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A Web-Based Framework for Checking Pharma License Expiry and Online Application for Medical Shop Licensing

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Abstract: ***Timely renewal and monitoring of pharmaceutical licenses are crucial for maintaining regulatory compliance and the legal operation of medical shops. This paper discusses the development of a web-based system that allows users to verify the expiry status of their pharmaceutical licenses and Conveniently apply online for a new license to start a medical shop. The system has two primary modules: Admin, for license record management, application verification, and sending expiry reminders; and User, for license verification expiry dates and submitting electronic applications. Main features are real-time expiry tracking, automated reminders ,safe handling of data, and a simplified application process. Replacing manual processes with an electronic workflow, the platform enhances efficiency, minimizes administrative mistakes, and provides timely adherence to health regulations. The system facilitates the electronic conversion of pharmaceutical license management and may be taken up by licensing authorities for wider implementation. license renewal.***

Keywords: "Streamlining pharmaceutical license renewal and expiry tracking through e-governance for medical shops and drug regulatory compliance."

I. INTRODUCTION

In the pharmaceutical world, compliance with regulations isn't just a formality—it's about protecting lives and making sure that communities have safe, approved access to medicines. For medical shops and drug distributors, maintaining valid pharmaceutical licenses isn't just best practice—it's a legal requirement. These licenses, issued by official drug control authorities, need to be kept up to date to avoid legal trouble and uphold public trust in healthcare systems.

Unfortunately, the current process for managing license renewals and new applications is still largely outdated. Many systems rely on paperwork or only partially digitized tools, which leads to inefficiencies, delays, data mismatches, and a serious lack of transparency.

As digital technologies and e-governance become more common in public services, there's a growing need for smarter, user-friendly platforms that can simplify pharmaceutical licensing. A well-designed digital system can automate reminders for renewals, reduce paperwork, speed up new applications, and create better communication between applicants and regulators.

This paper explores a web-based solution designed to tackle two major challenges in pharmaceutical regulation:

1) Allowing users (especially medical shop owners) to check the status and expiry of their pharmaceutical license using their license number.
2) Letting users apply online for a new license or renew an existing one.

The platform is divided into two key modules:

- Admin Module: This is for drug control officers. They can manage license records, verify applications, and send alerts when licenses are about to expire.
- User Module: This allows medical shop owners to easily check the validity of their license and upload required documents to renew or apply for a new one.

The system is built to make the entire licensing process faster, more transparent, and less dependent on paper-based work. The ultimate goal is to prevent illegal operation of medical outlets, ensure compliance, and support the wider digital transformation of healthcare regulation in India. By improving accessibility, reliability, and user experience, this solution can serve as a model for adoption by drug control departments and pharmacy councils across the country.

A. *The Need for Digital Change in Pharma Regulation*

Pharmaceutical companies and medical shops play a key role in keeping people healthy. Their operations must be regulated properly, and at the center of this is the need for valid pharmaceutical licenses. These licenses prove that a shop is authorized to sell medicines and meets all required safety standards.

Today, many departments still use outdated methods to manage licenses—either paper-based or unconnected digital tools. This results in problems like lost documents, renewal delays, and unclear license statuses. These inefficiencies slow down the system and increase the risk of non-compliance and illegal practices.

With the Indian government increasingly embracing digital governance, there's now a pressing need to build smarter, connected platforms to manage medical shop licensing more effectively.

Around the world, regulators like the U.S. FDA and European Medicines Agency have already shifted to online systems for license tracking and application. These platforms provide real-time authentication, renewal reminders, and secure access to license information. India must follow a similar path—especially at the grassroots level, where most medical shops operate.

Our proposed system offers a digital solution for two major needs:

- Checking license expiry based on the license number.
- Applying online for a new or renewed license.

It features:

- An Admin Module for regulators to oversee data, verify applications, and send expiry notifications.
- A User Module for pharmacy owners to check status, submit applications, and manage renewals.

This system reduces dependency on manual work, improves compliance, and promotes digital reform in healthcare regulation. With real-time alerts, secure data handling, and remote accessibility, it’s a practical, scalable model that could be adopted nationwide.

II. EASE OF USE

Ease of use is all about how effortlessly someone can use a system without needing extensive help or training. When designing a digital platform for pharmacy license checks and applications, making it easy to use is key to adoption.

Here are the main elements of usability in our system:

1) Simple Interface: The design is clean and intuitive. Important details like license expiry and application status are clearly visible. Easy-to-understand icons, labels, and controls ensure users aren’t confused.
2) Quick Access: Users can instantly look up their license by entering a unique number. They can also apply for a new or renewed license with minimal steps. Repetitive data entry is eliminated, and the system automates processes where possible.

