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An Android Application for Managing and Maintaining Health Condition of Pregnant Women

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Abstract: ***The purpose of this project is to develop an Android application that can provide a useful guide for the pregnant mom to manage their healthcare issues and maintain all necessary routine checkup with diets by themselves. The application will serve as an alternative to encourage self-care among the pregnant women in order to maintain a healthy weight gain during their pregnancy stages.***
This application is developed to bring convenience to the pregnant women and increase their self –care awareness. Mobile P2P Network has become part of P2P Network that also deals with various issues of cloud services when is accessed by portable devices in wireless environment. The pregnancy Healthcare data is relatively sensitive compared to other common data which need at most supervision. When Cloud services are accessed by the mobile devices additional challenge like security arises and correct time data delivery. Providing the Security and privacy for the pregnancy medical data is an interesting topic to deal with. In this paper the survey is done about the various challenges faced in Mobile based pregnancy Healthcare P2P Network and the existing scenarios along with pregnant women body checkup with medicine alert system. Our proposed system also consist of diet which is designed to provide the increased nutrients during pregnancy that are essential for the health of the mother and the well-being of the baby.
Keywords: Data Security, Healthcare Sector, Medical Data Management, P2P Network..

I. INTRODUCTION

Many healthcare professionals, hospitals and insurance agencies maintains the paper-based records, billing of the patients which is been converted later into computer-based billing and records which can be abused, modified or lost for malpractice done by frauds either for money or grudge. Hence the personal information of the patients is revealed, bogus information are entered and misused in traditional pregnancy Healthcare system.

Moreover Traditional healthcare system depends on the centralized server which is unreliable, insecure in accessing, storing medical data regardless of time, cost and location. Hence it is more complex and lack privacy and cost involved in integrating medical information is expensive. Given this scenario, Mobile cloud pregnancy Healthcare system is used to reduce healthcare differences and ensures adequate security and privacy. To overcome these issues introduce new mobi-cloud pregnancy healthcare computing concept in Android Smartphone systems.

Android operating system is used as a client application which focuses on two specific goals: the availability of e-healthcare applications and medical information anywhere, anytime.

Pregnancy Healthcare Information System (PHIS) is an important support tools in the management of health care services. It refers to any system that captures, stores, manages information related to the health of individuals or the activities of organizations that work within the health sector [1]. It has four key functions: (1) data generation (2) compilation (3) analysis and synthesis (4) communication and use. The PHIS collects data from the pregnancy health sector and other relevant sectors, analyses the data and ensures their overall quality, relevance and timeliness, and converts data into information for pregnancy health-related decision-making.

The ability to exchange health information electronically helps in providing higher quality and safer care for patients in many ways like (1) Providing accurate, up-to-date, and complete information about pregnant patients at the point of care, (2) Enabling quick access to pregnant patient records for more coordinated, efficient care, (3) Helping providers more effectively diagnose patients, reduce medical errors, and provide safer care, (4) Improving patient and provider interaction and communication, as well as health care convenience, (5) Enabling safer, more reliable prescribing etc. Foods from all basic food groups are included in quantities to meet the increased nutrient needs of pregnancy. Nutrient needs that are markedly increased include calories, protein, iron, folic acid and calcium. Alcohol should be avoided during pregnancy.

II. PROBLEM STATEMENT

Consumption of adequate of balance and healthy diet during the pregnancy stages are required for a healthy and successful pregnancy upshot. However, there are many pregnant women having unconscious of the importance of the prenatal nutrition. Hence, this may indirectly affect their gestational weight gain. Having obesity or underweight during the conception stage may cause pregnancy complication later. Thus, this application may guide the pregnant women to maintain a healthy gestational weight gain.

III.OVERVIEW OF PREGNANCY E-HEALTHCARE MONITORING SYSTEM AND P2P NETWORK

The advancement of telecommunication in Pregnancy medical field makes the diagnosis and treatment of people easy. Now monitoring the health of pregnant patient details and to provide her treatment on time is possible. But their some issues related to physical data storage, privacy of accessing user data, security etc. But with the help of the P2P Network these issues are reduced now. P2P Network is an on-demand network access to computing resources such as networks, servers, storage, applications, and services which can be quickly accessed, managed by a service provider and any users can access the resources via the internet. This cloud model promotes availability and is composed of essential characteristics, deployment models, and various service models.

