

# Smart Farming And Irrigation Automation Techniques To Improve Coconut And Palm Cultivation Using Iot

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**Abstract:** *Irrigation Performance Was Only Restricted To 30 To 50 Percent In Conventional Coconut/Palm Garden Irrigation Systems Such As Flood Irrigation, Basin Irrigation, And So On, Due To Substantial Water Wastage. Furthermore, The Cost Of These Systems' Inputs, Such As Labor And Electricity, Is High. Water Scarcity, As Well As Rising Labor Through Use Of Conventional Irrigation Systems Is Hampered By The High Cost For Energy And Water., Is The Most Appropriate Irrigation System For Coconut And Palm Trees In These Circumstances. Envisaged Workexamines Potential Of The Latest Emerging ICT Technologies In Agriculture, With An Emphasis On Coconut Tree Cultivation. The Conventional Mechanism Is Replaced By Smart Agriculture. A Multi-Model Data Collection Method Is Proposed In This Paper. With The Aid Of Sensors, It Collects Wide Spectrums Along With Environmental Data Like Ph Value, Vapour Level Content In The Soil Which Will Be Used.*

**Keywords:** *Internet Of Things, Smart Farming And Irrigation, Servo Motor, IR Sensors, Raspberry Pi, Pick and Place Robot*

## 1. INTRODUCTION

The New Phrase In Iot, Or Internet Of Things, Is “Smart Anything, Everywhere,” Which Combines Intelligence, Autonomy, And Connectivity. Smart Systems Are Today's Innovation Catalysts; Highly Automated, Intelligent Systems Are Taking Over Chores, Services, And, Maybe, Control Of Our Lives In All Areas Of Industry And Society. Where Labor Is A Bottleneck In The System, Smart Farming Technologies Can Help. This Occurs In Developed Countries With A Labor Shortage In The Agricultural Sector And A Pressing Need For More Intense Production To Meet Rising Food Demand. In Advanced Economies, Labor Is A Concern For Many Farming Activities, Particularly For Small Farms Or Marginal Farming With Dispersed Or Difficult-To-Access Fields. For Unique Agricultural Production In Difficult-To-Manipulate Environments, Specialized People Are Expected. Smart Irrigation

Techniques Can Help Consumers Save Water Outdoors. Weather Data Or Soil Moisture Data Are Being Used By Smart Irrigation Technologies To Determine The Landscape's Irrigation Requirements. Many Businesses And Companies Are Automating Their Fields As The World Shifts Toward Automation. When The Microcontroller Has Extracted The Data From The Soil, It Uses.

### 1.1 Data Collection

WIFI To Transfer It To The Data Collection Center. The Gathered Data Is Fed Into A Dedicated Classifier For Diagnosing Coconut Tree Deficiency Diseases Such As Button Shedding. Excess Acidity Or Alkalinity, Inadequate Drainage Facilities, Extreme And Prolonged Drought, Genetic Abnormalities, Insufficient Nutrients, Excessive Pollination, Hormone Deficiency, Insect Pests, Or Poor Management Practices May All Cause Premature Nut And Button Shedding. It Also Focuses On Increasing Coconut Yields By Tracking And Regulating The Soil's Ph And Moisture Level. As A Result, Iot-Based Smart Agriculture In Coconut Tree Cultivation Saves Time And Money On Soil Research. It Also Offers Periodic Soil Quality Monitoring As Well As Fertilizer Recommendations. It Will Be Extremely Beneficial To The Farming Community. As A Result, The Paper's Results Would Help Successful Agricultural Practices In Coconut Tree Cultivation. Farmers Can Get The Most Out Of Their Farms By Using Smart Farming And Irrigation Automation Methods.

