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Multipurposed Intelligent ID Card for Social Distancing & Safety Emergency alert systems

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Abstract: ***This proposed invention is related with multipurpose device which is intelligent id card provided to the employee will help track and trace by connecting to the respective corporate server network. This server acts as a central intelligence and provides a dashboard that will help set up and get data and insights. These constantly monitor the smart cards and transmit their position to the central system. Many important multi-tasking tasks can be performed using this smart ID card which has the ability to provide real-time location information and also automatically identify if the person is where they should be. Accidents, such as a person walking into a danger zone, can be easily reported. In the event of a fire, you can quickly find the total people count along with the latest positions. The crowding of places such as offices, shops, workplaces, bathrooms, canteens, etc. it can be reported in real-time in order to avoid any infections. The temperature measurement alone is useless if the readings are not associated with the employee and are recorded to analyses trends. The proposed ID card will keep track of the number of times the employee has washed their hands. If not, a social notification will be raised. With real-time monitoring, you can easily provide daily attendance data to HR for payroll calculation and contract work invoice review. The employee's Bluetooth tag will help track time spent within the authorized area and will sound an alarm if the person enters a danger zone, all in real-time. The employee tag will allow the employee to send an SOS signal in case of any danger or panic situation. It will not be necessary to keep an attendance register. The tag will automatically record the time of entry and exit. A body sensor attached to the ID card will detect if the card is moved away from the body and kept aside. Hence, there is no possibility of cheating. The battery inside the card would last 5 to 10 years. IP 65, therefore resistant to water and rain. No maintenance is required.***
Keywords: Covid-19 study, Safety Device, Health Tracking, Social distancing, smart id.

I. INTRODUCTION

Considering the current pandemic situation, ensuring the health and safety of employees and casual workers when they return to work is of the utmost importance. It is very critical for the company that operations produce the desired results. The obstacles to achieving company objectives are related to the safety of the workforce in the workshop, health and hygiene monitoring, social distancing, and quick decisions on outliers. All this can be addressed through the proposed intelligent solution based on multipurpose ID cards that deal with real-time monitoring of labor and related compliance checks in order to guarantee the value of your company's deliveries amid the potentially new coronavirus.[1] lethal, COVID-19 situation. Our state-of-the-art Smart ID cards are designed to help companies monitor real-time situations on the floor and ensure the productivity and safety of the workforce in the workplace. The following are the main challenges in society and offices/industries: -

1) *Workforce Monitoring in the Workshop:* The supervisory task of making sure employees and contractors are always in designated locations is currently a supervisory nightmare
2) *Safety:* Workforce safety is the most important challenge, and most accidents occur when driving around places where they are not authorized. There are currently no real-time updates on these violations.[2]
3) *Social Distancing:* Social distancing is the new norm. But supervising social distancing in an office or workplace is no easy task. Social distancing rules must also be respected in bathrooms and elevators.
4) *Monitoring Good Hygiene:* It is difficult to monitor whether a person has washed their hands at regular intervals or not. In the absence of such monitoring, the organization will be at risk of infection

5) *Temperature Scanning and Recording:* Thermal temperature scanning is possible but recording the temperature against the person is currently not possible. This affects the entire regulatory reporting process.
6) *Attendance and Payroll Invoicing:* Real-time presence all day is currently not possible. Creating payroll for employees and reviewing billing for contract work is a daunting task every month.[3]

II. LITERATURE REVIEW

There are many technological improvements underway in the field of electronics. twenty-first-century innovation is bringing automation - and the ability to improve security - to campus. the term "smart access cards" in educational, business, and government applications encompasses a wide range of technologies. the common feature of most proximity-based contactless solutions is based on the built-in high-frequency RFID technology. most contact id cards use magnetic stripe technology, which means students have to swipe their cards through a reader, slowing student access and creating bottlenecks. magnetic stripe cards are also unreliable as they are easily demagnetized.[4] students can load their own meal credit cards, allowing them to use their identity documents as debit cards at vending machines and canteens. id cards may include a prepaid expense account that students can use to make purchases at student stores and foodservice locations, as well as at school events. parents and students can access online accounts to view transactions, add funds and establish automatic allowances. multifunctional smart cards offer campuses several simple and cost-effective ways to increase the level of protection and the quality of education. today's smart access card technologies provide superior read range and performance so that educational institutions can improve efficiency and security at multiple levels.[5]

