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A Survey on different Kind of Greenhouse Environment Monitoring and Controlling System using Internet of Things

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Abstract: A Greenhouse is a composition of different materials mainly consisting of transparent glass, cloth and shade through which air, sunlight and essentials required by plants to grow can be passed easily. Greenhouses are small areas where plants are planted and taken care in a controlled environment and monitored. This paper present a survey of various greenhouse automation system in exist.

In this paper we report the basic module of greenhouse automation techniques along with the latest development in greenhouse automation, in this we have reported that basic module of various systems to get the knowledge of various greenhouse automation system for developed best greenhouse environment controlling and monitoring system.

I. INTRODUCTION

Greenhouse automation is the automation of greenhouse environment. To monitor the greenhouse environment parameters effectively, it is necessary to design a measurement and control system.

Greenhouse automation is a kind of automation systems which are used specifically for controlling the greenhouse appliances and devices mechanically and in some cases remotely. But due to controlling mechanically (in some cases remotely) make the physical limitation for controlling the system.

So now day's mobile devices are increased rapidly in terms of cost and smooth functionality. And today life most of the mobiles are connected through internet and internet of things, by using the internet of thing it make easier for user to control the automation system while they are far away from the system. Due to the controlling of a system from the outdoor save the energy, money and most important time.

In this paper we present comprehensive survey of "GREENHOUSE SYSTEM" using internet of things and without using the internet of things. In section I, Introduction gives general information about greenhouse system. The section II, describes different kind of greenhouse automation system. In section III, we present concluding remark about the system comparison of greenhouse system.

II. DIFFERENT TYPES OF GREENHOUSE SYSTEM

A. Greenhouse Environment Control Using Bluetooth

The given device created mobile software and interfaced with the device to greenhouse environment home equipment through Bluetooth for indoor controlling respectively.

They used Bluetooth to manipulate the home equipment and sensors. Where chosen Bluetooth simply because of the appropriate capacity to control home equipment from indoor Monitoring. The consumer can successfully manage and display the home equipment from remote places via the use of Bluetooth.

The microcontroller tool is the device via which utility engage with greenhouse mode is beneath for choosing Bluetooth through which to govern the gadget the command could be received primarily based on the mode selecting by way of the perfect tool from the android application.

The LCD display is used to indicate the command despatched with the aid of the android utility. The essential strength deliver is attached with the step-down transformer. And the Bluetooth module related with the Arduino Uno controller.

