Design And Implementation Of Polyhouse Automation Using PIC

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Abstract- *The major concept of this project is to create a favorable atmosphere for the growth of the crop by providing control over the atmospheric parameters within a polyhouse farm with respect to the outer environment using automation.Polytunnel have a variety of applications the majority being ,growing of vegetables floriculture and planting material acclimation,fruit crop growing for export market.*

Keywords- favorable atmosphere, polyhouse, floriculture.

I. INTRODUCTION

Polyhouse farming is a way of protected cultivation in agriculture. The polyethylene plastic is used to cover the structure. It enables to cultivate high value crops (horticulture) in the structure.Some are naturally ventilated polyhouses and some are under the total climate control system having motorised screens and ventilators.Protected cultivation under Polyhouse is gaining importance these days. It proves to be beneficial to the farmers since it enables.

II. EXISTING SYSTEM

The practice of protected farming which includes polyhouse farming.The PLC used is highly temperature , light intensity & soil moisture are continuously communicated through various sensors to the PLC.The system uses supervisory control & data acquisition for real time analysis of the process. In this paper several sensors are used such as temp sensor, light intensity sensor, soil moisture sensor, PLC & SCADA.

Disadvantages:

- Requires uninterrupted power supply.
- Winter time requires more heating which increases power consumption.
- Eradication cannot be achieved.

III. PROPOSED SYSTEM

The several accessories plant growth environmental parameters are monitored & controlled .Monitoring of "inner environment" is done with sunlight, temperature & humidity.PID controlling also done .Here we are different type of sensors. The parameters which are collected from input show on HMI screen.

Advantages:

- Capacity to withstand temperature.
- The operation is reliable (secure).
- Monitoring & controlling the process from remote place is possible.
- Input/output port can be expanded without supporting.
- Easy to program & debug.
- Self power operator

IV. BLOCK DIAGRAM

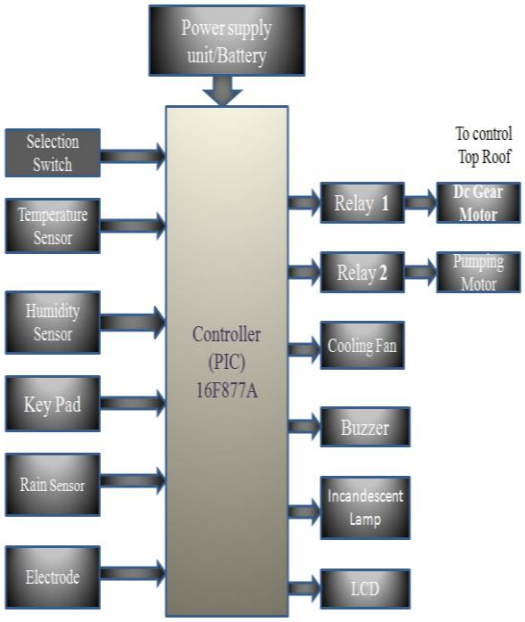

Figure 1:Block diagram

V. HARDWARE & SOFTWARE IMPLEMENTATION:

HARDWARE

- PIC microcontroller
- Temperature Sensor
- Rain sensor
- Humidity Sensor
- Relay
- Natural Air Cooling System
- Incandescent lamp
- Buzzer
- Gear Motor
- Pumping Motor
- Power Supply Unit
- LCD
- Key Pad