III. OBJECTIVES OF THE INVENTION

Following are the key objects of the proposed system:
Below are main objectives of this research work

1) Resuming business and making safe work environment for employees by tracing their health status.
2) To design multipurposed features based smart card which works as proactive tool for all kinds of industrial applications.
3) To implement safe social distancing at workplace and have an effective means of contract tracing in case of any covid19 incident.
4) To records contact history which can be retrieved on single click; hence it provides essential data in case of any outbreak.

IV. CONSTRUCTION & WORKING

Due to the current pandemic situation, companies have to rethink strategies before they can be restarted. employee monitoring in the workplace has become a necessity these days to help maintain social distancing in the workplace, safeguard employee health, avoid crowding, and business continuity. the proposed smart identity cards help verify the violation of the rules of social distancing between any two people whether it is a shop, an office, a meeting room, or a bus. various types of alerts can be issued such as a hiss/buzzer and/or led. in addition, every violation is captured on the system and the dashboard provides notification for repeat offenders.[6] The normal configuration for the breach is set to one meter but can be changed to suit your organization's preferences. a thermal sensor connected to an induction relay detects the person's temperature and talks to the proposed smart id card and sends the person's temperature data to the server in real-time. a green light turns on if the temperature is within limits and red light and a whistling whistle if the temperature is exceeded. social overcrowding is difficult to manage manually. our solution provides an easy way to manage overcrowding problems. once you've designated an area, all you need to do is specify the maximum number of people the area should be occupied with. as soon as the number is violated, an alarm can sound, warning the occupants to respect social distancing. this solves the problem of just one more person won't make a difference.[7]

A. Detail Description

The system comprises of:
1) Data collection though sensors unit & power connector units
2) Data sorting & analysis unit
3) Electronics controlling operations unit
4) Display monitoring unit
5) Covid-19 disease, safety, emergency alert communication unit
6) Mechanical safety casing unit.

This system is an effective and easy-to-adopt solution for businesses to implement a safe workplace. businesses can replace their existing id cardholders with the proposed smart card holder which works as a proactive tool to ensure social distancing is maintained at the workplace and also records contact history which can be retrieved on a single click; hence it provides essential data in case of an outbreak. from small to large organizations can implement the solution with ease and without much infrastructure cost. customers have been provided with mobile, and on-premises options to adopt the solution.[8]