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1) Block Diagram

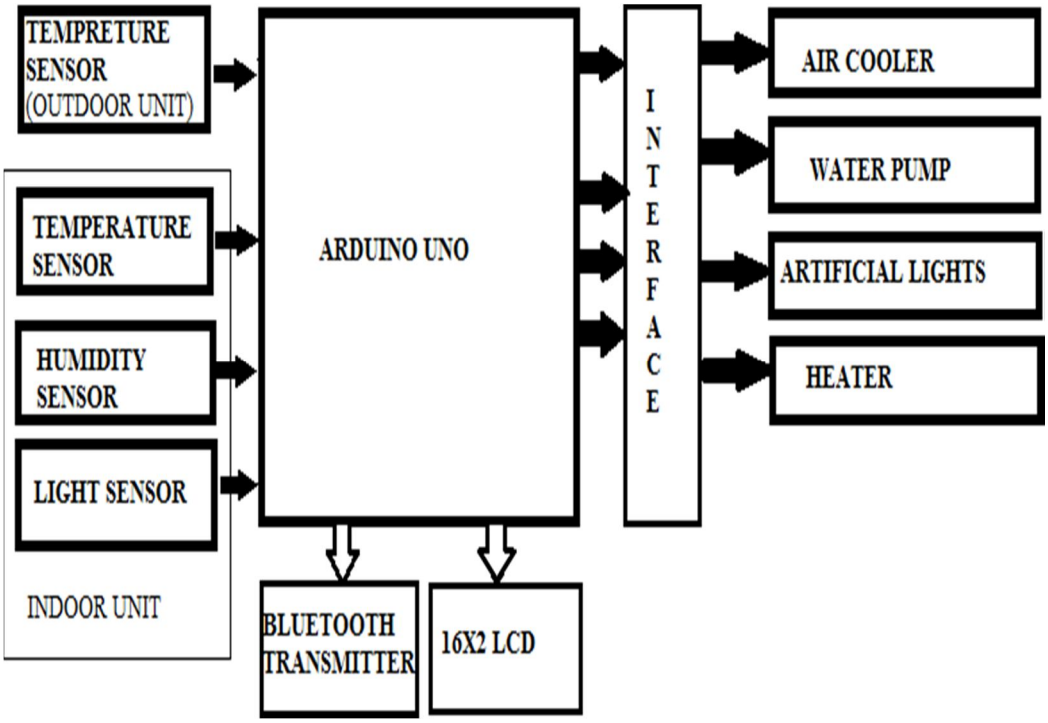

Fig:-Block diagram of Greenhouse environment control using Bluetooth

2) Hardware Required

a) Arduino microcontroller
b) Bluetooth module
c) Sensors
d) Liquid crystal display
e) Air cooler
f) Water pump

3) Performance: For the Bluetooth based totally greenhouse surroundings system HC-05 Bluetooth module is used which gives indoor connectivity. The system uses a Bluetooth module that is related to the Atmega328 Microcontroller. Where the HC-05 is Bluetooth module is smooth to apply Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The Arduino Uno is a microcontroller board primarily based on ATmega328 (datasheet). It has 14 virtual input/output pins (of which 6 may be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, an electricity jack, an ICSP header, and a reset button. It carries the whole thing needed to assist the microcontroller; sincerely connect it to a computer with a USB cable or energy it with an AC-to-DC adapter or battery to get commenced. The Uno differs from all preceding boards in that it does now not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to model R2) programmed as a USB-to-serial converter. By the usage of Bluetooth Module make consumer to govern home equipment from indoor cozy the Bluetooth offers connectivity. Though the usage of Bluetooth Module the gadget continues to be complex and now not user friendly.

B. Greenhouse Monitoring and Controlling Using GSM And Android Mobile App

In this system GSM (international gadget messaging)primarily based secured tool control device the use of App inventor for android cell phones. App inventor is a brand new visual programming platform for growing cellular programs for android-based totally clever phones. Due to use of app inventor no want to jot down programming codes to broaden app in the app inventor. The preface of the Global gadget for cellular verbal exchange (GSM) and mainly the usage of mobile phones were given the novelty of distance communication at the faraway region.

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1) *Block Diagram*

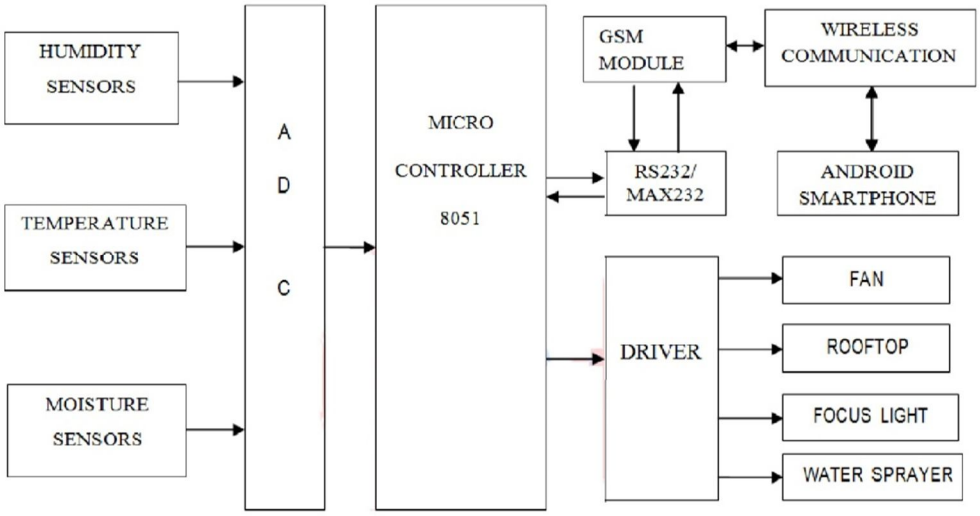

Fig:-Block diagram of GSM based greenhouse system using android mobile phone

2) *Hardware Required*

a) GSM module
b) Microcontroller
c) Driver
d) Android mobile
e) Humidity sensor
f) Fan
g) Rooftop
h) Light
i) Focus light
j) sensors

