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IOT based Smart Greenhouse

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Abstract: ***Internet of Things is one of the most important technologies of the 21st century. Smart green Housesystem is basically a system in which various sensors are used for controlling and monitoring various parameters inside greenhouse such as temperature, pressure, humidity, soil moisture, ph sensors etc. And green house is basically a place or we can call it an environment where plants like vegetables and flower and grown and they are usually covered with glass or ''translucent plastic roofs". The purpose of this project is to design an easy, easy to install, user-friendly to monitor and trace the values of parameters such as temperature, humidity, natural sunlight which are continually monitored and controlled with an aim to optimize them for getting maximum possible plant increase and yield***
Keywords: Green-House, GSM, Agriculture

I. INTRODUCTION

Agriculture In India Is Still Carried Out In Conservative Way And Lags Behindhand In Assimilating Modern Technologies. Nearby 56 Percentage Of Indian Populace Has Been Involved In Agriculture And Associated Activities.
Which Create Only 15 Percent Of Gdp So It Becomes Much Significant For The Participants Involved To Come Out Of The Conservative Agricultural Practices And Update The Agriculture Using Technology.
The Economic Influence Of Agriculture To India's Gdp Is Progressively Declining With The Country's Broad-Based Economic Growth While Large Number Of People Continues To Work In Agricultural Sector. Hence, There Is An Instant Need To Advance The System, Which Can Rise The Harvest And Food Healthy Organic Food.

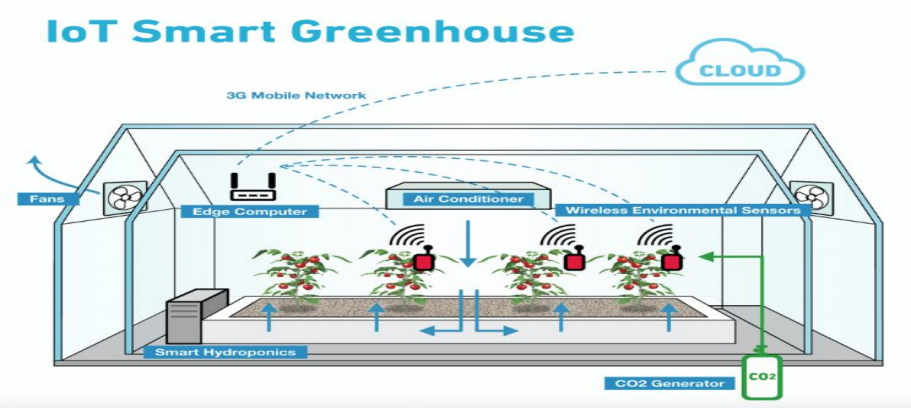


FIG.1 Green House

A. Problems Faced In Agricultural Sector

1) Places as Punjab, Which Take Sufficient Quantity Of Water Through River And Canal Irrigation System, Faces Problematic Of Soil Salinity Due To Excess Irrigation. Places With Incomplete Water Source Like Rajasthan, Appearances Problem Of Acute Water Deficiency For Agriculture.
2) Extreme Use Of Nourishments, Pesticides And Insecticides Makes The Soil Dependent On Them, Corrodes Fertility, In Increases Resistance In Bugs And Pests, Contaminates Ground Water And Close Water Forms Whenever It Rains.
3) Different Plants Need Different Quantity Of Dampness, Moisture, Temperature And Light Wave Length, And Lack Of Awareness Of This Data Or Carelessness Of A Person Cultivating Land Can Cause Plants To Die Before Maturing.
4) Once The Harvest Is Formed, Farmers Are Further Browbeaten By Middlemen In Agricultural Produce Advertising Committee (Apmc) Markets (Mandis) Due To Which Truckloads Of Money Is Earned By Those Middlemen And Farmers Are Obligatory To Sell Their Products At Throwaway Price Particularly During Zaid Period When They Grow Perishable Plant And Fruits.

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B. Introduction to Smart Agricultural Model

1) All The Above Mentioned Features Of Present Agricultural Practices Should Be Improved To Get Higher Yield. Hence, We Move In The Direction Of A Smart Greenhouse Model Where The Plant Is Provided With An Atmosphere For Its Optimum Growth.