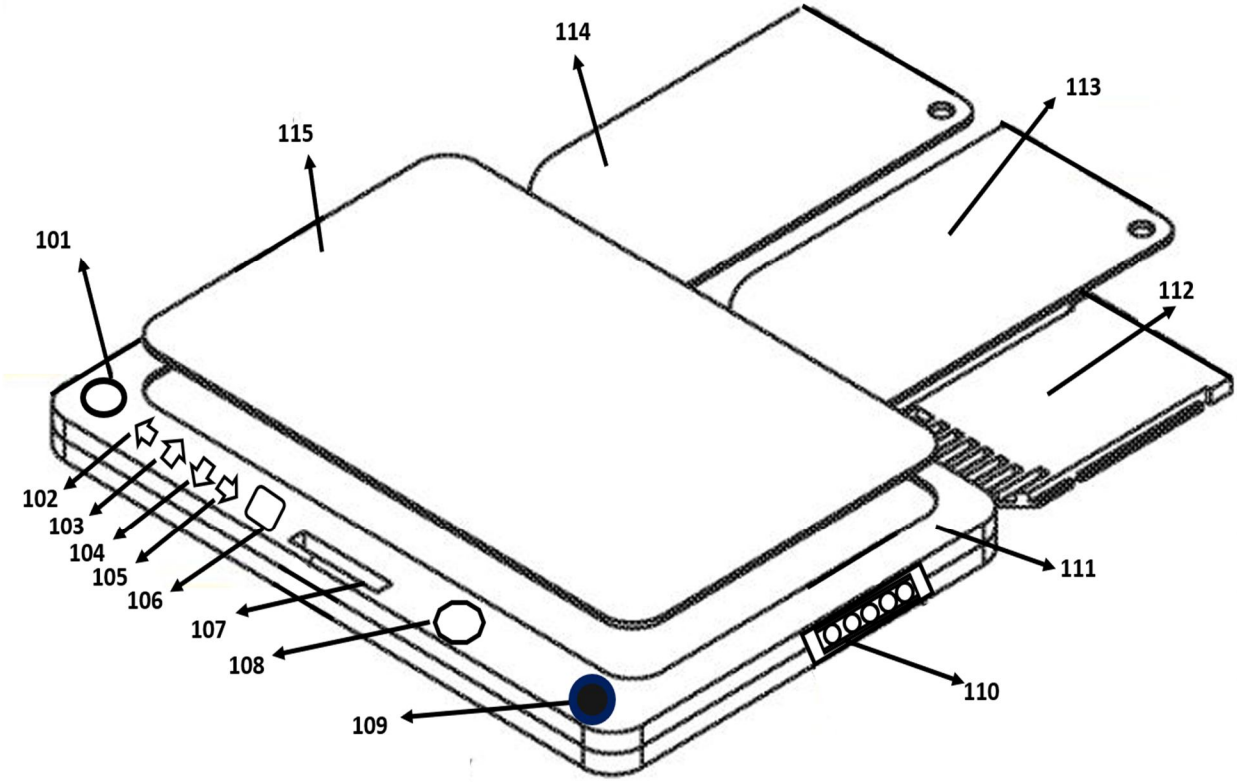

Fig 1] 3d mechanical design of smart id card

Figure-1- proposed system detailed description below is with reference to the accompanying figure. these same numbers are used throughout the drawings to refer like features and components. figure 1 shows proposed system which consist of controlling mechanism. it consists of four major contributions like: -

Referring to the figure-1 on sheet 1 as 3d implementation of mechanical design of smart id card
101 comprises contribution _1: power on/off push button.
102 comprises contribution_ 2: left mode selection switch.
103 comprises contribution_ 3: up mode selection switch.
104 comprises contribution_4: down mode selection switch.
105 comprises contribution_5: right mode selection switch.
106 comprises contribution_6: ok mode selection switch.
107 comprises contribution_7: smart id-card hook block.
108 comprises contribution_8: microphone.
109 comprises contribution_9: audio speaker.
110 comprises contribution_10: smart pin data transfer & power charging connector.
111 comprises contribution_11: light weight & strong body casing of plastic carbon fiber.
112 comprises contribution_12: external programable ram card.
113 comprises contribution_13: external data storage memory card.
114 comprises contribution_14: RFID scanning card.
115 comprises contribution_15: touch screen display.