3) *Performance:* The Above Bluetooth based greenhouse gadget we describe the controlling of appliances is confined to the specific range as a consequence the drawback is triumphed over by GSM based Home automation system where the controlling of appliances from out-door is viable. They use SIM900 GSM Module – This way the module supports communi in the 900MHz band. We are from India and maximum of the cell network companies on this us of a function in the 900MHZ band. GSM modules are manufactured by means of distinct organizations. They all have special enter power supply specs GSM module calls for 12 volts enter. So feed it the use of a 12V,1A DC electricity supply GSM modules which require 15 volts and some other types which need the simplest five volts input. They vary with producers. If you're having a 5V module, you can strengthen it directly from Microcontroller 5V out. As the makes use of GSM Module for sending messages to the controller and receiving massages from the controller, for controlling the Greenhouse appliances we required the server for the server they make use of the cell app and the app is developed in MIT App Inventor. Due to this machine is secure for each the in-door controlling in addition to out-door controlling is however for the nearly infinite variety. Due to rubbing down sending receiving make machine complicated and the value of the device is highly-priced.

C. Green House Monitoring and Controlling Using Wi-Fi

This gadget from an android utility based on Arduino. This system uses Wi-Fi technology as a conversation protocol connects aspect. This greenhouse machine consists of two most important Components.

a) Android application
b) Arduino Uno

The device primarily based on the interconnection among Wi-Fi Module in which the consumer Wi-Fi modules may be linked to the station Wi-Fi module that allows you to be giving commands through the clever Smartphone which is linked to similar to an external tool, can have priority in giving instructions and extracting paintings over them works in grasp-slave precept.

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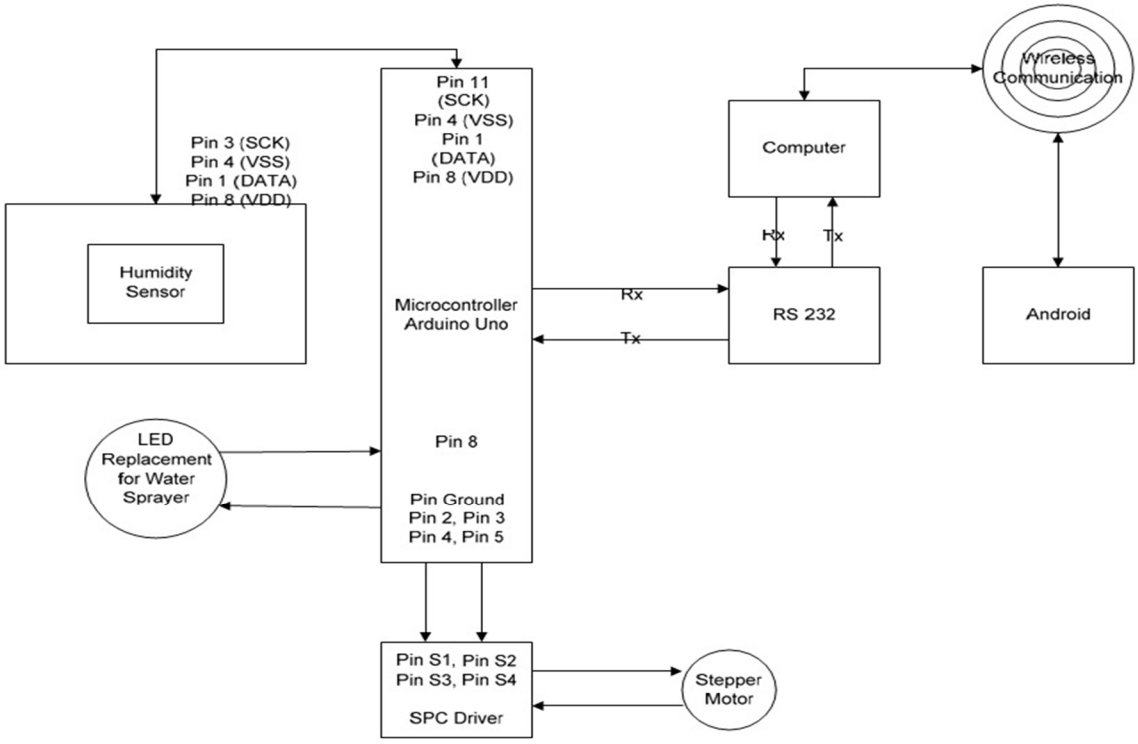