Electronic healthcare monitoring system is accessed by all the participants' healthcare system such as patients, healthcare providers healthcare payers, health insurance and billing system using open source cloud which acts as a server that faces several challenges, like data storage, management (Eg. physical storage issues, availability & maintenance), interoperability, availability of resources, security and privacy) A data analytics framework can be used by various stakeholders to not only manage disease treatment but also improve the quality of patient outcomes. However, the security of data is paramount. Data use should focus on patients' protected health information for research.

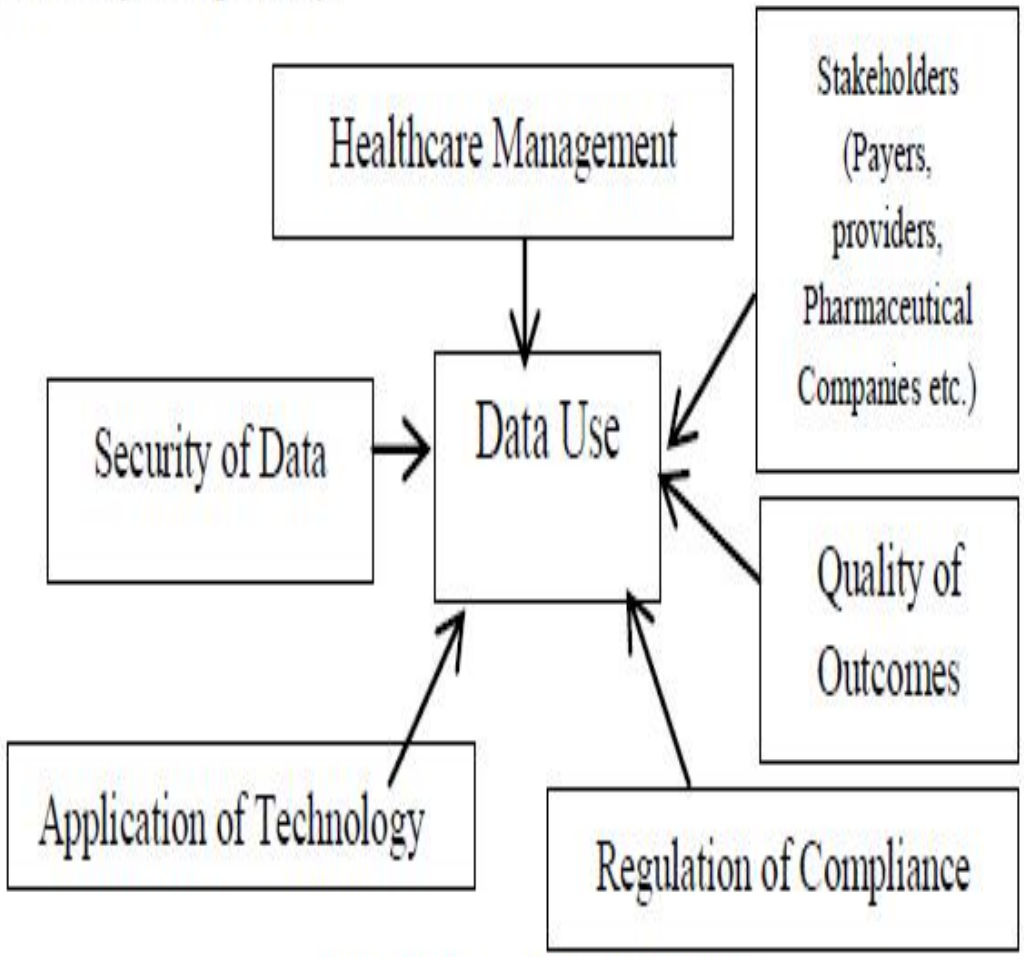


Fig: 1 Framework for Data Analytics

A. Pregnancy Diet Management System

1) *Nutrient Supplements:* Assessment of dietary intake should be completed for every pregnant woman. The increased nutrient needs of pregnancy can generally be met with slight changes in dietary habits. Daily supplementation of 30 mg ferrous iron is usually prescribed for pregnant women in the second and third trimester. For those women with limited intakes of fruit, juices, leafy green vegetables or whole grains, foliate may be prescribed. Prenatal vitamin and mineral supplements should be provided for women with inadequate diets and for high risk populations. Excessive vitamin and mineral intakes should be avoided because of potential toxic effects in pregnancy. Vitamin and mineral supplements for use during pregnancy should not contain more than twice the recommended amount for adults.
2) *Anemia:* Iron deficiency is the most common cause of anemia in pregnancy. Iron needs markedly increase in pregnancy. Supplements of 2 mg copper and 15 mg zinc per day may be prescribed for women taking iron supplements of more than 30 mg per day. Eat foods high in iron such as beef, pork, lamb and organ meats; iron fortified cereals; dried beans, peas, or lentils; dark green leafy vegetables; peanut butter and molasses. Combine foods high in Vitamin C with iron-rich foods. Use cast-iron cookware, if possible.
3) *Caffeine:* Although data from human studies do not provide significant evidence that caffeine affects pregnancy outcome, the Food and Drug Administration advises that pregnant women eliminate or limit consumption of caffeine-containing beverages such as coffee, tea and colas.
4) *Diabetes Mellitus:* Pregnant women with any type of diabetes need special medical and nutritional care. Women with diabetes mellitus should achieve good blood sugar control prior to becoming pregnant. All other women should be screened for diabetes at 24 to 28 weeks of pregnancy.
