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Alerting About the Rise in Water Level and Controlling Motor Through Wireless Network

Raheela Afsha[1], Dr. Baswaraj Gadgay[2], Veeresh Pujari[3], Pallavi B.V[4]
[1]PG Student Dept. Of VLSI Design & Embedded Systems VTU PG Centre Kalaburagi
[2]Research Guide & Professor VTU PG Centre Kalaburagi, Karnataka, India
[3]Assistant Professor VTU PG Centre Kalaburagi, Karnataka, India
[4]Assistant Professor VTU PG Centre Kalaburagi, Karnataka, India

Abstract: ***Floods occurred due to torrential rain hit and global environmental changes such as melting of snow in cold region, all these factors makes water crosses its usual flow then flooding take place, people leaving near the river & dams experiences heavily floods for this reason we have designed this model to secure their life's and their belongings by giving instant alert. This paper present alerting about the rise in water level and controlling motor through wireless network, prototype of river model is designed here, from each referenced level marked in container the information sensed by sensor is passed in the form of SMS to people about floods. Objective of this project is to safeguard the life of citizens and their properties from this natural disaster caused due to flood by giving early warning, for this reason i have design hardware with programming code and applied to GSM module then it transmit flood alert message to mobile phone. In this model arduino uno controller collect the data from sensors and passed to GSM module from that it send SMS to user mobile phones. Wi-Fi is not used as medium for communication due to its short coverage range for that reason we are using GSM module due its wide coverage area then Wi-Fi. GSM bring benefits by giving quick information to people for making decisions quite earlier to face disaster.***
Keywords*: *Arduino Uno, Water detecting sensor, GSM SIM 800 Module, IR sensor, Water pump, Mobile phone.

I. INTRODUCTION

There are several types of natural disasters, flood is a one among them and it is most powerful, it has much enough power to change the direction of rivers, sweep away and destroy whatever is in their path. Over flowing of water from dams, tanks this may damage many house and put people life's and their belongings at risk. Damage to homes also occurs due to heavy rain, which leads to flooding, peoples from tabasco, mexico region experience tragic floods in 1999 and 2007. Half million people's homes were damaged by floods in, 2007. Various methods presently exist, but still they are no appropriate solutions so we have develop this prototype alerting about the rise in the water level and controlling through wireless network.

CONAGUA1 is currently monitors river levels and put on their website, hence it is visible for everyone at any region, but especially for those peoples living near flood occurrence place. The technique of CONAGUA1 is not fully automatic monitoring, since a gauge performs this task by measuring river stages with a limnimetric rule, and then the data collected are captured manually and are displayed on the CONAGUAs website. The data is also not accurate; to measure and display this information could be too late for help or planning a rescue strategy. One of the risks occurs is, a life of person is put in danger that comes to do this task. The cost of gauges is very expensive, for water level measurement and to give correct information at accurate time which safe many lives of citizens who live near river and dams regions Fig .1 shows the over flow of water from dams.

