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Water Level Meter for Alerting Population about Floods

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Abstract: ***There exist several types of natural disasters, among them flood is one of the most dangerous since it has enough destructive capacity to change the flow of rivers, and wreck whatever comes in their path. My motivation for this work is based on all damages caused in our region due to floods. By this natural disaster many people have been suffered and damage has occurred to their home and lost their belongings. The main aim of this project is to develop an electronics based system, which will detect the level of water and updates using IoT on a real-time basis. This system consists of a set of magnetic sensors. Water level will be analyzed using magnetic sensors and updated in the webserver using IoT module. Authorities can view this information using internet from any place and also they can make a decision to divert the people from that place, this is to avoid further complications. A buzzer alert and a siren alert will be given to indicate the severity of the water level.***
Index Terms: ***Raspberry pi2 model B, IoT module, magnetic sensors, buzzer, and siren.***

I. INTRODUCTION

Nowadays floods became the dangerous natural disaster.it is having enough destructive power to sweep away and destroy whatever comes in their path.so my aim is to detect the occurrence of floods and alert the people. So that everyone can be safe. There is a buzzer and siren to indicate the severity of the situation. Buzzer indicates that water level in the river reaching its maximum level, so everyone should leave that place. Siren will be activates when the river reaches its maximum position and ready to overflow.it is the 60db siren.so people can understand the situation and escapes from that place. There will be a website which is specially designed to show the status of water level in the rivers.

II. EXISTING SYSTEM

Existed system have implemented a unique system for this application by using magnetic sensors. The sensors are fixed at specific locations. A floating magnet will be floats on the water and it activates the magnetic sensors one-by-one based on the water level present in the river. If water in the river reaches lower level magnetic sensor, then it switches the LED ON. Similarly second magnetic sensor is also indicated with an LED. Whenever third magnetic sensor is activated then we are indicating that level with LED and buzzer gets ON. When water level reaches to maximum automatically a Siren of 60 dB is activated.

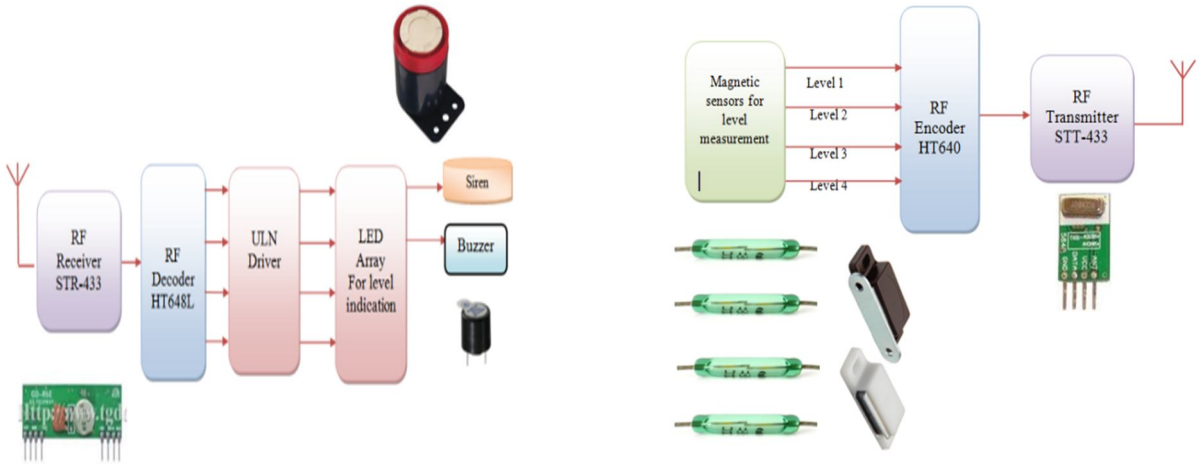

Fig1: Block diagram

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A. Draw Back

The existed system does not have any remote monitoring system using IoT module.