5) *Food Safety:* Food borne illness is especially dangerous for pregnant women. To avoid exposure to Listeria, pregnant women should avoid unpasteurized milk and soft cheeses; carefully follow “keep refrigerated” and “use by” dates; and thoroughly reheat processed meats such as hot dogs. To prevent toxoplasmosis, pregnant women should wash hands after handling cats, not clean cat litter boxes, avoid eating raw or partially cooked meats and wash hands after handling raw meat. To avoid other food borne diseases, proper food handling procedures should be followed including storing foods at proper temperatures; washing cutting boards and knives after contact with raw meat, poultry and seafood; and careful hand washing before and after handling food.
6) *Hypertension:* Immediate referral for medical treatment is essential for pregnant women with increases in blood pressure. A diet to meet the nutrient needs of pregnancy with ample but not excessive amounts of calories and protein should be encouraged. Sodium intake should not be restricted.
7) *Vegetarian Diets:* Pregnant women consuming vegetarian diets need careful nutritional assessment. The type of vegetarian diet will determine the potential for nutrient deficiencies with increased risk as more foods are excluded. Most pregnant women consuming milk and eggs can meet the increased nutrient needs of pregnancy. Vegan diets will require careful planning to consume adequate protein from complementary plant proteins. Alternate sources of Vitamin B12 and calcium will be needed in a vegan diet. Iron status should be carefully monitored. Low prepregnancy weight and less than optimal weight gain are common problems for vegans. High calorie foods such as nuts, nut butter, wheat germ, avocados, dried fruit, coconut, honey and salad dressings may be needed.

IV. OBJECTIVES

A. To Investigate the Most Efficient Way to Help Pregnant Women to Maintain Healthy During Their Prenatal Stages.

As the increase of widespread of smart phones consumers, the Smartphone become a necessity in our daily life. Most of the human activities can perform through smart phones. In response to this, Smartphone serve as a good platform for self-care.

B. To develop an Android software application that will help pregnant women to manage their own Gestational Weight Gain in which some recommendation of nutrition and workout are recommended to them during the prenatal stages

Weight gain during pregnancy is vital for baby grows. A poor gestational weight management may cause labor complication. Hence, in the My Pregnancy Care application, it provides a pretty handy guide for the pregnant women to have balanced diet consumption and stay healthy during their pregnancy stages. In order to manage the gestational weight gain in a healthy amount, workout also plays an important role. In this application, it will provide some recommendation workouts for the pregnant women to help them stay healthy and keeping fit during pregnancy. This workout is aimed to help the pregnant mom to adapt to their changing bodies and their growing baby.

