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Smart Blind Stick using IOT

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Abstract: ***People suffering from certain permanent Accidental, paralyzing, or aging-related movement abilities frequently require assistance from others. In order to provide navigation assistance. We aim on integrating a smart blind stick with features like voice recognition technology to give voice commands and head- tilting which will control the motion of the blind stick. It also has some additional features such as fire sensors, water sensors, light sensors with buzzer alert and Ultrasonic sensor for obstacle detection. The result of this design will allow the special people to live a life with less dependence on others.***
Keywords: Ultrasonic sensors, Fire sensors, Light sensors, Water sensors, Raspberry pi, Speaker, Webcam, Buzzer, GPS, Tensor flow object detection, Processor Intel Core i5, Hard Disk, RAM .

I. INTRODUCTION

In the recent days visually impaired people suffer from serious visual impairments preventing them from travelling independently. As we all know, having the ability to see is crucial to human existence, yet some people are rendered immobile by their blindness. In this essay, we suggest a navigation method or tool that is useful to blind people. With the use of that blind stick, people can see obstacles in front of them, as well as move in both known and uncharted territory. It uses Ultrasonic sensors to identify obstacles, and the blind person is alerted to them when their phone vibrates or plays an audio message. The capacity to move confidently, swiftly, and safely around his immediate area independently is referred to as mobility and independence for visually impaired persons, however it is not achievable without technology. The capacity to move confidently, swiftly, and safely around his immediate area independently is referred to as mobility and independence for visually impaired persons, however it is not achievable without technology. One method that we put into place helps that blind individual. With the aid of GSM/GPS, those individuals may use an application for an Android phone or computer that is carried by the blind person and administrator to identify obstacles in front of them, safeguard the blind person, and monitor both the blind person's home location and present position. In addition to being able to monitor a blind person's whereabouts, a new tool called live video capture has been added. By capturing the stream in front of a blind person, an administrator may watch from their home. Different types of smart blind sticks have been developed in the past, but the new generations of blind sticks are being developed and used with features of machine learning and hence leaves a little to tinker about to the user who uses the blind sticks. The project also aims to build an advance blind stick which would have a sort of intelligence and hence helps the user on his or her movement.

II. LITERATURE SURVEY

1) This research aims to assess students' knowledge of the Ge loT topic covered by the Internet of Things. IOT initiatives that address design, development, and other requirements are relevant to our field of study. The Smart Stick Assistant For Visually Impaired People Using Al Image Recognition is the project I've chosen to work on as a result. A blind assistance app called "The Smart Stick Assistant For Visually Challenged People Using Al Image Recognition" basically came from the conventional white or blue cane and improved into the present day technology. It's a project to improve accessibility for blind individuals so they may receive assistance when travelling. A contemporary automation of utilizing cutting-edge technological components, such as the Blynk app and ESP shield, would lessen the challenges faced by the community of visually impaired persons in getting better responses from their surroundings.

2) Person(s) with vision impairment I find it challenging to communicate and perceive my surroundings. For someone who is visually impaired, moving around might be difficult because it can be difficult to tell where he is and how to get from one area to another. The development of an intelligent and smart stick to help and an alert system to warn visually impaired people about obstacles and provide information about their whereabouts has taken decades of research. In this essay, we'll talk about developing a smart kit system to help the blind. The smart gear is provided as people struggle to recognize the world and obstacles in front of them while walking. The apparatus is intended to function as an artificial eyesight and the visually impaired person through beeps which is assigned to a particular action. The designed system consists of hardware and software

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part; hardware detects the slippery area, potholes on the road or path where the user is walking and the objects that comes in contact with the stick through ultrasonic sensor, infrared sensor and water sensor; software uses various algorithms to processes images for face recognition, to detect the text through image processing.