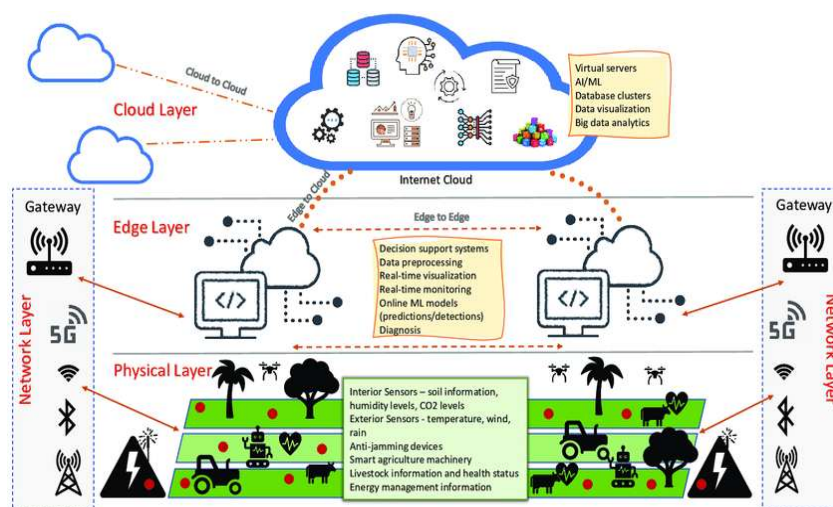


Fig.1.Smart Farming System Using Iot

## 2. LITERATURE REVIEW

In [1] It Is Mentioned About These Solutions Transform The Way Field Resource Management Is Performed, As They Developed An Embedded Linux Infrastructure Enabling Platforms, Which Comprises A Computer System, Applications, With Use Of Paramount Key Apps.As An Irrigation Control System, This Programme Makes Advantage Of The GPRS Capability Of A Mobile Phone.They Also Stated That The Microcontroller Would Be Deployed To Boost The System's Output While Lessening Power Usage.

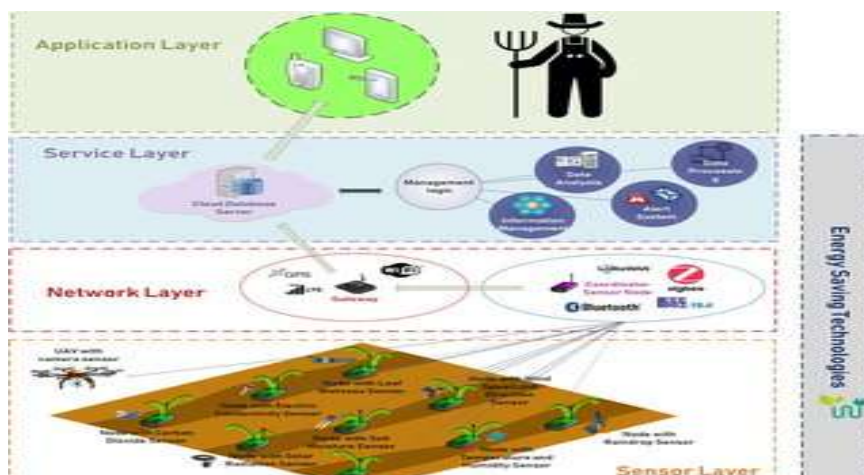


Fig.2 Network Layer Communication Through GSM

In [2] Using A Computerised Servo Controller Rain Information Communication Technology Based Machine Watering Methodology That Only Initiates Irrigation When There Is A High Water Usage, A Significant Quantity Of Water Is Saved. They Are Adopting A Method To Address Under Irrigation And Over Irrigation, Many Of Which Result In Leaching And Nutrient Loss In The Soil. In [10] According To Proper Performance Of Robotic Soil Management Unit Integrating Sensor Along With Microchip, Unplanned Fertiliser Application Leads In Even Worse Crop Quality the Employment Of ISFET And Photonic Devices As Analysing Probes In Conventional Farming Quality Analysis Methodologies Has Been Proven To Be Much More Complicated.

The Prototype Design Will Allow Fertilisers To Be Administered In Areas Wherever Key Macronutrients (Nitrogen, Phosphorus, And Potassium) Are Inadequate, Demonstrating That It Is A Close To Zero, Gardener Robotic Fertilisation Equipment This Innovative Approach Also Has A Low Power Consumption Since It Allows For Actual World Moisture Threshold Computing Methodology, Which Helps Farmers In Making Sure That Original Threshold Value Is Retained , Thus The Optimum Moisture Content Value For A Specific Building While Decreasing Sometimes Harmful Effects On The Environment. In [15] Agriculture Is A Vital Means Of Income For Our Rural People, And It Has Had A Considerable Influence On Economic Growth, According To The Computerized Rainwater Harvesting Based Approach. Crop Development Is Essential For Improved Yield And Higher Quality Delivery. As A Consequence, Optimum Parameters And Appropriate Moisture In Crop Beds Can Have A Substantial Influence On Productivity. Implementing A Scheduled Watering Strategy Helps Improve Water System Maintenance.

