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Smart Irrigation Sytem using Internet of Things

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Abstract: ***Our country is mainly occupied with farming people so agriculture plays a very important role to development of country. And this agriculture depends on the monsoons which are not sufficient source of water .so the irrigation is used in agriculture field.***

Internet of things (IOT) is a milestone in the evolution of technology.IOT plays an important role in many fields, one of that is agriculture by which it can feed billion of people on earth in future. The objective of this paper is aiming to overcome this challenge, the whole system is micro control based and can be operated from remote location through wireless transmission so there is no need to concern about irrigation timing as per crop or soil condition.

Sensor is used to take sensor reading of soil like moisture, temperature, air moisture and decision making is controlled by user by using microcontroller.

The data received from sensor are sent to server database using arduino.the irrigation will be automated when the moisture and temperature of the field is reduced the farmer is notified with the information regarding field condition through periodically this system will be more useful in areas where there is scarcity of water and will be worth efficient with satisfying its requirements. Automation of farm activities of farm activities can transform agricultural domain being manual and static to intelligent and dynamic leading to higher production with lesser human supervision.

This paper proposes an automated irrigation system which monitors and maintains the desired soil moisture content via automatic watering.

Keywords: soil moisture sensors, IOT, Arduino, microcontroller.

I. INTRODUCTION

In this fast growing world India, economy mainly relies upon agriculture, there is an extraordinary need to modernize the ordinary farming practices for the better productivity. Because of impromptu utilization of water the ground water level is diminishing step by step, absence of downpours and scarcity of land water additionally results in decrement in volume of water on earth. These days, water deficiency is getting to be one of the greatest issues on the planet. We need water in every single field. In our everyday life additionally water is basic. Farming is one of fields where water is required in huge quantity. Wastage of water is the serious issue in farming. Each time overabundance of water is provide for the fields. There are numerous strategies to spare or to control wastage of water in agribusiness.

The target of the framework is to a) save vitality and water assets b) handles the framework physically and naturally c) identifies the dimension of water. Because of the climatic changes and absence of accuracy, agribusiness have brought about poor yield when contrasted with populace development. Water system is generally done utilizing trench frameworks in which water is siphoned into fields after customary interim of time without any criticism of water level in field.

This kind of water system influences crop wellbeing and produces a poor yield since certain harvests are too sensitive to even think about watering content in soil.

A shrewd water system framework, in opposition to a traditional water system strategy, controls provided water. The criticism component of a savvy water system framework is a moisture sensor and temperature and humidity sensor. Evapo - transpiration (ET), warm imaging, capacitive techniques, and neutron dispersing strategy and gypsum squares are a portion of the advancements that empower moisture detecting. Capacitive sensors, anyway prompt, are expensive and need to be aligned frequently with differing temperature and soil type. Neutron test based moisture sensors are exceptionally precise however present radiation perils, adjustment trouble and are exorbitant. A huge agribusiness field presents is with various piece of zones, subsequently, dampness estimation at a solitary situating in the field does not bode well. Thusly, what is required is a dispersed number of sensor hubs and dispersed siphoning units to siphon water to those particular areas secured by the sensor units. An mechanized water system unit, related to an low cost moisture sensor, is proposed in this paper.