2) Water Received From The Amalgamation Of Various Foundations Like Canal, Rain Water Reaping And From Acquisition From Tube Well Proprietors Is Stored In An Underground Tank. This Subversive Tank Is Armed With An Ultrasonic Sensor Which Sends An Sms Whenever Tank Is Empty.
Tube Well Drive Can Be Swapped On By Sending A Message To The Gsm Component By The Farmer. This Water Is Impelled Into An Overhead Cistern Which Gets Filled Using A Pump According To The Set Beginning Value. In The Air Tank Is Linked To Drop Irrigation Network Via A Valve, Which Opens When Humidity Level Decreases Below Threshold Cost.

3) Due To The Close Construction Of Greenhouse, Creatures And Pests Cannot Enter Confidential, Thus Removing The Requirement Of Insecticides. Growing Led Lights Are Swapped On When Light Strength Is Low For Picture Combination, This Safeguards Faster Rate Of Growth.

4) The Humidity And Temperature Of Air In A Greenhouse Are Restrained By Instrument And Whenever Temperature Is High Or Air Dampness Develops Too Low, Fogger Is Turned On To Provide The Required Moistness And Cool Down The Temperature.

5) Ultrasonic Sensors Are Entrenched Confidential The Bee Hive Containers To Send A Mail When The Boxes Are Full. Storing Ampules Are As Long As With Ultrasonic Sensors To Approximation The Volume And Send A Mail To An E Import Company About The Volume, Whenever The Rfid Tag Is Swiped. This Removes The Obligation Of Middleman.

Many Problems Of The Agricultural System And The Solution Adopted By Us Are Explained In Detail In The Following Sections.

II. LITERATURE SURVEY

Although India Receives Ample Amount Of Precipitation And Have Many Big River Systems But Still Only One Third Of The Entire Agricultural Land Is Associated Via Canal Irrigation System. Residual Mainstream Of The Helping Is Reliant On Monsoon Or Tube Wells. Places with Additional Water Faces Problem Of Land Saneness Due To Over Irrigation And Water Logging. Water Composed On The Surface Also Blocks Holes In The Soil And Kills Helpful Microorganisms. Otherwise, Places With Incomplete Source Of Water Cannot Do Irrigation Finished The Growing Season Because The Obligation Of Water Often Exceeds The Source Due To Conventional Type Of Irrigation Like Waterer Or In Case Allowing The Water To Just Irrigate The Field Straight From Water Drainage Channels. Effects Of Extreme And Irregular Irrigation.

Increase Salinity
Water Logging
Hindrance In Air Announcement To Plant Roots
Reduction In Infection To Soil
Land Becomes Marshy
More Nitrate Construction In Soil
Acidity Of Soil

Hence, Problem Lies In The Misused Use Of Water. For Best Use Of Water, We Use Trickle Irrigation. It Is An Irrigation Process To Save Water By Permitting Water To Board The Origins Of Plant.

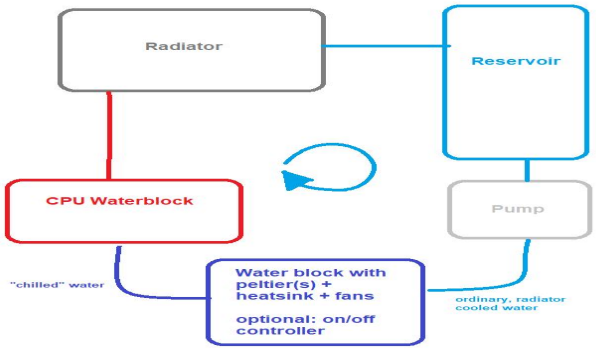


FIG.2. Water Logging

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Water Attained From All The Bases Like Canal, Rainwater Gathering Etc. Are Not Allowable To Irrigate The Fields Directly, In Its Place It Is First Stored Into An Underground Tank. Tank Is Prepared With Ultrasonic Sensor Which Procedures The Level Of Water Unceasingly And Alerts The User With A Sms Whenever Water Close Falls Under The Threshold Mark.

Comparative Humidity (Rh) Affects Leaf Growth, Photo Mixture, Fertilization Rate And Finally Crop Yield. Prolonged Dry Atmosphere Or High Temperature Can Make The Subtle Sepals Dry Fast And Result In The Death Of Flower Before Adulthood. Hence It Is Very Critical To Control Air Humidity Also Temperature. We Place Infection And Humidity Sensor Confidential The Smart Greenhouse To Amount Wetness And Temperature.