Fig:-Block Diagram of Home Automation Using Wi-Fi Interconnection

2) *Hardware Required*

a) Arduino
b) Wi-Fi module
c) Stepper Motor
d) Relay
e) Humidity Sensor

3) *Performance:* In the given system complete home equipment attached to relay is controlled with the aid of microcontroller ATMega328 ESP8266 is a Wi-Fi module interface to the microcontroller for wireless communique. The ESP8266 is a low-cost Wi-Fi microchip with complete TCP/IP stack and microcontroller functionality produced with the aid of Shanghai-primarily based Chinese producer Systems. This small module allows microcontrollers to connect to a Wi-Fi community and make easy TCP/IP connections the usage of Hayes-fashion instructions. The ESP8285 is an ESP8266 with 1 MiB of integrated flash, taking into consideration unmarried-chip gadgets capable of connecting to Wi-Fi the successor to these microcontroller chips is the ESP32. It makes the transfer of records quicker and the processing the records a whole lot quicker than another era. The Arduino Uno is a microcontroller board primarily based on ATmega328.Arduino is an open-supply, prototyping platform and its simplicity makes it ideal for hobbyists to use as well as experts. The Arduino Uno has 14 virtual input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, an electricity financial institution, an ICSP header, and a reset button. It carries the whole lot needed to assist the microcontroller; truly join it to a pc with a USB cable or strength it with an AC-to-DC adapter or battery to get started out. For switching motive makes use of the relay module which operated on DC Voltage for working we required 5V of electricity supply. The device is secure for each the in-door controlling and out-door controlling is but for the unique variety. It has the 366 meters with the PCB antenna.

D. Cloud Based Low Cost Home Monitoring And Automation System

A cloud-based low coast domestic automation device applied the usage of the diligent chipKITuno 32 and Arduino Uno R3 the controlling of the machine is connected to the internet with the aid of which they can reveal the machine at home which can be used for manage and safety.

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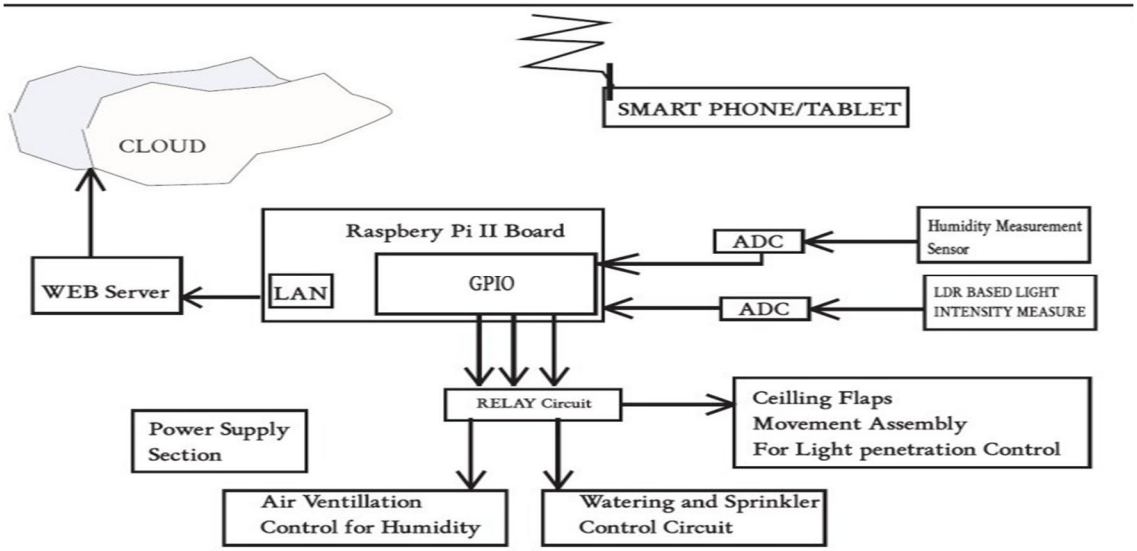

2) Hardware Required

a) Raspberry-Pi
b) Wi-Fi Shield MRF24WG0MA
c) Proximity sensor
d) Power supply
e) nRF24L01 module
f) Relay

3) Performance: In this device, a cloud-primarily based low-value Greenhouse automation system applied the use of the diligent chip kit Raspberry Pi. The supplied prototype aims to apply as few resources as feasible to demonstrate an easy and coffee-value greenhouse connected. It includes a base node related to cloud service (hosted externally). In which we can take a look at the popularity of various appliances and sensors at the greenhouse. Right here use a Raspberry Pi becomes used as the base node to demonstrate a residence connected to the base node thru RF. A Raspberry Pi in this machine is hooked up to the web server modules. One is on the base node Relay module and every other is on which is a node established in an exceptional area of the house. This publishes to the cloud. The cloud has to manage switches to show off/at the appliances at the greenhouse to open /close the appliances etc.