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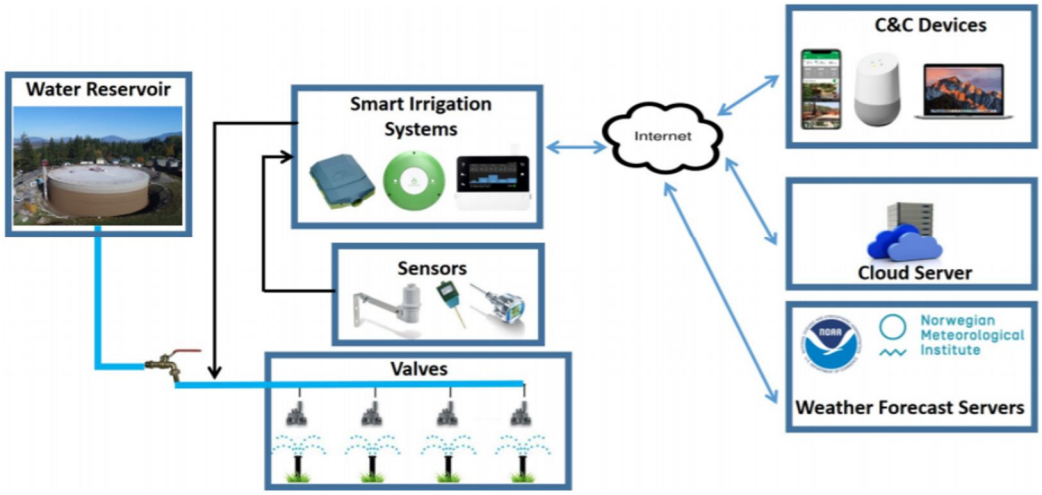

Figure 1: System Architecture

II. LITERATURE REVIEW

In A Remote Estimation and Control Framework for Nursery Dependent on GSM-SMS [4] the proposed framework presented a GSM-SMS remote estimation and control framework for nursery dependent on PC-based database framework associated with base station. Base station is created by utilizing a microcontroller, GSM module, sensors and actuators. In reasonable activity, the focal station gets and sends messages through GSM module. Criterion estimation of parameters to be estimated in each base station is set by focal station, and after that in base stations parameters including the air temperature, the air humidity.

Indu et al. (2013) [5] predominantly centers around surveys in the field of remote monitoring and control, the innovation utilized and their potential preferences.

The paper proposes a creative GSM/Bluetooth based remote controlled inserted framework for water system. The framework sets the water system time contingent upon the temperature and humidity perusing from sensors and type of yield and can consequently inundate the field when unattended.

Data is traded between far end and structured framework by means of SMS on GSM arrange. A Bluetooth module is additionally interfaced with the fundamental microcontroller chip which takes out the SMS charges when the client is within the limited scope of few meters to the assigned framework. The framework educates clients about numerous conditions like status of electricity, dry running engine, expanded temperature, water content in soil and smoke by means of SMS on GSM arrange or by Bluetooth.

In [6], R.Suresh et al. (2014) referenced about utilizing programmed microcontroller based downpour firearm water system framework in which the water system will occur just when there will be extreme prerequisite of water that spare an enormous quantity of water.

These frameworks convey a change to the executives of field asset where they built up a product stack called Android is utilized for gadgets that incorporate a working framework, middleware and key applications. The Android SDK gives the apparatuses and APIs important to start creating applications on the Android stage utilizing the Java programming language. Cell phones have nearly turned into a vital part of us serving various necessities of people. This application utilizes the GPRS highlight of cell phone as an answer for water system control framework.

These framework secured lower scope of farming area and not financially moderate.

In IOT SMS caution framework dependent on SIM900A [7], an IOT caution framework dependent on SIM900A module of SIMCOM Organization was intended for nursery.

The framework can accumulate natural parameters, for example, air temperature and air humidity. In the interim, with the utilization of AT order, this framework can likewise acknowledge SMS programmed sending and accepting, ecological parameters overwhelm caution and deficient balance alert.

Through the framework setting, the caution message can be sent to the client indicated cell phone naturally regardless of what the clients' area is. This framework as an average utilization of IOT in the agribusiness has got a few agreeable outcomes in the real activity.

