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INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 3 **Issue:** X **Month of publication:** October 2015

DOI:

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Smart Ration Distribution System

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Abstract-- Public distribution system is one kind of widely controversial offices that involves corruption and prohibited smuggling of goods. All this happens because every job in the ration shop involves manual work and there are no exact hi-tech technologies to automate the job. This concerns the illegal entry in the registers of the shop about the amount of goods given to the consumers. The second apprehension is the weight of the goods that are given to the people. Further, there is always difficulty for the verifying officials go through the stocks available and the commodities given in a register and find out the irregularities. The project proposes an approach to automate all the above said manual jobs and the whole thing from data entry to weighing to hammering is prepared by machines and the people have no hand in that. This provides high reliability and there brings a sense of truthfulness to the people. Further, as all the data allocation is prepared by the computer and it can keep track of all the data and the entire process of data maintenance is taken care of by the PC and hence no possibility of mistakes and practically no manual work. Here instead of a Ration card, a Smart Ration card will be used for the purpose of authorizing and subsequently the person's finger print will be matched for authentication. After that the consumer to select the materials and then dispense the materials based on ARM controller. After dispensing the materials the government head office receives the delivery Report from the PC with the help of GSM.
Keywords-- Smart ration card, finger print recognition, LPC2148, personal computer, GSM module, ISIS schematic capture

I. INTRODUCTION

Public distribution system (PDS) is one of the important provisioning systems in our Indian country. This PDS is recognized by the Government of India subordinate Ministry of Consumer Affairs, Food, and Public Distribution. This scheme was launched in India on June 1997. The fair price shops are mainly used to distribute the goods with low cost or free of cost. It is a concern of India's public distribution System implanted by Government of India, which distributes rations at a subsidized price to the poor. In India approximately 500000 fair price shops are available. Here the Major commodities distributed include essential food grains, so much as wheat, rice, sugar, and kerosene, through a network of public distribution shops constituted in several states across the country. The central and state governments joint the responsibility of regulating the PDS. While the central government is obligated for procurement, storage, conveyance, and majority allocation of food grains, state governments holds the province for distributing the aforesaid to the consumers through the ingrained network of Fair Price Shops (FPSs). State governments are also responsible for functional obligation, including allotment and identity of families below the poverty line, issue of ration cards, superintendence and monitoring the functioning of FPSs. The Indian ration card is the authority of the Indian peoples. This is mainly used for buying supported food and fuel (LPG and kerosene). It is an important livelihood tool for the misfortunate, providing proof of personal identity and link with government databases. India's public distribution system (PDS) runs based on the ration card, including its purpose of identification, eligibility, and entitlement. Ration card has three categories – extreme poverty level (AAY), below poverty line (BPL) and above poverty line (APL). The poverty lines are identified depends upon the annual income of that particular family. Depends upon the family incomes the ration card color is decided. The different colors of ration cards are navy blue (BPL), white (APL) and orange (AAY). A below poverty line (BPL) correspondence bearer should be collected 35 kg of food grain and the card holder above the poverty line should be collected 15 kg of food grain as per the norms of PDS. Up to the age of 12 years, a half unit ration materials are issued and full unit ration materials is issued in case of age more than 12 years. In fair price shops presently the peoples are facing so many problems like corruption, wastage of time and no proper material distribution…. etc. to overcome this problem here we proposed to dispense all the materials automatically and also maintain the stock details properly.

II. LITERATURE ANALYSIS

Vinayak T.shelar [1] was suggested RFID tag as an alternative of conventional ration card for the purpose of protected material distribution. At this time customer's database is stored in ARM microcontroller and this microcontroller is performed to distribute the materials automatically without any man power. After that GSM sends message to consumer.

R.Parthipan [2] introduces "A systematic application for public distribution-ration shop". This system used to maintain the stock details based on SQL SERVER and this is a smart way for monitoring the delivery and distribution of goods.

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Badgujar, Monali R.rathi and Shital R.tambe [3] proposed the "automation in rationing system using GSM and RFID technology". They introduce RFID card instead of traditional smart ration card for the purpose of authentication. If consumer enters into ration shop, first they will read our RFID card in a RFID reader. After that the consumers selects the quantity of goods and collect the goods automatically.

Kashinath wakade, pankaj chidrawar and dinesh aitwade [4] develop the normal ration shop into the "smart ration distribution and controlling". Here subscriber has to utilize the RF based ID card to collect ration from dealer. With the help of PDA device the ration shop worker will collect amount easily after selection of quantities. Lastly GSM used to send the bill details and quantity details to the consumer.

