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Smart Greenhouse using IOT

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Abstract: ***The introduction of conventional methodology as an IOT with the new technologies (internet of things). Agriculture plays a crucial role in the growth of agricultural countries, such as India, where the most of the people are connected directly or indirectly in the cultivation of crops. The typical approach requires a lot of human intuition that struggle at the moment. By modernizing the new conventional methodology of agriculture, the solution to this issue is smart agriculture. In order to manage and track agricultural activities with minimal human efforts, these technologies are being created. The s sensor consists of a humidity sensor, a temperature sensor, a humidity sensor, a light intensity sensor and a Wi-Fi module. The sensor part that interfaces with Arduino alerts the user via the Android application. Based on this, we classify existing and potential patterns of IoT in agriculture by analysis.***

Index Terms: IOT, Arduino, Intelligent Farming System, Sensor.

I. INTRODUCTION

The idea of IoT gained attention in 1999, thanks to MIT 's automatic identification center and its relevant market research publications. The IoT has get big trend of next generation technologies that may impact the complete scale of the enterprise with large advantages which are the next generation connectivity of end devices, systems and services. The IoT makes suitable solutions for different things likes smart healthcare, smart cities, smart security, smart retail, smart industries and smart traffic congestion control and smart agriculture. Green-house is an important part of agriculture because it allows you to get good yields by growing your crops in a controlled climate. Android application controlled green-houses provide the ability to monitor and control climatic conditions that directly or indirectly control plant growth and production. The greenhouse is the best option to improve performance. Manually operated seedling sheds often face many problems, such as visual inspection of plant growth, manual watering, control of opening and digestion, and manual application of fertilizers and pesticides. It is incorrect and unreliable due to time consuming and risk of human error. The Android application greenhouse is the best solution. Eliminate the complexity of the system by reducing individual participation in the optimal environment.

Today, due to the growing influence of the Internet on everyday life, With the infrastructure to connect billions of devices, advances in sensor and sensors technology in recent years have enabled the use of different sensors that can monitor barriers and different environments. As a result, these techniques are widely used in agriculture and make life a little easier for farmers. Therefore, different sensors and control devices can be used to collects environmental information in the greenhouse and transmit it to the control android application via the Internet. These sensors detect the change and read it from the data on its input ports.There have been attempts on a wireless sensor network that can collect data from a receiving device and send it to a backend server.

Collected data from different sensors on various environ-mental condition that monitor the entire system. Monitoring of the environment and crop production is not just a matter of crop testing, but there are many other factors that affect crop management, soil and crop monitoring, light, water overflow and high temperature. The IoT can provide an organized sys-tem of limited-resources available to help and best utilizes IoT and increase your productivity. The objective of the proposed system is to improve the quality of crop products, and also maintain basic properties of agriculture, by assembling period of time knowledge on the surroundings. Thus, it's necessary to optimize the resources utilized in agricultural processes, primarily within the irrigation system.

II. LITERATURE REVIEW

The system contains integration intelligence in controller and sensors using Arduino uno smart platform networking objects utilizing Zigbee innovation, encourage intelligent with keen objects utilizing cloud administrations.[1]

Water system of the agriculture field is carried out using programmed drip water system, which works concurring to the soil dampness limit set appropriately so that the ideal sum of water is given to the plants.[2]

The new scenario of decreasing water tables, drying up of rivers and reservoirs, the unpredictable environment presents an urgent need for an appropriate use of water. To cope with this use of temperature and humidity sensor at suitable places for crop monitoring is implemented.[3]

Innovative advances in remote sensor networks have made it conceivable to utilize nursery boundaries in accuracy agribusi-ness for observing and control.[4]