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III. PROPOSED SYSTEM

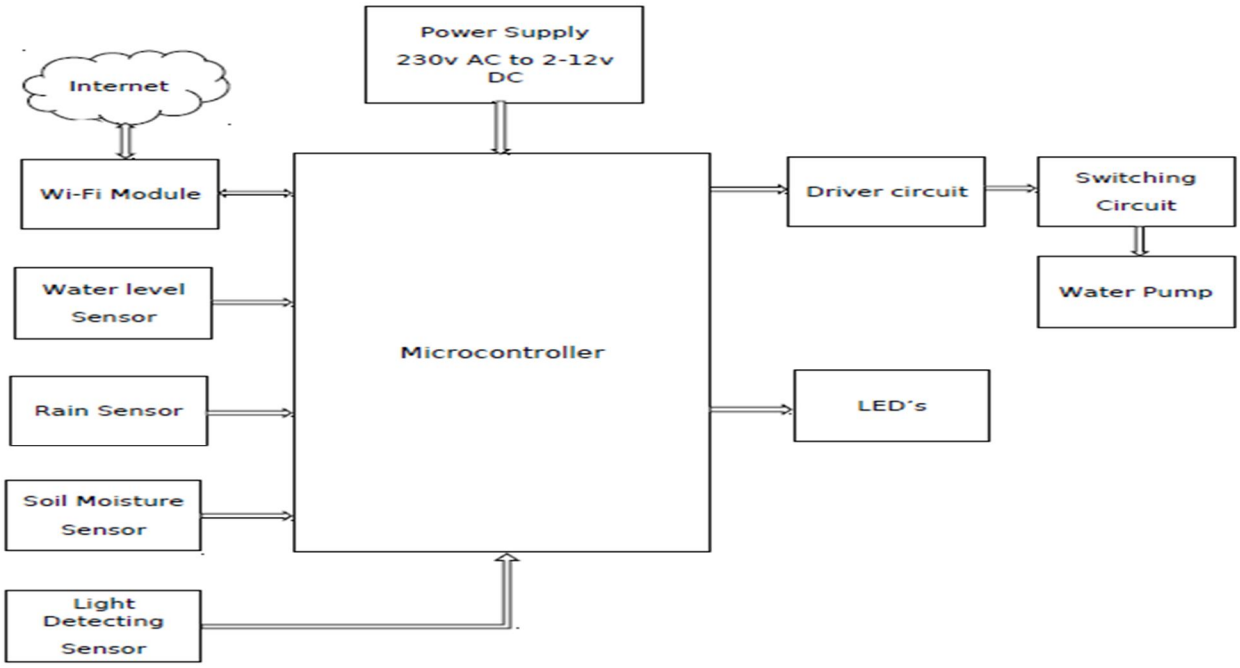

Figure 2: Proposed System Architecture Diagram

The proposed framework gives constant data on the field water system. Here the water is provided dependent on the real requirements for the harvests. This mechanized water system framework is cost decrease and asset streamlining. It improves the earth quality and expands the water system. It likewise lessens water logging and water deficiencies. The square graph of savvy water system framework is described in Fig2. It comprises of a microcontroller (ATmega328) which is the cerebrum of the framework. Both the dampness and temperature sensors are consolidated to the info pins of the controller. The water siphon and the servo engine are combined with the yield pins. In the event that the sensors withdraw from the per-ordinate run, the controller turns on siphon. The servo engine is utilized to control the precise purpose of the pipe, which guarantees equivalent dissemination of water to the dirt. To diminish the measure of field work for the rancher this activity likewise offers remote switching on-off of siphons for watering, flooding. Remote sensor system of soil dampness sensor, soil pH sensor and soil temperature sensor is associated with an Arduino Mega 2560 smaller scale controller board. The android application controls the siphons over GSM organize through SMS (which empowers siphon power over long separations) and Blue-tooth (when in closeness for constant analysis of the sensor readings). This framework can be executed on a huge scale for cultivating purposes, which can additionally demonstrate to be increasingly valuable. Inferable from winning conditions and water deficiencies, the ideal water system calendars ought to be resolved particularly in homesteads to monitor water. The component used are microcontroller, power supply, rain sensor, soil moisture sensor water level sensor, LDR Wi-Fi module, driver and switching circuit, water pump, Led's