In "An overview of automatic rationing system" Jaid rahul.A, Kadam chetan.K and Kokare aniket.S [5] bring in RFID based smart card instead of conventional ration card for the purpose of secured material distribution. This system is mainly used to reduce the man power and also to avoid the corruption. Here AVR microcontroller is used to distribute the materials automatically.

Ashwini lanjudkar, pooja mhalaskar and pallavi shinde [6] are planned the "intelligent government rationing system" for the function of dispense materials properly. This system used Aadhar card for authentication. At this time Aadhar card is used to show the user details like name, address and bank details…etc and web camera is used for face identification and security purpose. After that GSM sends message to consumer.

In "mechanized government rationing system" priyanka v.mane and uroosa hippargi [7] improved the normal ration shop with automatic bill payment process. Here instead of ration card an Aadhar card will be used for security function. If customer scan the Aadhar card means the processor will display the consumer's details and to verify the user with help of fingerprint. Then the user will select quantities and pay the amount. After the material distribution, GSM sends message to consumer phone.

Smitha R.jagdale et.al. [8] recommend the "microcontroller based efficient ration distribution system" for automatic material distribution. This system uses the RFID card instead of traditional ration card. Here RFID card provides all the details of user and easily identifies the quantity details of that particular consumer. Here ATMEL microcontroller is performed to distribute the materials and GSM module used to link the PDS shop database to the government database.

Suraj V.S.et.al. [9] Propose the normal PDS into the "automization of rationing system". Thus system used to replace the manual work in public distribution system with the help of RFID card. This RFID card is used for authentication and identifies the consumer's details easily. User to select the materials and collect the goods automatically. Then GSM is used to update the stock details and to alert the consumer regarding the arrival of goods.

M.elizabeth sherine and shinu sadeyone [10] suggest "NFC based stock maintenance and billing system with auto alert to customers". This method used to maintain the stock details automatically and also intimating the customers on arrival of new stock in the stores. At this time NFC tag is used to communicate with the customers and distribute the materials automatically. Subsequently GSM sends message to customers.

S.vennal Venkatraman [11] initiates "ration whiz" to automate the ration distribution system using PLC module. This automated ration system replaces the conventional ration card by food card. This system used to distribute the materials automatically. At this time stock details connected to the government database through GSM modules, which further sends the up-to-date information to the government and the consumer.

S.Deepika.et.al. [12] planned "A prevention and automation of PDS using RFID and facial recognition camera". Here RFID card is given to all the users instead of traditional ration card. This card is to identify the consumer's details easily and facial recognition is used for authentication. After the person enters the shop holding a card the camera identify the image of the person in the database of the PC. If the image matches the necessary goods are delivered. Then stock details send to the government via GSM.

A.N.madur et.al. [13] suggested "replacing traditional PDS with smart PDS" with the help of RFID card. This card easily identifies the user's quantity details. User to select the materials with the help of keypad. After that ARM controller used to distribute the materials automatically. At that time the updated stock details are send to the customer mobile based on GSM module.

S.Valarmathy.et.al. [14] planned the "Automatic Ration Material Distributions Based on GSM and RFID Technology". Here every customer is provided with RFID cards. First user is authenticated and then system shows the balance of person. If the user will have sufficient balance to withdraw the current amount, system will open the valve. Through valve grain will come and it will get weighted by weight sensor. Once the count reached the entered amount controller automatically shut down the valve and updates the account of the customer. The updated account information is send to the customer's mobile using GSM.

Rajesh C. Pingle et.al. [15] Suggested the "Automatic Rationing for Public Distribution System (PDS) using RFID and GSM Module to Prevent Irregularities", in this automated system conventional ration card is replaced by smart card in which all the details about users are provided as well as their AADHAR number which is used for user authentication. To involve

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Volume 3 Issue X, October 2015
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

government in the process we proposed connecting the system at ration shop to a central database via GSM. Hence it is possible to prevent the corruption and irregularities at ration shop.

III. SYSTEM DESIGN

This smart ration distribution system mostly performed to reduce the corruption and reduce the wastage of time. Because in our system the goods are distributed automatically without any manpower. Fig.1 explains the basic module of automatic materials distribution and stock maintenance based on smart ration card technology. This system consists of the ARM processor, smart card, motor driver, LCD and GSM. The proposed system expresses sharing of grains as well as liquids.