3) When travelling from one spot to another, a blind person finds it challenging to identify the presence of any impediments in their path, and it is quite challenging to locate the stick's exact location if it has been misplaced. Therefore, the smart stick is presented as a suggested remedy to assist the visually impaired in their day-to-day living without the assistance of others. Using an ultrasonic sensor in the blind stick, we suggested a solution for the blind in this research. He is able to detect impediments at a distance of four metres, while infrared technology is utilised to detect closer obstacles in front of blind persons. In this way, the radio frequency transmitter and receiver enable the user to precisely locate the smart stick using a buzzer. When an obstacle is recognised, the smart stick's vibration motor, which is housed there, activates and vibrates. The Arduino UNO serves as the controller in this suggested manner. The branch is capable of detecting every challenge in front of the user. The user-friendly, quick-response, and extremely low power consumption of the smart stick lighter weight, and it is simple for the user to grip and fold.

4) People who are blind or partially sighted have difficulty moving securely from one location to another. They find it more and more difficult to complete simple activities without substantially relying on others. Our suggested system seeks to offer a simple solution to this problem. In this system, we employ infrared sensors to help detect raised surfaces like staircases and ultrasonic sensors to help detect obstructions. Additionally, we employ ISD1820 to provide speech warnings in the event that a barrier is encountered. The user can send panic messages to the predefined emergency contacts by using facilities for a panic button. The message informs the emergency contact of the user's GPS coordinates. Our smart blind stick seeks to offer a cheap, effective, quick, and light alternative.

5) This report will present a n order to help the visually challenged people, we design smart stick. One of the many problems that people have little control over is blindness. It steals away from a person's life the intense visual beauty of the world. However, as they must overcome countless obstacles in order to carry out even the most basic duties in their daily lives, missing out on the beauty of nature becomes one of their least concerning problems. One of their biggest issues is transportation, whether it be using the roads, railroads, or other public spaces. It is known as the "Smart Stick." It is a tool that directs the user by detecting obstructions in the user's line of sight. With the aid of numerous mounted sensors, it will identify all obstructions in the way.

6) The proposed system consists of Arduino Nano, which Jumper wires are used to link these parts to the Arduino's digital and analogue pins. When using the suggested approach, an input voltage of It has the following characteristics: 9V/12V. It can check for a setting with a range of obstacles of varied sizes and appropriate vibratory and auditory alarms are raised. It can recognize. Surfaces that are moist or wet might warn the user. And it is able to communicate the user's location to friends via SMS can be used in the event of an emergency or crisis RF remote control-based locatable when lost. The An Arduino-based algorithm checks for input from each of the sensors

7) When a blind person gripping this as they cross the street walking cane When a barrier is present, it is being photographed with a camera and that picture is sent to the object identification a microcontroller that issues a warning that item through the ear pad. Raspbian is a walking stick inserted at which the Pins are used to interconnect an ultrasonic sensor. The camera should be attached at the same time. where both should face in Raspberry Pi the same way on the highway. Moreover, the device features a connection between the RF receiver and the walking stick. When a blind person presses button 1 on the RF transmitter, a beep sound emanating from their walking stick will be heard, allowing them to locate their walking stick in case they misplace it or it falls. In a similar vein, pressing button 2 will cause it to instantly read our present position. Each command is transmitted by depressing a button on the RF transmitter that they are holding.

8) The suggested model tries to develop a system where barriers are now detected using a camera and where obstacles are detected in front of the user using sensors. The suggested system would use a Convolutional Neural Network (CNN) model and a Recurrent Neural Network (RNN) model to perform image captioning on the scene that was collected by the camera. A Raspberry Pi, ultrasonic sensors, a camera module, a buzzer, and an audio device will all be used in this system. The burst signal is first sent by the Raspberry Pi, which activates the ultrasonic sensor.

9) This essay suggests a clever mechanism that would help the blind avoid pitfalls or gaps in their path. The technology assesses if the way ahead is flat or free of obstacles by calculating the distance between the device and the landscape in a continuum. As the user holds the cane in hand, information is conveyed via vibration. The prototype employed a laser light to project a downward beam at a fixed angle, a camera mounted to pick up the laser spot on the ground, and a personal computer for calculation. Additionally, we offered a rough layout for the can's vertical trajectory.

