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Bio-Metric Enabled Examination Student Verification System

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Abstract: ***It has been a form of malpractice plaguing the field of education and examination services since the very beginning. Before more modern forms of administering exams fairly were introduced, it was very common to have another individual who was more qualified or better prepared take the exam in place of the actual candidate. This led to a large number of fraud candidates being shortlisted and selected in these examinations, while more deserving candidates were left behind.***
Now a days most of the examination boards are looking forward for a solution to deal with is problam. Authentication of the students is biggest task to reduce proxy in exam hall. In present system Verification task is done manually. Which will increases the tendency of proxy in examination hall. In this proposed project we came up with best solution to reduce the proxy in examination hall. Finger print reader is integrated with system, which will verify each students by their thumb impression. Which will reduce the time elapsing to take attendance. The device is very compact and ease to handle. Best part of the project is all information is transmitted to the SD Card and can be further implemented with Zigbee technology.

I. INTRODUCTION

The project was developed considering the amount of impersonation we get to see in the modern day society, with the growing need for academic certificate and their importance in securing a position in the society. Candidates have been suffering the computation and are tempted towards the unethical ways of achieving the results. As the years pass by the number of candidate appearing for any exam has increased rapidly, making it really difficult for the examination board to maintain the database without any impersonation or altering it through internal or external sources. When we look at the government sector and the exams that are being conducted we can hardly expect the game to be fair. In the recent time the amount of news that we were exposed to on this topic is no less than a disaster in this sector. Yet the deserving candidate should not suffer from the loopholes in the examination which crushes this dreams to given give an attempt. Examination boards have not yet used fingerprint authentication for verifying the right candidate present in the concerned examination hall. Due to the traditional system of examination which use pen and paper to verify and is mostly based on human interactions , the impersonation is very easy at some or the other point of this type of examination attendance verification process. The process is based on trust and loyalty which is exactly what at steak. Candidate attending the exam can be impersonated by anyone with some amount of manipulation. In this project we use a fingerprint biometric to verify the original candidate and send the detail to the examination office immediately through a ZigBee transceiver. Initially we collect the candidate fingerprint while he is applying for exam, verify the same when he is taking the exam and again cross verify while he collects the certificate if required.

II. PROPOSED METHODS

A. Arduino Mega

Arduino is open-source concept with simple input and output , it has a developer friendly environment that adds up-to processing and wiring language. Arduino can be used to develop interactive objects and can be operated from software which is installed in our computer for the sake of Arduino control and configuration. This software is available for free. The Arduino Mega is also a board containing microcontroller built-in which was inspiration to Arduino Mega 2560. It has 54 digital input/output pins, USB connection, reset button, 16analog inputs, ICSP header, 16MHz crystal oscillator, power jack and 4UARTs. It has the basic requirement to support the microcontroller, when this board is connected to a computer with USB cable and is supplied with power of AC-DC adapter or battery it gets started. This Arduino Mega is compatible with almost all the suitable protection designed. The Arduino Mega 2560 is an update to the Arduino Mega, which it replaces. The Arduino Mega 2560 does not use the previously used driver chip, which was FTDI USB-to-serial. Rather it uses USB-to-serial converter after programming Arduino Mega 2560 as required. ATmega 8U2 is used in revision 1 and even in revision 2 boards. In revision 2 of the ATmega 2560 board resistors function to pull the 8U2 HWB line to ground level, which in turn makes it easy to be placed into DFU mode.

Table 1 Arduino Mega 2560 Specifications

Specification	Range
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	54 (of which 15 provide PWM output)
Analog Input Pins	16
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	256 KB of which 8 KB used by boot-loader
SRAM	8 KB
EEPROM	4 KB
Clock Speed	16 MHz
LED_BUILTIN	13
Length	101.52 mm
Width	53.3 mm
Weight	37 g