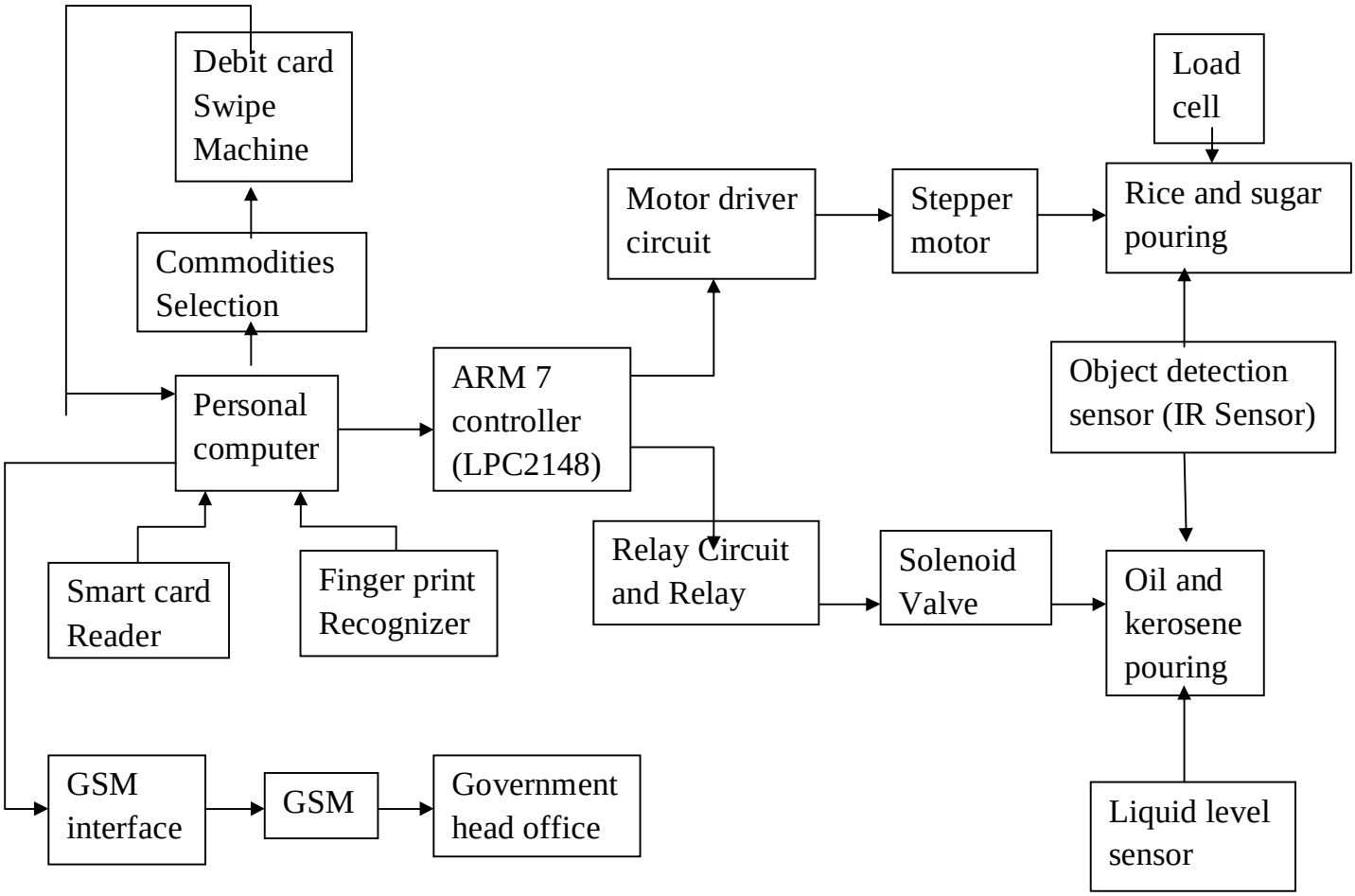


Fig.1 System Block Diagram

IV. SYSTEM FUNCTIONING

First the user gets the smart ration card instead of a traditional ration card for secured ration materials collection. This card used to easily identifies the user's details. In a smart card corner the designer will print the serial number based on family details. Depends upon this serial number user to collect the materials. The shop worker provides the schedule to the user. On that day only the user buys the materials. The last two days per week are allotted for distributing the materials to all users. This process is regularly reducing the user's time wastage; reduce worker's stress; proper maintenance….etc. Finger print recognizer is used for high secured purpose. User to insert the smart card means the PC search the database and to provide the user's details. Subsequently the user thumbs our finger print into the finger print recognizer. If the recent finger print and saved finger print are matched means PC shows the user's quantity details. After verifying the user's details the PC displays the particular user's quantity details. Then the user selects the goods with the help of the keyboard. With the help of this, the user will pay the amount automatically after the selection of materials. Here consumers use the debit card for secured payment. The payment

