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Auto Metro Train Shuttle between Stations

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Abstract: ***The main aim of this project is to demonstrate the technology used in metro train movement which are used in most of the developed countries. This train consists of a controller that enables the automatic running of the train from one station to another station. In this proposed system an autonomous train will eliminates the need of any driver. Thus, any human error will not happen. In this project 8051 micro controller has been used as CPU. Whenever the train arrives at the station it stops automatically, as sensed by an IR sensor. Then the door automatically gets open and the passengers will go inside the train .It is equipped with a passenger counting section, which counts the number of passengers entering. There is the limit of time – after this the doors will be automatically closed and the train starts moving to another station.***
The entryway will then closes and the prepare begins (there will be a period set as of now in the matter of how long the prepare will stop at each station) set in the controller by the program. The traveler tallies and the stations are shown on a LCD show interfaced to the 8051. Prepare development is then con-trolled by an engine driver IC interfaced to the 8051. The prepare joins declaration to alarm the passengers before shutting the entryway and furthermore caution them before gazing. As prepare achieves the goal the procedure rehashes therefore accomplishing the coveted operation. Promote the venture can be improved by making this framework more progressed by showing the status of the prepare over a bigger show unit for the comfort of the travelers. The status of the prepare comprises of the parameters like, expected entry and flight time and so forth.
Keywords: 8051Processor, IR sensor, DC motor, LCD, voice sensor.

I. INTRODUCTION

This project is designed so that students can understand the technology used in now-a-days driverless metro trains which are utilized as a part of the greater part of the created nations like Germany, France, and Japan and so forth. These trains are outfitted with the CPU which controls the prepare. The prepare is customized for a particular way. Each station on the way is characterized and furthermore the stoppage timing of the prepare and separation between the two stations is predefined.
This proposed framework is a self-ruling train and it kills the need of any driver. Along these lines, any human mistake is discounted. In this venture PIC microcontroller has been utilized as CPU. At whatever point the prepare touches base at the station it stops naturally, as detected by an IR sensor. At that point the entryway is opens consequently so that the travelers can go inside the prepare. The entryway then closes after an endorsed time set in the controller by the program.
The mechanized framework for a metro rail is a coordinated application which make shows the significant station data when the prepare achieves a specific station. This implanted application mainly focuses on overcoming escape clauses in the current framework. It is advanced to meet the cost and power utilization necessities.

II. EXISTING SYSTEM

A. Few Inconveniences of the Current Framework are
1) Constant human mediation.
2) High cost.
3) More Manpower is required.
4) Installation and incorporation is tedious.

III. PROPOSED SYSTEM

A. The Proposed Framework Overcomes the above Disadvantages and has the Beneath Specified Benefits
1) Automated framework requiring less labor.
2) Display unit is placed
3) Automatically the door gets closed after the prescribed time is completed.