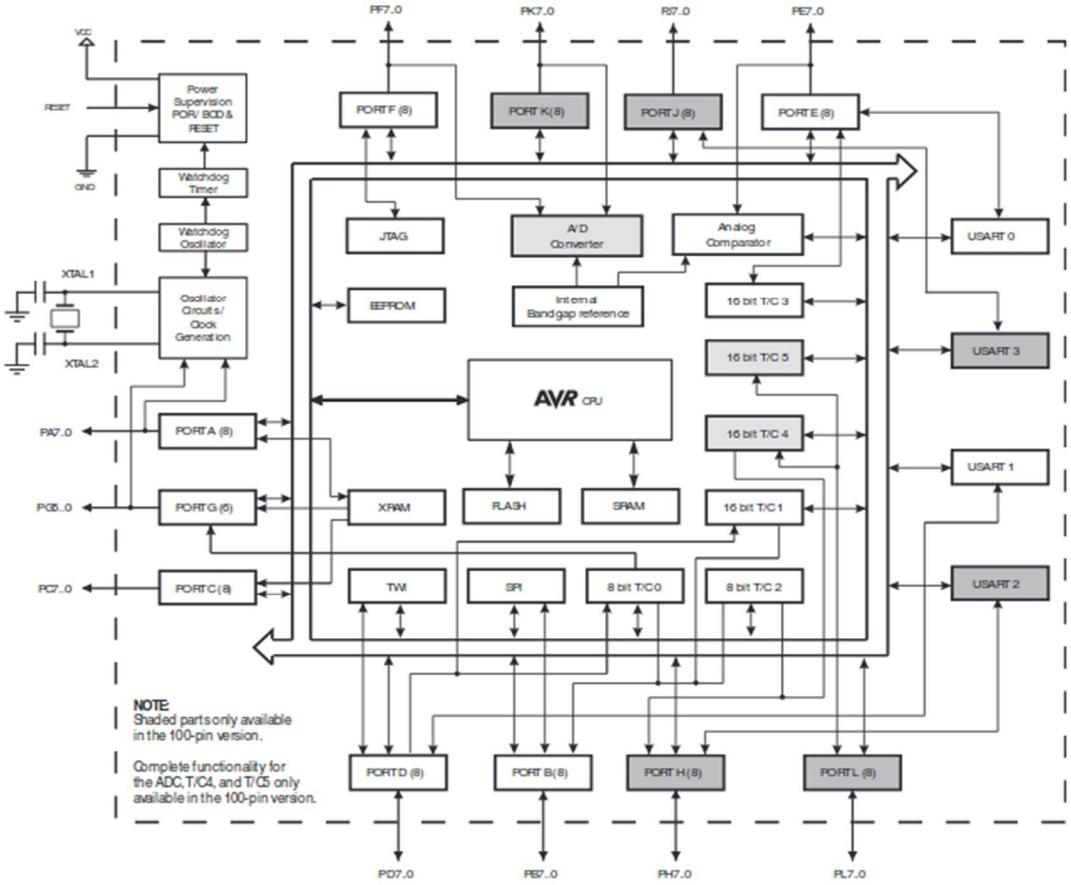

Figure 1 Inner view of Atmega2560

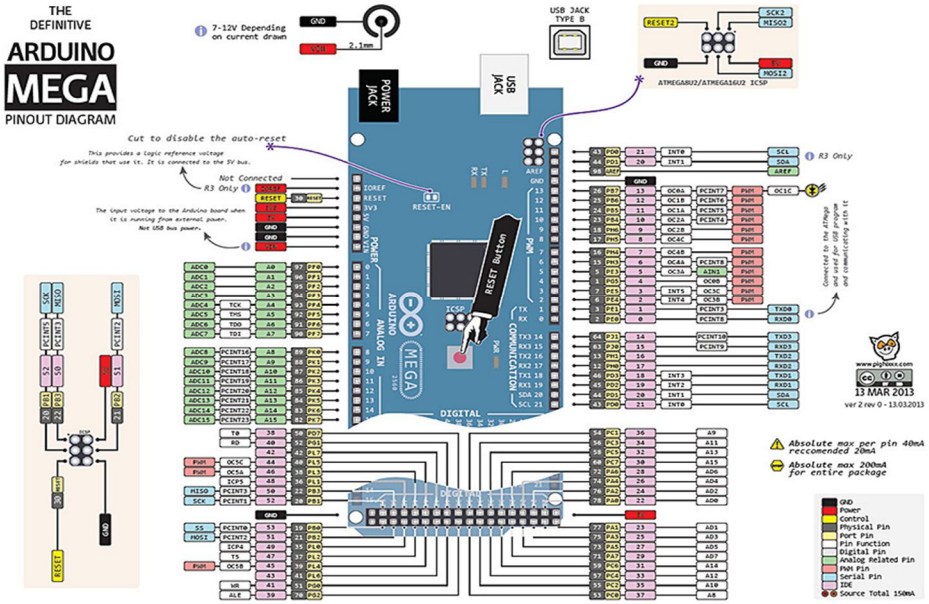

Figure 2 Pinout diagram of Arduino Mega

The Mega 2560 can communicate with other boards, microcontrollers and computers. The ATmega2560 provides with four hardware UARTs for communication with TTL(5V) serial. ATmega 16U2 channels one of the revisions on the board over the USB and provides an virtual communication port, which is then used by the software on the computer. OSX and Linux machines recognize the connection as a com port but on windows machines we will need a .inf file. The Arduino software which is the IDE is inbuilt with a serial monitor which allows simple text data to be sent and received on the board. The RX/TX LEDs which are on board will blink when data is either being received or being sent via the ATmega8U2/ATmega16U2 chip to the USB connection on the computer but does not blink for serial communication pins 1 and 0.

1) Advantage of Arduino Mega

a) Arduino Mega has 70 input/output pins.
b) This is better if the user does not want an add-on on their board.
c) The memory Mega holds is 8KB SRAM, 4KB EEPROM, and 256KB of flash.
d) Mega can be used if second, third or fourth port is need for higher speed as it has 4 hardware serial ports.
e) Mega has 14 PWM (Pulse Width Modulation) ports.

B. Fingerprint Module