III. PROPOSED SYSTEM

The main objective of this project is to develop an electronics based system, which will identify the level of water and updates information in web server via IoT on a real-time approach. This system consists of a set of magnetic sensors which are connected to a microcontroller. Water level will be analyzed using magnetic sensors and updated in the webserver using IoT module connected to the controller. Authorities can view this information using internet from any place and also they can make a decision to divert the people from that place, this is to avoid further complications. A buzzer alert and a siren alert will be given to determine the severity of the water level.

A. Block Diagram

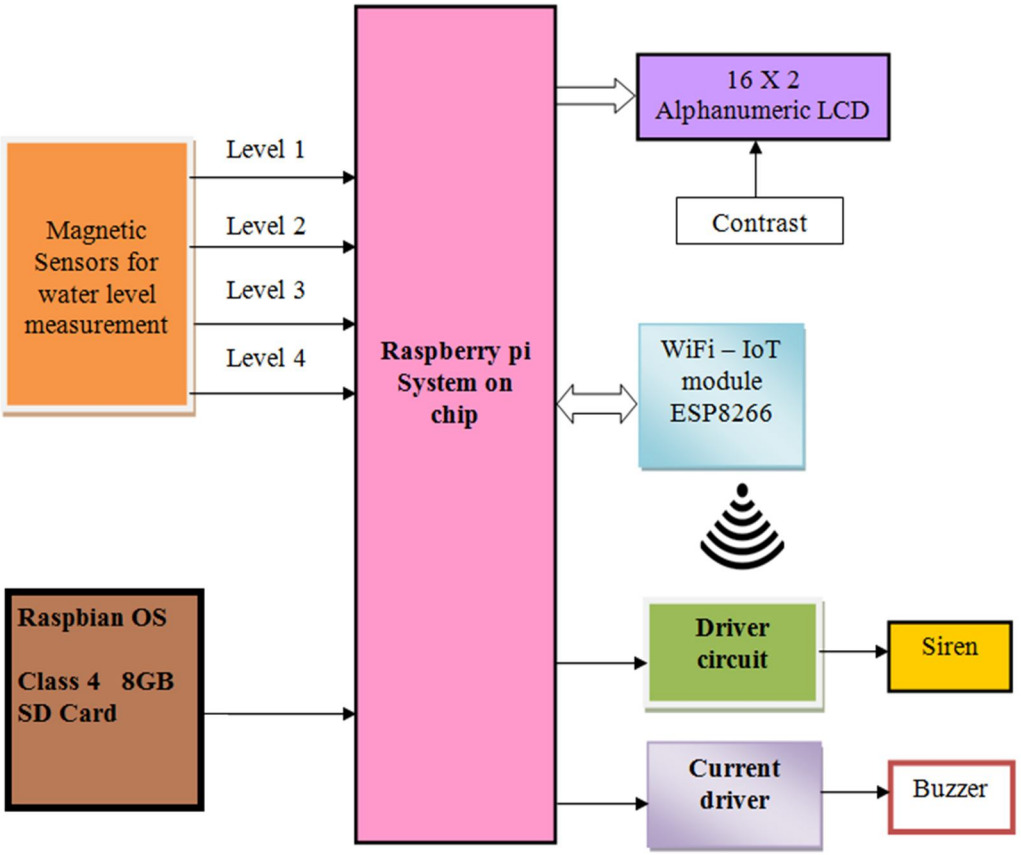

Fig2: Block diagram

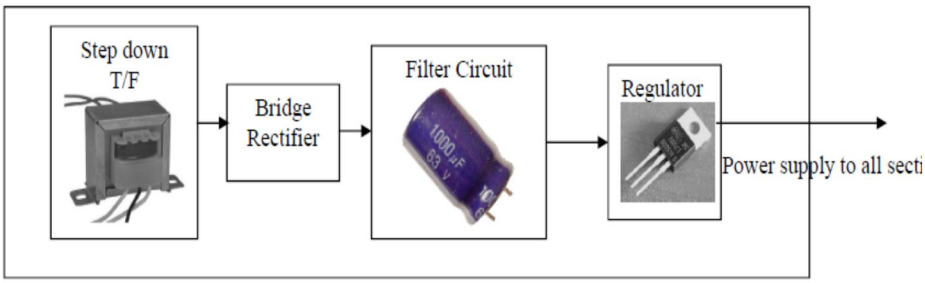

Fig3: Power supply

B. Internet of things

Internet is helping people to communicate each other using different applications.