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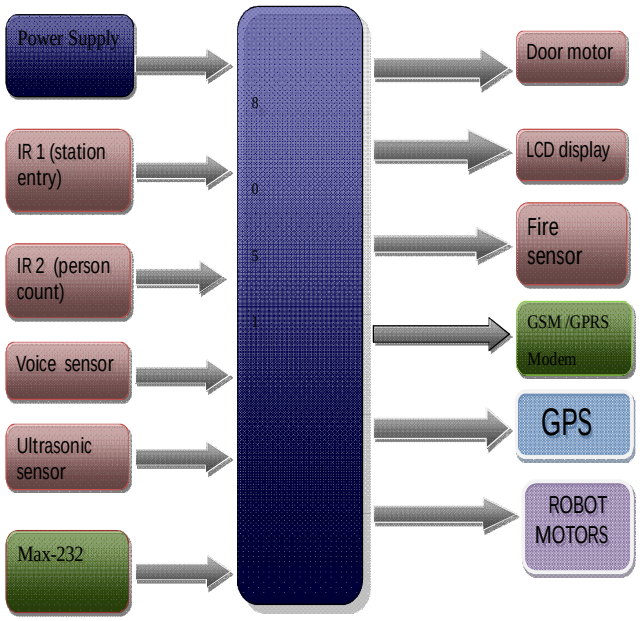
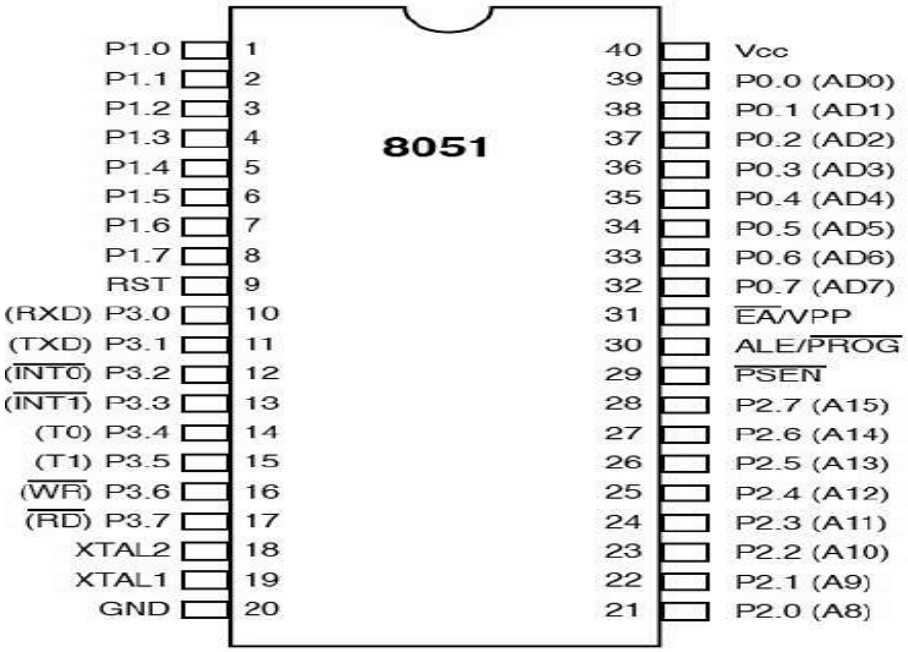
B. Required Components

They are different components that are used in auto metro train. This system has a simple combination of electronic circuit. This project contains the basic component that are power supply, IR sensor(station reached),IR sensor (person count),door motor, fire sensor, ultrasonic sensor, voice sensor, LCD display, GPS, Robot motors, GSM/GPRS modem,max-232,voltage regulator.

C. Block Diagram



D. 8051 Processor



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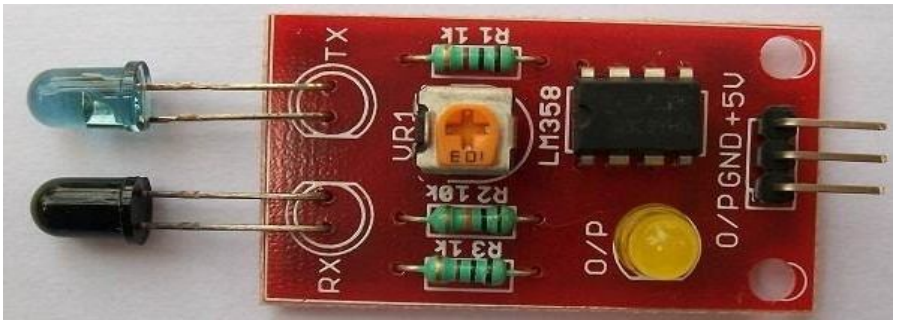
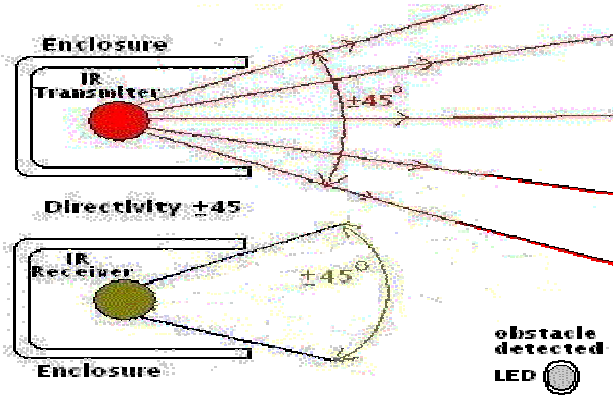
1) The 8051 is an 8-bit microcontroller with 8 bit data bus and 16-bit address bus. The 16 bit address bus can address 64K(216) byte code memory space and a separate 64K byte of data memory space. The 8051 has 4K on-chip read only code memory and 128 bytes of internal Random Access Memory (RAM).
2) Besides internal RAM, the 8051 has various Special
3) Function Registers (SFR) such as the Accumulator, the B register, and many other control registers.
4) Two 16 bit /Counter timers
5) 3 internal interrupts (one serial), 2 external interrupts.
6) 4 8-bit I/O ports (3 of them are dual purposed). One of them used for serial port,
7) Some 8051 chips come with UART for serial communication and ADC for analog to digital conversion.
8) Most of these pins are used to connect to I/O devices or external data and code memory.
9) 4 I/O port take 32 pins(4 x 8 bits) plus a pair of XTALS pins for crystal clock
10) A pair of Vcc and GND pins for power supply (the 8051 chip needs +5V 500mA to function properly)
11) A pair of timer pins for timing controls, a group of pins (EA, ALE, PSEN) for internal and external data and code memory access controls
12) A pair of Crystal clock pins(XTAL1,2)
13) One reset pin for reboot purpose