The Fingerprint module used in this project is R307 which is the modified version of the Fingerprint module R305 which was previously being used.

Specification / Model	R305	R307
Storage Capacity (Fingerprints)	250	1000
3.3V Operation	No	Yes
USB Operation	No	Yes
Finger Detect Output	No	Yes

Table 2 Difference Between R305 (Old) and R307 (New)

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The R307 Fingerprint module is built with optical fingerprint sensor, high-speed DSP processor , high-capacity FLASH chips, high-performance fingerprint alignment algorithm and other hardware. Software composition consists of stable performance, fingerprint matching, simple structure, with fingerprint entry, image processing, search and template storage and other functions.
The SPI is used for the communication taking place between SD card and ATmega. This communication takes place at the digital pins 11,12 and 13 on most Arduino boards while on 50, 51 and 52 on Arduino Mega board. Another hardware SS pin that is pin 10 on Arduino board or pin 53 on Arduino Mega or another pin for this specific work in the call to SD. The fingerprint module R307 has two interface USB 2.0 and TTL UART. USB 2.0 is used to connect to the computer, the default baud rate is 57600, refer to communication protocol, RS232 interface is a TTL level. Microcontrollers like ARM, DSP and other serial device with a good connection can be used. Microcontrollers with the voltage of 3.3V and 5V can be connected directly.