After study in the field of agriculture, researchers have found that agricultural yields are declining day by day. How-ever, in the field of agriculture, the use of technology plays an important role in increasing crop productivity and also reducing the efforts of additional human resources and power. Some of the research efforts are carried out to boost farmers, providing systems that use technologies that are useful for growing agriculture yields. Y. Kim developed a remote sensing and irrigation control system utilizing a distributed wireless sensor network aimed at variable rate irrigation, real time field sensing, and site-specific precision linear movement irrigation system control to optimize efficiency with minimal water usage. The device defined specifics of the variable rate irrigation architecture and instrumentation, the wireless sensor network, and real-time field sensing and control through the use of suitable software. Five field sensor stations were used to create the whole system, which collects the data and sends it to the base station using the Global Positioning System (GPS) where appropriate irrigation control steps were taken according to the database available with the system. As well as remote control for precision agriculture, the device offers a promising low-cost wireless solution.[5]

Ravi Kodali and his group say that, this work gives a model of a smart green-house, which assists the farmers to do the work in a farm automatically without the utilization of much hand-worked review. The farming of field is done utilizing automatic drip system, which operates works as per the soil moisture limit set as per needs so as optimal amount of water is applied to the plants. [6]

Bharat Institute of Technology gave a report on, The Project Green Bee dependent on Monitor and Control of greenhouse/nursery climate. As per the report, the framework is displayed for the automation of greenhouse/nursery utilizing installed system.[7]

The fresher situation of diminishing water tables, evaporating of waterways and tanks, flighty climate present a critical need of legitimate use of water. To adapt up to this utilization of temperature and moisture sensor at appropriate areas for observing of harvests is carried out in. [8]

A calculation created with limit estimations of temperature and soil dampness can be customized into a microcontroller-based passage to control water amount. The framework can be fueled by photovoltaic boards and can have a duplex correspondence connect dependent on a cell Web interface that permits information investigation and water system planning to be customized through a website page. [9]

Proposes an electronic framework which incorporates the utilizations of IoT. The framework screens viewpoints, for example, moisture and can handle the moisture level dependent on an edge esteem. In this manner the proposed framework is equipped for checking and controlling the boundaries locally.[10]

Executes a programmed irrigation IoT framework dependent on Ardiuno to modernize and improve crop profitability. The point of the proposed paper is to expand crop efficiency with less water utilization by using moisture and temperature sensors and calculating the amount of water needed for cultivation dependent on the sensor information, in this way boosting the crop yield. [11]

S. Muthunpandian has proposed a automated framework has been planned and executed on for crop field checking consistently. The framework keeps up the water levels in the field at power utilization in the yield field. Created framework is valuable in the water system system.[12]

III. PROPOSED SYSTEM

The Proposed System utilizes the idea of the Internet of Things. Internet of Things is an environment for connecting the aavailable physical articles with internet so they could be used through internet and in this each physical item is assigned with and IP address along these making them capable enough for gathering and transferring information over an organization with no manual intervention.

The proposed framework will give a keen answer for green house. It ends up carrying out the innovation of Internet of things alongside the traditional frameworks available. We made a complete model of smart green-house for executing our system.

The advanced framework is an embedded framework which will intently notice and control the climatic factors of a green-house/nursery continuously for cultivating of harvests or explicit plant species which could boost their production over the entire yield development season and to wipe out the troubles engaged with the framework by decreasing human mediation to the most ideal extent.

It is Arduino Uno based system that controls and monitors the values of different parameters like temperature, light intensity, soil moisture and humidity.

The Arduino Uno get physical values through sensors which are connected to arduino. After that data connected by the sensor is transmitted to the module GPRS.
GPRS module send the data to servers.
Users can control and monitor the system.
Example, if temperature cross the limit then fan automat-ically start so its push down the temperature to normal level.
The paper points a high accuracy checking the informa-tion and control agriculture computerization framework with Internet of Things technologies. The framework for the most part centers moisture varieties connect with temperature changes information by brilliant sensors and controls water system framework.
At the point when any of the above pronounced climatic factors pass an ensured boundary which must be kept up to wellbeing the harvests, the sensors sense the change and the microcontroller peruses this from the information at its input ports in the wake of being changed to an advanced structure. The microcontroller then executes the required activities by involving transfers forthcoming the wandered-out factors has been direct back to its ideal level. Since a microcontroller is utilized as the core of the framework, it makes the set-up ease and powerful in any case.