When Temperature Increases Above A Convinced Level, Microcontroller Will Trigger Relay Committed To The Fogger, Which Will Dusting Tiny Water Condensations Of Size Of Micron Which Will Continue Postponed In The Air And Take The Temperature Down. In Case The Air Dampness Falls Below The Set Value, Similar Apparatus Will Be Activated And The Small Water Droplets Will Uphold The Relative Humidity (Rh).

Various Wavelengths of Light Plays Exact Roles For Plant Development Since Dissimilar Photosynthetic Colors Within Plants. Use Different Wave lengths.. Advancement In Led Technology Have Made It Possible To Build Leeds That Emit The Light In A Very Explicit Ranges To Achieve Very Specific Consequences In Plant Growth.

We Can Effect Plants Principal And Secondary Breakdown, Which Are Straight Related With The Output Quality. To Avoid Participation Of Middleman And Their Opposing Effects On Farmers We Sustained An Iot Based Solution, To Inform The Purchasers (Agencies) About The Goods Fashioned By A Farmer.

The Agriculturalist Just Have To Put Down His Authorized Rfid Card And Then Automatically It Will Send An E-Mail To The Buyer Sharing The Information Of Amount Of Goods Produced At That Instant Of Time.

III. METHODOLOGY

A. Irrigation System

For Best Use Of Water, We Use Dribble Irrigation. It Is An Irrigation Technique To Save Water By Permitting Water To Board The Origins Of Plant.

Water Gotten Starting all the Bases Like Canal, Tube Well, Rainwater Reaping, Etc. are not Allowable to Irrigate the Fields Straight, in its place It Is first Stored Into An Subversive Cistern. Tank Is Equipped With An Ultrasonic Sensor Which Events The Equal Of Water Constantly And Warnings The User With A SMS Whenever Water Level Falls Underneath The Verge Spot. The User Then Directs An SMS to the GSM Component, Which Recovers The SMS And Activates Relay To Switch On Tube Well. The Dampness Sensors Are Deployed In The Field Which Measures The Soil Wetness And Opens The Valve Whenever Dampness Is Below Threshold And Closes It When Moisture Has Reached Optimum Value[6].

B. Air Fever and Humidity Control

We place infection and humidity device inside the smart greenhouse to amount humidity and temperature. When temperature increases above a convinced level, micro-controller will activate relay devoted to the Fogger, which will sprinkling tiny water dews of dimensions of micron which will continue postponed in the air and take the temperature down.

In Case the Air Moisture Falls below the Set Value, Similar Instrument will be activated and the Small Water Dews will Maintain the Relative Humidity (Rh). In Case The Comparative Humidity Is At Beginning And Further Cooling Is Compulsory, Peltier Module Is Used Which Can Be Powered By Solar Panels and can Control the Infection by make cold or Heating as per the requirements.

Glass Greenhouse Structure can grip the warmth throughout Night Time, that thwarts the leaves from frost taste in cold winter night in some cold and dry areas.

C. Growing LED Light

Many Wavelengths Of Light Theatres Specific Roles For Plant Growth Since Different Photo synthetic Colors Within Plants Utilize Dissimilar Wavelengths. During Morning, Leaves Accept It Directly From Sun But In Instruction To Improvement Up The Rate Of Progress, We Have As Lengthy As The Greenhouse With Plant Regrowing Lights Which Will Turn On On Each Occasion The Interpretation From Ldr Device Falls Below Cut-Off Value.

Advancement In Led Technology Have Made It Conceivable To Build Leds That Emit The Light In A Very Definite Spectra To Achieve Very Specific Outcomes In Plant Growth. We Can Affect Plants Primary And Subordinate Metabolism, Which Are Straight Related With The Output Quality.