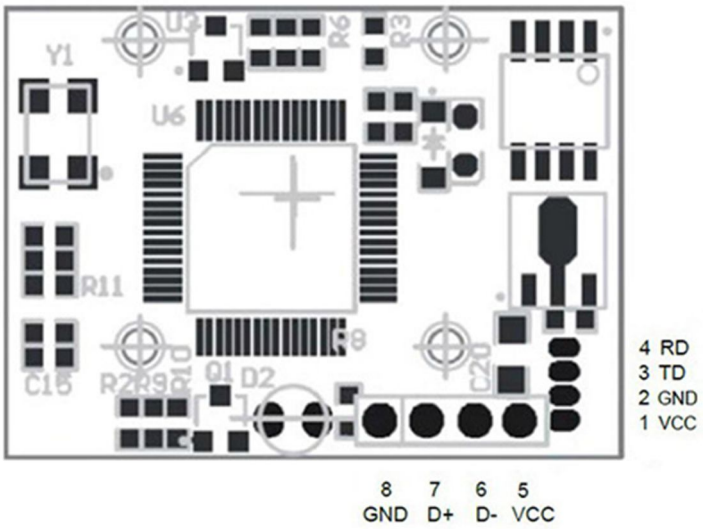

Figure 3 Pin diagram of Fingerprint module

Pin no.	Name	Function
1	VCC	Power input
2	GND	Signal ground
3	TD	Data output TTL logic
4	RD	Data input TTL logic
5	VCC	+5VDC
6	D-	Data -
7	D+	Data +
8	GND	Ground

Table3 Technical Parameters of R307

C. SD Card Interface

All the SD cards are designed or programmed to work right away from box. If the SD card was used in any camera or computer before it cannot be read by SD library hence it should be formatted so an file system is created , This file system can be read or written by the Arduino. But formatting the SD card can shorten their life span. The cards used here are SD , microSD size , SDHD size. To format the card we need a SD card reader and an computer. The library uses FAT16 if possible but can support FAT16 and FAT32. Formatting is a simple and easy process.The SD library supports to read data from and write data to SD cards, eg: Arduino Ethernet Shield.This library supports FAT16 and FAT32 file system on SDHC card and SD cards. The file sent to SD card library will include paths separated by the “/”,eg : "directory/filename.txt". The directory at work is always the root of the SD card , a name is used to refer to same file with or without slash. Eg: “/file.txt” is equivalent to “file.txt” .The version 1.0 in the library supports many files to be opened at a time.

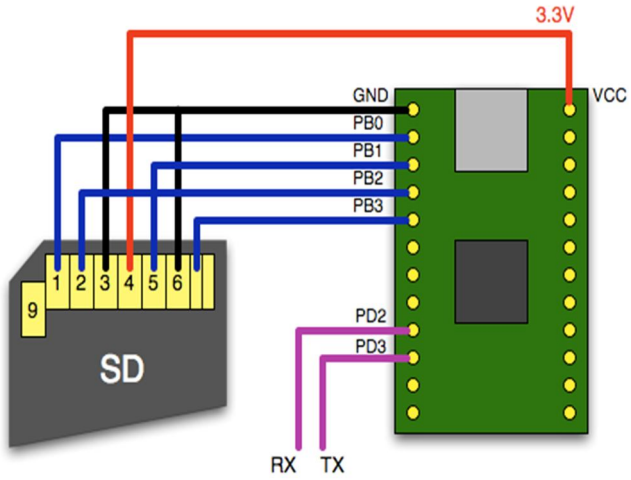

Figure 4. Pin diagram of SD card

Pin	Pin name	Signal Function
1	DAT2	Data Bit 2
2	CD/DAT3	Card Detect / Data Bit 3
3	CMD	Command Line
4	Vdd	Supply Voltage 2.7v / 3.6v
5	CLK	Clock
6	Vss	Ground
7	DAT0	Data Bit 0
8	DAT1	Data Bit 1