### 3. PROPOSED MODEL

Irrigation In Coconut And Palm Cultivation Is Performed By Hand, And Manpower Is Used To Search For Dryness And Moisture. When Neutralizing The Acidic Or Basic Level, The Ph Values Of The Soil Were Not Taken Into Account. Appropriate Chemical Compounds For The Coconut's Health Were Not Added. A Temperature Sensor Is Part Of A Smart Irrigation System. This Temperature Sensor Is Mounted On The Irrigation Field At A Particular Spot. Linear Programming Is Used In An Automated Intelligent Wireless Drip

Irrigation System To Get The Most Benefit From Available Water And Crop Water Requirements. The Decision Support System Assists In Making Irrigation Decisions For Various Crop Fields. After That Microcontroller Gathers Input Sets From The Soil, It Transfers That Through WIFI To The Data Collecting Centre.

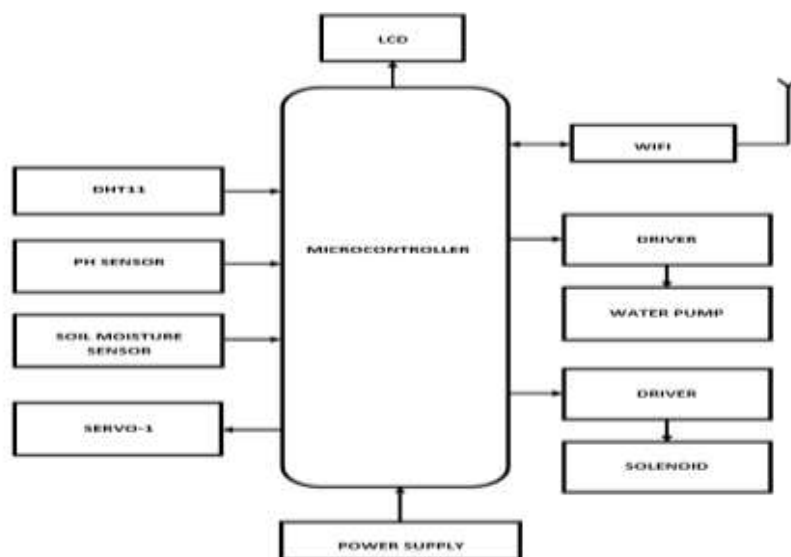


Fig.3 Module Of The Proposed System

### 3.1 Drawbacks Of The Existing System

In Order For Smart Agriculture To Work, Internet Access Must Be Available At All Times. Many Poor Regions In Affluent Nations Do Not Fulfill This Requirement. Furthermore, The Network Web Server Is Sluggish.. Data On Barcodes Is More Constrained In Terms Of Form And Length. In Order To Employ Sophisticated Agricultural Equipment, Agriculturists Must Comprehend And Learn How To Use Latest SAAS Software Technologies. Adopting Smart Agriculture Farming On A Wide Scale Across Countries Is A Major Challenge. Premature Nut And Button Shedding Can Be Caused By High Acidity Or Alkalinity, Insufficient Drainage Facilities, Acute And Persistent Drought, Genetic Aberrations, Insufficient Nutrients, Excessive Pollination, Hormone Deficit, Insect Pests, Or Poor Management Strategies. Without The Introduction Of Iot Concept, Multiple Data Gets Trafficked And Thus By Cause Loss Of Data Which Is A Major Drawback.

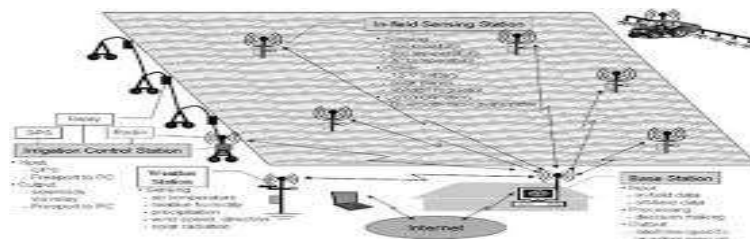


Fig.4. Data Trafficking Without Iot Usage

### 3.1 Advantages Of Proposed System

Its Reliability since A Portion Of The Current System Does Not Achieve Reliability, The Intention Is To Build A Reliable System That Overcomes Some Of The Shortcomings Of The Existing System's Restricted Use. Also Its Flexibility since The Current Method Was Confined To A Single Technique, The New System Would Be More Adaptable To A Number Of Other Techniques. Cost Efficient Because The Word GCS (Google Cloud Service) Is Implemented In The Proposed Framework As A Substitute For The Current System's GSM/GPRS Module. This Will Benefit The Proposed Architecture's Low Development Costs.