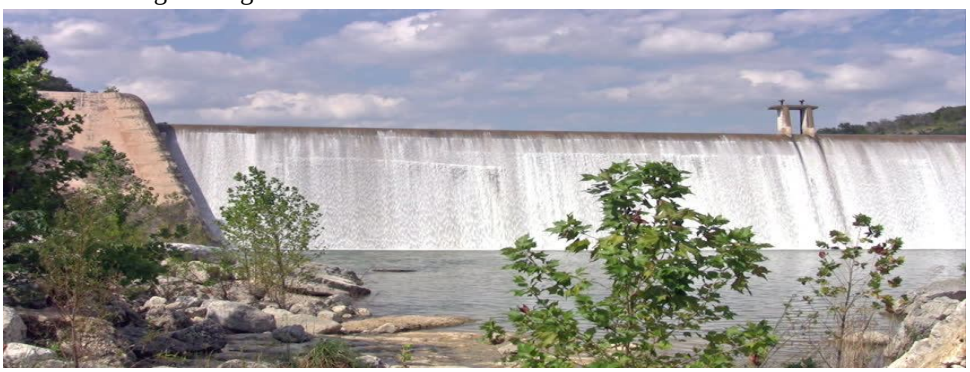

Fig .1: Over flow of water from dams

In this project we present a prototype to demonstrate the dam model, along with that i have added a tank level model application for automatically controlling the water flow into the tank and switch on/off motor when needed. The IR sensor is used to detect water is coming or not from ground tank through pump to top tank model. When the water reaches the reference level 4 an alert occurred with a buzzer sound and display on LCD and an alert notification is send to the mobile number with a text message of details of water level through GSM SIM 800.

II. RELATED WORK

X. Yang et.al., [1] in this paper automatically measure and dynamically track the water level in the river model, water level meter was designed. An optical scale with 1um resolution was used as a position detection sensor; the optical scale output signals were used which send data to at89s52 microcontroller. Water surface detection probe was designed based on the water with low electrical conductivity, and the probe was fixed on the sliding rule of the optical scale; a stepper motor was used to drive the probe slid up and down. When probe downward contacted the water surface, the counter value was read and the height of water level was displayed. It uses modbus protocol and rs485 as communication medium, from this it get the data about the level of water with graphs and curve it display and report is generated. The disadvantage is rs485 consistent, the network required on-the spot wiring and its communication distance was limited.

M. A. Wister et.al., [6] in this paper an alternate communication infrastructure to provide basic services to victims is proposed. It consist of three types of wireless communication networks: a wireless sensor network to measure the level of rivers and alert people living in flood prone lands; an ad hoc mobile network to route messages from victims to care facilities, and a wireless mesh network to handle people information hosted in temporal shelters. The wireless mesh network includes the usage of rfid technology. People hosted in temporal shelters use smart labels to access instantly a website link, send an e-mail, send a sms or dial a phone number. As rfid technology that works with high-frequency (13.56 mhz) both the reader and the tag was used in this project read and write on rfid tags that can be carried out directly using nfc technology incorporated in some smart phones. The information is transferred remotely. Disadvantage is that in an rfid system, a single read/write error can seriously affect work it leads to insufficient transfer of information to rescues team and food, shelter proving people.

Z. Chowdhury et.al., [2] in this paper the node in network are placed, to monitor the river water automatically. The modules consist of multiple measuring nodes. The modules collect data and transmit them periodically to a central monitoring system. This monitoring system contains a database that processes the raw data and extracts information. Based on this information, various approximations are made such as water level rise rate, time remaining to exceed the critical level etc. The results show that possible flood occurrence and help estimate a timeframe to take necessary measures to avoid damages of human life and properties. As gsm/gprs modems are used to transfer data to monitoring stations, the disadvantage is serial interface are bulky and requires large space that adds to the weight of the node modules.

D. Farrell et.al., [3] in this paper to measure the water level ngwlms technique uses silicon strain gauge pressure sensors and acoustic ranging sensor, microprocessor for collection of data and it also records the data, to increased quality of data as well as to collect data quality assurance parameters. It is a self-calibrating acoustic sensor which can collect 181 samples in three minutes. All data quality assurance parameters are stored in every six minutes. There is no need of an observer, 11 ancillary sensors for are used for observations including air and water temperatures, water density, conductivity, current direction, current speed, wind speed and direction, and barometric pressure this method will relay data, every three hours, acquisition of near real-time is possible from a data collection platform (dcp), national oceanic and atmospheric administration (noaa) through geostationary operational environmental satellite (goes).

III.PROPOSED WORK

In this paper I have created a micro model prototype to test the performance of water level measurement system. This is basically a river, dam, tank level monitoring method to check the level of water and give the alert when it reaches the reference level. This experiment should be done near river, but it is absurd idea to wait till the water rises in river, lakes, due to rain, so i am going to implement this work on micro model, the aim is to give a flood alarm, it consists of an audible alarm siren, alarming for 24-hour of operation. When the water level reaches the marked level where sensors are placed, a speaker alert (buzzer) is triggered and display on LCD. The model also sends information about level of water from the container to a mobile phone through GSM.