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10) The major goal is to create a smart stick that prevents leg weakening, loss of balance, and incorrect interior and outdoor navigation. These are the causes of fall accidents, which may be harmful and dangerous. To enable the blind and old to move confidently and freely indoors or outside, a suitable gadget is required. The project seeks to create a robot cane that will observe events routinely and improvise interior and outdoor navigation by spotting obstacles at various heights on flat surfaces. The cane is also modelled to take into account real-time motions or people walking or their various gait patterns by tracking each step they take and how far they go. When a person walks, an acceleration value is established at a certain threshold. The distance between the stick and the leg can be measured with the help of an ultrasonic and force sensor combination that is attached to the tip of the shoe. If a person is inclined to fall, his hand will exert more effort than usual, which the pressure sensor will detect and translate into force being applied to the shoe. Alarm is set off when output exceeds the threshold Value.

11) The intelligent walking stick makes it easier and more comfortable for blind persons to navigate and complete their tasks. Normal stick does not detect obstacles, making it ineffective for people who are visually impaired. Considering that a blind individual has no idea what kinds of things or objects are in front of them. The person is unable to gauge the size of the object or how far away they are from it. Moving about is tough for someone who is blind. In a smart walking stick, the object is located with the aid of an ultrasonic sensor that gauges the object's distance from the user. Blind individuals who encounter obstacles might be alerted to them by hearing the sound produced by the BUZZER. For those who are blind and frequently require assistance, the system is quite helpful.

12) In order to create smart sticks for blind people, this project details the precise coordination and communication between sensors, controllers, modules, and other parts. The designed stick has two main goals: to boost mobility and to produce a buzzer as an output after successfully implementing obstacle detection. To give blind persons with a smart electronic aid, the smart stick system concept was developed. When walking in the street, blind and visually impaired people have trouble spotted impediments. The ultrasonic sensors, camera, and buzzer make up the system. The total system's goal is to offer blind people a low-cost obstacle detection assistance that gives them the impression of artificial vision by delivering details about the environment and the static and moving objects nearby. so they can independently walk.

13) This study describes the development of a visually challenged person's walking stick using an ultrasonic sensor. A buzzer is used to alert the blind person while an ultrasonic sensor module, HC-SR04, is utilized to identify obstacles in their route. The suggested method installed using PIC 16F877A is a microcontroller. This walking stick can help the blind navigate safely. Within a range of 5 to 35 cm, it can detect obstacles.

14) The technology includes a headset that transmits the recognized object as a voice to persons with hearing impairments. In addition, the cane GPS to determine the position, as well as a Wearing the headset is necessary for communication. The opponent will be hinted at. The key Among the system's features is decreasing the user's workload, their level of mobility, simple movement throughout the planet. The challenge is discovered with the use of ultrasonic reflections waves they released.

15) There are numerous issues that people cannot control. Among these problems is blindness. It steals away from a person's life the intense visual beauty of the world. However, as they must overcome countless obstacles in order to carry out even the most basic duties in their daily lives, missing out on the beauty of nature becomes one of their least concerning problems. One of their biggest issues is transportation, such as crossing streets, taking trains, or going to other public locations. They always need help from people to do this. However, if no such support is provided, they may occasionally be left defenseless. Their reliance on others undermines their self-assurance. They have typically used the traditional cane stick to help them navigate. This is risky for them and other people because it leads to numerous mishaps. We made the decision to help these persons with disabilities by developing a technology-based solution because we live in a technologically advanced age. It is known as the "Smart Stick." It is a tool that directs the user by detecting obstructions in the user's line of sight. With the aid of numerous sensors that have been fitted, it will detect every obstruction in the way. The microcontroller will gather data and transmit it as vibrations to alert the user of roadblocks. It is a useful tool that will be very helpful to blind people.

