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Impact of Climate Change on Crop & Predict the Disease

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Abstract: ***The prime need of this world is that the simplest agriculture which decides the event of each country because the survival of the individual is completely obsessed with farming and its best production.***
Climate changes are in response to changes within the hydrosphere, biosphere, and other atmospheric and interacting factors. Human activities driven by demographic, economic, technological, and social changes have a big impact on activity. The climate influences the incidence further as the temporal and spatial distribution of plant diseases. the foremost factors that control the growth and development of diseases are temperature, light, and water. Climate affects all life stages of the pathogen and host and poses a challenge to many pathosystems. The environmental change, especially when combined with the pathogen and host introductions, may cause unprecedented effects.
Keywords: IOT, Temperature, Raspberry-pi 3B+.

I. INTRODUCTION

Climate change may well be a serious concern for agricultural communities worldwide. The foremost problem that's observed in most of the regions of farming is that the primary diseases in crops, no proper monitoring of soil moisture, temperature and humidity thanks to which the assembly finally lands up in low-level identification of diseases on plant and are the important research topic in agriculture fields and it's also important to wish the primitive measures within the monitoring of temperature, and humidity of the growing crops. Temperature change and agriculture are associated with one another, both of which happen on a world level. Global action is already affecting agriculture, with effects unevenly distributed across the planet. global climate change has many elements, affecting biological and human systems in numerous ways. The considerable spatial heterogeneity of worldwide global temperature change impacts has been widely studied; global average temperature increases mask considerable differences in temperature rise between land and sea.

II. LITERATURE SURVEY

M.N. Mugal and Shugufta Parveen[1]- In this paper, they suggest that increased CO2 concentration can cause a decrease in nitrogen levels in soil, which favours VAM. The climate influences the incidence additionally because of the temporal and spatial distribution of plant diseases. the foremost factors that control the expansion and development of diseases are temperature, and light, and water. the action affects the survival, vigor, rate of multiplication, speculation, direction, and distance of dispersal of inoculums, rate of spore germination, and penetration of pathogens. Climate affects all life stages of the pathogen and host and poses a challenge to many path systems.

Owais A. Khan and Tariq A. Bhat[2]- Predicted an increase of the disease pressure in each decade on the consequence of more favourable temperature conditions. Food production is additionally being impacted by adaptations towards a more sustainable biosphere, a little amount a tiny low amount the same as the expansion of bio fuel crops and solar farms that compete with edible crops for land suitable for food production and also the decrease in chemical inputs so on decrease risks to ecosystem services.
Sachin Gupta, Deepika Sharma, and Moni Gupta[3]-

Changing diseases thanks to global temperature change have highlighted the requirement for better agricultural practices and also the use of eco-friendly methods. Plant diseases are one of the foremost important factors which have an on-the-spot impact on worldwide agricultural productivity and temperature change will further make true worse.

Andrew j.challnior, markstafford smith[4]-

This paper introduces all of those areas of progress, with more detail being found within the subsequent papers within the special issue. The remaining scientific challenges are discussed, and a distinction is developed between projection- and utility-based approaches to agro-climate ensemble modelling. Recommendations are made regarding the way within which uncertainty is analyzed and reported, and therefore the way during which models and data are wont to make inferences regarding the longer term.

Adam H. sparks And Robert j.hijmans[5]- Weather affects the severity of the assorted plant diseases, and activity is probably visiting change the patterns of crop disease severity. We examined the worldwide effect of natural action on potato mold, the disease that caused country potato famine and still could be a customary potato mold around the world. We used a met model and regarded three global climate models.

Dean p.Holzworth, Val Snow, and peter Thorburn[6]- During the past decade, the appliance of agricultural production systems modeling has rapidly expanded while there has been less emphasis on model improvement. Cropping systems modeling has become agricultural modeling, incorporating new capabilities enabling analyses within the domains of greenhouse emission emissions, soil carbon changes, ecosystem services, environmental performance, food security, pests and disease losses, livestock and pasture production, and global climate change mitigation and adaptation. New science has been added to the models to support this broadening application domain, and new consortia of modellers have formed that span the multiple disciplines.