#### 4. CIRCUIT DIAGRAM OF PROPOSED SYSTEM

The Volumetric Water Content Of Sample Is Measured Using The Soil Moisture Sensor. As A Result, It Is Appropriate For Plant Pathology, Planetary Geology, Oceanography, Gardening, Vegetation, And Physiology Research. We Are Employing The Drip Irrigation System To Evaluate The Most Efficient Soil Moisture Levels For Different Plants By Measuring Freshwater Loss Due To Perspiration And Seedling Absorption Over Time. The Below Circuit Consists Of A Soil Moisture Sensor, Relay Driver, Power Supply And Ph Sensor To Run The Circuit. It Has Also LCD Display The Temperature And Humidity Measurements.

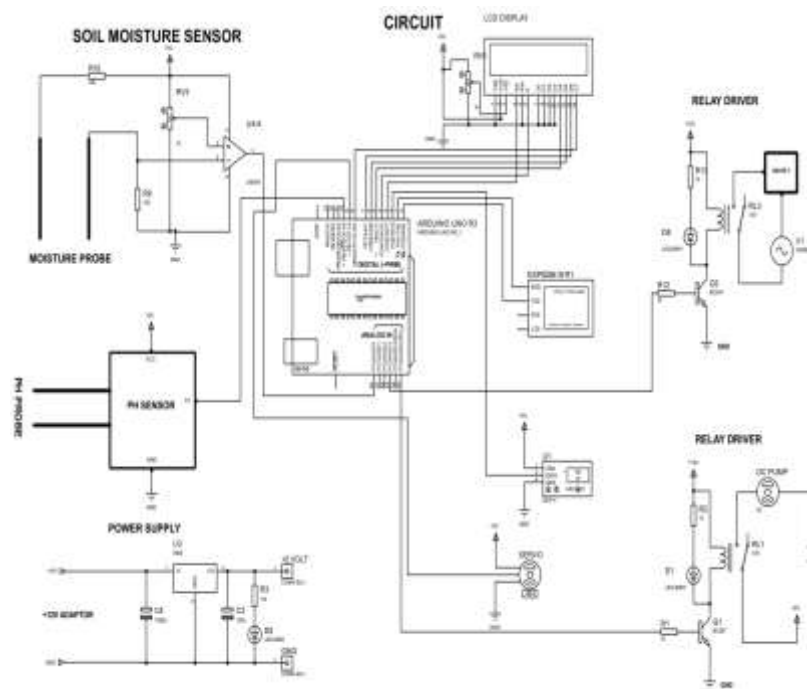


Fig.5 Circuit Of Proposed System

#### 5. RESULT ANALYSIS

The Cost Of The Entire System Will Increase Massively With The Use Of Iot Technology. In Both Urban And Rural Areas, Community Agriculture Is Taking Advantage Of Hardware And Software Resources As Well As Enormous Amounts Of Data. Systems That Assess Big Quantities Of Information To Increase Operational Efficiency And Productivity Are Characterized As Decision Support Systems. Food Production Has A

Logistically And Qualitative Traceability That Allows For Production Efficiency And Input Environmental Sustainability Through The Use Of Real-Time Data For Decision Making. Automatic Irrigation Systems That Are Controlled Through Sensors For Measuring Temperature, Humidity, And Soil Moisture. Crop Surveillance That Enables For Economies Of Scale And The Suppression Of Acidity Of The Soil .So, Akind Website Has Been Created To Monitor The Acidic And Basic Levels Of The Soil, As Well As The Atmospheric Environment Suitable For Coconut And Farm Cultivation.

Table 1. PUMP Status With Respect To Different Temperature And Humidity [ Main Web Page]

<b>DAT E AND TIME</b>	<b>TEMPERATURE(Cel cius)</b>	<b>HUMIDITY( %)</b>	<b>P h</b>	<b>SOLENO ID STATUS- ACIDIC SOLUTI ON</b>	<b>SERVO STATUS- BASIC SOLUTI ON</b>	<b>PUMP STAT US</b>
2021-03-05 15:31: 43	32	34	4	ON	OFF	ON
2021-03-05 15:32: 48	32	31	8	OFF	ON	OFF
2021-03-05 15:33: 54	33	37	12	OFF	ON	ON
2021-03-05 15:35: 00	33	39	1	ON	OFF	ON
2021-03-05 15:36: 06	33	40	3	ON	OFF	ON
2021-03-05 15:41: 23	33	32	7	OFF	OFF	OFF

High Acidity Or Alkalinity, Insufficient Drainage Facilities, Acute And Prolonged Dryness, Genetic Abnormalities, Insufficient Nutrients, Excessive Pollination, Hormone Shortfall, Insect Pests, Or Poor Management Tactics Can All Cause Premature Nut And Button Shedding. The Below Graph Denotes Ph Level Acidic With Soil Moisture Vs Temperature Readings.