V. PROJECT SCOPE

The scope of this project is to include essential functionality to encourage self-care among the pregnant women throughout their prenatal stages.

VI.LITERATURE SURVEY

This section provides review of research work conducted in the field of cloud computing for storing and sharing large data files involved in medical imaging. Current challenges faced in this area are also mentioned below.

A. InfoDev (2006) in its framework paper has highlighted that health based web sites has improved knowledge, behaviour and slowed health decline among the users. Studies conducted in Peru, Egypt and Uganda show use of ICT has avoided maternal deaths. Mobile phones were used in South Africa to provide timely reminders to patients with tuberculosis (Infodev, 2006).

B. Another approach is to provide tailored information based on individual characteristics of a person. This works well for different patients who have their unique need (Bental , Cawsey and Jones, 1999). For example for pregnant mothers during each stage of pregnancy the needs may be different and different types of health attention depending upon their health and physical condition may be needed (CenterSite, 1995-2007).

C. Patients can be educated to monitor their own health. For example in (JA Cafazzo, 2000- 2004), diabetic patients are given device to measure blood pressure which is transmitted through mobile device to central data repository. Clinical rules engine receives the data from mobile device and notify the patient's family physician if readings are not within the desired range.

D. Mobile devices can be used to provide health information based on geographical location of the person. These mobile devices are handy to use by travelers to be aware of illness in a particular location (Kamel Boulos MN, 2003).

E. In Malaysia, infant mortality is estimated as 250,000 in 2005 [Unicef]. According to the Malaysian Health Facts in 2005 (Ministry of Health Malaysia (MOH), 2006), thereare 122 government hospitals, 6 Special Medical Institutions, 6 non government hospitals and 222 private hospitals for maternity and nursing homes in Malaysia. There are only 20,105 doctors in Malaysia with the doctor to population ratio is 1 to 1,300. Expecting mothers are usually referred to hospitals where more accurate and better advice are available. In urban areas, medical advice is quite easily available through clinics where most doctors are general practisioners and expert advise is expensive. Getting medical aid and advice in rural area is difficult .

VII. SLOUTION

To reduce infant mortality and morbidity issues, mobile phone based pregnancy support system can be an effective alternative to the Internet. This system is made possible with the rapid development of the local IT and telecommunication infrastructure as well as the competitiveness of mobile service providers. Though this number is inclusive of those subscribers with multiple phones, which is only a small group, it is still the easiest and simplest way to communicate and deliver information.