A. System Overview

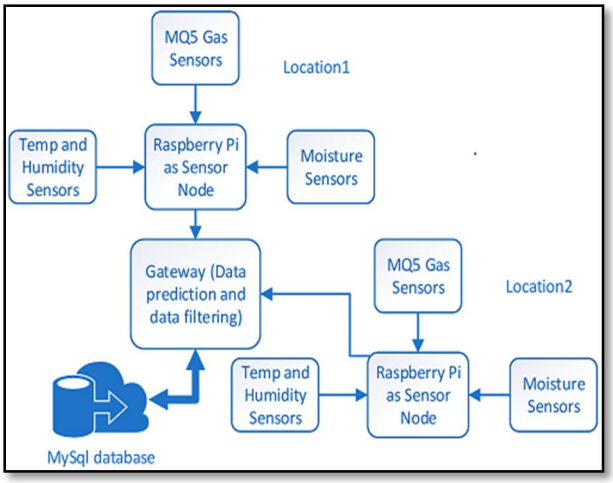

Fig.1 Block Diagram of Impact of Climate Change on Crop & Predict the Disease

1) Climate change and agriculture are associated with one another, both of which occur on a world level. Global climate change is already affecting agriculture, with effects unevenly distributed across the globe.

2) Plant diseases play a very important role in agriculture. A limited amount of data on the potential impacts of global climate change on plant diseases is accessible.

B. Sensors

A sensor could be a device that detects and responds to some sort of input from the physical environment. the particular input may well be light, heat, motion, moisture, pressure, or anybody of an excellent number of other environmental phenomena. The output is usually a symptom that's converted to a human-readable display at the sensor location or transmitted electronically over a network for reading or further processing

1) *Temperature and Humidity Sensor (DHT11):* DHT11 is a low-cost digital sensor and it is used for sensing temperature and humidity. This sensor may be easily interfaced with any microcontroller like Arduino, Raspberry Pi, etc… to live humidity and temperature instantaneously. DHT11 humidity and temperature sensor are offered as a sensor and as a module.

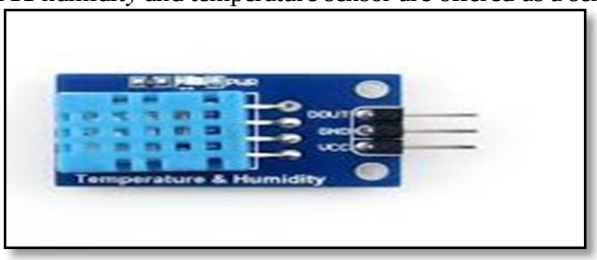

Fig.2 DHT11

2) *Soil Moisture Sensor:* Soil moisture is over just knowing the quantity of water in the soil. Soil moisture sensors measure the number of water and therefore the volumetric water content in the soil. Soil moisture sensors measure the volumetric water content within the soil. Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using another property of the soil, like electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content.

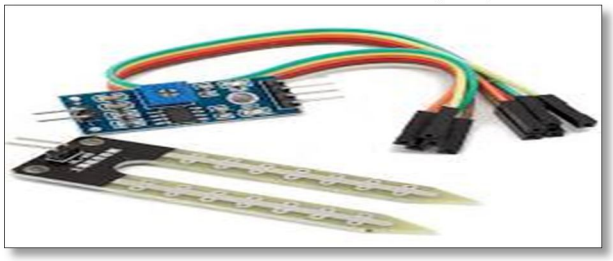

Fig.3 Soil Moisture Sensor

3) *Raspberry Pi 3B+:* The Raspberry Pi is a credit-card-sized computer. The Raspberry Pi 3 Model B+ is an improved version of the Raspberry Pi 3 Model B. It is based on the BCM2837B0 system-on-chip (SoC), which includes a 1.4 GHz quad-core ARMv8 64bit processor and a powerful Video Core IV GPU.

Fig.4 Raspberry Pi 3B+

4) *Relay Module:* The relay module is an electrically operated switch that allows you to indicate on or off a circuit using voltage and/or current much above a micro-controller could handle. The relay protects each circuit from the other. The relay module contains each channel within the module that has three connections named NC, COM, and NO.

Fig.5 Relay Module

5) *SD Card:* Secure Digital, officially abbreviated as SD, maybe a proprietary non-volatile memory card format developed by the SD Association (SDA) to be used in portable devices. A memory card or memory cartridge is an electronic data device used for storing digital information, typically using non-volatile storage. These are commonly utilized in portable electronic devices, like digital cameras, mobile phones, laptop computers, tablets, PDAs, portable media players, game consoles, synthesizers, electronic keyboards, and digital pianos, and permit adding memory to such devices without compromising.