E. IR Sensors



IR reflectance sensors contain a coordinated infrared transmitter and infrared beneficiary match. These gadgets work by measuring the measure of light that is reflected into the beneficiary. Since the beneficiary likewise reacts to surrounding light, the gadget works best when very much protected from abient light, and when the separation between the sensor and the intelligent surface is small(less than 5mm). IR reflectance sensors are frequently used to recognize white and dark surfaces. White surfaces for the most part reflect indeed, while dark surfaces reflect inadequately. One of such applications is the line adherent of a robot.



F. Ultra Sonic Sensor

An ultrasonic sensor has two parts

1) A transmitter that sends out a signal that humans cannot hear
2) A receiver that receives the signal after it has bounced off nearby objects. The sensor sends out its signal and determines how long the signal takes to come back.

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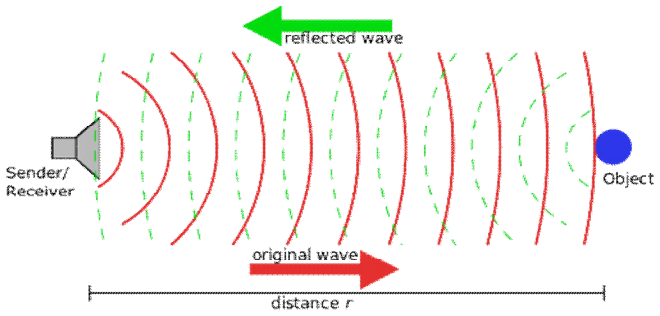
3) If the object is very close to the sensor, the signal comes back quickly
4) If the object is far away from the sensor, the signal takes longer to come back
5) If objects are too far away from the sensor, the signal takes so long to come back (or is very weak when it comes back) that the receiver cannot detect it.
6) The sensor sends a message back to the computer brick telling it the time taken for the signal to return. Then the brick uses this info to compute how far away the object is.

G. Working Operation



The ultrasonic sensor sends out sound from one side and receives sound reflected from an object on the other side. The sensor uses the time it takes for the sound to come back from the object in front to determine the distance of an object.

H. LCD

1) LCD remains for Liquid Crystal Display. LCD is finding
2) Far reaching use supplanting LEDs (seven fragment LEDs or, on the other hand other multi fragment LEDs) on account of the accompanying.

I. Reasons

1) The declining costs of LCDs.
2) The capacity to show numbers, characters and illustrations. This is as opposed to LEDs, which are restricted to numbers and a couple characters restricted to numbers and a couple characters.

3) Incorporation of an invigorating controller into the LCD, in this way alleviating the CPU of the assignment of reviving the LCD. Conversely, the LED must be invigorated by the CPU to continue showing the information.
4) Ease of programming for characters and design.
5) These parts are "particular" for being utilized with the microcontrollers, which implies that they can't be initiated by standard IC circuits. They are utilized for composing distinctive messages on a smaller than expected LCD.