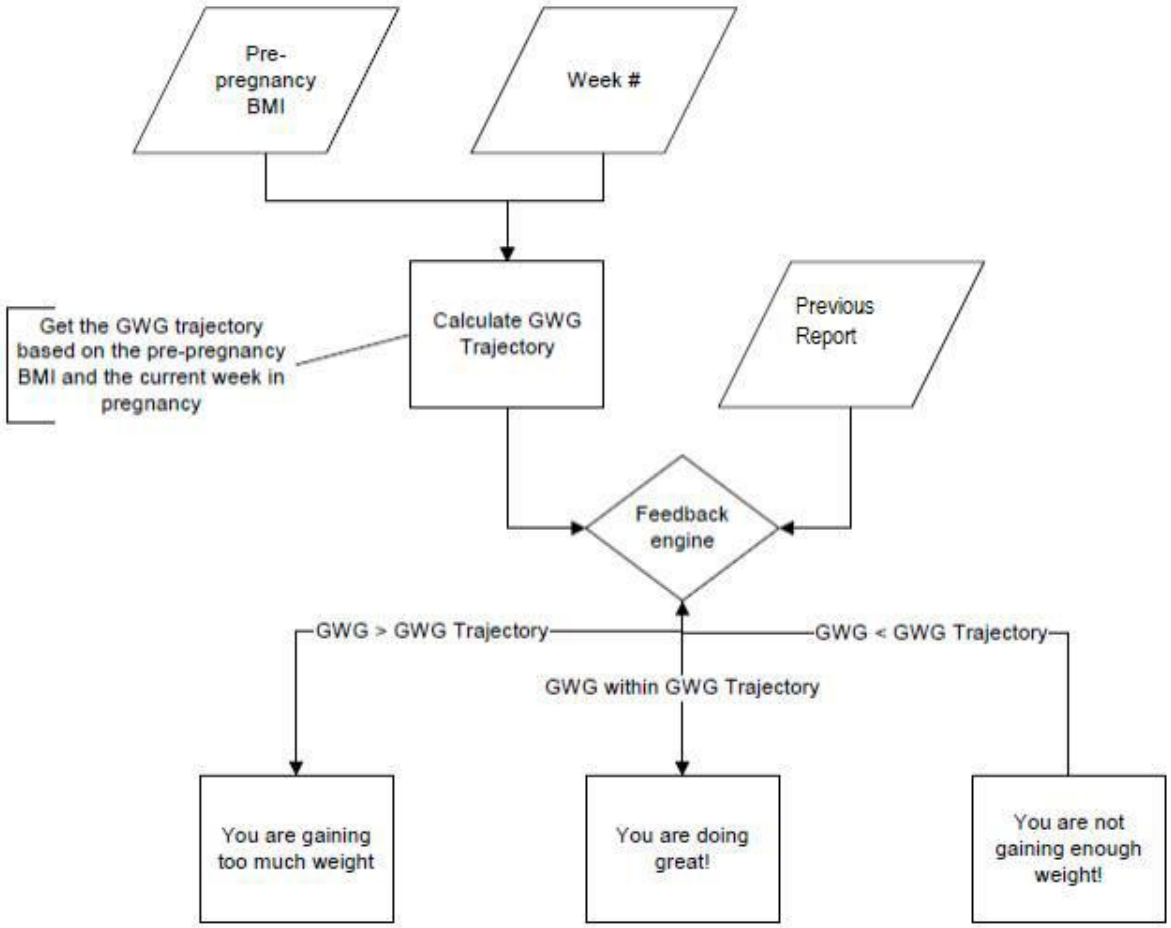
VIII. PROPOSED SYSTEM

"PHIS Android APP" is a multi-platform mobile software application that sends messages to a person to remind this person, that , "it's time to take your medications/refill your prescription" or "it is time for a scheduled procedure" . It is to assist those who forget sometimes, or may have obstacles/impairments in life that can be overcome by this reminder assistance Proposed system is an Android application that can provide a useful guide for the pregnant mom to manage their that can provide a useful guide for the pregnant mom to manage their healthcare issues and maintain all necessary routine checkups with diets by themselves.

This project consists of two parts: the first is to do a research based on the title so that this application is useful for the pregnant women with the information it provide. The next part of the project is to expose to the development of the android which include development tools, coding, and also the interfaces.

The goal of the project is to bring convenience to the pregnant women. Most of the pregnant women need to visit their doctor regularly for a check-up and keep track of their health care including their Gestational Weight Gain (GWG).

However, the doctor might not be able to always keep track on them and give them immediate feedback. Thus, this application is to encourage the pregnant women can keep track on their healthcare issues and maintain all necessary routine checkup with diets at anywhere and anytime they wish. In addition, this application will also provide some guidance to nutrition and some workout for the pregnant women. Hence, this may help them save their time, improve their healthcare and satisfaction and reduce costs.



IX. IMPLEMENTATION

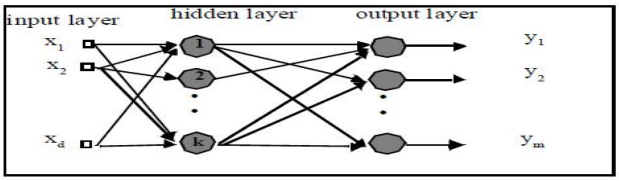
A. Technology

1) *JSP (Java Server Pages):* Java Server Pages (JSP) is a server-side programming technology that enables the creation of dynamic, platform-independent method for building Web-based applications. JSP have access to the entire family of Java APIs, including the JDBC API to access enterprise databases. This tutorial will teach you how to use Java Server Pages to develop your web applications in simple and easy steps
2) *Servlet:* Servlets provide a component-based, platform-independent method for building Webbased applications, without the performance limitations of CGI programs. Servlets have access to the entire family of Java APIs, including the JDBC API to access enterprise databases. This tutorial will teach you how to use Java Servlets to develop your web based applications in simple and easy steps
3) *HTML and CSS:* HTML stands for Hyper Text Markup Language, which is the most widely used language on Web to develop web pages. CSS is used to control the style of a web document in a simple and easy way.CSS is the acronym for "Cascading Style Sheet". This tutorial covers both the versions CSS1,CSS2 and CSS3, and gives a complete understanding of CSS, starting from its basics to advanced concepts
4) *Android :* Android is a mobile operating system developed by Google, based on a modified version of the Linux kernel and other open source software and designed primarily for touchscreen mobile devices such as smartphones and tablets.