Fig.6 SD Card

C. Software

1) *SD Card Formatter:* The SD Card Formatter used to formats SD Memory Card, SDHC Memory Card and SDXC Memory Card (respectively SD/SDHC/SDXC Cards) complying with the SD filing system Specification created by the SD Association (SDA). It is strongly recommended to use the SD Memory Card Formatter to format SD/SDHC/SDXC Cards instead of using formatting tools given individual operating systems.

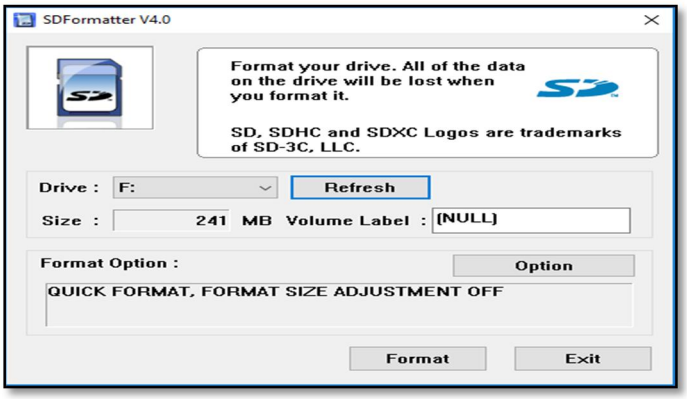

Fig.7 SD Card Formatter

2) *Win32 Disk Imager:* Win32 disk imager is software that permits you to form bootable ISO images easily. Its open-source software and it had been developed by premaster and tuxinator2009. You'll use this utility to put in writing your ISO files into CDs, DVDs, and SD/CF cards.

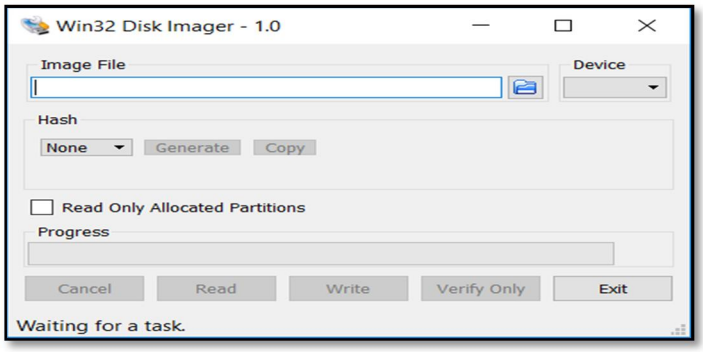

Fig.8 Win32 Disk Imager

3) *Twilio App:* An Application instance resource represents an application that you simply have created with Twilio. An application inside Twilio may be a group of URLs and other configuration data that tells Twilio the simplest way to behave when one all told your Twilio numbers receives a call or SMS message. Applications are useful for encapsulating configuration information that you simply have to distribute across multiple phone numbers.

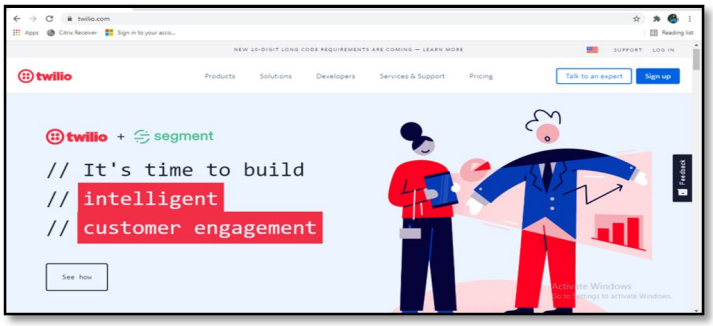

Fig.9 Twilio app

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D. Methodology for Proposed Work

The prime need of this world is the best agriculture which decides the event of every country because of the survival of persons completely passionate about farming and it best production. The most problem that's observed in most of the regions of farming is that the early diseases in crops, no proper monitoring of soil moisture, temperature and humidity due to which the assembly ends up in low-level identification of diseases on plant and is that the vital research topic in agriculture fields and it's also important to require the primitive measures in the monitoring of temperature, the humidity of the growing crops.