16) Blind people encounter numerous challenges while interacting with their immediate environment. The purpose of this work is to present a tool that will aid blind persons in navigation and obstacle detection. We intend to offer a functioning prototype that consists of a walking stick with an integrated ultrasonic sensor and microcontroller system. To generate ultrasonic waves, a mirasonic censor is employed. The sensor transmits data to the microcontroller when it detects impediments. The microcontroller then analyses the data and determines whether an impediment is nearby enough. The circuit accomplishes nothing if the obstacle is not close enough. When an obstruction is imminent, the blind person receives an alert from the microcontroller. Furthermore, we intend to incorporate the e-SOS (electronic Save Our Souls) system. Every time a blind person experiences any difficulty navigating, he hits the e-SOS distress call button on the stick to make a video call to a

member of his family. A mobile Android device streams the video via an Android app. The Android software also informs the blind person's family member of where they are. Thus, using an Android mobile application, a family member can direct a blind person as they go along the path.

17) A vital quality of human beings is their sense of vision, which God endowed with inherent talent. However, not everyone can sense things visually. For movement, blind people typically utilize a regular stick or the assistance of others. However, they are unable to find holes, fires, slick surfaces, or items higher than the waist when using a regular stick. a straightforward in this work. The cordial walking stick was created and put into use using ultrasonic and infrared sensors that can identify the direction and location of the obstacle(s) and water in front of these individuals and that can also issue a fire alert to enable them to walk with less uncertainty. The planned system was created using a microcontroller, making it a full-fledged prototype. In essence, the IR and ultrasonic sensor communicates If a barrier is there or not, the estimated distance value is compared to the pre-defined value. The sensor holder was created using 3D CAD software. The sensor holders that were mounted on the walking stick were printed using an Up-Mini 3D printer. The sensors were thus installed in the proper location. The purpose of creating this stick was to give blind people a practical and secure way to move around regularly so they wouldn't think about their handicap.

18) The most important feature of people is their sense of vision, which God endowed with innate talent. However, not everyone can sense things visually. For movement, blind people typically utilise a regular stick or the assistance of others. However, they are unable to find holes, fires, slick surfaces, or items higher than the waist when using a regular stick. a straightforward in this work. The cordial walking stick was created and put into use using ultrasonic and infrared sensors that can identify the direction and location of the obstacle(s) and water in front of these individuals and that can also issue a fire alert to enable them to walk with less uncertainty. The planned system was created using a microcontroller, making it a full-fledged prototype. In essence, the IR and ultrasonic sensor sends.

19) This study describes an Arduino-powered ultrasonic walking staff for the blind. WHO estimates that 285 billion people worldwide have vision impairment and 30 million individuals are irreversibly blind. If you look at them, it's pretty clear that they need assistance from others to walk. To get where one wants to go, one must ask for directions. They have additional challenges to deal with on a daily basis. The use of this blind stick allows for more certain walking. This stick recognizes the thing in front of the user and responds to commands or vibrations by vibrating. The individual can now move around fearlessly. This gadget will be the ideal way to go past their difficulties.

20) Blind stick is an is a cutting-edge stick made for persons who are severely crippled to better navigation. Here, we recommend adopting cutting-edge technologies to travel with ease. The blind stick incorporates motors and an ultrasonic sensor. In the initial step of our suggested project, ultrasonic sensors use ultrasonic waves to find impending obstructions. The sensor transmits this information to the microcontroller when it detects impediments. This information is then processed by the microcontroller, which determines whether the impediment is close enough. If the obstruction is not immediately present, the circuit has no effect. When an impediment is detected, the microcontroller sends a signal to rotate the motor, which in turn rotates the wheel, so that the blind won't become annoyed by the constant alarming buzzer sound and he or she can move more freely.

III. COMPARISON TABLE

AUTHORS	YEAR	METHODOLOGY	LIMITATIONS
Mr. Chitta Sonika, Dr. C K Gomathy	2021	Controls the movement of a blind stick.	This system does not employ fall detection to avoid accidents.
Prof. Poonam Pawar, Rajeshwari Bhirud, Karan Shinde, Snehal Gawade, Reshma Gholpa	2020	System is designed by of an Arduino based voice controlled. This system is powered by Arduino Uno	It is designed a simple and efficient automatic speech recognition system for isolated command words.
N.Loganathan, S.R. Cibisakaravarthi, K. Lakshmi, and N. Chandrasekaran	2020	Using an android app, this model is designed and implemented a motorized blind stick.	This system doesn't have powerful object detection.