IV. SYSTEM BLOCK DIAGRAM

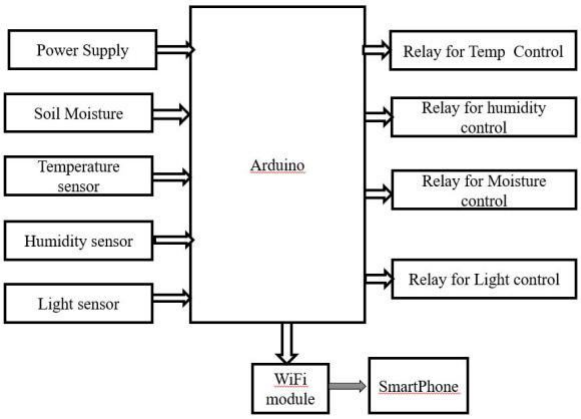

Fig. 1. System Block Diagram.

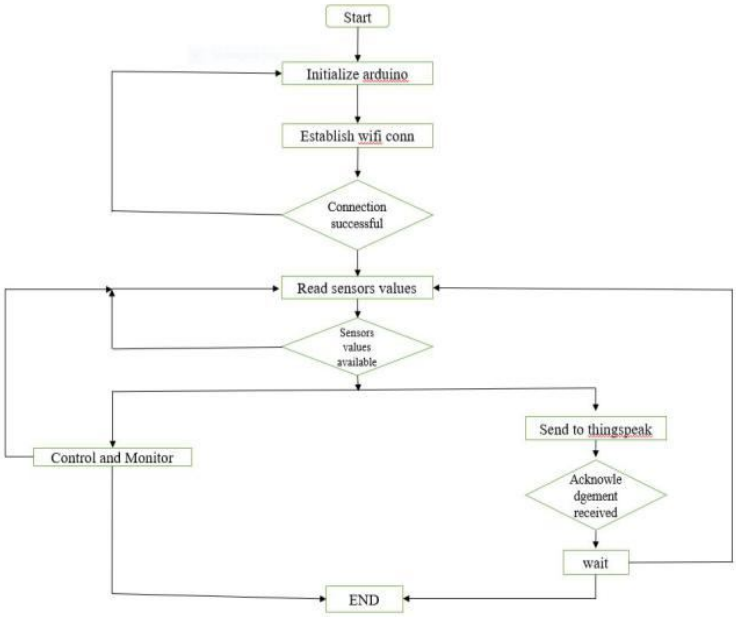

Fig. 2. System Architecture.

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V. DATA FLOW DIAGRAM

A Data Flow Diagram[DFD] gives the flow of information of system.
DFD diagram shows control by Relay of greenhouse and display information on LCD screen.
Smart greenhouse system use sensor to senses humidity, light, soil moisture etc. upload data on server.

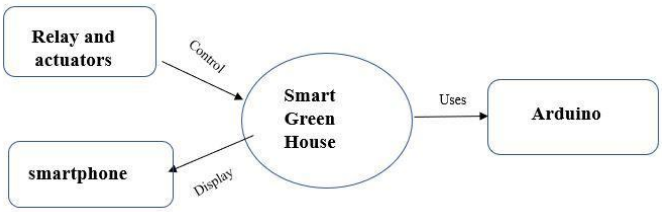

Fig. 3. DFD 0.

It is a system based on a microcontroller that gives physical values of different sensors, such as light in-tensity, temperature, humidity, soil moisture Values are continuously modified and optimized to achieve optimum growth of crop.
The data and its status can be accessed directly on the Android application. .There of the following sensors that will going to be used in this project.

1) Moisture sensor,
2) Light sensor,
3) Temperature sensor and
4) Humidity sensor.

VI. SYSTEM ARCHITECTURE

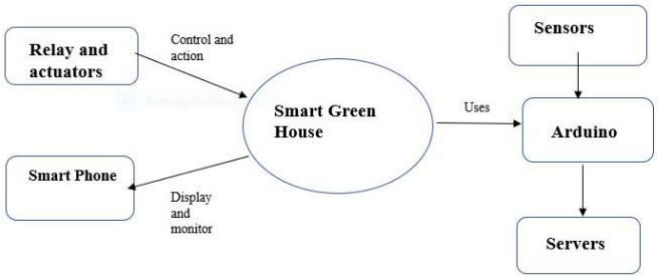

Fig. 4. DFD 1.

