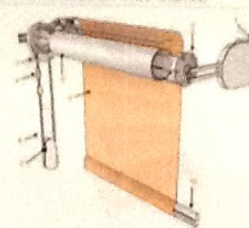Ventilation control system to decrease the temperature with natural air flow



Figure 5. Opening and closing System of side curtains

## 4.4 Mixing system automation, nutrient and irrigation.

Allowing each plant receives the same amount of nutrients and implementing a drip irrigation system to maintain the moisture.


Figure 6. Irrigation system and nutrient mixer

## 4.4 Development of a graphical user interface of automatic control.

Generate an interface that allows to set and control the internal conditions of the greenhouse, in order to set the parameters to match the crop to be.


Figure 7 Labview for PC


Figure 8. PLC interface

## 5. Results

Results obtained by implementing the greenhouse located in the Technological Institute of Serdan City.
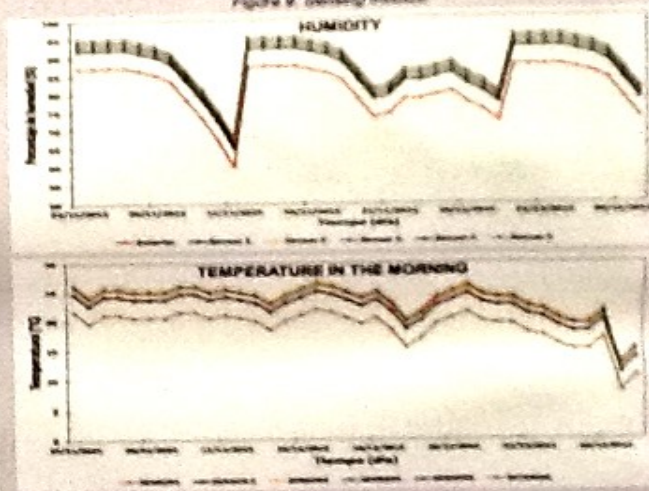

Figure 9. Sensing module.


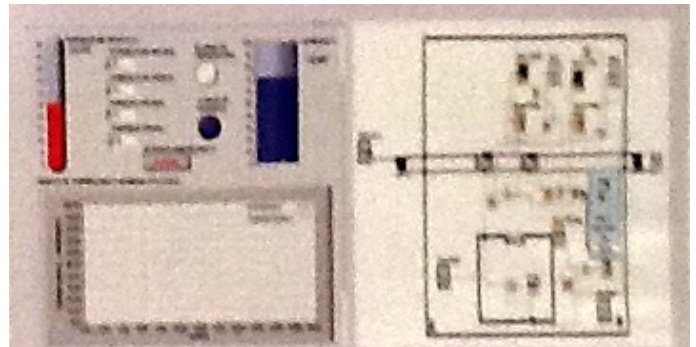Figure 10. Results of humidity and temperature sensing


Figure 11. GUI in Labview (PC).


Figure 12. GUI in Unitronics (PLC).

## 6. Conclusion

Using free hardware Arduino as a data acquisition card and LabView (PC) or Unitronics (PLC) as programming language was achieved perform a graphical interface of temperature and humidity monitoring with dynamic parameters, setting functionality with real-time response and external storage of records. The system allows conduct the necessary studies for the development of a methodology for growing tomatoes in areas with mild winter weather.

### Acknowledgements

2015