E. Soil Moisture

Soil moisture is that the water that's held within the spaces between soil particles. The foundation zone soil moisture is that the water that's available to the plants, which is usually considered to be within the upper 200 cm of soil. Moisture is of fundamental importance to many hydrological, biological and biochemical processes. The proposed system includes soil moisture measurement because of the main module. Irrigation to the sphere and acknowledgment to the user is done supported by the water content within the soil.

F. Moisture Sensor

Soil moisture sensors measure the volumetric water content within the soil. Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using another property of the soil, like electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content. The relation between the measured property and soil moisture must be calibrated and should vary looking on environmental factors like soil type, temperature, or electric conductivity. Reflected microwave radiation is full of soil moisture and is employed for remote sensing in hydrology and agriculture.

G. Raspberry Pi 3B+

The Raspberry Pi is a credit-card-sized computer. The Raspberry Pi 3 Model B+ is an improved version of the Raspberry Pi 3 Model B. It is based on the BCM2837B0 system-on-chip (SoC), which includes a 1.4 GHz quad-core ARMv8 64bit processor and a powerful Video Core IV GPU.

H. Conceptual Design

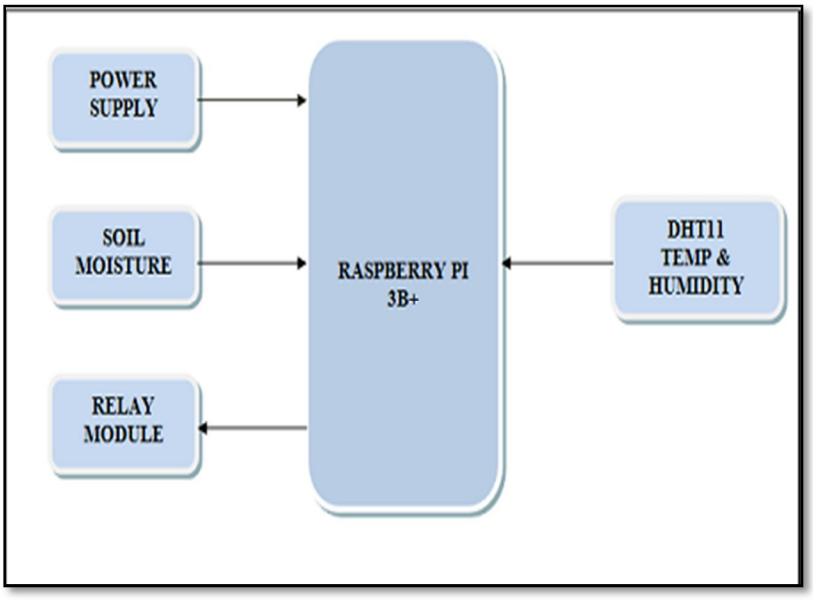

Fig.10 Conceptual Design of Project

It is a circuit of our project. Here we attach the sensors to the raspberry pi by using connection wires. In this circuit, we attach the moisture, temperature and humidity sensor. And give the 5v supply to the circuit by using relay module.

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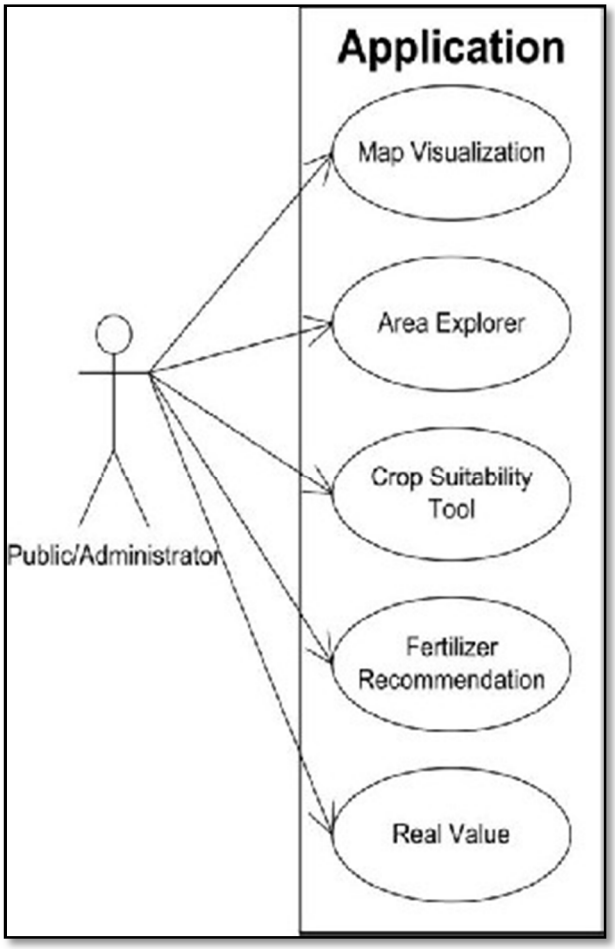