an application 101, contribution 1: power on/off switch helps to turn on & off the smart id card once given to respective users.
an application 102, contribution 2: left mode selection switch helps to move courser to left side on display.
an application 103, contribution 3: up mode selection switch helps to move courser to upside on display.
an application 104, contribution 4: down mode selection switch helps to move courser to downside on display.
an application 105, contribution 5: right mode selection switch helps to move courser to right side on display.
an application 106, contribution 6: ok-mode selection switch helps to finalize the mode of operation to perform.
an application 107, contribution 7: smart id-card hook block helps to attach the lanyards which are multicolored printed by respective company names.
an application 108, contribution 8: microphone this helps in delivering alert messages, voice in 2-way communication whenever required through internet/ Bluetooth calling system.
an application 109, contribution 9: audio speaker helps microphone this helps in receiving alert messages, voice in 2-way communication whenever required through internet/ Bluetooth calling system.
an application 110, contribution 10: smart pin data transfer & power charging connector helps in both applications to charge battery & simultaneously fast transfers data to respective connected e-device.
an application 111, contribution 11: light weight & strong body casing of plastic carbon fiber helps to provide protentional casing to all electronics systems. helps to avoid EMI & mounting support.
an application 112, contribution 12: external programable ram card this helps in storage of different codes & new software features to controller. allows hardware with software integration.
an application 113, contribution 13: external data storage memory card helps to store all records of user's attendance, his work status, maps & other company expert safety instruction manuals.
an application 114, contribution 14: RFID scanning card helps to give wireless attendance allows entrance with exit automatically without any contact.
an application 115, contribution 15: touch screen display helps to show all current operations performing on the screen in real time.

B. Diagram of the Concept

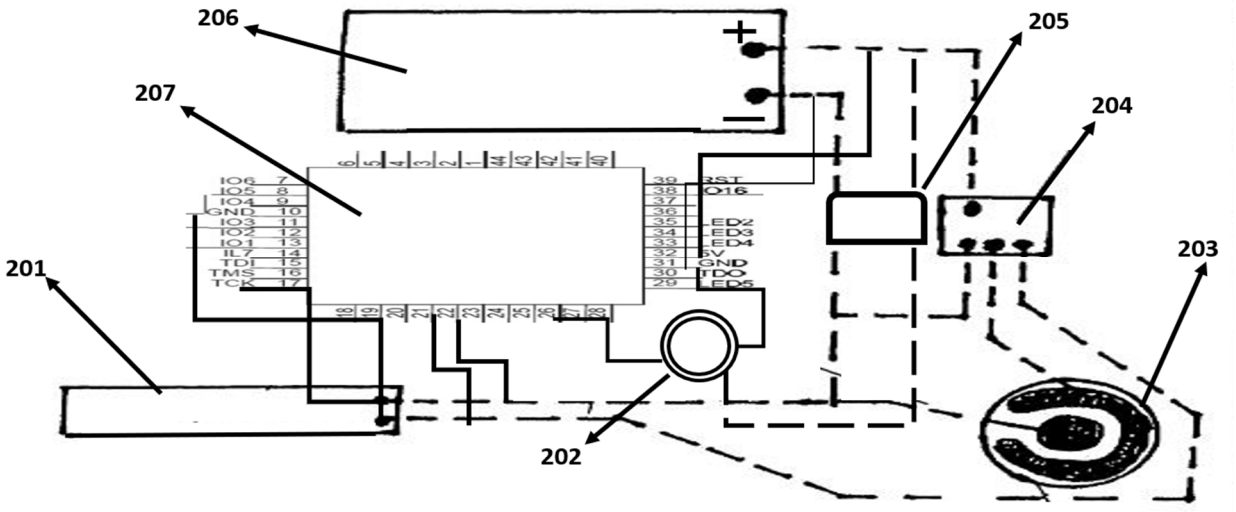

Fig 2] electronic circuit schematic of overall smart id card system

Referring to figure-2-on sheet-2 as electronic circuit schematic of overall smart id card system
201 comprises contribution _1: temperature sensor unit.
202 comprises contribution_ 2: heart beats & blood pressure measuring unit.
203 comprises contribution_ 3: speaker & microphone unit.
204 comprises contribution_4: multi-pin data transfer connectors with charging power socket.
205 comprises contribution_5: gps based position tracker unit.
206 comprises contribution_6: battery storage unit.
207 comprises contribution_7: microcontroller & data storage with processing unit.

an application 201, contribution 1: temperature sensor unit helps to measure body temperature of users & send data to controller for further processing & display.
an application 202, contribution 2: heart beats & blood pressure measuring unit helps to measure the health status level of user & display the parameters on smart id screen.
an application 203, contribution 3: speaker & microphone unit helps in both two-way communication application in that respective wi-fi range.
an application 204, contribution 4: multi-pin data transfer connectors with charging power socket helps for connecting id to power supply for charging & quick data sharing with other smart appliances.
an application 205, contribution 5: gps based position tracker unit helps to track exact location of users in any emergency conditions gives alerts.
an application 206, contribution 6: battery storage unit helps in providing respective power supply that is needed for the all electronics operation.
an application 207, contribution 7: microcontroller & data storage with processing unit helps to data acquisition system to display the processed functions on smart id card touch display screen.