B. Algorithm

1) Multilayer Perceptron Algorithm : Multilayer perceptron's (MLPs) extend the perceptron with hidden layers, i.e. layers of processing elements that are not connect

ed directly to the external world. Multilayer perceptrons. Below Figure shows a one hidden layer MLP with d inputs, k hidden PEs and m outputs (MLP(d-k-m)). Normally the PEs in MLPs are nonlinear sigmoid PEs. Let us analyze the extra processing power that a layer of nonlinear PEs achieves in terms of discriminant functions. The multilayer perceptron is the most known and most frequently used type of neural network. On most occasions, the signals are transmitted within the network in one direction: from input to output. There is no loop, the output of each neuron does not affect the neuron itself.



The multilayer perceptron constructs input-output maps that *are a nested composition of nonlinearities*, i.e. they are of the form

$$y = f\left(\sum f\left(\sum(\ \bullet\ )\right)\right)$$

where the number of function compositions is given by the number of network layers. The resulting map is very flexible and powerful, but it is also hard to analyze. Our goal now is to find out what type of discriminant function can be created with the map of above Eq. Multilayer perceptron's are the most commonly used types of neural networks. Using the back propagation algorithm for training, they can be used for a wide range of applications, from the functional approximation to prediction in various fields, such as estimating the load of a calculating system or modelling the evolution of chemical reactions of polymerization, described by complex systems of differential equations. In implementing the algorithm, there are a number of practical problems, mostly related to the choice of the parameters and network configuration. First, a small learning rate leads to a slow convergence of the algorithm, while a too high rate may cause failure (algorithm will "jump" over the solution). Another problem characteristic of this method of training is given by local minimums. A neural network must be capable of generalization.

X. RESULT ANALYSIS

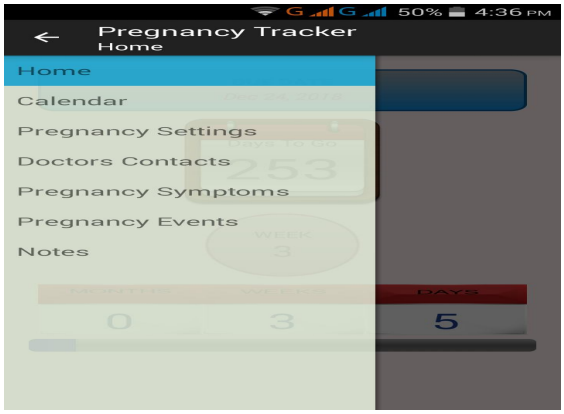


Fig. 1 image of pregnancy tracker

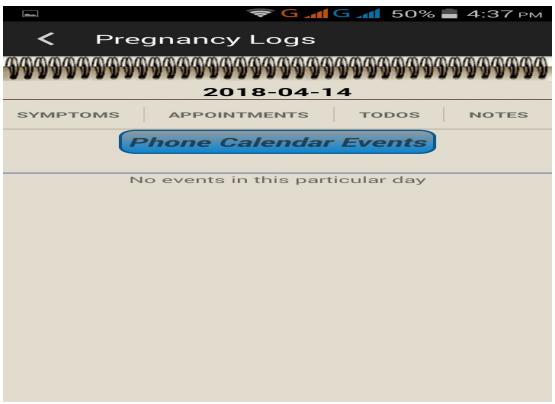


Fig. 2 image with appointment

XI. CONCLUSION

The development of this system is based on android open source platform, which provides cost effective and fast retrieval of healthcare related information to access more securely using P2P Network reside on the public network. This application is developed to bring convenience to the pregnant women and increase their self -care awareness. Therefore, this application may act as an alternative or medium that will help the pregnant women to reduce the risk during pregnancy. A market survey will be analysis to develop a persuasive application that can bring convenience to the target user. At the end of the project, the persuasiveness of the application will be evaluated.