Table 4. SD card Pins

D. Block Diagram And Schematic Diagram

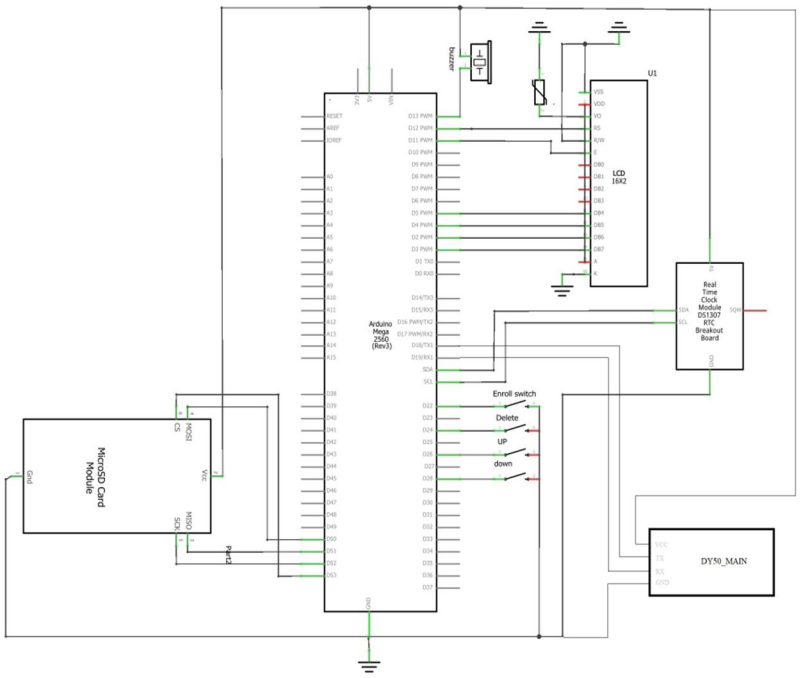

Figure 5. Schematic diagram for Bio-Metric Enabled Examination Student Verification System

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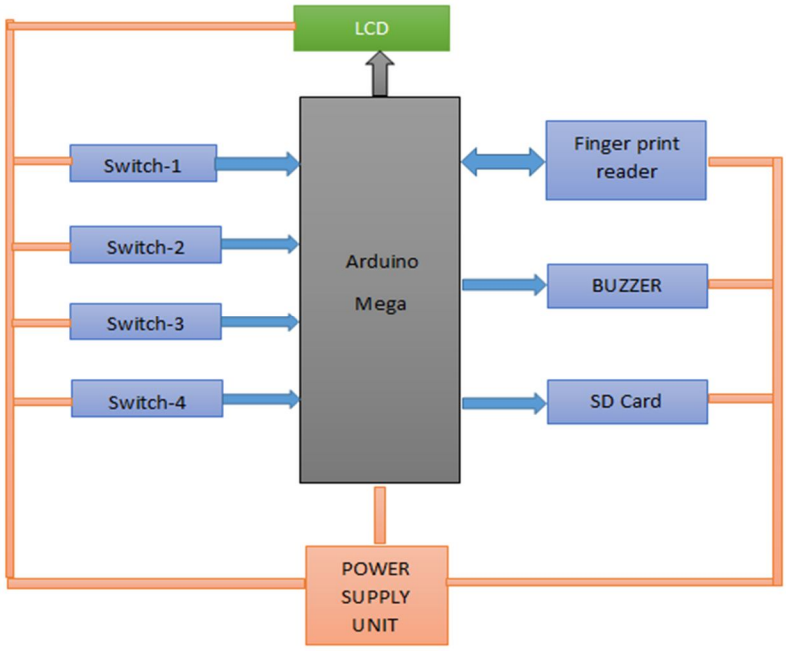