V. METHODOLOGIES

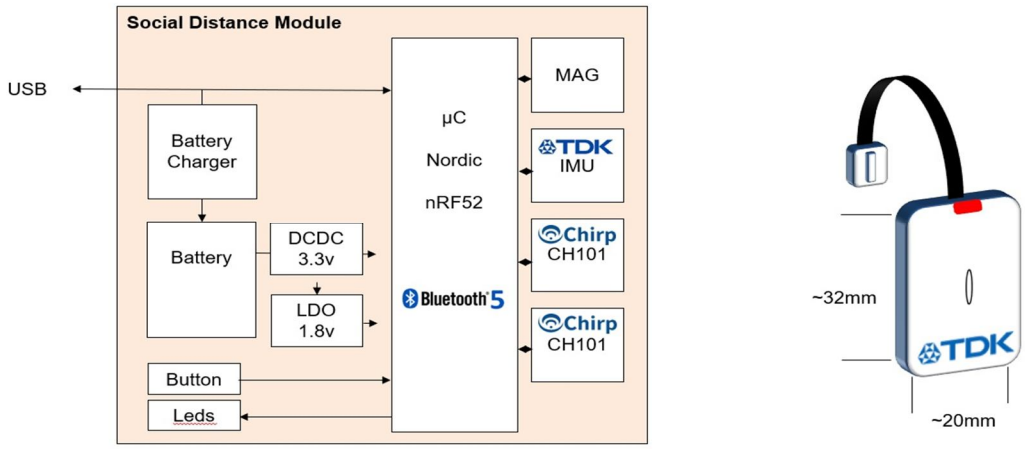

Fig 3] Block diagram of the system

Considering the ongoing coronavirus pandemic, businesses and industries must ensure secure social distancing and contact tracing to allow their people to feel more confident about working in co-located physical workplace. the idea is to create a single device with multipole features smart id for all industrial employs working in the office or industrial plant site area in safe & effectively. As shown in fig. 3 the ability to automate monitoring of new safety policies, while empowering employees as part of the new normal in business operations, is critical for any organization.[9] The proposed smart id is the complete solution you were looking for! it will take care of real-time monitoring or labor-related compliance, monitor real-time situations on the floor, and ensure the productivity and safety of the workforce in the workplace. the intelligent identity card forms the heart of the solution. it is ergonomically designed to shape and fit like an id card. each employee would be equipped with this smart card. there would be smart relays and trackers installed within the workplace premises. these sensors and transmit the information from the id card along with the location information to the central server.[10] the central server acts as the coordinating central brain. it receives inputs from these sensors and applies the intelligence on it to process measures for workplace monitoring. this type of workplace monitoring includes creating virtual zones that are assigned specific business rules and then monitored remotely. ensure that people keep a safe distance from each other and reduce virus interactions whether it is an office, a factory, or a construction site, each employee can be equipped with a compact wearable proximity sensor that allows easy monitoring of interactions within common areas, also alongside security badges for control accesses.[11] when the sensors register that two or more people have exceeded the safety limit, it alerts them with an audible or visual alarm. avoid temporary closures of operational establishments with enhanced security measures.