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D. Smart Apiculture

Likewise, Apiculture Is Also Combined Inside The Setup Since It Does Not Accept Any Breeze Or Bugs From Outside Which Can Aid The Fertilization. Bee Store Boxes Are Fitted With Ultrasonic Sensor To Approximation The Existing Level Of Honey, And An E-Mail Will Be Sent To A Obtaining Unit Whenever The Level Spreads A Threshold Set Value. Thus Honey Produced Can Directly Be Sold To Finish Customers. E. End Market Joining To Save The Farmer From The Clutches Of Apmc And Middlemen, We Have Designed A Marketing System Which Attaches Farmer To Customer Directly, Circumventing The Middlemen. The Storing House Will Have Containers Equipped With Ultrasonic Sensor That Are Used To Approximation The Volume Of The Products Inside. Whenever Fruits And Potatoes Are Plucked, They Are Stored In These Ampules And Farmer Will Putdown A Rfid Tag, And The Data From All The Ampules Will Be Updated On Google Worksheet .Hence The Buyer Has The Knowledge Of The Quantity Stored By Farmer.[7]

IV. IMPLEMENTATION

A. Hardware-Software Resources

1) Launchpad CC3200
2) Accessible WIFI
3) Ultrasonic Sensor.
4) Regrowing LED Lights
5) PELITER Fan
6) GSM SIM900A
7) RFID Tag and Sensor
8) LCD for Display
9) Relays for Connecting Pump.
10) ENERGIA (Software)
11) 12V Battery or 12V Adapter

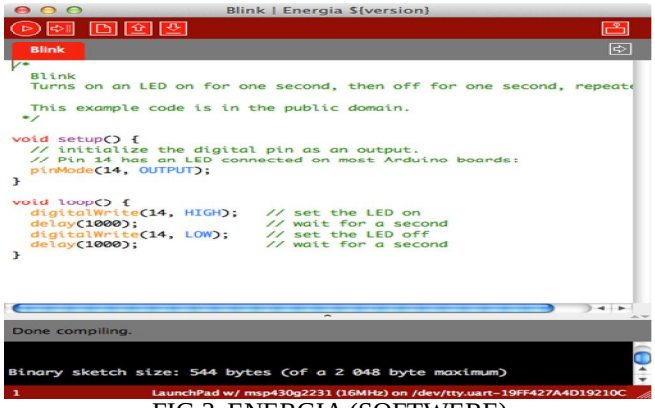


FIG.3. ENERGIA (SOFTWERE)

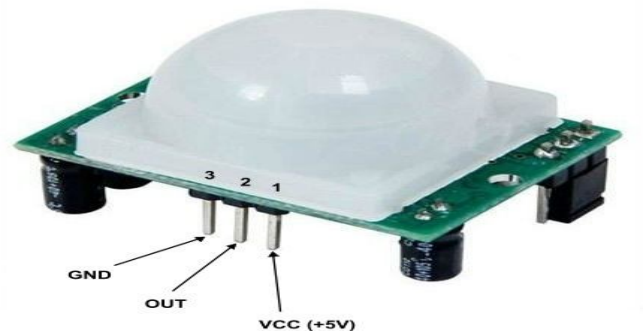


FIG.4. RFID Tag and Sensor

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FIG.5. PELITER FAN



FIG.6. Water-Gun

B. Setup

The Ultrasonic Sensor. Is Attach To Launchpad Cc3200

Is Powered Up By Out Side 12v Battery Or 12v Adapter. The Home Appliances Are Join To Mains Through Transfer Which In Turn Is Join To A Future Digital Pin Of The Board. RFID Tag And Sensor Work Properly The Board Is Programmed To Have Access To The Local Wi-Fi..



Fig.7. Green House

V. FURTHER SCOPE

The Smart Greenhouse Can Be Further Upgraded In Many Habits And Can Be Rummage-Sale In Wide Agricultural Applications. It Can Be Placed And Operated In Some Of The Environmental Conditions To Grow Any Kind Of Vegetation. Non-Conformist Energy Sources Such As Solar Panels[10], Wind Mills Are Used To Supply Power To The Automatic Greenhouse Apparatus And Peltier Effect For Cooling Resolve. [11]Soil-Less Farming Can Be Complete To Additional Improve The Nutritious Value.

Integration Of Farming With Iot Can Make It Much More Effective And Lucrative Action. Smart Greenhouse Has A Positive Scope Of Future In Agriculture Field And It Will Make A Rebellion In The Way The Agriculture Is Conceded Out In India.

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VI. CONCLUSION

The Benefit of Smart Greenhouse Over Conservative Agricultural is that we were able to produce pesticide and insecticide free crops and make a weather for the correct growth of flowers and even provides alternative basis of income through apiculture, Selling Tube Well Water Etc.