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process success means the PC sends commands to ARM micro controller recording the material distribution. If user select Rice or Sugar means commends passed to motor driver circuit and they control the stepper motor. Stepper motor rotates clockwise to distribute the rice. For distributing sugar, stepper motor rotates anti clockwise. If the user selects liquid item means the controller sends commend to relay circuit. At this time relay switch ON and pass commands to the solenoid valve. The valve will be open and distribute the liquid items. Here weight sensor is used for calculating the material's weight exactly and dispense the materials properly. They are primarily executing the correct quantity of materials. The IR sensor is one type of object detection sensor. This is very useful for distributing the materials correctly. The sensor senses the object and gives the instructions to the controller. Then only the controller distributes the materials. Here liquid level sensor is used for calculating the liquid levels and distributing the liquids accurately. If the liquid level low or high means the buzzer will on automatically. After material distribution the PC maintains the stock details and intimates the stock details to the government head office with the help of GSM. For this kind of process, we reduce the corruption and avoid the fake stock entry. Fig. 2 shows the basic model of smart ration card with authentication. These contain all details regarding users and easily maintain the stock details. This method used to avoid crowd, long waiting period, properly maintain customer details and stock details.



Fig. 2 Smart Ration Card

V. MODULE DESCRIPTION

A. LPC 2148

The LPC2148 micro-controllers are based on a 32/16 bit ARM7TDMI-S CPU core. They have real-time emulation and embedded trace support that combines the micro-controller with embedded high speed flash memory of 512 kB. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode (16bit instruction set) reduces code by more than 30 % with minimal performance penalty. Due to their tiny size and low power consumption, LPC2148 are ideal for applications where miniaturization is a key requirement, such as access control systems and point-of-sale systems. It has serial communications interfaces ranging from a USB 2.0 Full Speed device, multiple UARTS, SPI, and SSP to I2Cs. It has on-chip SRAM of 8 kB up to 40 kB. This makes these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power.

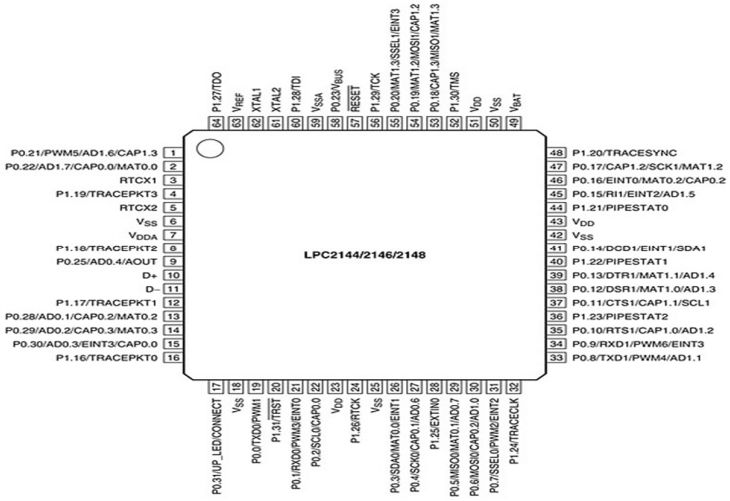


Fig. 3 LPC 2148 pin configuration

B. GSM Module

GSM is a digital mobile telephony system. 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 1800 MHz frequency band. The GSM module is communicate the microcontroller with mobile phones through UART. To communicate over UART or USART, we just need three basic signals which are namely, RXD (receive), TXD (transmit), GND (common ground). GSM modem interfacing with microcontroller for SMS control of industrial equipments. The sending SMS through GSM modem when interfaced with microcontroller or PC is much simpler as compared with sending SMS through UART. Text message may be sent through the modem by interfacing only three signals of the serial interface of modem with microcontroller i.e., TxD, RxD and GND. In this scheme RTS and CTS signals of serial port interface of GSM Modem are connected with each other The transmit signal of serial port of microcontroller is connected with transmit signal (TxD) of the serial interface of GSM Modem while receive signal of microcontroller serial port is connected with receive signal (RxD) of serial interface of GSM Modem. The SMS message in text mode can contain only 140 characters at the most. It depends upon the amount of information collected from GPS Engine that you need at the base station for tracking vehicle or person.