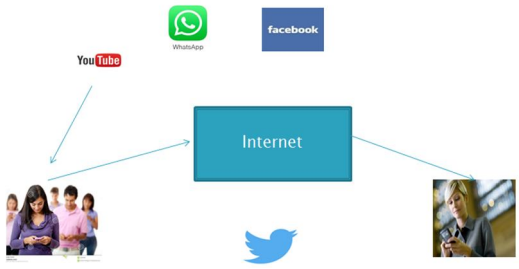

Fig4: Internet of things

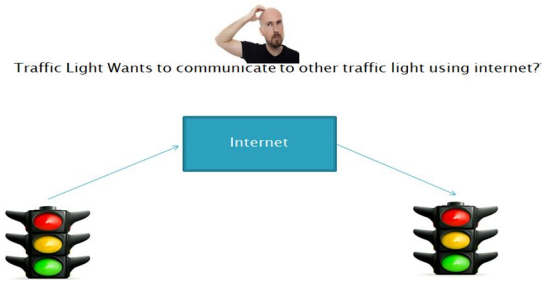

Fig5: Internet of things

What if I prefer to communicate Things? Each other via Internet? Internet of things helps the things to communicate mutually each other via IoT (internet of things) module.

C. Esp8266ex

The Internet of Things (IoT) is the connection of physical objects or "things" embedded by all of electronics, software, sensors, and network connectivity, which facilitate these objects to collect and interchange data.

D. *Different modules*

ESP8266 (ESPRESSIF)
ESP8089
ESP6203

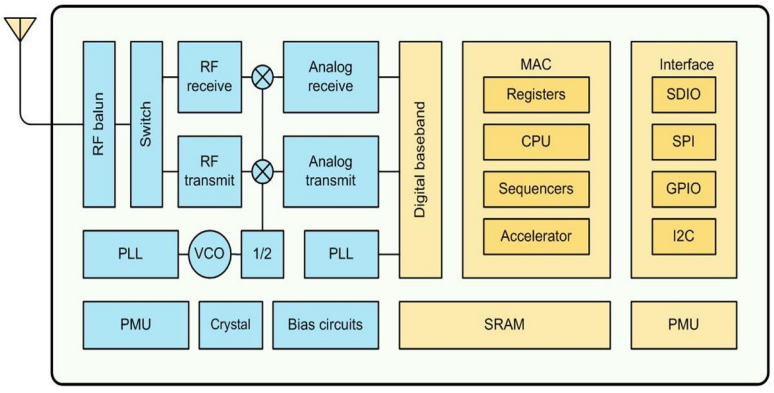

Fig6: ESP8266

E. Wi-Fi module

ESP8266 can be utilized to host the application. When ESP8266EX hosts the application, it boots up instantly from an external flash. It has integrated cache to refresh the performance of the system.ESP8266EX is the most integrated Wi-Fi chip in the industry; it integrates the antenna switches, power amplifier, less noise receive amplifier, filters, and power management modules, it requires

minimal exterior circuitry, and the entire solution, including front-end module, is designed to maintain minimal PCB area.ESP8266EX is always integrated with external sensors and other application specific devices over its GPIOs.

F. Features

1) 802.11 b/g/n
2) Integrated low power 32-bit MCU
3) Integrated 10-bit ADC
4) Integrated TCP/IP protocol stack
5) Integrated power amplifier and matching network
6) Supports antenna diversity
7) Wi-Fi 2.4 GHz, support WPA/WPA2
8) Support quick Link Function for both Android and IOS devices
9) Deep sleep power <10uA, Power down leakage current < 5uA
10) Wake up and transmit packets in <2ms
11) Standby power consumption of < 1.0mw

