GREENHOUSE IN-CLIMATE MONITORING AND CONTROL SYSTEM

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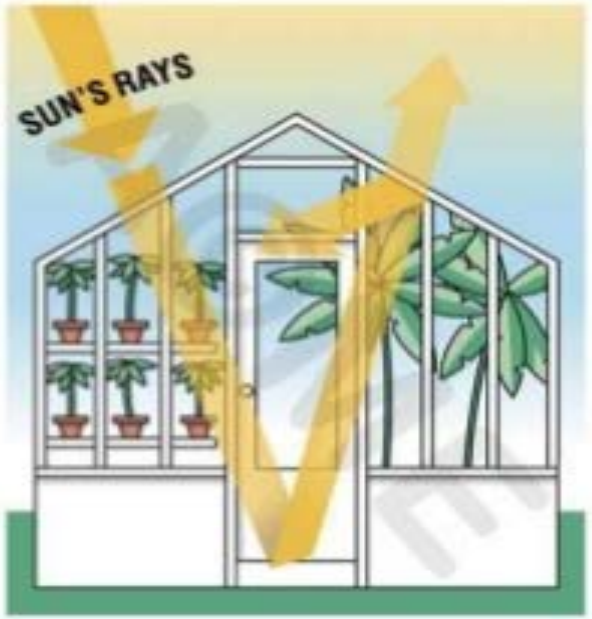
Introduction

Automatic Greenhouse weather control

- Greenhouses form an important part of the agriculture and horticulture sectors in our country.
- They can be used to grow plants under controlled climatic conditions for optimum production.
- Automatic monitoring and controlling of the climatic parameters which directly or indirectly govern the plant growth and hence their production.

Greenhouse effect



- Traps the infrared rays from sunlight
- Increases the level of CO_2
- Increases the amount of chlorophyll
- Plant health and growth is impressive

• RATIONALE

- The Philippines is frequently bombarded with typhoons
- The weather is unpredictable, the production of fresh vegetation is always affected by the sudden changes in the weather
- Use of greenhouse could be the solution to avoid destroying the expected harvest
- Monitoring and control system of a greenhouse using a microcontroller
- Improving the vegetable craft management process
- Adjustment of temperature, humidity, as well as proper time for watering the planted vegetables
- It can handle large scale of crops and vegetables.
- It can handle large scale of crops and vegetables

- **OBJECTIVES OF THE STUDY**

The main objective of this study is to develop a system for the monitoring and controlling of the temperature and humidity as well as real-time clock for the watering system of the planted crop.

Specifically it aims to:

(1) To design and construct a Greenhouse in-climate Monitoring system.

(2) To design a user interface to allow the user to get easy access to the adjustment of temperature, humidity as well as the time for watering.

- **OBJECTIVES OF THE STUDY**

(3)To test and evaluate the effectiveness of the overall system in terms of :

(a) Functionality

(b) Efficiency

(c) Safety

• RESEARCH METHODOLOGY

- The research project involved three phases described as follows;
  - Phase 1: Construction of the Greenhouse
    - Fabrication stage of the hardware components include the assembly of the prototype greenhouse, aligning and fitting the different type parts of the set up based upon the layout design
    - All of the major components used for the hardware of the system is chosen based on the required specification so that the compatibility of the each components will surely contribute to the system's efficiency

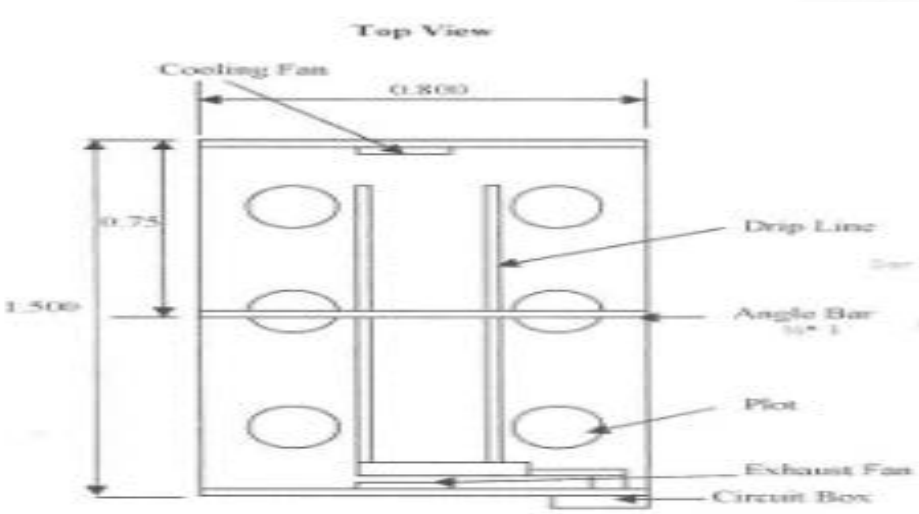
- Phase 2: Characterization and Analysis of Greenhouse (Monitoring and control of the climate inside the greenhouse)
  - In monitoring the climate, when the temperature reaches up to 28degrees centigrade and above; the blower fan will automatically turns “ON” until such time when the digital humidity temperature sensor senses that it is below
- Phase 3: Testing of the Greenhouse In-Climate Monitoring and Control System