Figure 6. Block diagram of Bio-Metric unit

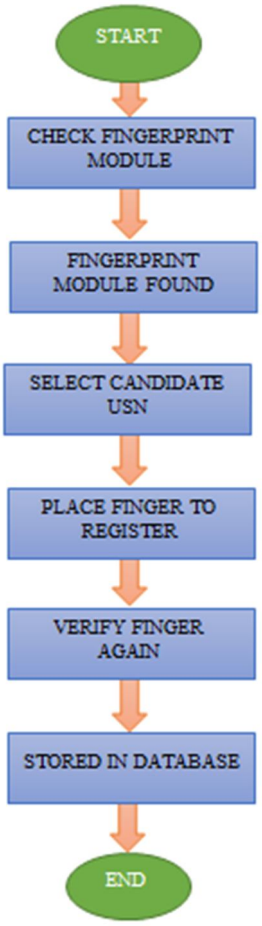

Figure 7. Flow chart for Enrolling a Candidate

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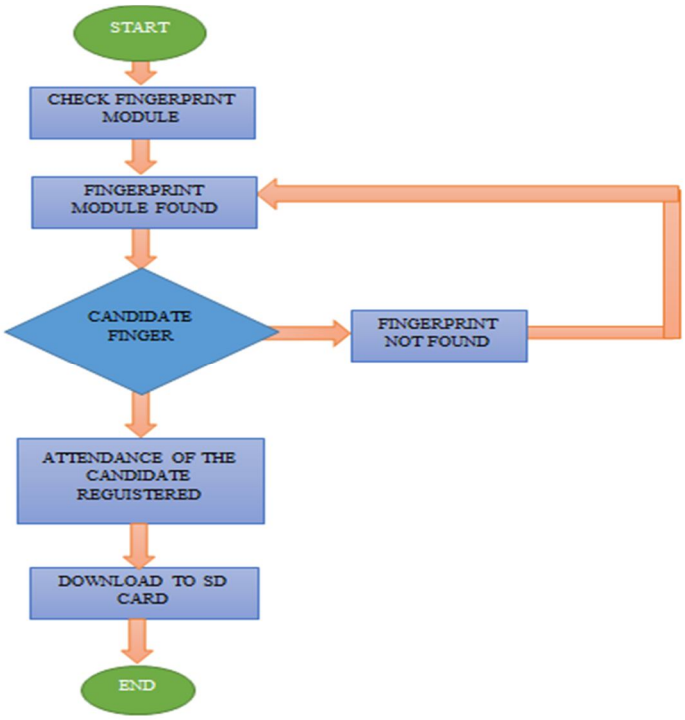

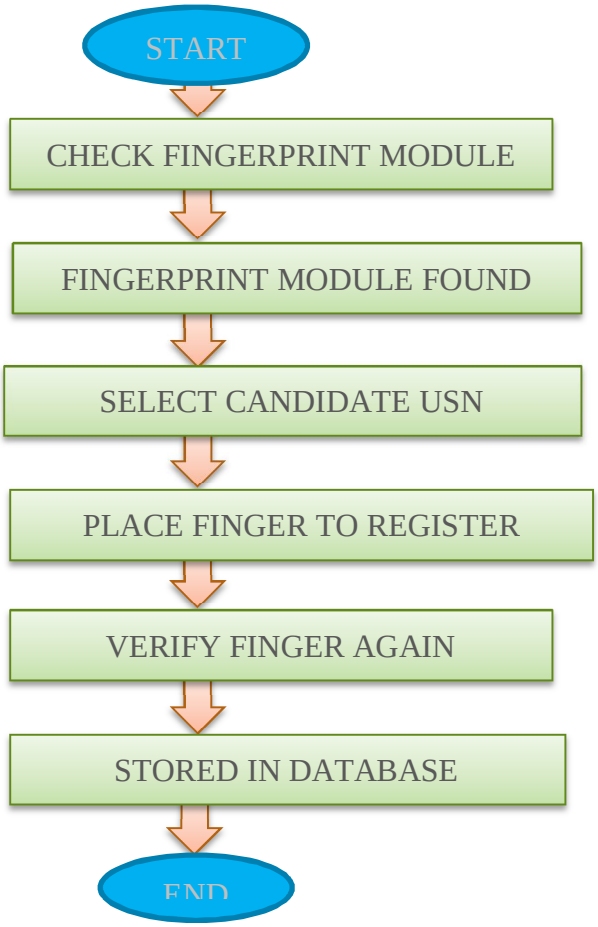

Figure 8. Flow chart for Bio-Metric Enabled Examination Student Verification System

III. RESULT AND CONCLUSION

	User ID1	User ID2	User ID3	User ID4
SUBJECT 1	(PRESENT)	(PRESENT)	(PRESENT)	(PRESENT)
SUBJECT 2	(PRESENT)	ABSENT	ABSENT	ABSENT
SUBJECT 3	(PRESENT)	ABSENT	ABSENT	ABSENT
SUBJECT 4	ABSENT	ABSENT	ABSENT	ABSENT
SUBJECT 5	ABSENT	ABSENT	ABSENT	ABSENT
SUBJECT 6	ABSENT	ABSENT	ABSENT	ABSENT

Table 5. The final result obtained according to candidate USN and subjects

Bio-Metric verification can be done using the following methods for more secure optimization.