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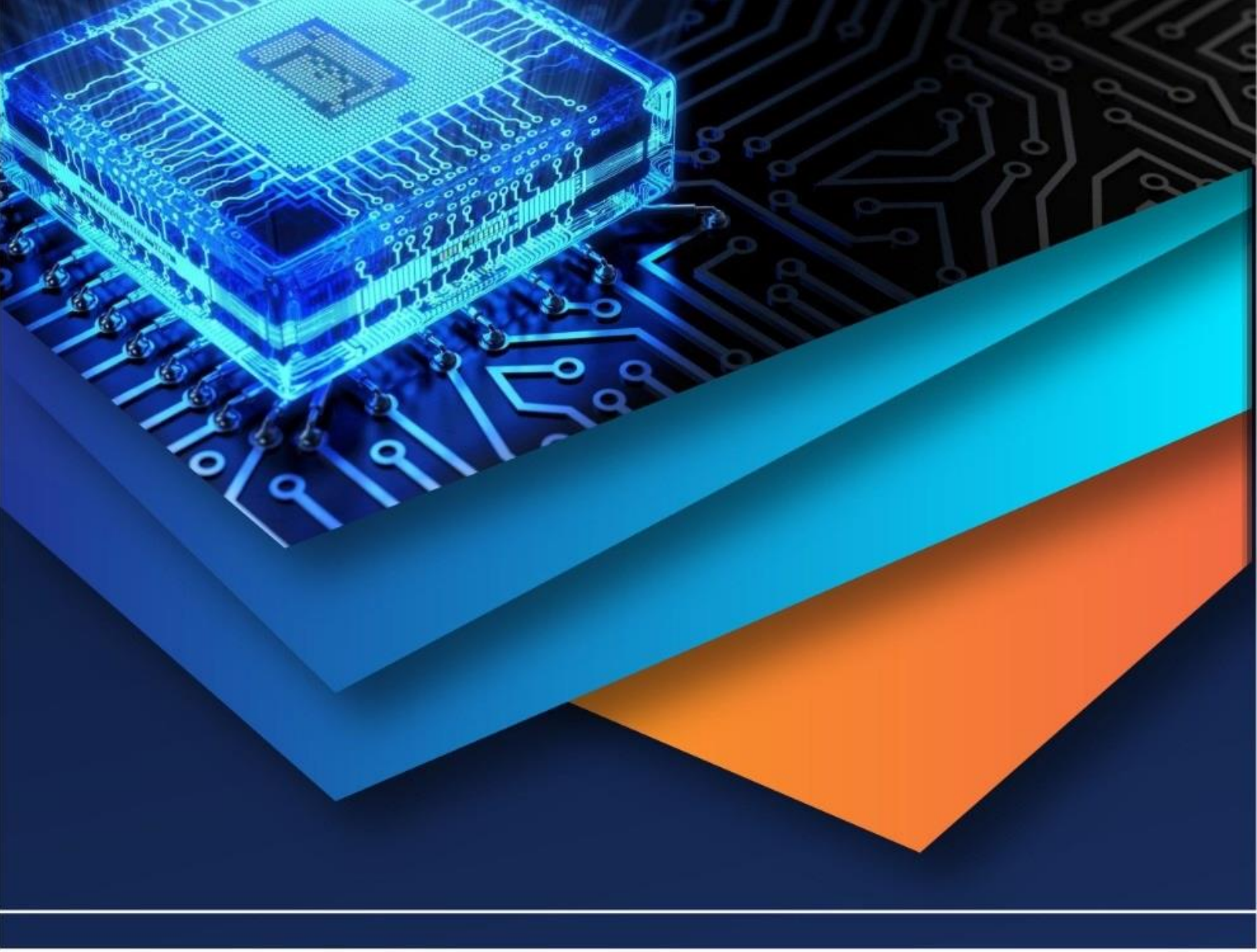

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