RESEARCH METHODOLOGY

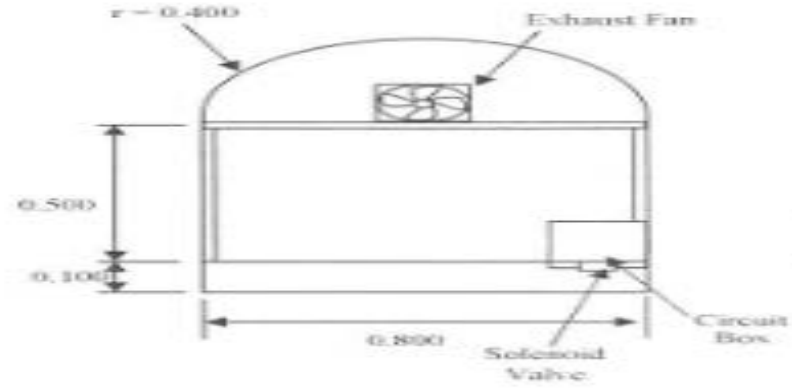
The proponents used the Project Development Study type of research.

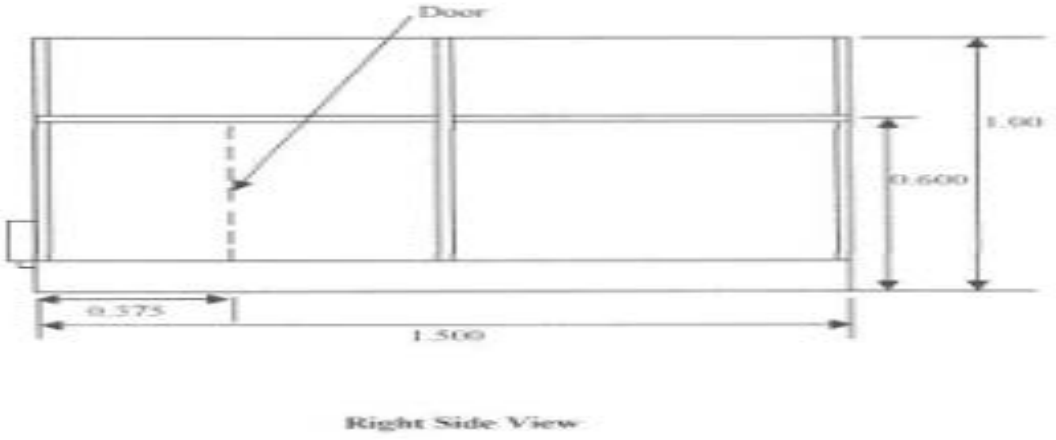
The prototype greenhouse circuit was activated and the project was subjected to evaluation and monitoring of the planted crops were made to determine its level of reliability and acceptability by the group of evaluators . The performance of the project was evaluated to determine the function of the desired output. The weight mean was used to determine the level of acceptability of the research project in terms of the following criteria; functionality, efficiency and safety.