Fig.11 Use Case Diagram of Project

III. RESULT OF WORK COMPLETED

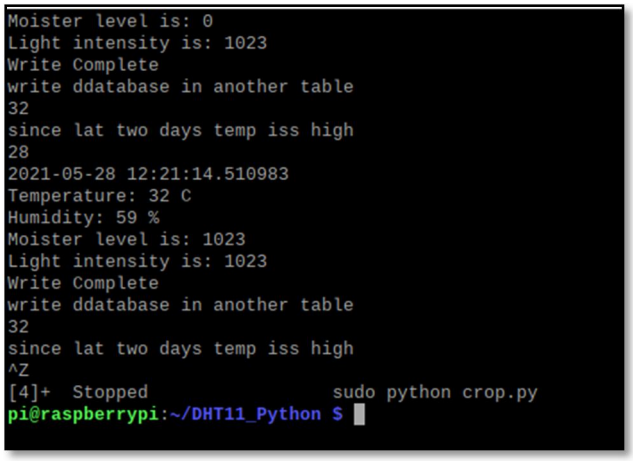

Fig.12 Read Data By Using Python

Here we read the data by using Raspberry Pi and run the command on command prompt by using python code and read the data. Here we read the temperature, humidity, moisture level and light intensity in environment.

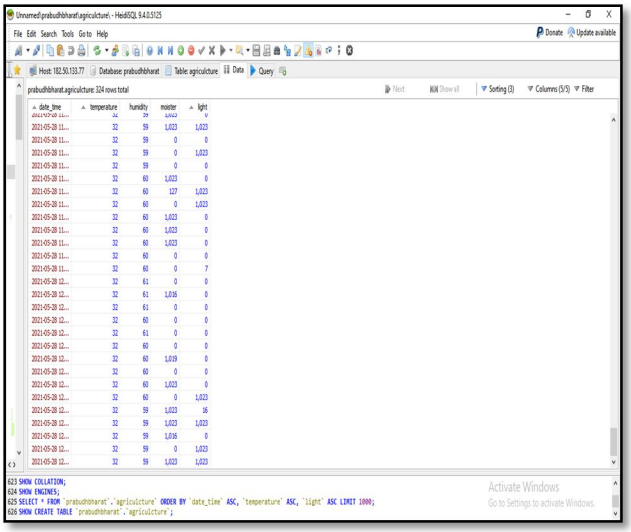

Fig.13 Store the Data in MySQL Database

Here we store the data like humidity temperature, soil moisture level, and light intensity in MySQL Database. It takes the continuous reading of temperature, humidity, moisture level, and light intensity in the environment. The reading of this sensor changes within a second. The result will store in the database, when the given condition will true then reading will update on the database.

Table for temperature condition

CROP	MAX TEMP	MIN TEMP
Maize	35°C	22°C
Wheat	25°C	10°C
Groundnuts	27°C	20°C
Fenugreek	20°C	15°C

IV. EXPERIMENTAL RESULT

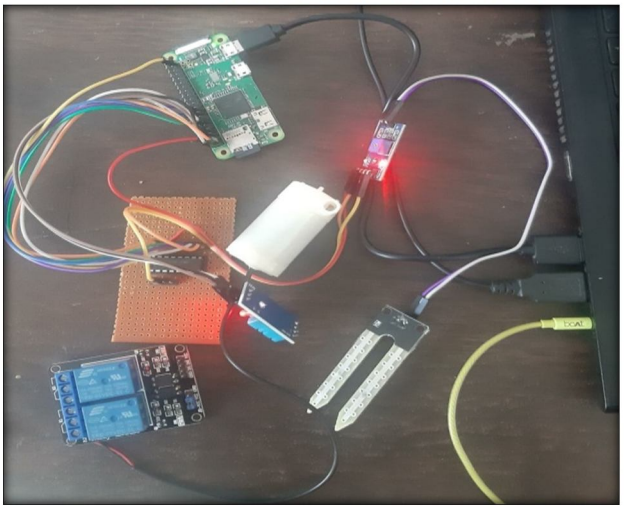

Fig.13 Working Experiment Setup

V. CONCLUSION

Changing disease scenarios thanks to global climate change have highlighted the necessity for better agricultural practices and the use of Eco-friendly methods in disease management for sustainable crop production. Within the changing climate and shift in seasons, choice of crop management practices supported the prevailing situation is important. Understanding the potential effects of temperature change on agriculture. Our knowledge is restricted on how multi-factor climate changes may affect plant health. To incorporate future climate scenarios altogether research aimed toward developing new tools and methods.