IV. DISCUSSION OF PROPOSED WORK

This project is designed using arduino. Sensors are connected to arduino using jumping cables. The entire system is observed and controlled by power full credit card sized microcontroller arduino. Dc motor are used for automatic water supply. In this paper, we are using a mesh topology in which sensor nodes are placed in the farm area. Sensors in our proposed topology are mobile where as the base station is stationary and it collect the data from sensor nodes and process them. This work proposes that how to deploy the sensed data to the base station in wireless sensor networks. For this purpose firstly set the farm area [5].moisture sensor checks whether the soil is alkaline or acidic. Soil should have proper proportion of nutrients which is essential for the plant growth. Also with help of ph we can determine for what type of plant the soil is feasible. In this project, we have added a ph sensor to check the acidity of the soil and give constant updates to the android application about the same. In algorithm the moisture sensor gives the water content level in the soil and sends it to the arduino. it will process this data by comparing it with threshold value if it it is less than the predefine threshold value then start the irrigation .

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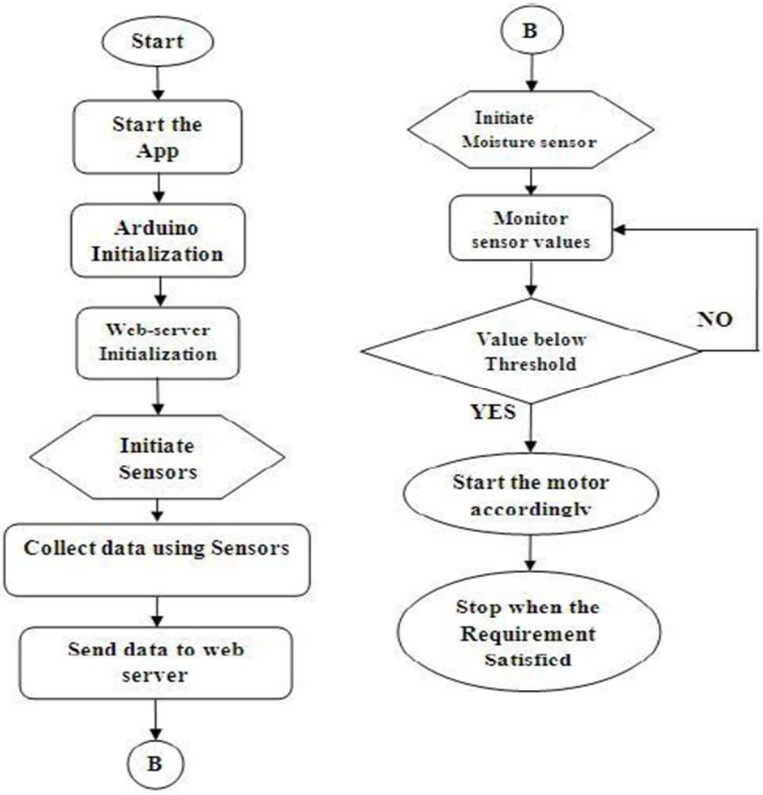

Figure 3: Proposed Block Diagram

Power supply is provided by using 5volt battery. Sensor values are displayed in monitor by using arduino operating system. Here motor automatically ON and OFF based on soil values here the sensor values are evaluated and displayed in system monitor using ardunio OS. the motor automatically will be on based on reading here the sensor values are evaluated and displayed in system monitoring arduino OS .the motor automatically will be off based on reading.