I have added a tank level monitoring application in this prototype. Where the water is continuously filling the tank as it called as river model, and IR sensor is attached, to check inflow of water into the top tank from bottom tank through pump. When the water reaches the sensor which is placed at marked level a buzzer alert is generated and a message is send to mobile phone whose number

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is fed into the controller, to get the flood alerts through arduino Uno to GSM module, message is seen on mobile phones. We are controlling the flow of water when needed through this communication module i.e. GSM. When conducting this project, we focus on floods alerts for safe guarding the life of peoples who are leaving near water bank, rivers, and dams. When their no water, motor is in off state then we need to start it by sending commands as '# A' for ON and '# a' OFF, as shown in fig.2 flow chart of project.

Flow chart:

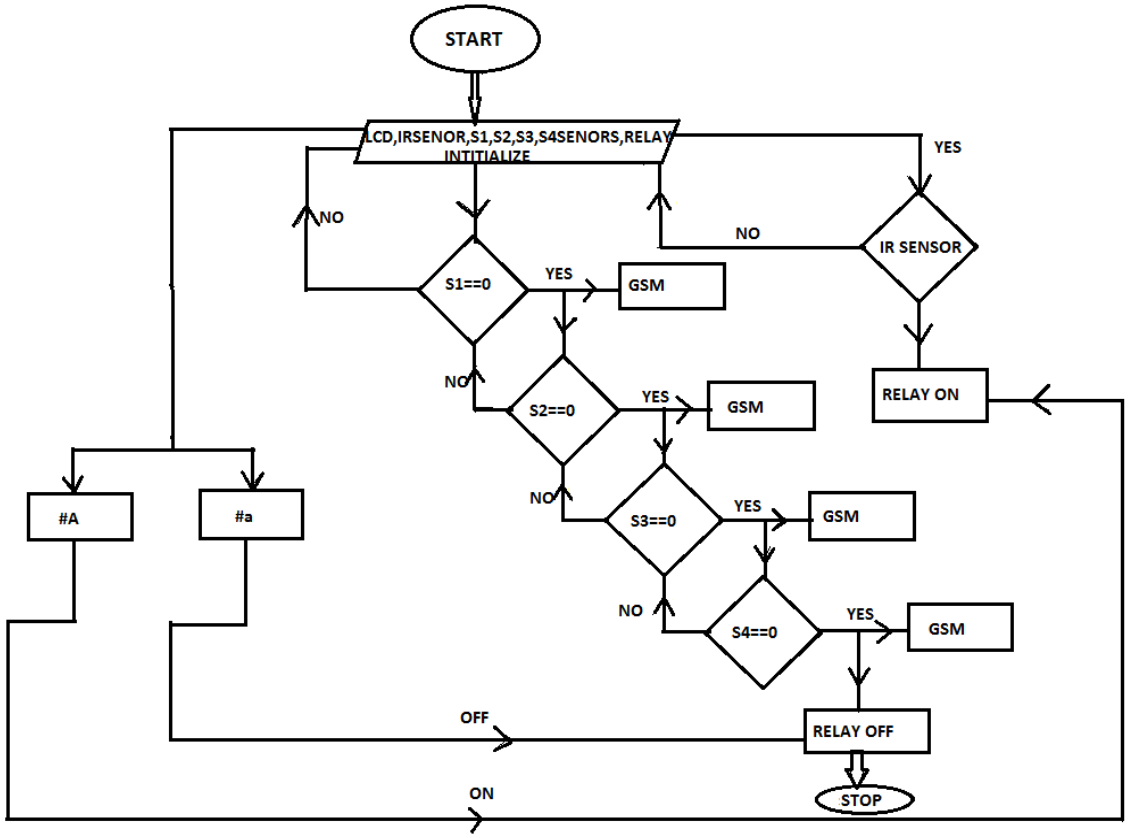

Fig .2: Flow Chart

Water is pump from ground tank to the top tank through pump, an IR sensor is placed at the outlet of pump, to detect water is coming or not. If water is not coming then the water pump is in OFF state with the help of relay we are doing this and we send command to turn ON and OFF of water pump through SMS. Transformer is used to power up the whole setup. The top tank consist of water level sensors marked and placed at different level, when the water is reached at marked level one LEDs glow and message is send, this is continuous till it reach the 4 level senor and an alert through buzzer sound is generated, for each level it is displayed on LCD screen, along with that a message is send as water is reached to marked level it might be first level or last level. When the water is below 25% pump turn ON at 25% a alert message is send and at 50%,75%,90% water is filled in tank continuously, along with alert is send to mobile through GSM and buzzer sound is listen, above 90% the pump turns OFF automatically giving message as floods, may occur is crosses its usual limit. As in this tank level model is also included if we want to stop tank at specific level we can control by sending command through GSM, means a two way communication is done through GSM.

When the water rises and reached near the placed senor, the sensor is made up of highly sensitive copper probe when it is placed in water due to electrical conductivity of water it produces high voltage and is indicated by the LED glow, the neutral wire is placed at the bottom of tank it is open when the electrical energy flows the circuit until it reaches the placed sensor. IR sensor is an obstacle detection sensor it transmit IR waves continuously and if any obstacle is comes in on contact then the waves is reflected back and is detected by IR reflector LED in this way it sense the water is flowing through pump or not and if it is not flowing it give signal to controller then the relay turn OFF the motor. Fig .3 shows block diagram of each component and its interconnection with different blocks.