VII.HARDWARE USE

A. Power Supply

The philosophical model that describes a system's configuration, behavior and vision is a system architecture.
The Arduino board can be powered up with different type of power sources so we can use adapter. Adapter can be used to convert 30V ac to 12V and this can be connected to power jack .It can supply 230V power supply.

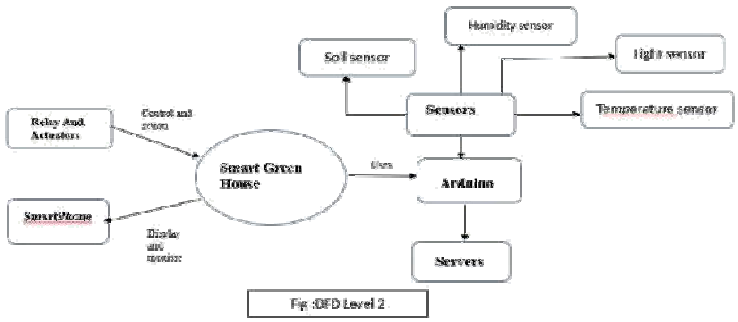

Fig. 5. DFD 2.

B. Temperature Sensor

A temperature sensor (LM35) sensor is an instrumental equipment which is used to measure temperature or heat on the machine part and its connect to arduino uno.

Fig. 6. LM35 Sensor.

C. Humidity Sensor

It detects the relationship between humidity in the air. Humidity is the measure of water vapour present in the air. Humidity measurements are an important tool for predicting the climate outdoors as well as for controlling the climate indoors.

Fig. 7. Humidity Sensor.

D. Moisture Sensor

Soil moisture sensor is used to measure moisture and water moisture of soil. If water moisture level is low then user get the alert message.

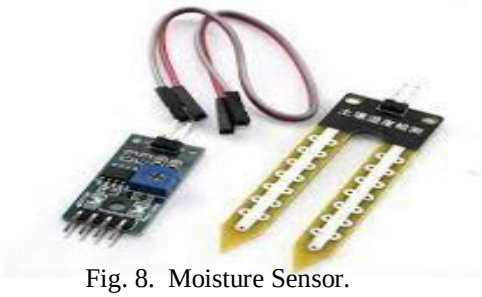

Fig. 8. Moisture Sensor.

E. Display Unit

It display all the unit which sensors are giving the physical values to micro-controller.

Fig. 9. LCD Display.

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F. WIFI Module

It is low cost serial-to-Wi-Fi. Its give any Arduino controller get the access of your Wi-Fi network.

Fig. 10. WIFI Module.

G. Light Intensity Sensor

Light intensity sensor a simple concept. It automatically turns ON the lights on when sunlight descends below the visible regions of our eyes and automatically turns OFF on the lights when sunlight falls on them (in the morning), using a sensor called LDR (Light Dependent Resistor) which detects light like our eyes.

Fig. 11. Light Intensity Sensor.

H. Relay

The electromagnetic coil attracts a plate, which is attached to a switch. Thus, the movement of the switch (ON and OFF) is controlled by the current flowing to the coil, or not, respectively. It is very useful characteristic of a relay is that it is often customary to electrically isolate different parts of a circuit. This will allow a low voltage circuit (eg 5VDC) to modify the installation during a high voltage circuit (eg 100 VAC or more).

Fig. 12. Relay.

I. Arduino Microcontroller

Arduino Uno is an open-source platform software and hardware .There are total 20 pins mounted on a board, from these , 14 are digital pins and denoted by D0,.,.,.,.,.,.,D13 and 6 analog pins A0,.,.,.,.A5. Arduino board can be connected to pc using usb cable .it has two different connectors at its two ends. Power is given to arduino by two ways one is usb cable and another power extension adapter.

Fig. 13. Arduino Microcontroller.