1) Optical technologies.
2) Acoustical technologies
3) Microwaves
4) Capacitive sensors
5) Pressure (tactile) sensors
6) X- γ- or particle rays technologies
7) Magnetic fields
8) Electric fields
9) Chemical emissions

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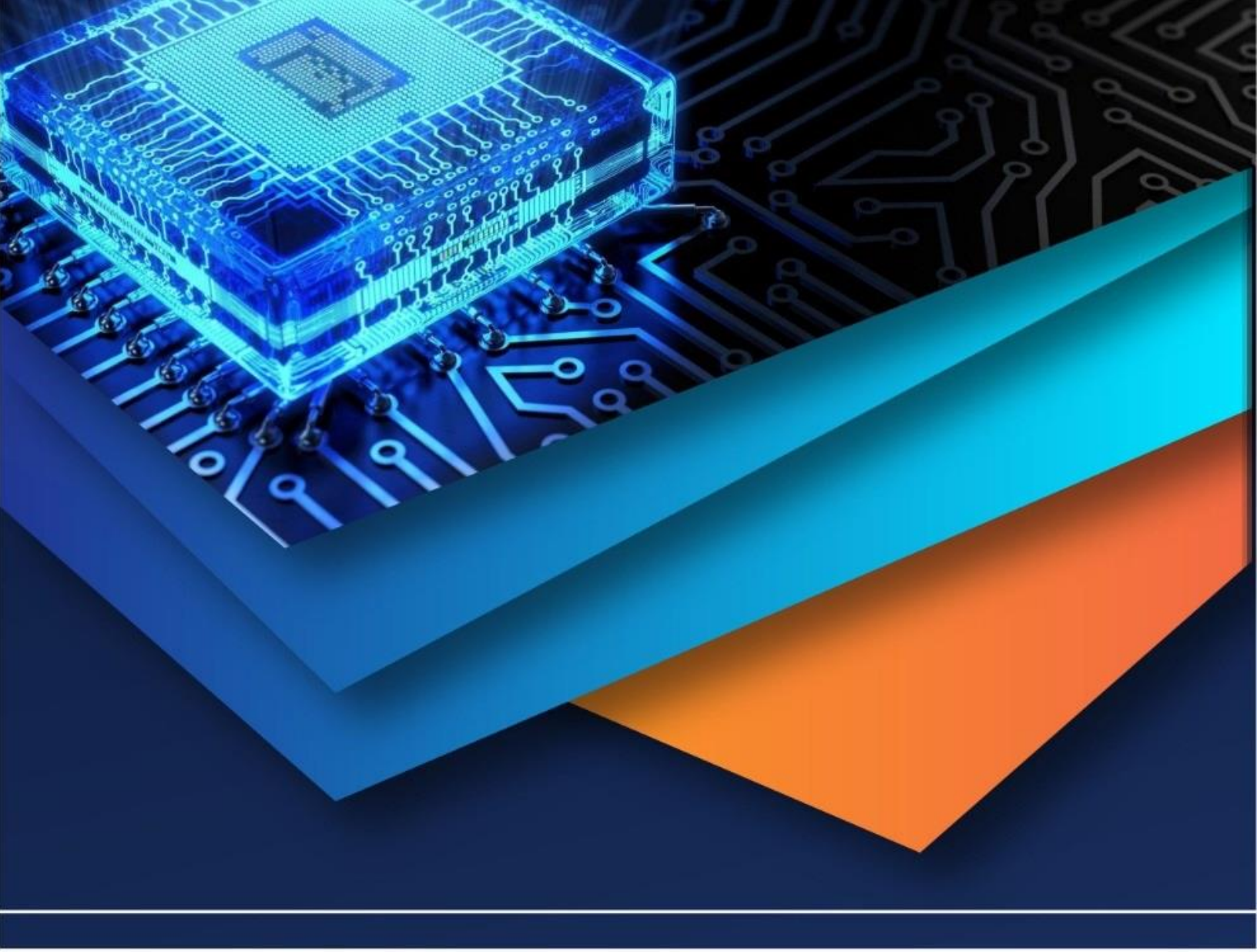

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