J. GSM

1) GSM (Global System for Mobile communication) is an open, digital cellular technology used for transmitting mobile voice and data services.

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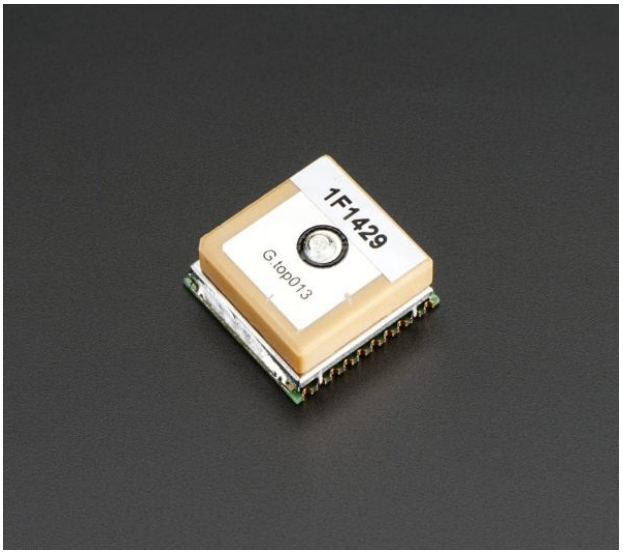
2) GSM (Global System for Mobile communication) is a digital mobile telephone system that is widely used in Europe and other parts of the world. GSM uses a variation of Time Division Multiple Access (TDMA) and is the most widely used of the three digital wireless telephone technologies (TDMA, GSM, and CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz or 1,800 MHz frequency band. It supports voice calls and data transfer speeds of up to 9.6 kbit/s, together with the transmission of SMS (Short Message Service).

K. GPS

The Global Positioning System (GPS) is a space-based radio navigation system owned by the United States government and operated by the United States Air Force. It is a global navigation satellite system that provides geolocation and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites.[1] The GPS system operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information. The GPS system provides critical positioning capabilities to military, civil, and commercial users around the world.



L. H-Bridge

An H-extension is an electronic circuit which empowers DC electric engines to be run advances or in reverse. These circuits are frequently utilized as a part of mechanical autonomy. H-extensions are accessible as incorporated circuits, or can be worked from discrete segments

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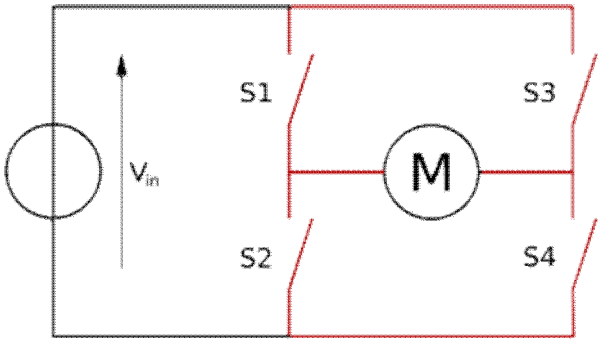
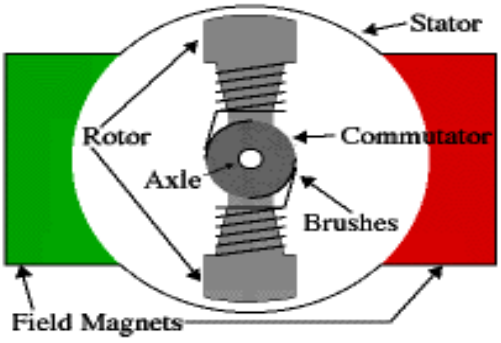


The two essential conditions of a H-connect. The expression "H-connect" is gotten from the run of the mill graphical portrayal of such a circuit. A H-extension is worked with four switches (strong state or mechanical). At the point when the switches S1 and S4 (as per the principal figure) are shut (and S2 and S3 are open) a positive voltage will be connected over the engine. By opening S1 and S4 switches and shutting S2 and S3 switches, this voltage is turned around, permitting turn around operation of the motor. Using the classification over, the switches S1 and S2 ought to never be shut in the meantime, as this would bring about a short circuit on the info voltage source. The same applies to the switches S3 and S4. This condition is known as shoot –through.