C. Stepper Motor

A stepper motor is a brushless, synchronous electric motor that converts digital pulses into mechanical shaft rotation. Every revolution of the stepper motor is divided into a discrete number of steps, and the motor must be sent a separate pulse for each step. The stepper motor is connected with Microcontroller output port pins through a ULN2803A array. So when the microcontroller is giving pulses with particular frequency to ULN2803A, the motor is rotated in clockwise or anticlockwise. The LPC2148 Slicker board has four numbers of I/O port lines, connected with I/O Port lines (P1.16 – P1.19) to rotate the stepper motor**.** ULN2803 is used as a driver for port I/O lines, drivers output connected to stepper motor, connector provided for external power supply if needed. Stepper Motor can connect JP17 or J6 connector.

D. Relay

Relays are devices which allow low power circuits to switch a relatively high Current/Voltage ON/OFF. A relay circuit is typically a smaller switch or device which drives (opens/closes) an electric switch that is capable of carrying much larger current amounts. There are 2 input channels. Each input is connected to the triggering coil of the respective relay. There are 2 output channels that each correspond to an input. When the input is energized, the relay turns on and the '+' output is connected to +12v. When the relay is off, the '+' output is connected to Ground. The '-' output is permanently wired to Ground.

VI. RESULTS AND DISCUSSION

In this process we use the KEIL Version4 software to run the coding and build up the code into the controller. Subsequently the ISIS schematic capture is to simulate hardware modules and provide the output.

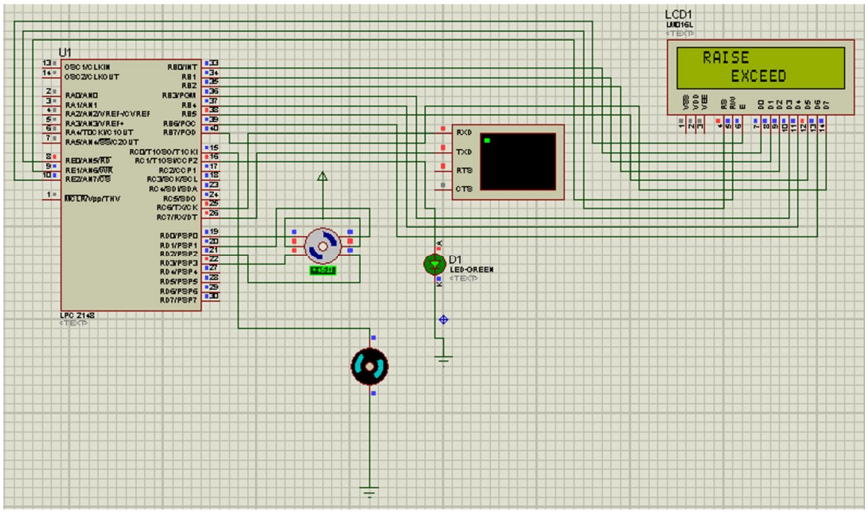


Fig. 4 simulation output for smart ration materials distribution

First Microcontroller receives commends from PC. After that controller sends instruction to virtual terminal. Here virtual

terminal is controls both the motor and LCD. At that time stepper motor will rotate means user collects rice and sugar. Otherwise relay switch at as 1 and with the help of solenoid valve user receives kerosene and oil. If any problems occur in machine means the buzzer automatically ON. With the help of the LCD the user easily identifies the process.

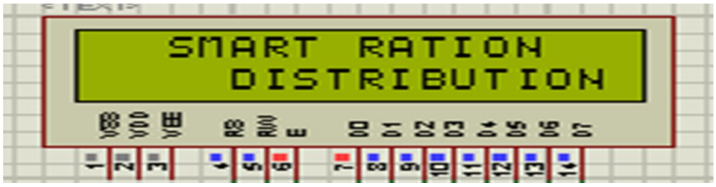


Fig. 5 LCD Display

VII. CONCLUSION

In ration shop several drawbacks are there like material robbery, corruption, malpractices, long waiting time to collect materials, low processing speed. To overcome above problems the mechanized rationing scheme is needed. Here the automatic ration shop concerned smart card and controller for distributing the materials. At this time ration card is changed by smart card and send the stock details to government head office using GSM module. Here all the works are done automatically without any manpower. So this proposed system used to avoid the corruption, goods theft, forgery and also they reduce the user's waiting time. This system also suggested maintaining the stock details properly and updating the details easily. They provide a secure, safe and efficient way of fair price shops.