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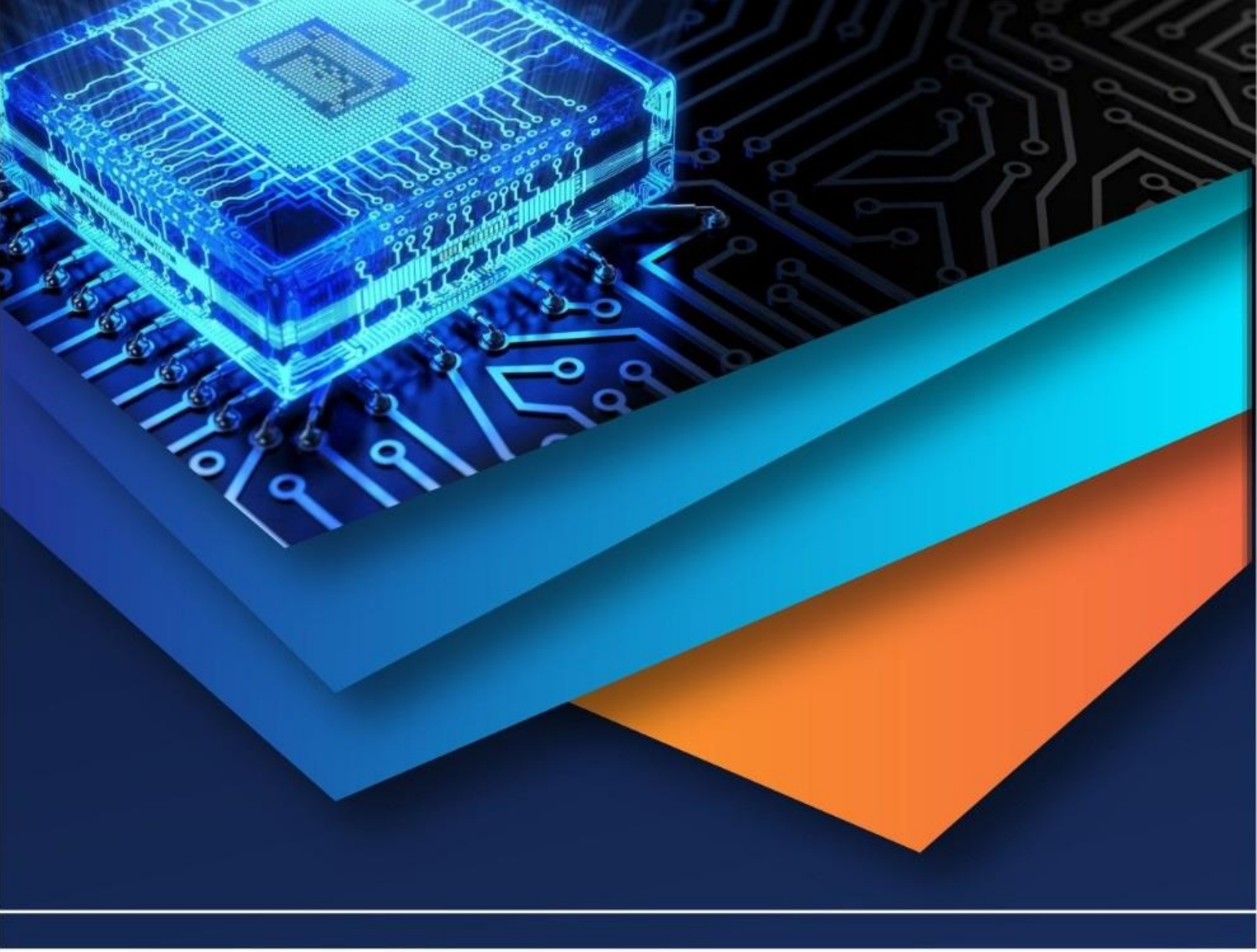

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