G. Pin definitions

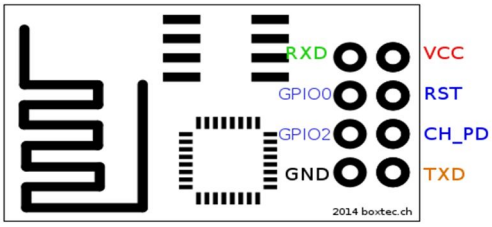

Fig7: Pin definitions

H. Interfacing with USB UART

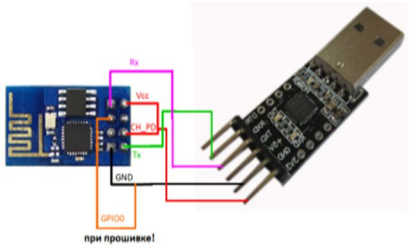

Fig8: Interfacing with USB UART

AT commands are instructions utilized to behave like modems.AT is the abbreviation for Attention. These commands mark Hayes commands that were used by the Hayes capable modems.

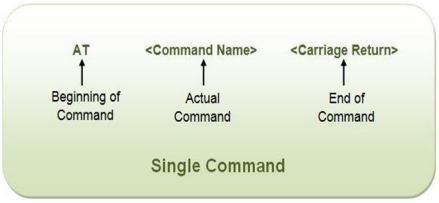

Fig9: AT commands

I. important AT commands

1) AT
2) AT+GMR to display version of the modem.
3) AT+CWMODE? +CWMODE=3 Select the relevant mode.
4) AT+CWLAP it figure out all the access points.
5) AT+CWJAP="ssid", "password" Join Access Point.
6) AT+CIPMUX=1 to set multi-port.
7) AT+CIPSERVER=1, 8888 to set TCP server & port.
8) AT+CIFSR Get IP Address.

Wireless connectivity is instrumental in the Internet of Things era and the nature of wireless combine solutions in industrial machinery is increasing instantly at generally levels of machinery systems. Industrial machinery systems handle wireless package to incorporate remote and local facilities and equipment to pick up operational efficiency. A wireless machinery system contains a mix of network technologies, equipment and systems including enterprise and automation systems. 802.15.4 Networks are regularly used to connect wireless sensors. Most of the major vendors of wireless IoT (internet of things) devices in industrial automation offer a wide range of devices with various wireless technologies in order to support many different applications. Eaton is a major provider of Wi-Fi and cellular devices for industrial automation applications.

J. *Major Fields of ESP8266EX applications to Internet of Things include:*

1) Home appliances
2) Home automation
3) Smart plug and lights
4) Industrial wireless control
5) IP cameras
6) Sensor networks
7) Wearable electronics

IV. HARDWARE MODULES USED IN THIS PROJECT

A. Raspberry-pi2 Model B

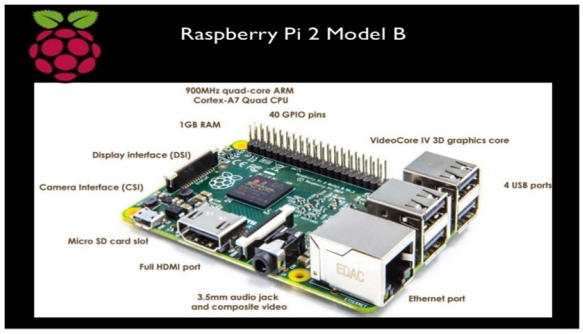

Fig10: Raspberry pi2 model B

The Raspberry Pi2 Model B has a Broadcom system on a chip (SoC).

B. Features

1) Operating voltage (5v)
2) Frequency (900 MHz)
3) RAM (1GB)
4) Storage – micro SD card slot (push retrieve type)
5) Video & Audio Output – HDMI and AV by 3.5mm jack.
6) Connectivity – 10/100MB Ethernet
7) USB - 4x USB 2.0 ports, 1x micro USB for power
8) 2×20 pin header for GPIOs

9) Camera header
10) Display header
11) Power – 5V via micro USB port.
12) Dimensions are (85 x 56 x17) mm