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A. Block Diagram

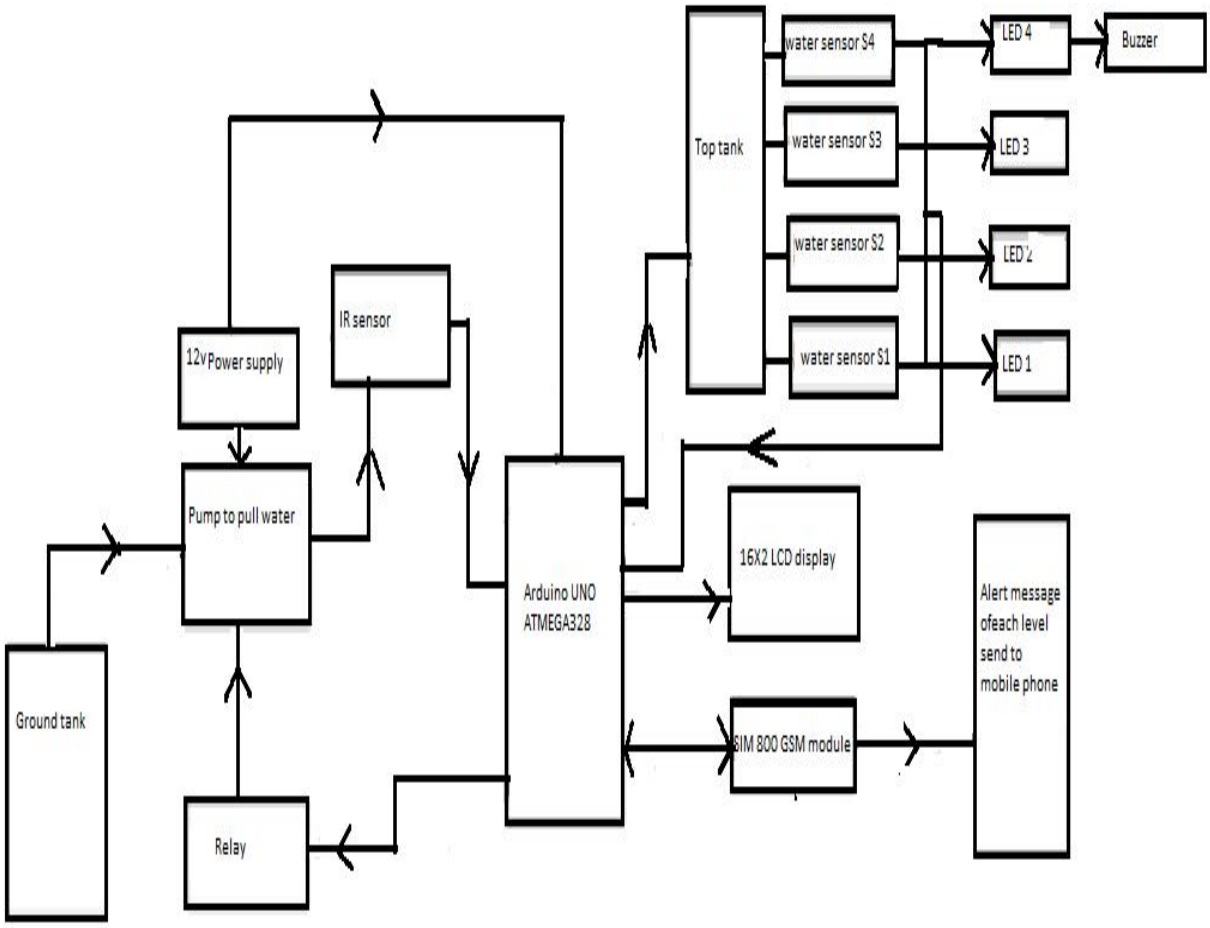

Fig .3: Block diagram

IV. RESULTS

The project is implemented to secure the life's of people by providing instant alert about the rise in water level and send SMS to mobile phone, and other part of project is avoid dry running of pump and save electricity when no water is present in tank it switch water pump automatically.

Fig .4: Water level 1 is displayed on LCD

Fig .5: Water level 2 is displayed on LCD

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Fig. 6: Water level 3 is displayed on LCD

Fig .7: Water level 4 is displayed on LCD

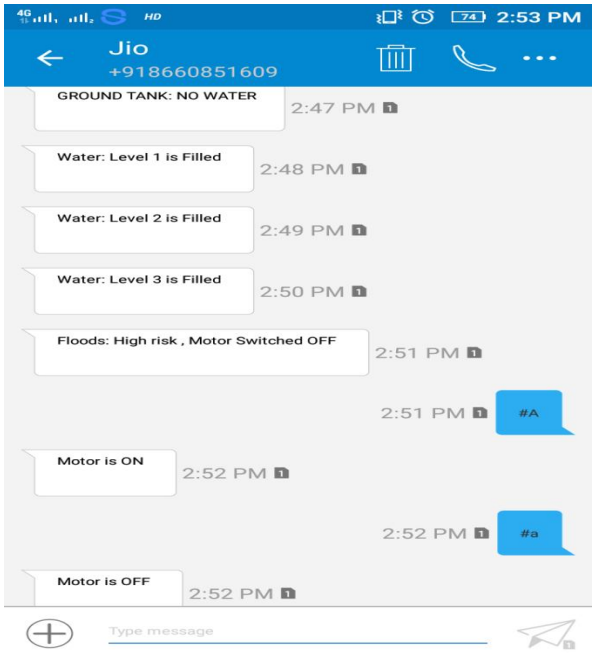

Fig.8: Messages on mobile phone

V. CONCLUSIONS

In this paper we focus on the instant alert about rise in water level for alerting peoples about floods, to secure their life and belongings. This micro model used arduino uno board and sensors, sensors are placed on different height in water drum, rise in the level is sense by sensor and transmitted to GSM module and is seen on mobile phone through wireless network. Different level messages send to mobile phone with level 4 high risk message. People leaving near this floods affected area may knew before with the help of buzzer sound and alert message and can take decision to move from that place.GSM is a two way communication medium we are controlling the pump on and off when required as tank level model is added, IR sensor checks the water incoming ,so that we can prevent dry running of when water is not available in ground tank in this way we are able to give alert about rise in water level and secure the life's of people and avoiding wastage of electricity and dry running of pump.