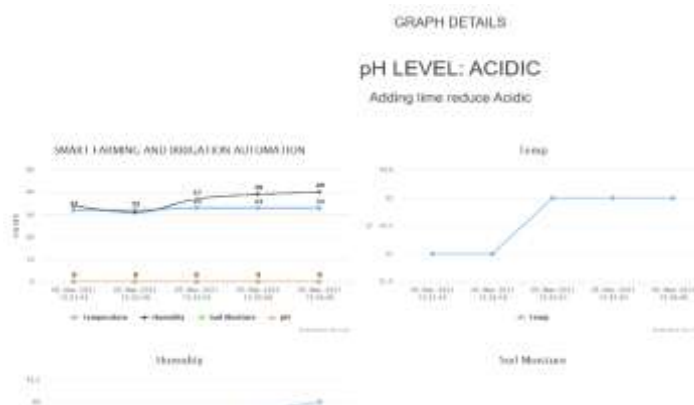


Fig.6 Graphical Representation Of Acidity Level

Irrigation Systems That Are Automatically Regulated By Sensors That Measure Temperature, Humidity, And Soil Moisture. Crop Surveillance That Allows For Economies Of Scale And The Reduction Of Soil Acidity. As A Result, A Helpful Website Has Been Developed To Track The Acidic And Basic Levels Of The Soil, As Well As The Air Condition Suited For Coconut And Agricultural Production. The Below Graph Denotes Ph Level Acidic With Soil Moisture Vs Temperature Readings.

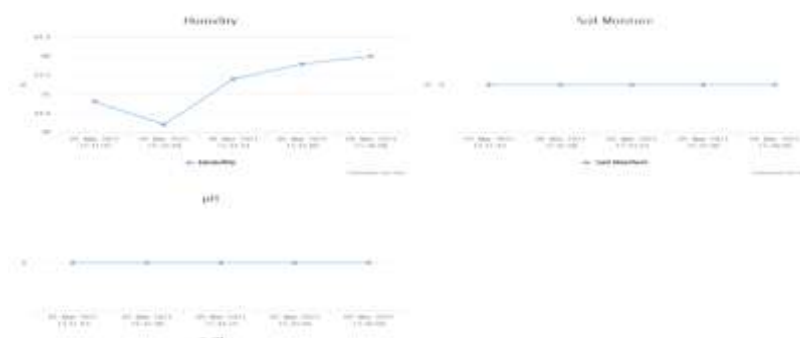


Fig.7 Graphical Representation Of Other Parameters – Soil Moisture, Humidity.

## 6. CONCLUSION

Due To Server Upgrades, Farmers Can Learn About The Nature Of Respective Crop Fields At Any Time And From Any Place. It Has The Ability To Save Up To 45 Percent On Water Use As Compared To Traditional Irrigation. Recently, There Has Been A Major Increase In The Implementation Of IOT, With The Key Problem Being Network Reliability And Power Consumption. As A Result, This Suggested Framework Includes Greaterefficientmethodologies For Input Value Clustering As Well As Actionable Insights, Productive Node Density, And Assimilating With General Software Frameworks, As Well As Bolstering For Additional Information And Communication Technology Protocols Like Transmission Control Protocol - MQTT And Coap, Allowing For Rigorous Empirical Association With Evaluation Methodologies. It Saves Time And Reduces Human Mistake In Altering The Water Threshold Value That Is Existing Now, Allowing Them To Increase The Earnings Based On Several Parameters Such As Sales, Quality, And Growth. We Have



Enhanced The Existing System By Using A Comprehensive Information And Communication Technology (ICT) Based Systems In This Field. A Convenient And Enhanced Smart Phone Facility Was Used Here To Boost The Information That Was Used To Convey Messages To Farmers Frequently. We Have Employed Broadband Technologies To Create A Low-Cost Solution. Perhaps This Machine Will Not Have A Connection Problem. A Burglary Control System Was Also Employed In This Situation. We'll Try To Find The Liquid Level Per Plant Sampling By Using This Advanced Industry 4.0 Technologies.

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