VIII. ACKNOWLEDGEMENT

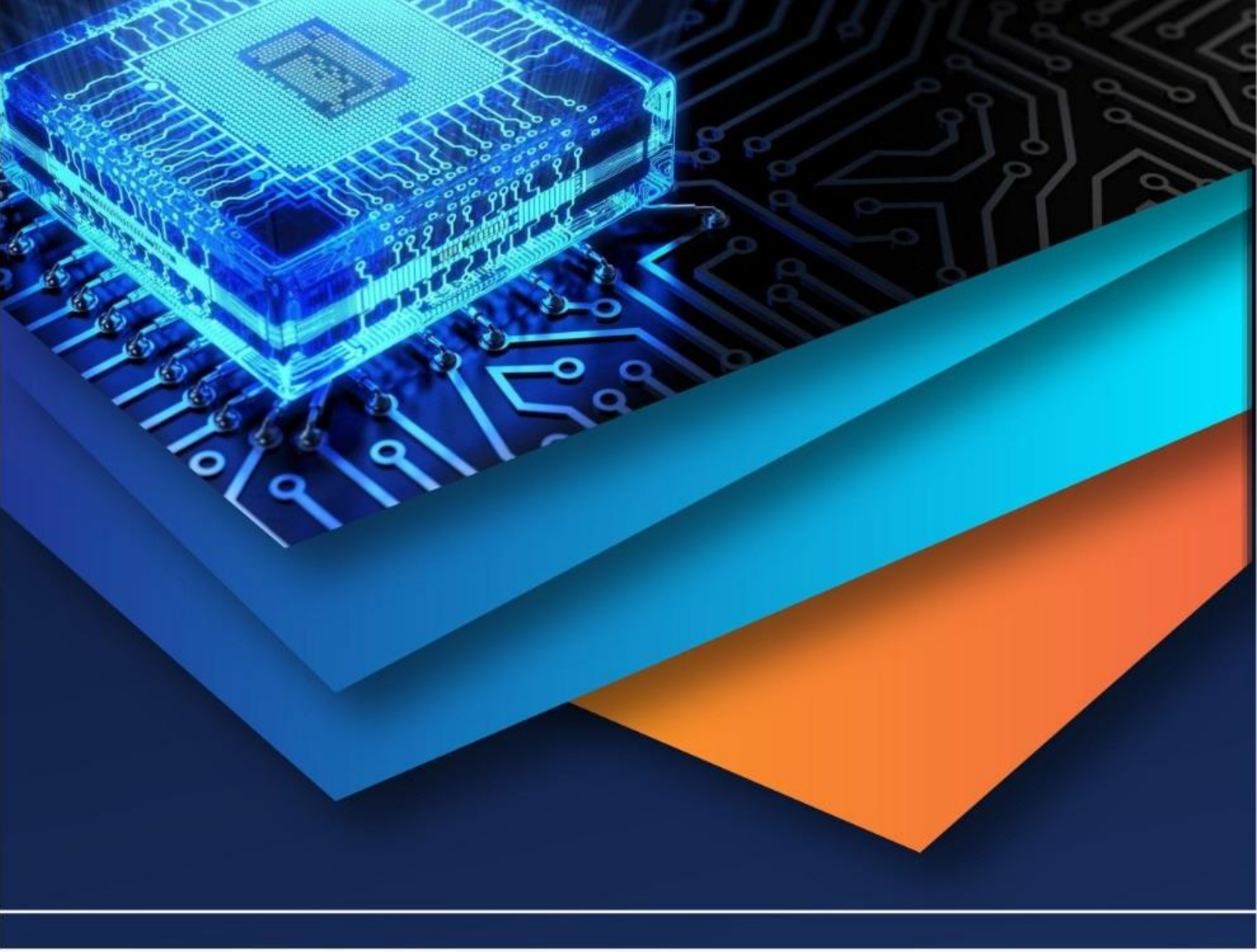
I obtain this prospect to gratefully acknowledge the inspiration, encouragement, guidance, help and valuable suggestions received from all our well-wishers. I would like to thank our project guide Dr.P.KANNAN who have helped us and made available much useful information to complete this project report. I solemnly express my heartiest gratitude to our head of the department, Mr.M.KARTHIKEYAN for his guidance and encouragement.

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