C. Basic hardware of raspberry-pi

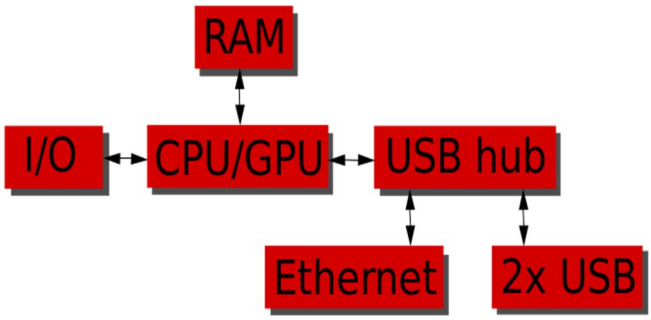

Fig11: Hardware of raspberry pi

V. SOFTWARE IMPLEMENTATION

A. Raspbian os

Raspbian whizz is a free operating system based on Debian, optimized for the Raspberry Pi hardware. An operating system is the set of fundamental programs and utilities that makes the Raspberry Pi run. Raspbian offers more than a pure OS pre-compiled software packed in a nice format for easy installation. Enhanced for good performance on the Raspberry Pi. However, Raspbian is still under observant development with a significant improving testability and performance of as many Debian packages as possible.

Coding will be done in python/embedded C language. But in this project I have used Embedded C language. Embedded c is a powerful language.

B. Hardware components

1) *Magnetic sensors:* A sensor is a device that measures a physical quantity and directly converts it into a signal which can be read by an observer or by an instrument. Initially connection inside the magnetic sensor is opened. When an external magnet placed in front of it, then it will close the connection. Floating sensors will be present to close the circuit when water gets contact with it. Then the related water level information will be displayed in the LCD. In this project 4 magnetic sensors are placed at different positions to detect the levels of water inside a river or lakes.
2) *Buzzer:* Buzzer is an audio signaling device which makes a buzzing noise or beeps sound and is used for signaling. Buzzers and beepers includes in alarm devices and timers. Here buzzer is used to indicate the 3rd stage of water level. When water rises to 3rd level buzzer will be activated and sound will be constant. The information will be updated in the webserver using IoT module.
3) *Siren***:** Siren is an electronic device which is used for producing a long and loud noise. In this project siren will be activated when the water level rises to 4th magnetic sensor.it is a 60db siren. Siren alert will be off when the water level reaches the 3rd level.

VI. RESULT

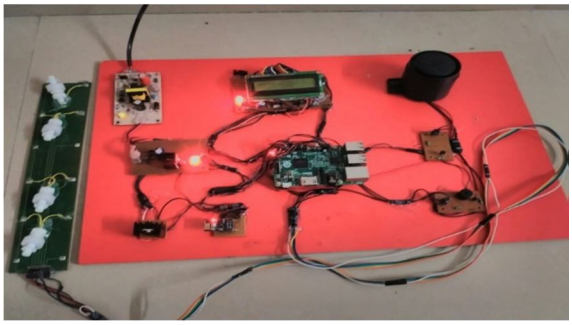

Fig12: Monitoring device

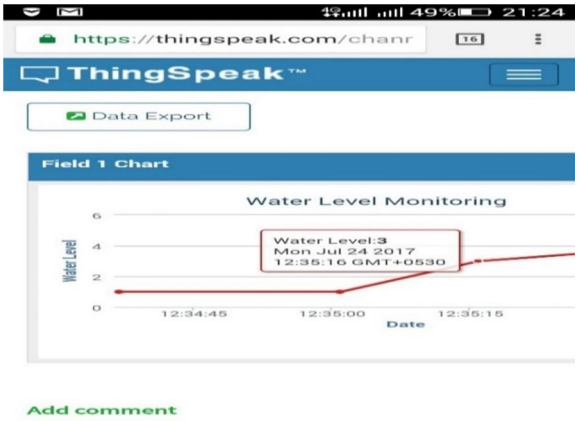

Fig13: Result displayed on web server

A. Applications

Near all water bodies like rivers, oceans, sea, and dams.