M. Dc-Motor



An electric engine is a machine which changes over electrical vitality into mechanical vitality.

N. Principles of Operation

In any electric engine, operation depends on basic electromagnetism. A current-conveying conductor creates an attractive field; when this is then set in an outside attractive field, it will encounter a drive relative to the current in the conductor, and to the quality of the outer attractive field. As you are very much aware of from playing with magnets as a child, inverse (North and South) polarities pull in, while like polarities (North and North, South and South) repulse.

The inward arrangement of a DC engine is intended to outfit the attractive collaboration between a current-conveying conductor and an outer attractive field to produce rotational movement. How about we begin by taking a gander at a basic 2-shaft DC electric engine (here red speaks to a magnet or twisting with a "North" polarization, while green speaks to a magnet or twisting with a "South" polarization).

O. Working of the Project

1) Train moves with the assistance of engines settled to the controller with the assistance of H-scaffold.
2) It goes to the station and stops there for specific time restrict which is pre-modified and afterward moves to the next place.
3) The number of individuals coming inside will be checked with the assistance of IR sensor interfaced to the controller.
4) If it surpasses specific point of confinement then the prepare entryway gets shut.
5) It additionally has a LCD as its show unit.
6) A remote camera is interfaced for checking reason. So that the approved individual will can screen.

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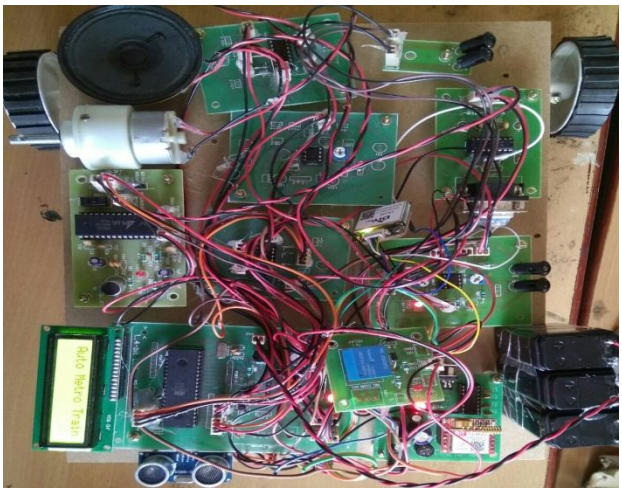
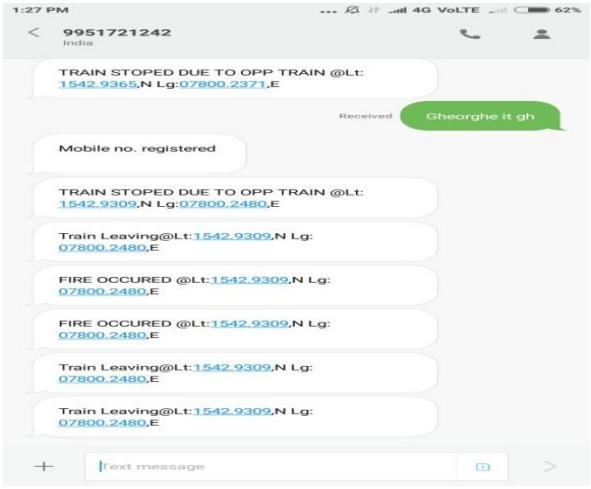
IV. RESULT

Consequently our venture is executed to run the prepare without driver inside indicated time restrict and furthermore utilizing IR sensor which takes a shot at observable pathway guideline.

A. Output





V. CONCLUSION

These days the mishaps of trains are expanding step by step. Of these real mischances are happening because of human issues. A man can do a misstep yet a customized processor doesn't have a shot of doing blunder. This is the primary explanation for this venture. This is an exceedingly propelled innovation which is as of now utilized as a part of created countries, for example, Japan, Germany, France and so forth.