SOFTWARE

- MP lab IDE

VI. RTL SCHEMATIC DIAGRAM

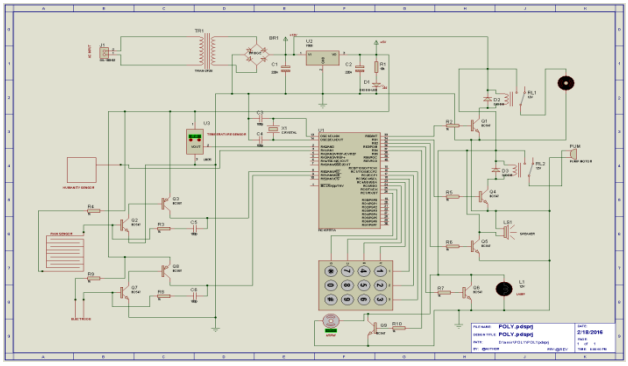

Figure 2:RTL Schematic diagram

VII. PINDIAGRAM OF PIC 16F877A

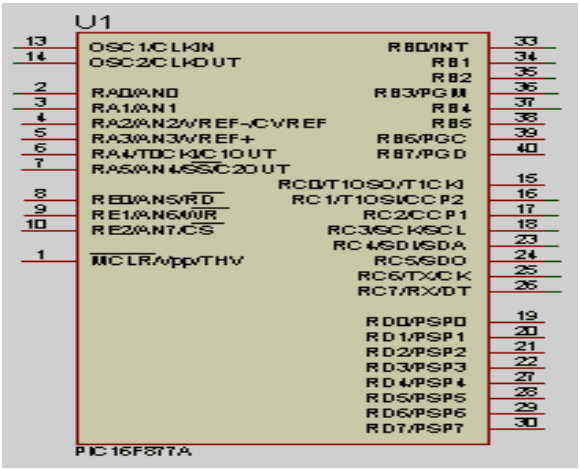

Figure3: pin diagram of PIC 16F877A

VIII. MICRO CONTROLLER PIC 16F877A

- RS232 Tx, Rx interface with MAX232 IC on socket.
- 18f4520 microcontroller
- ULN 2803 To Drive Stepper Motor & Relays.
- Quartz crystal 20Mhz.
- 2 LED.
- 2 Push Button.
- RTC.
- Reset button.
- Power plug-in jack.
- Extension slot on every uC pin.
- GND bus.
- VCC bus.
- Four mounting holes 3,3 mm (0,13").

IX. POWER SUPPLY UNIT

It is designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronics' circuits and other devices. A power supply has many types of components It can be broken down into a series of blocks, each of which performs a particular function.

- Regulator Ics: - IC7805, IC7812.

- 3 Pins - 1 pin(input)
  2 pin (neg)
  3 pin (output)

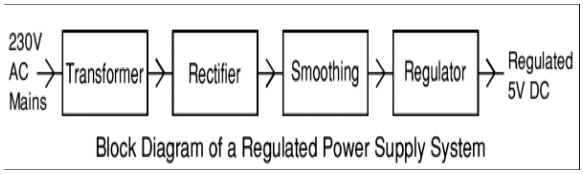

Figure4: Block Diagram of a Regulated power supply

This circuit can give +5V output at about 150mA current, but it can be increased to 1 A when good cooling is added to 7805 regulator chip. If you need other voltages than +5V, you can modify the circuit by replacing the 7805 chips with another regulator with different output voltage from regulator 78xx chip family.

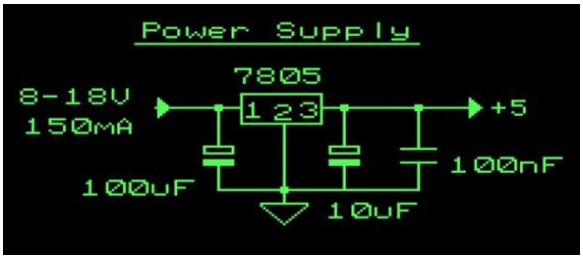

Figure 5: Circuit Diagram of Power Supply System

X. PUMPINGMOTOR

Operating Voltage 5v Dc .This is a mini submersible type water pump that works on 5vdc.It is extremely simple and easy to use. Just immerse the pump in water, connect a suitable pipe and power the motor to start pumping water. Great of building fire extinguishers, fire fighting tools, fount wins, waterfalls, plant watering systems etc.This motor is small, compact and light it can be controlled From a microcontroller using our dc motor drivers or relay board**.**

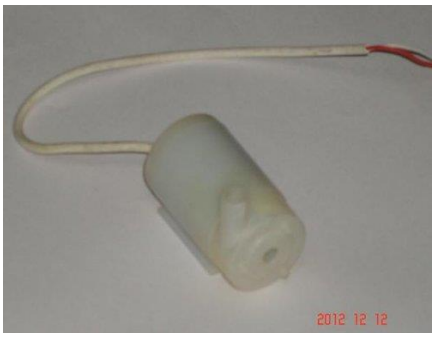

Figure6: Pumping motor

XI. GEAR MOTOR

Operating Voltage 5- 9v DC .Speed 100 RPM .To Control top Roof**.**

XII. TEMPERATURE SENSOR

1-Voltage IN
2-Voltage OUT
3-Ground

Temperature sensor range is -55to150degree Celsius. 0.5 degree accuracy guaranteed.

Figure7: Temperature Sensor

XIV. HUMIDITY SENSOR

Digital temperature and humidity sensor is a composite Sensor contains a calibrated digital signal output of the temperature and humidity. Application of a dedicated digital modules collection technology. Connected with a high-performance 8-bit microcontroller. The sensor includes a resistive sense of wet components and an NTC temperature measurement device.

- Humidity sensor range is 1%to100%RH
- Humidity sensor accuracy +/-5%

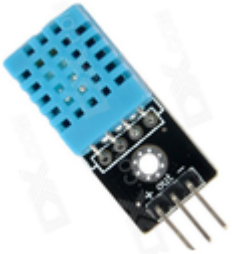

Figure8: HUMIDITY SENSOR

XIV. SINGLE CHANNEL RELAY

Used to interface microcontroller with output field instruments. Operating voltage 5vdc. It leads to Electromagnetic principle**.**

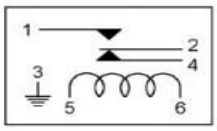

Figure9: Single Channel Relay

XV. DOUBLE CHANNEL RELAY

Operating voltage 5v dc.Used to drive the motor in 2 directions. To Open & Close Roof Top.