Priyanka Abhang, Shambhavi Rege, Shrishti Kaushik, Shriya Akella, Manish Parmar.	2020	This system has implementation control over blind stick.	Do not have fire sensors and water sensors.

Rajath V, Swetha Shekarappa G, Senbagavalli M	2020	It has a framework that let any visually impaired people lead life in ease.	Limitations on water and light sensors.
Vanitha Charitha, U.Sairam	2020	The proposed model's design, along with the Android companion app, has been Evaluate to ensure easy-to-use interfaces for different types of users	In this paper the model is limited to IR sensors.
T. S Aravinth,	2020	System is controlled by Arduino Voice Control App or button instructions.	The system built here does not have obstacle detection to ensure safety of the user.
Bhushan Chaudhari, Priyanka Dorugade, Hrushikesh Konde, Rehan Kondkari, Prof. Deepti Lawand	2020	It has two modes, including automated mode. manual mode 20. The blind stick will be moved by an Arduino Nano under computer control.	It should have autonomous obstacle detection and notification of fall detection to alert the guardian.
Akhlaqur Rahman,A.S.M Mehedi Hasan Shuvo,Kh. Fatema Nur Malia, Mahmudul Hasan Nahid,Md. Milan Mia, A.T.M. Manfat Zayeem	2019	Machine Learning Algorithms for surface detection to know the accessible routing for the users.	To improve the personalization features including different types of sensors.
Srinidhi Srinivasan, Rajesh M	2019	Controlling a blind stick using by the meansof smartphones, for this purpose android application is created	In his system user location to be monitored on timely basis.
G.Srinivas, G.M.Raju, D.Ramesh, S.Sivram	2019	Movement of a blind stick via voice command . And also uses GSM Module to send an emergency alert.	Location monitoring system can be added.
Harsh Vora, Aime Gupta, Chintan Pamnani, Tushar Jaiswal,	2019	This smart blind stick helps a disabled person to move with the movement of head using Arduino, NodeMCU, Bluetooth.	Detection of obstacles to be added.

Kushnav Das	2019	The proposed system consists a Voice Command interfacing	This project can further be improved .
Sankari Subbiah, Ramya Parvathy Krishna, Senthil Nayagam,	2019	Useful for visually impaired to detect any kind of obstacles.	Gesture controlling to be added.
Naiwrita Dey, Pritha Ghosh, Rahul De,Ankita Paul, Chandrama Mukherjee, Sohini Dey	2019	An inexpensive smart blind stick by integrating a microcontroller.	Motion of the blind stick is controlled manually.
Mukesh Prasad Agrawal, Atma Ram Gupta	2018	To collect slope information from sensors attached to general-purpose blind stick and feed this slope information back to blind stick users.	In this system instead of collecting slope information we can have obstacle detection which is more useful and provides safer travel.
Saurav Mohapatra, Subham Rout, Varun Tripathi, Tanish Saxena, Yepuganti Karuna	2018	The Smart blind stick comprise of voice recognition.	additional features to operate the wheelchair can be added.
Md. Allama Ikbal, Faidur Rahman, M. Hasnat Kabir	2018	Useful for detecting any kind of obstacles for helping the blind for movement.	The cost of smart blind stick is expensive.
R.Dhanuja, F.Farhana, G.Savitha	2018	This project uses arduino kit Microcontroller circuit and DC motors to create the movement of smart blind stick and IR Sensors to detect the obstacles.	Furthermore, the pronunciations accuracy must be ensured.
Manoj kumar, Rohit verma, Mukesh kumar, Shekhar Singh, Er. Thakurendra Singh,	2017	Helps to detect obstacles in order to avoid them	They aimed to replace the traditional smart blind stick.

IV. CONCLUSION

The modern blind stick can reduce the number of risk and injuries for the visually impaired person walking in the public. Advances will be made on the technology of smart blind stick with sensors and driven by intelligent control algorithms to minimize the level of human intervention serves as a foundation for the next wave of aids that will enable the blind to securely navigate.