III. CONCLUSION

In this paper, we gift the comparative look at of various forms of greenhouse environment controlling and tracking systems. Where the goal of most of the machines within the field can without a doubt assist to improve the yield of the vegetation and ordinary manufacturing and assist people to grow flowers extra efficaciously. In the above-given system made with a unique kind of microcontroller and wherein some of them can be operated as indoor and out of doors. With the study, we discover that each one system Possess some drawbacks and a number of the systems having fee excessive.

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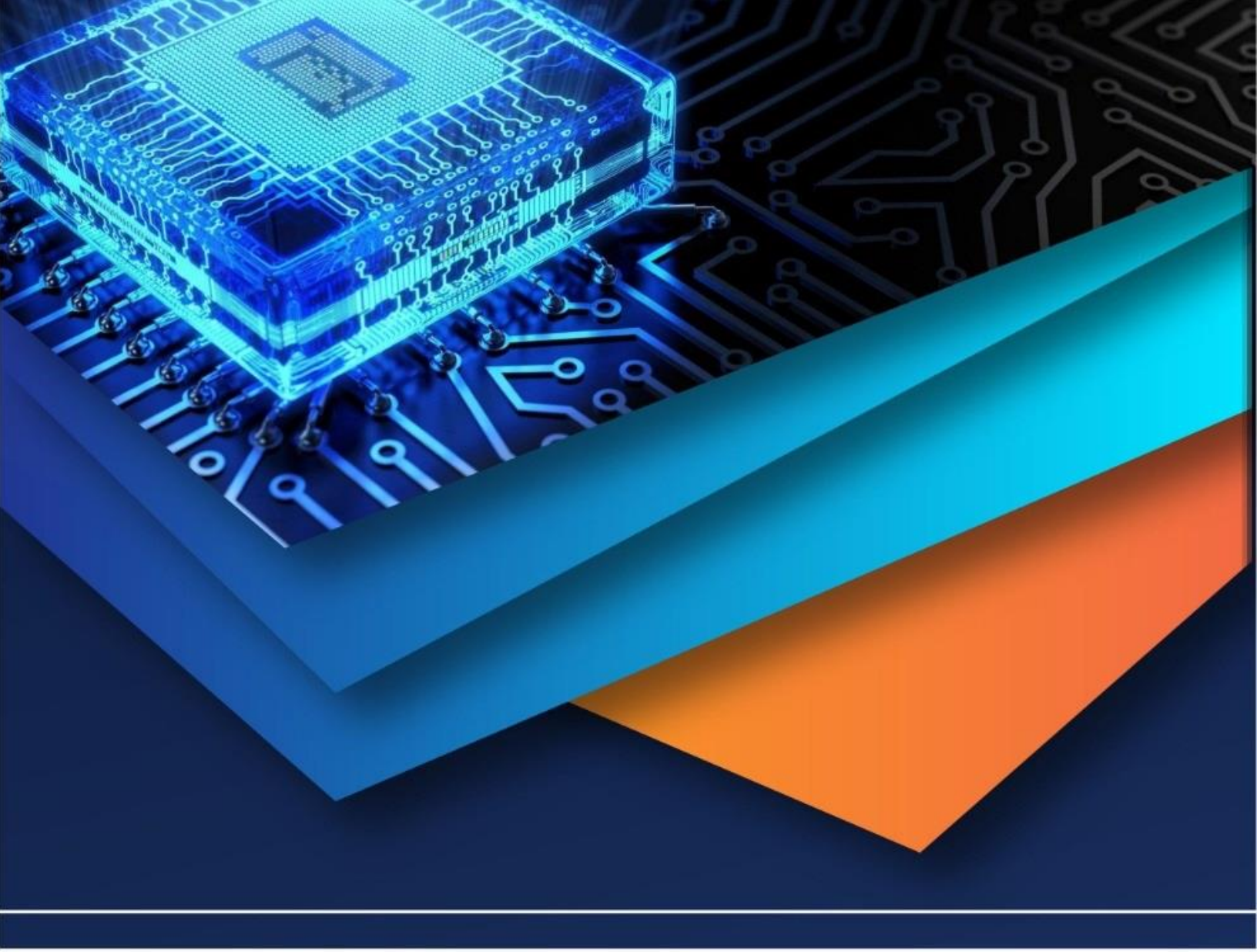

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