Figure10: Double Channel Relay

XVI. BUZZER

The buzzer is an electromagnetic type audio signaling device. Which has a coil inside which oscillates a metal plate against another, which given voltage differences produce sound of a pre defined frequency. You must be aware of sounds of a buzzer like beep sound in many appliances**.**

SPECIFICATION:

- Sound pressure at 10cm value 80db at 12v Dc.
- Frequency value 2048Hz.
- Operating voltage 3.15v dc.

Figure11: B**uzzer**

XVII. APPLICATION

Every factor influencing can be controlled in a polytunnel. Polytunnel are often used in floriculture and nurseries as the economic values of flowers can justify. It can also protect crops from intense heat, bright sunlight, strongwinds, hailstation and cold waves**.**

XVIII. FUTURE SCOPE

- If we add GSM in future to know the plant current details.
- Camera can be inserted.
- Variety of plants can be added.

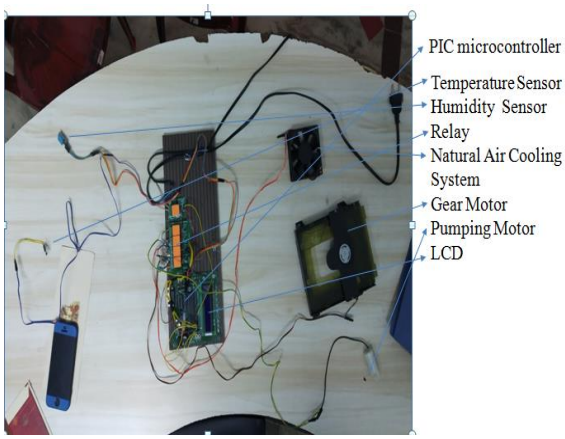

Figure12: Demo Model

XIX. RESULT

Figure13: step1

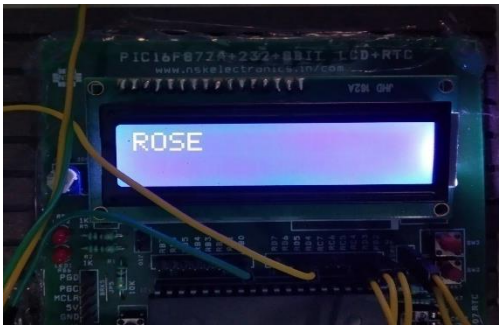

Figure14: Step 2

Figure15: Step 3

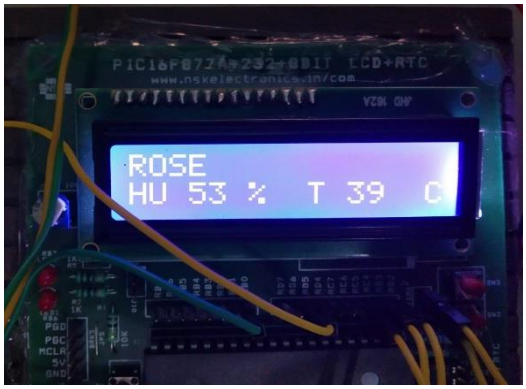

Figure16: STEP 4

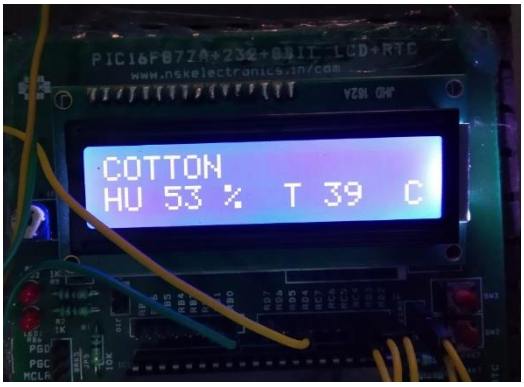

Figure17: step 5

XX. INFERENCE

This project is to create a favorable atmosphere for the plant growth within a polyhouse farm with respect to the outer environment using automation .Polytunnel are built of a pre-galvanized cum tubular structure where in crops are grown under a favorable controlled environment and other condition via.temperature, humidity, lighintensity, soilmedia, irrigation, fertilization, fustigation, and other agronomical practices throughout the season irrespective of the natural conditions outside.

XXI. CONCLUSION

- Smart polytunnel is to develop the plant growth
- Improving the productivity.
- Temperature can be measured.
- Humidity level can be calculated

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