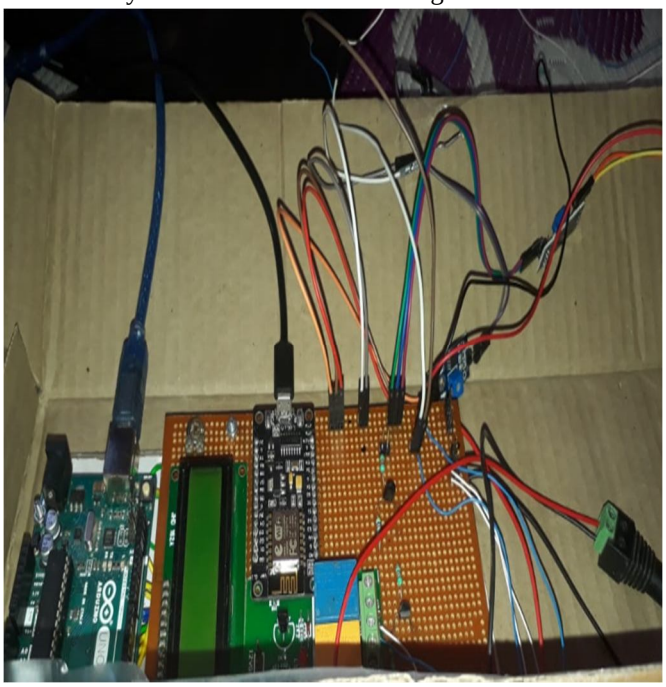

Figure 4: Proposed Model Design

Figure 5 : sensor readings when soil moisture is dry and motor in on mode.

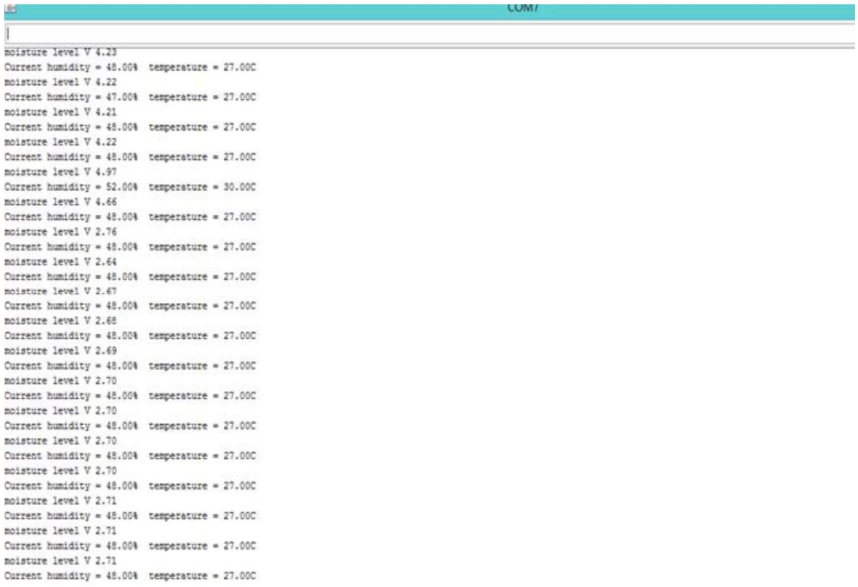

Figure 6: sensor reading when soil moisture is wet and motor in off mode.

V. CONCLUSION

In the present the farmers use water system approach through the manual control, in which the farmers irrigate the land at standard interims. This process appears to devour more water and results in water wastage. Additionally, in dry territories where there is lacking precipitation, water system winds up troublesome. Henceforth, we require a programmed framework that will decisively monitor and control the water basic in the field. Introducing Smart water system framework spares time and guarantees sensible utilization of water. Additionally, this architecture utilizes smaller scale controller which guarantees an expansion in framework life by lessening control utilization. The whole framework is monitored also, constrained by the power full credit card measured small scale controller Arduino. It gives a few benefits and can accomplish with less labor. The framework gives water just when the humidity in the soil goes underneath the reference. Due to the direct exchange of water to the roots water the board takes place and furthermore keeps up the dampness to soil proportion at the root zone steady somewhat. In this manner, the framework is productive and good to evolving condition.

VI. FUTURE WORK

To improve the efficiency and effectiveness of the system, the following recommendations can be put into consideration. Option of controlling the water pump can be given to the farmer i.e he can switch on/off the pump in order to start/stop the process of irrigation without being present at the farm. The farmer may choose to stop the growth of crops or the crops may get damaged due to adverse weather conditions. In such cases the farmer may need to stop the system remotely. The idea of using IOT for irrigation can be extended to other activities in farming such as cattle management, fire detection and climate control. This would minimalize human intervention in farming activities. Our Future work includes, a water meter introduced to appraise the measure of water utilized for water system and in this way giving a cost estimation. A valve can be utilized for differing the volume of water stream. Moreover, Wireless sensors can likewise be utilized.