The closures are a sign of the difficulty of industrial plants in complying with the reinforced security measures put in place to deal with the pandemic. the application of digital health policies and traceability solutions are an essential tool to help workers follow the distancing rules and control their exposure to potential contamination, thus avoiding organizations having to close plants and structures. track all interactions between infected and healthy people to identify a contamination cluster. it is important to track contacts at a local work facility level, which means monitoring the potential spread of the coronavirus from person to person. the instant traceability provided by the attached proximity detection tags ensures that the potential contamination cluster can be immediately traced around the infected employee and limits the impact to only this cluster.[12]

VI. RESULTS & OUTCOME BY NOVEL POINT

As shown in the Fig 4. We get the results in terms of safety & smart connectivity as follows:

Fig 4] Social Distancing Alert

1) *Ensure Social Distancing and Overcrowding:* The norms relating to the number of people and the distance they have kept can be objectively monitored and tracked during meetings. canteen etc where the gathering is necessary and inevitable.
2) *Hygiene and Hygiene Monitoring through RFID Detection:* We are all aware that regular personal hygiene and hygiene can prevent the spread of the virus. the solution helps to automatically monitor sanitation routines and make sure people observe personal hygiene. this is done by a rule's engine within the receivers that periodically monitors these activities.[13]
3) *Automatic Contact Tracking:* In the unfortunate event that someone has caught the virus, the system can provide you with a list and hours of the employees the infected employee came into contact with and the areas where they resided. a quick report of those specified times can be generated so that employees who have come in contact can be quarantined.
4) *Increase Employee Productivity and safety Through a single Device:* Productivity is the function of the total output (production) generated divided by the total input (time on the job). employees returning to work have a major concern. "is the place safe for me to work?". a workplace that proactively maintains a coronavirus office policy with data and traceability will help employees work confidently in a safe environment.[14]
5) Incident Management: The solution does not require continuous monitoring. when rules are violated, alerts are created automatically.
6) Active Service: Instantly check the number of people on active duty around the clock and at any time. this can be used for payroll and billing.

VII. CONCLUDING REMARK

The idea is to create a smart id for all industrial employs working in the office or industrial plant site area in safe & effectively with following 6 major functions: -

1) *Social Distancing:* Ensure that people keep a safe distance between them and reduce virus interactions whether it's an office, a factory or a construction site, every employee can be equipped with a compact wearable proximity sensor which allows easy monitoring of interactions within common areas, alongside security badges for access control. when the sensors register that two or more people have exceeded the safety limit, it alerts them with an audible or visual alarm. there will be a beep if people approach within 1.5 meters.[15]
2) *Emergency Warning Signal:* The actual situation is whenever there is an emergency situation, there is a central alarm indication system, however sometimes it may be possible that it is not guaranteed that the message will be delivered to everyone, so the idea is to provide each one with a dedicated warning indication on the i cards to ensure that everyone receives an alarm indication.

3) *Navigation System:* How can we also track the employee with the id card location, if someone gets stuck inside the office even after an emergency situation. tracking all interactions between infected and healthy people to identify a contamination cluster, it is important to track contacts at a local work facility level, which means monitoring the potential person-to-person spread of the coronavirus. the instant traceability provided by the attached proximity detection tags ensures that the potential contamination cluster can be immediately traced around the infected employee and limits the impact to this cluster only.[16]
4) *Automatic Attendance and Vacation Management:* As our system has a special rfid card that helps to scan automatically, which helps to keep track of every employment status every time you enter or leave the office.
5) *Smart Communication Calling System:* This card will have one voice receiver speaker with mic that helps any employee to contact directly to any co-workers into the industry through one-touch on display through wi-fi calls.[17]
6) *Fast Charging a Long time Back up with Data Sharing:* This system having lithium-ion battery's which can charge within 1 hour to use the whole day. also, additional data sharing porty for information storage by connecting to any other smart devices like laptop, computers, tablets, etc.
7) *Employ Health Status Indicator:* This system has special sensors that measure users' body temperature also blood pressure & heartbeats that helps to give alert information about the health condition of the user for that respective task. also, in such a pandemic situation, it will help to send alerts to others working around him for social distancing in case of anything the wrong level indicated.[18]