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VIII. CONCLUSION

Here, proposed design is implemented with Arduino plat-form for greenhouse monitoring, controlling temperature and soil moisture with the help of Android application using IOT. We can predict soil moisture level .Irrigation system can be monitored. So using the IOT technology we can Increased the productivity of crop.

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Based on this, we classify existing and potential patterns of IoT in agriculture by analysis.

Sources	Similarity
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The idea of IoT gained attention in 1999, thanks to MIT's automatic identification center and its relevant market research publications. The IoT has get big trend of next generation technologies that may impact the complete scale of the enterprise with large advantages which are the next generation connectivity of end devices, systems and services. The IoT makes suitable solutions for different things likes smart healthcare, smart cities, smart security, smart retail, smart industries and smart traffic congestion control and smart agriculture. Green-house is an important part of agriculture because it allows you to get good yields by growing your crops in a controlled climate. Android application controlled green-houses provide the ability to monitor and control climatic conditions that directly or indirectly control plant growth and production. The greenhouse is the best option to improve performance. Manually operated seedling sheds often face many problems, such as visual inspection of plant growth, manual watering, control of opening and digestion, and manual application of fertilizers and pesticides. It is incorrect and unreliable due to time consuming and risk of human error. The Android application greenhouse is the best solution. Eliminate the complexity of the system by reducing individual participation in the optimal environment.
Today, due to the growing influence of the Internet on everyday life, With the infrastructure to connect billions of devices, advances in sensor and sensors technology in recent years have enabled the use of different sensors that can monitor barriers and different environments. As a result, these techniques are widely used in agriculture and make life a little easier for farmers. Therefore, different sensors and control devices can be used to collects environmental information in the greenhouse and transmit it to the control android application via the Internet. These sensors detect the change and read it from the data on its input ports. There have been attempts on a wireless sensor network that can collect data from a receiving device and send it to a backend server.

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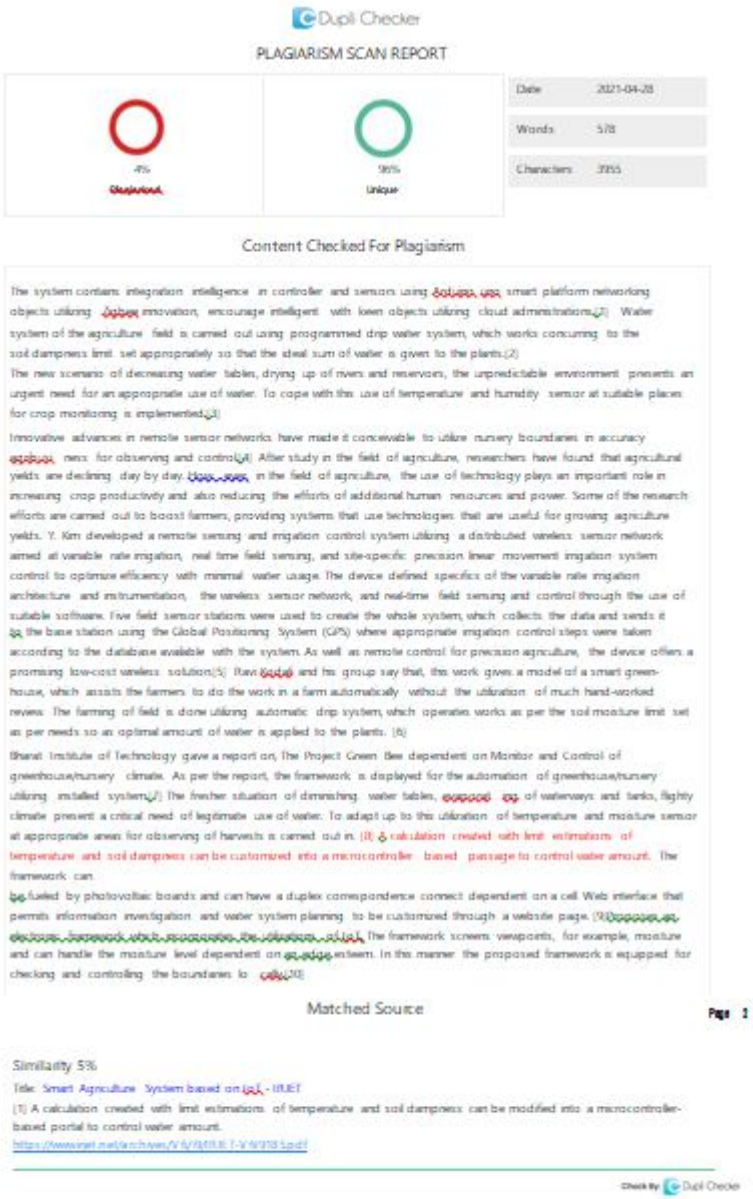