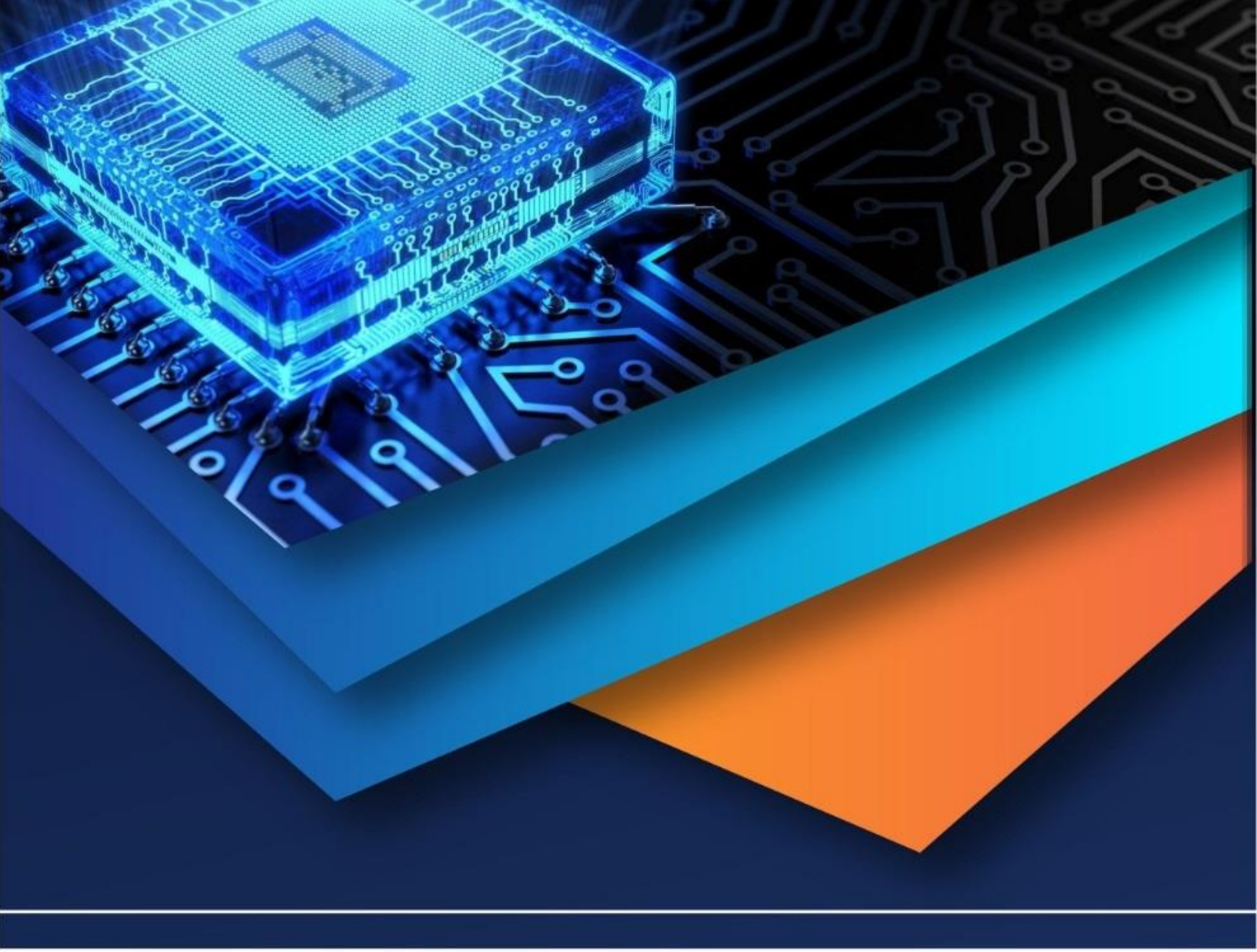
Moreover, this organization can be fitted by any separated in his house (rooftop greenhouse), who doesn't have knowledge about undeveloped. since any can continue some climatic disorder in this type of greenhouse, it is imaginable to nurture any type of crop. Hence, We Grow Plants Like Hibiscus Which Are Trafficked To India. We Can Decrease 70%-80% Water Requirement.

It Also Increases Yield And Rate Of Growth And Produces Organic Agricultural Products. Most Significantly, We Are Able To Connect Farmer Directly To Consumer Using Iot, Which Can Save Him From The Controls Of Middlemen. It Reduces Effort And Time Of Farmer Makes Farming Efficient And Profitable Activity.

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