DESIGN

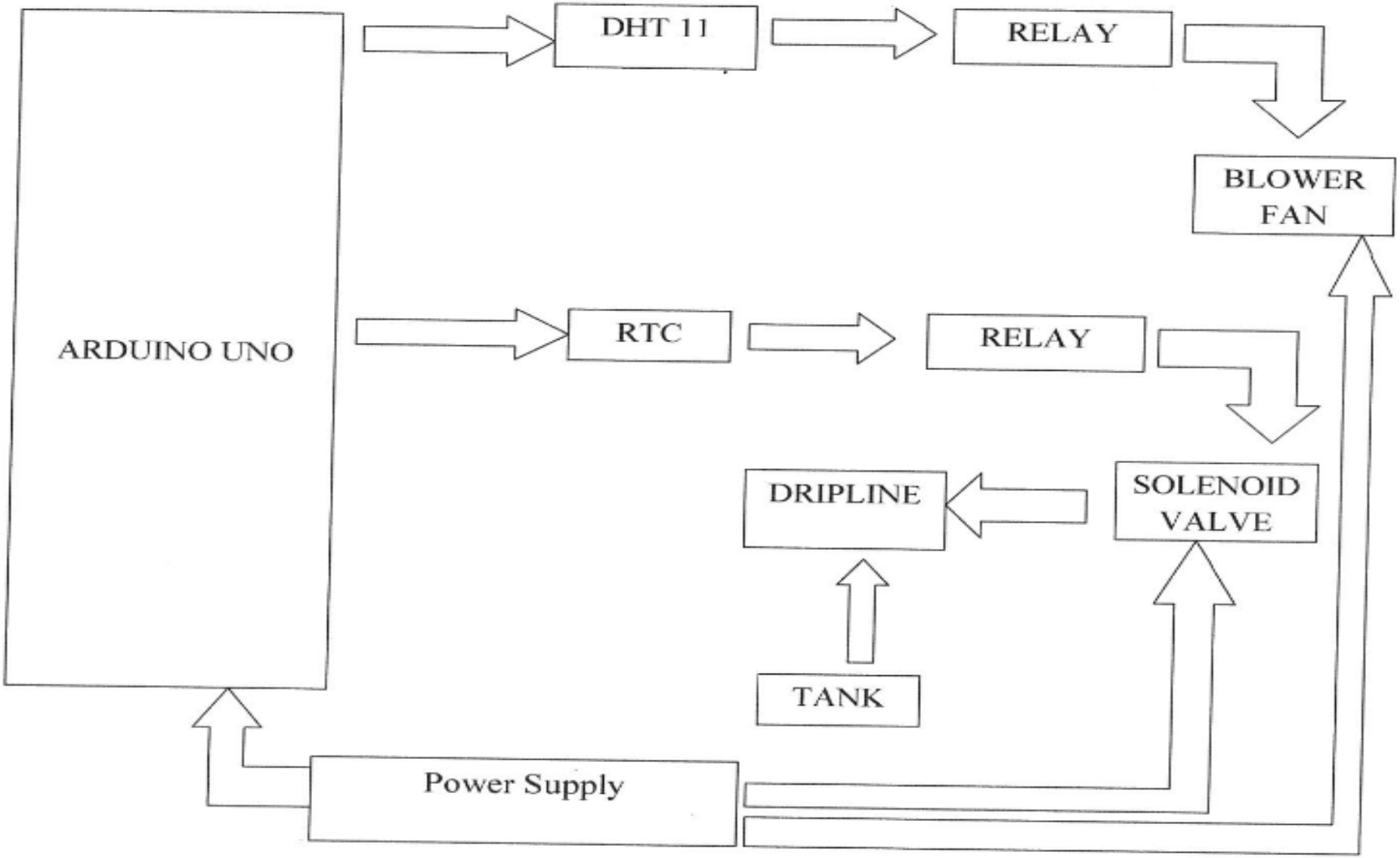

Top View
Cooling Fan
0.800
0.75
1.500
Drip Line
Angle Bar
Plot
Exhaust Fan
Circuit Box


Scale 1:20 meter


r = 0.400
Exhaust Fan
0.500
0.100
0.800
Circuit Box
Solenoid Valve
Front View


Door
1.00
0.600
0.375
1.500
Right Side View

BLOCK DIAGRAM



FINISHED PROJECT

RESULTS

The performance of the project was evaluated and analysed to measure the reliability and acceptability of the system as a whole. Evaluation of the project using the three criteria revealed the following results:

x=3.65 (highly acceptable) for functionality,

x=3.74 (highly acceptable) for efficiency,

x=3.73 (highly acceptable) for safety,

The project obtained an overall mean of 3.71 with an equivalent descriptive rating of highly acceptable.

- In terms of the growth rate, the normal cauliflower takes 65days to mature, and it starts to have a bud at around 57days from the time it was planted
- Using the controlled greenhouse, it takes only 48days to 55days to harvest the said cauliflower
- The harvest period is comparatively shorter than the normal cultivation and the harvest time is definitely reliable

CONCLUSIONS

After testing and evaluation, the project was found to be efficient, functional, safe and useful in the adjustment of temperature, humidity, as well as proper time for watering the planted vegetables. It could help people most especially the farmers, cooperatives and government agencies that are planning to have a greenhouse. The monitoring and control system of a greenhouse using a microcontroller is a means of improving the vegetable craft management process since it can handle large scale of crops and it can be adjusted to be able to accommodate any plant life.

RECOMMENDATIONS

Based on the conclusions drawn, the following recommendations are presented:

1. Modify the design of the project to be adaptable to a full-scale greenhouse.
2. Develop an easy access user interface by having an additional features that can be added to the system for a faster and more suitable monitoring of the greenhouse.
3. Design a system for two or more greenhouse simultaneously monitored and controlled using the microcontroller.

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Thank You