By utilizing this auto metro prepare the timings of the prepare will be correct and it keeps away from a great deal of burden to the travelers. This venture will incredibly lessen the human mediation in the control of trains and subsequently spares a great deal of time and cash. In this manner the venture "AUTO METRO TRAIN TO SHUTTLE BETWEEN STATIONS" is enormously valuable in all angles.

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BIBLIOGRAPHIES

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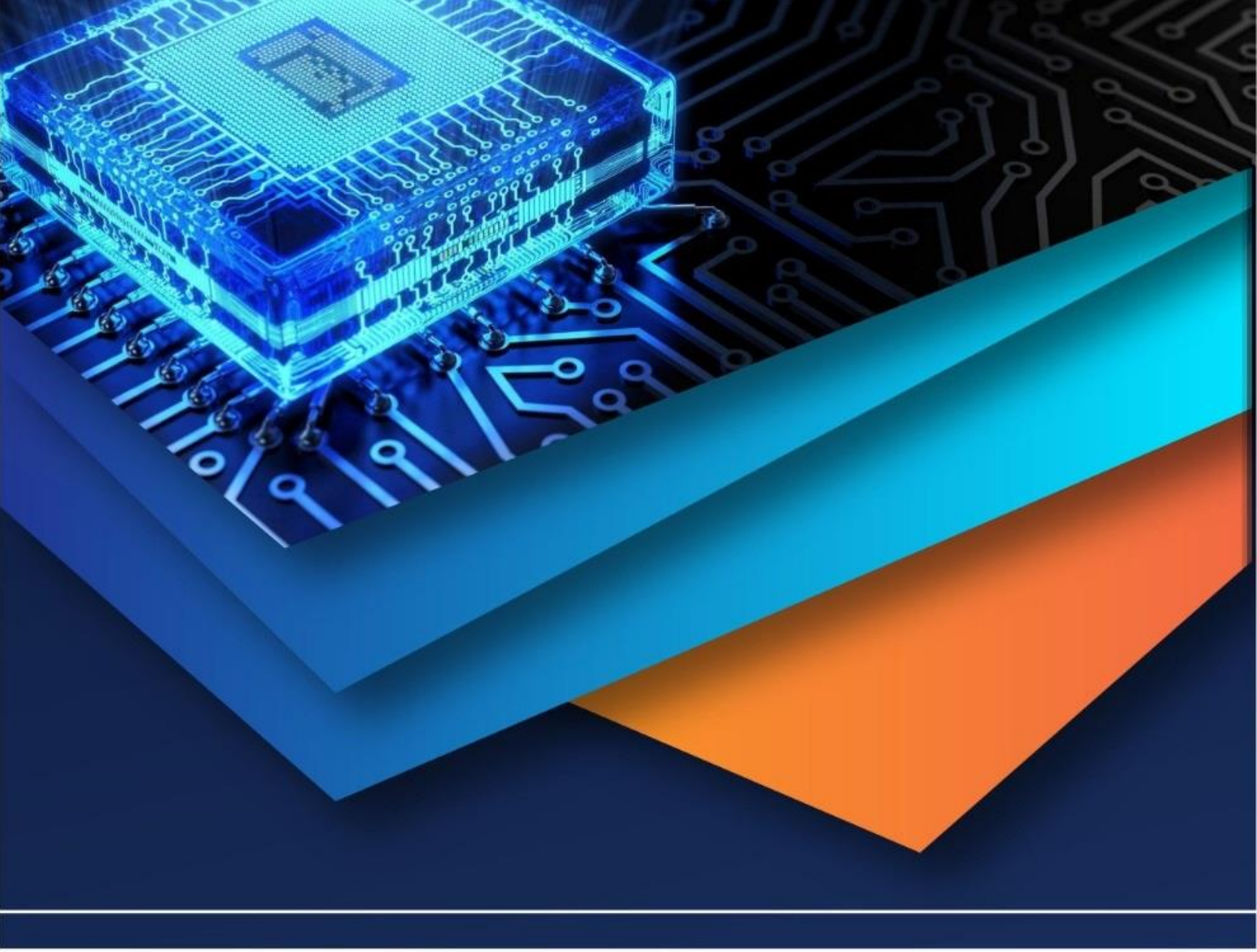

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