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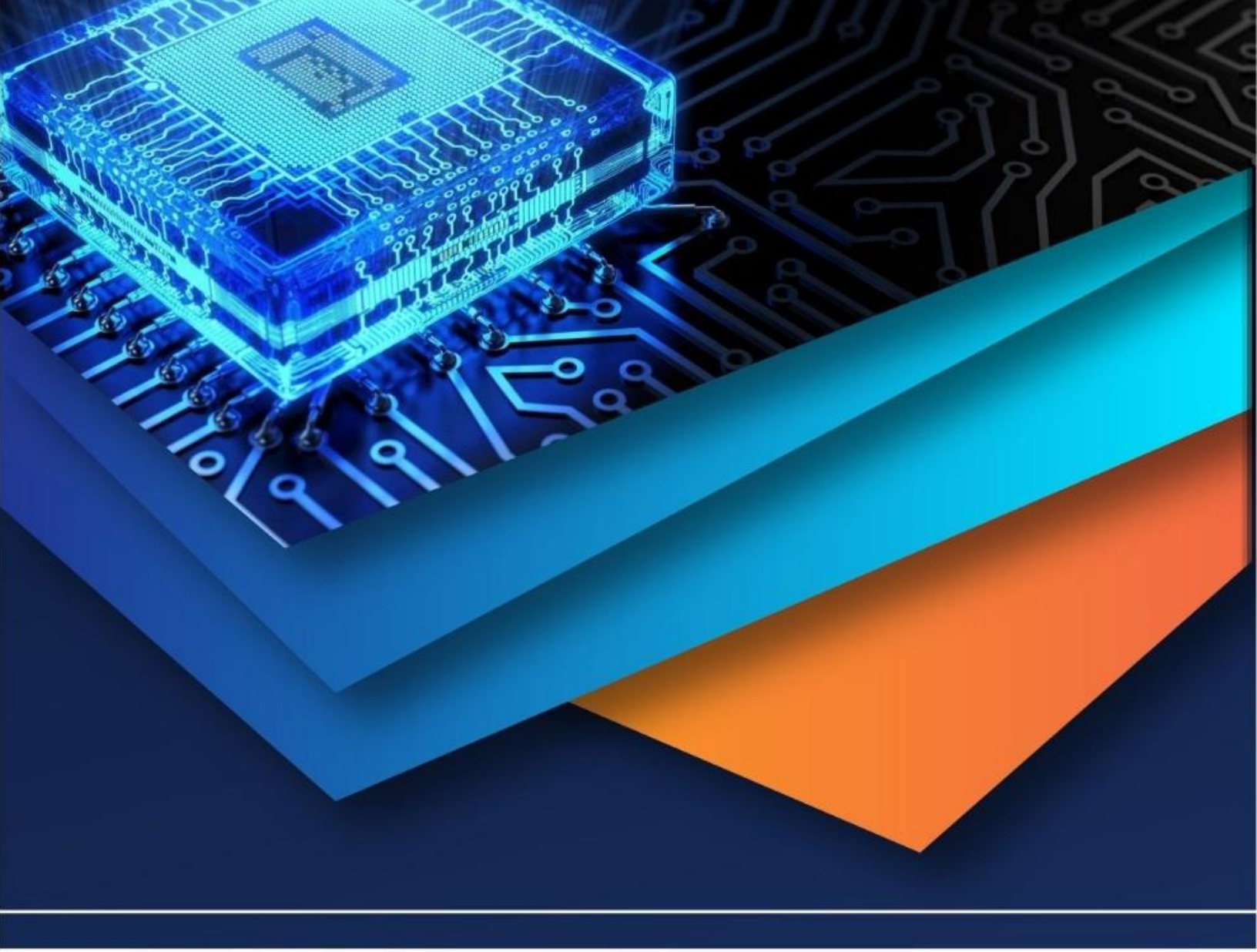

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