VIII. ACKNOWLEDGMENT

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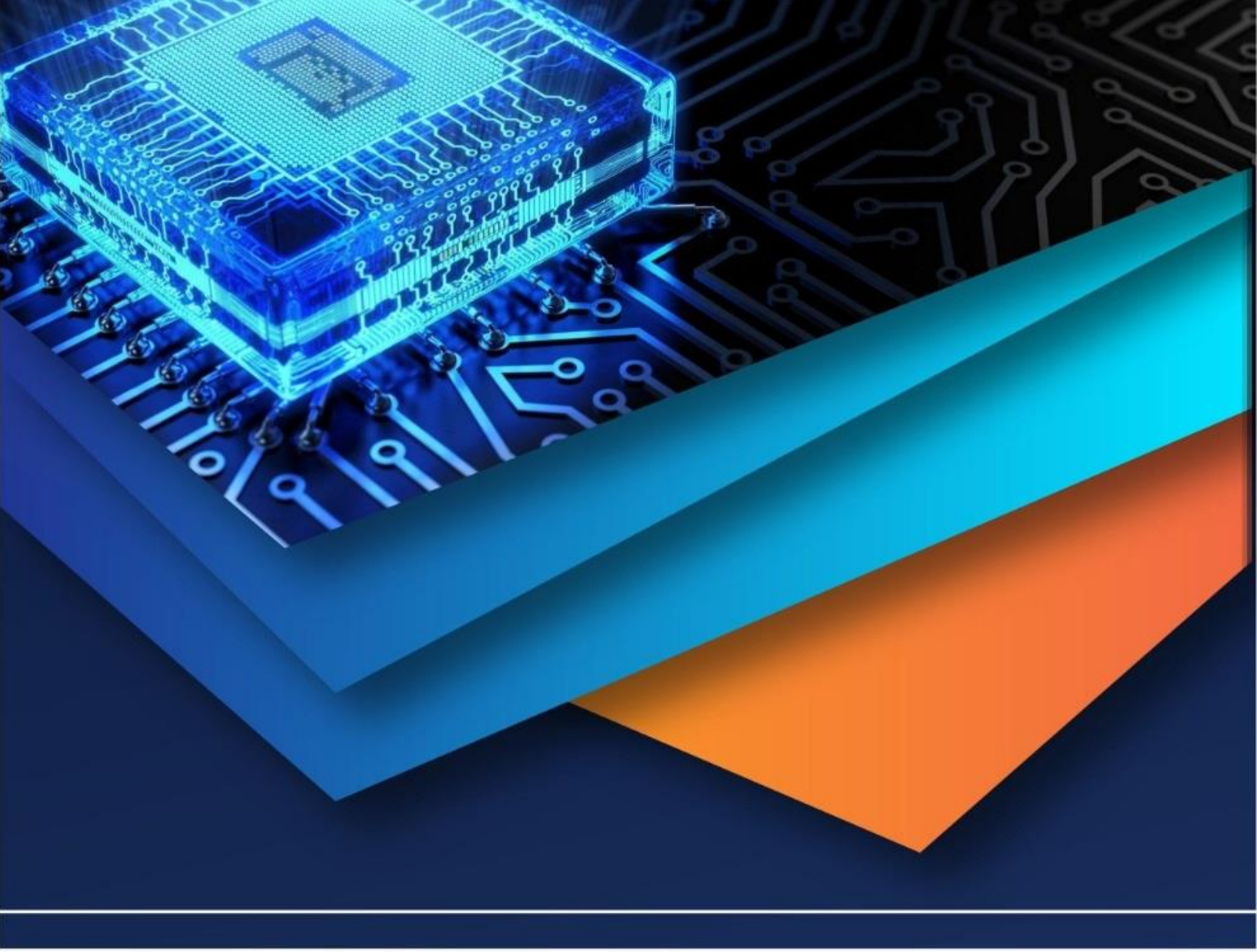

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