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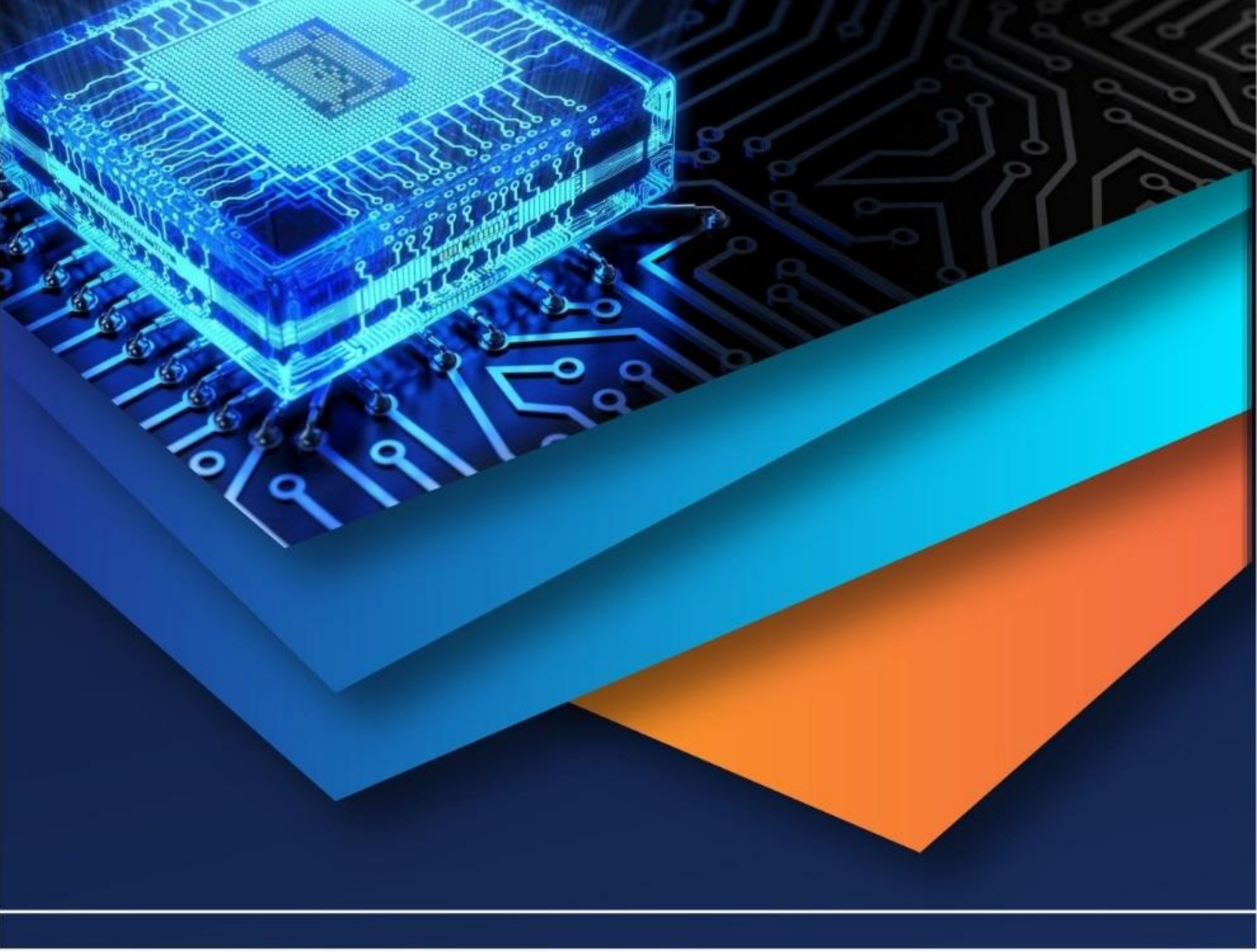

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