The range of the ultrasonic sensor can be expanded, and a technique for calculating the speed of incoming obstacles can be implemented, both of which would improve other features of this system.

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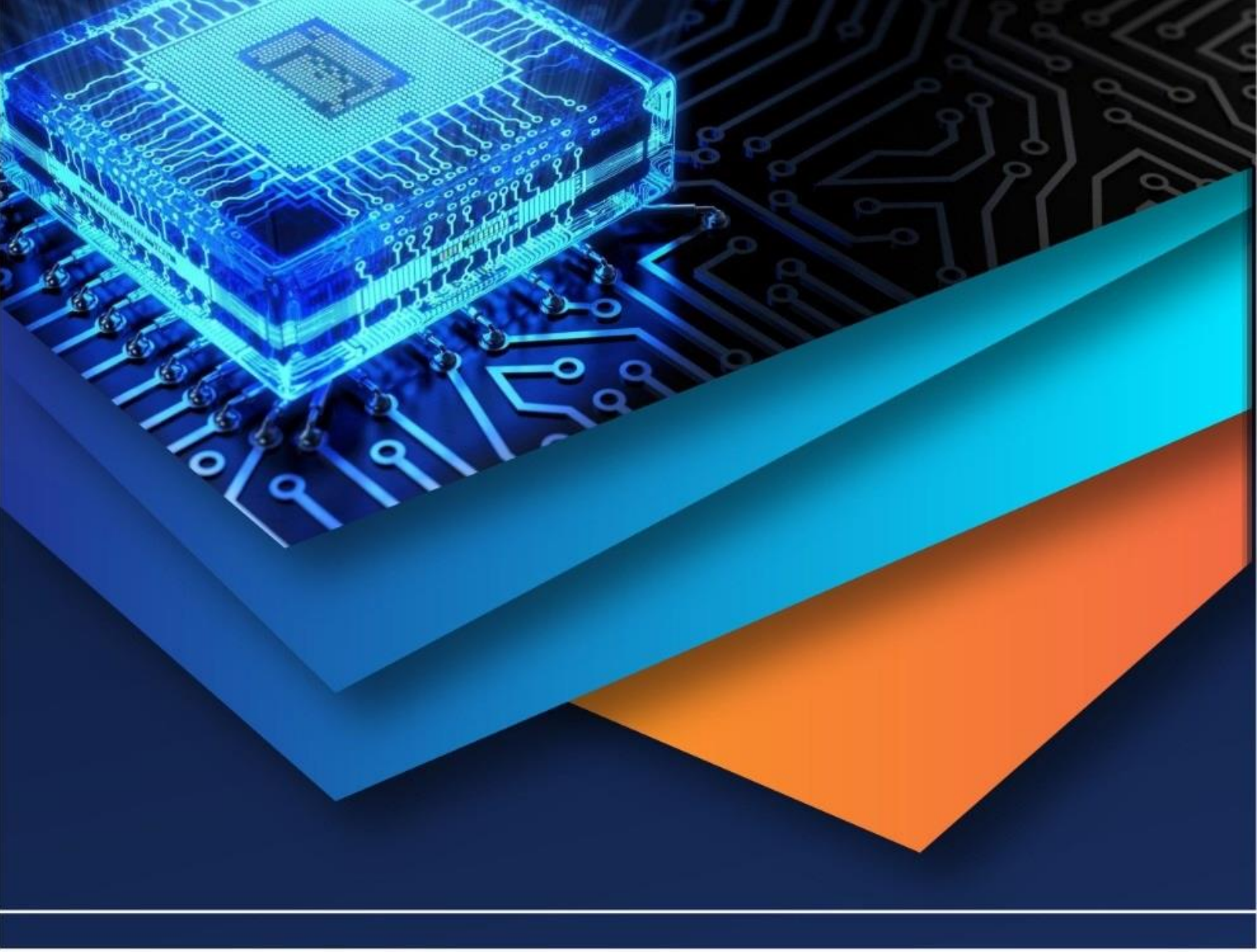

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