VII. CONCLUSION

The problems caused by floods are large in scale and complex in nature.to deal with these problems the aim of this project is detecting occurrence of floods with the help of magnetic sensors and alerting the people. The severity level will be indicated with buzzer and 60db siren. When water level reaches to maximum automatically a Siren of 60 dB is activated. Then the information will be updated on the web server using IoT module.

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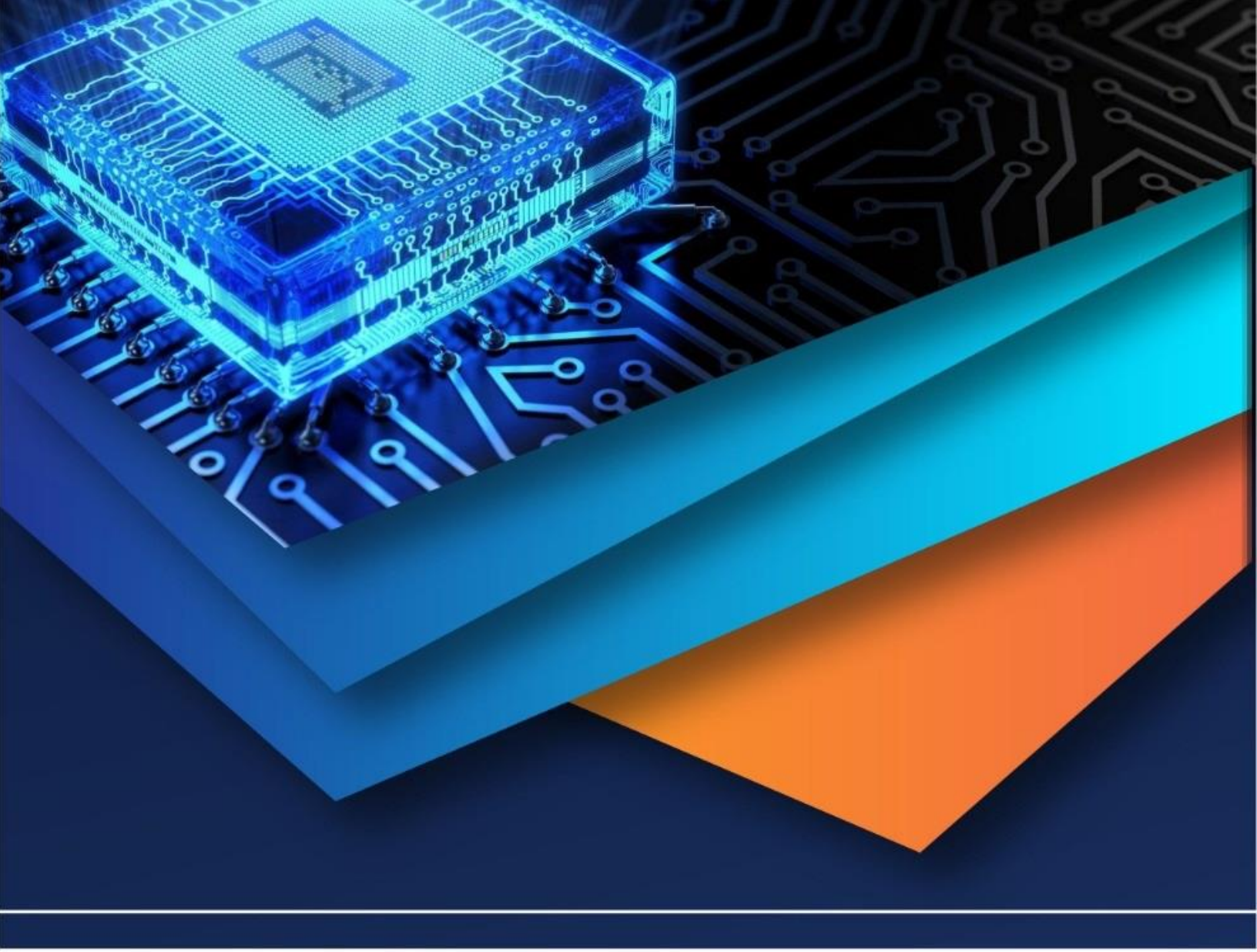

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