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The system contains integration intelligence in controller and sensors using ... smart platform networking objects utilizing ... innovation, encourage intelligent with keen objects utilizing cloud administrations.[2] Water system of the agriculture field is carried out using programmed drip water system, which works concurring to the soil dampness limit set appropriately so that the ideal sum of water is given to the plants.[2]

The new scenario of decreasing water tables, drying up of rivers and reservoirs, the unpredictable environment presents an urgent need for an appropriate use of water. To cope with this use of temperature and humidity sensor at suitable places for crop monitoring is implemented.[3]

Innovative advances in remote sensor networks have made it conceivable to utilize nursery boundaries in accuracy ... news for observing and control.[4] After study in the field of agriculture, researchers have found that agricultural yields are declining day by day. ... in the field of agriculture, the use of technology plays an important role in increasing crop productivity and also reducing the efforts of additional human resources and power. Some of the research efforts are carried out to boost farmers, providing systems that use technologies that are useful for growing agriculture yields. Y. Kim developed a remote sensing and irrigation control system utilizing a distributed wireless sensor network aimed at variable rate irrigation, real time field sensing, and site-specific precision linear movement irrigation system control to optimize efficiency with minimal water usage. The device defined specifics of the variable rate irrigation architecture and instrumentation, the wireless sensor network, and real-time field sensing and control through the use of suitable software. Five field sensor stations were used to create the whole system, which collects the data and sends it ... the base station using the Global Positioning System (GPS) where appropriate irrigation control steps were taken according to the database available with the system. As well as remote control for precision agriculture, the device offers a promising low-cost wireless solution.[5] Ravi ... and his group say that, this work gives a model of a smart green-house, which assists the farmers to do the work in a farm automatically without the utilization of much hand-worked review. The farming of field is done utilizing automatic drip system, which operates works as per the soil moisture limit set as per needs so an optimal amount of water is applied to the plants. [6]

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[1] A calculation created with limit estimations of temperature and soil dampness can be modified into a microcontroller-based portal to control water amount.

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The Proposed System utilizes the idea of the Internet of Things. Internet of Things is an environment for connecting the available physical articles with internet so they could be used through internet and in this each physical item is assigned with and IP address along these making them capable enough for gathering and transfering information over an organization with no manual intervention.
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Users can control and monitor the system.
Example, if temperature cross the limit then fan automatically start so its push down the temperature to normal level.

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Temperature Sensor:
A temperature sensor (LM35) sensor is an instrumental equipment which is used to measure temperature or heat on the machine part and its connect to arduino uno.
Humidity Sensor:
It detects the relationship between humidity in the air.Humidity is the measure of water vapour present in the air. Humidity measurements are an important tool for predicting the climate outdoors as well as for controlling the climate indoors.
Moisture Sensor:
Soil moisture sensor is used to measure moisture and water moisture of soil. If water moisture level is low then user get the alert message.
Display Unit:
It display all the unit which sensors are giving the physical values to micro-controller.
WIFI Module:
It is low cost serial to WiFi. Its give any Arduino controller get the access of your WiFi network.
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Light intensity sensor a simple concept. It automatically turns ON the lights on when sunlight descends below the visible regions of our eyes and automatically turns OFF on the lights when sunlight falls on them (in the morning), using a sensor called LDR (Light Dependent Resistor) which detects light like our eyes. Relay:

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Sources	Similarity
Serial Data SDA The SDA pin is bi-directional and is used to transfer ... So the switch motion (ON and OFF) is controlled by the current flowing to the coil, or not, respectively. A very useful feature of a relay is that it can be used to ... https://www.coursehero.com/file/p8rkpl/Serial-Data-SDA-The-SDA-pin-is-bi-directional-and-is-used-to-transfer-data-en/	7%

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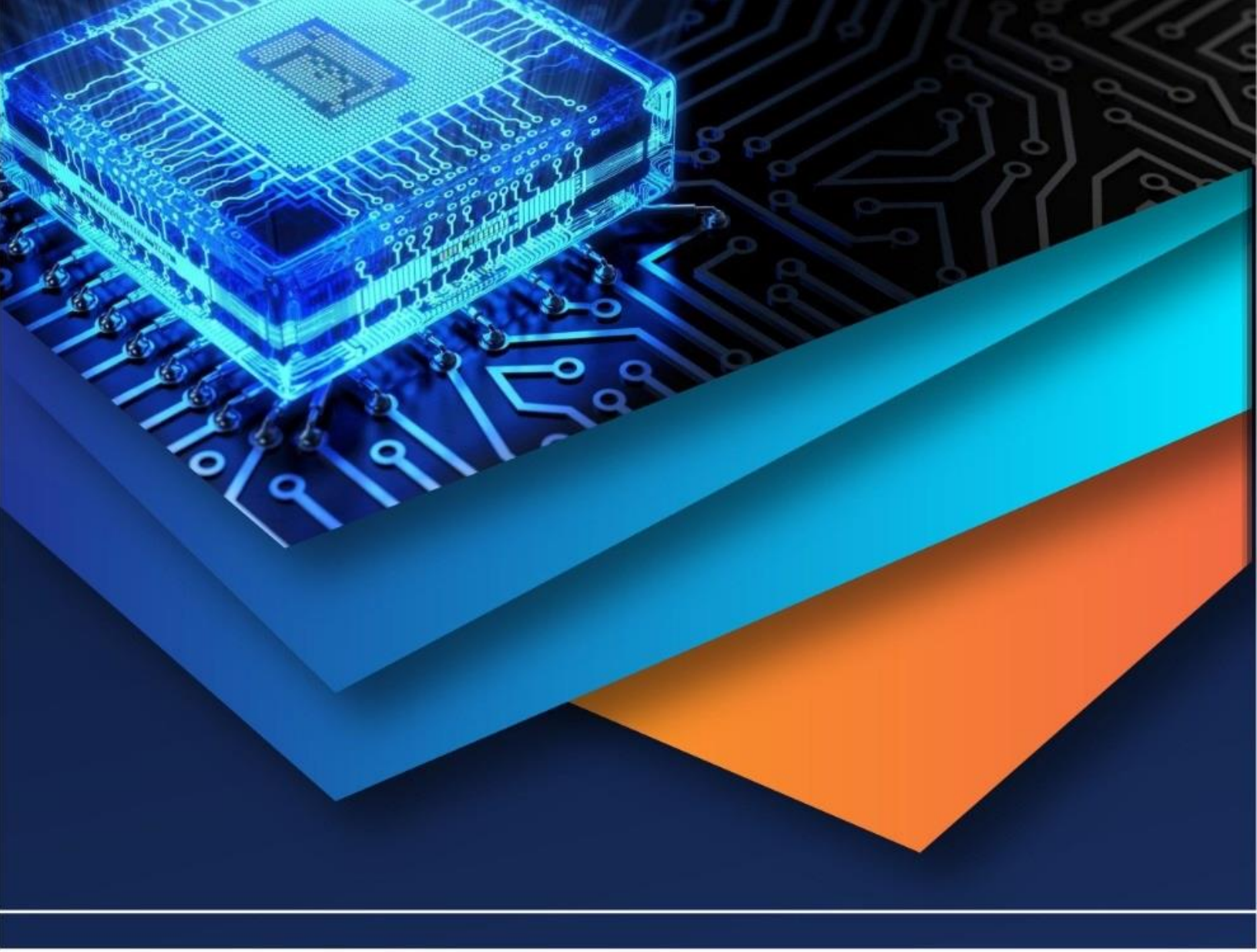

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