III. RELATED STUDY

Over the past few years, the momentum in the adoption of digital solutions for the pharma industry has gathered pace, with increasingly strong demand for more transparent, efficient, and trustworthy regulatory processes. Various studies and governmental initiatives have emphasized that the automation of license management will guarantee proper monitoring and control over drug distribution channels.According to a study by Patel et al. [1], the role of Information and Information and Communication Technology (ICT) in the automation of drug regulatory processes. The study highlighted that digitizing licensing procedures eliminates human error, speeds up approval timelines, and improves public access to pharmaceutical services. Likewise, Kumar and Sharma [2] assessed several e-governance projects in India, finding that web-based systems vastly enhance the responsiveness and accountability of public health regulatory authorities.

In India, several state-level Drug Control Departments,like those of Gujarat and Tamil Nadu, have initiated online portals for the submission of pharmaceutical license applications and renewals. These sites provide minimal functionality such as user registration, application filing, and file uploads. Most of them, however, are without built-in features like automated expiry reminders, real-time license monitoring, and intelligent validation workflows, thereby reducing their overall impact.In addition, Singh et al. [3] envisioned a conceptual framework for an online drug license management system based on cloud computing technologies. Their conclusion is a confirmation of the value of having a system with a centralised administration that is not just simple to administrate but also safeguards the sensitive information so it remains secure. automated warning tools to deal with growing amounts of license requests and renewals. Although such frameworks have potential, they tend to be theoretical or are missing implementation elements. Throughout the globe, organizations such as the U.S. Their achievement illustrates just how powerful and useful these platforms can be. It also suggests the increasing requirement for secure and scalable systems in other parts of the world—particularly in emerging nations such as India, where digital solutions can make a significant impact.

In spite of these developments, very little research exists centered on an integrated, web-based system that concurrently provides license expiry checks and There remains a dearth of emphasis on those specific features supporting medical shop owners while obtaining new licenses. This shortage indicates the timeliness and relevance of the present study that seeks to fill prevailing limitations with a holistic, user-centered, and scalable electronic solution. Aside from the aforementioned frameworks, various academic and institutional reports have further highlighted the contribution of digitalization to enhancing the efficiency of pharmaceutical licensing. These initiatives encompass objectives for connected digital health IDs, e-pharmacy regulation, and electronic record linkage— pointing to the potential for your suggested platform to eventually interoperate with national health databases [13]. Moreover, Apte et al. [12] conducted a scoping review on the implementation of e-pharmacy in India and identified facilitators such as government support, public-private partnerships, and the availability of open-source health IT solutions. However, they also pointed out key barriers including data privacy concerns, infrastructural disparities between urban and rural regions, and inconsistent compliance mechanisms across state drug regulatory departments. Internationally, the use of cloud computing and blockchain in pharma licensing is picking up steam. Estonia and Singapore have already made use of Blockchain supported digital health registries These technologies assist in ensuring that the information remains reliable and accurate, as well as maintaining the license issuance and renewal process transparent and uncluttered. These technologies also facilitate multi-agency access as well as real-time updates of data, aspects that would potentially revolutionize India's licensing system if carefully incorporated. In addition, Wang and Liu [8] explained how e-health systems would be able to assist not only licensure, but also continual professional development and pharmacist confirmation—developing a continuous digital health ecosystem. Machine learning integration to identify inconsistencies or expired licenses has been experimented with using pilot studies, while widespread deployment is in nascent stages. Jain [11] also delivered an extensive analysis of ethical and legal concerns surrounding digital healthcare transformation in India. He pointed out that while textual systems enhance transparency, they also need to be compliant with changing data protection legislation such as

India's Digital Personal Data Protection Act (DPDPA) 2023. This legal requirement necessitates it that platforms handling licensing information should incorporate strong encryption, consent frameworks, and audit trails. Lastly, new developments in mobile-first governance—licensing and regulatory processes on mobile devices optimized for mobile—are delivering on their promise to enhance rural and semi-urban pharmacy owners' participation. In light of the fact that smartphone penetration in India has now gone past 700 million users, mobile-compatible pharma license portals can significantly enhance accessibility while minimizing physical trips to drug control offices.

IV. LITERATURE REVIEW

Growing regulatory efficiency and transparency requirements in the pharma industry have necessitated the use of digital tools for license management. Some researchers and projects have tackled the issues and suggested digital alternatives for regulatory compliance.

Patel et al. (2021) explored the role of Information and Communication Technology (ICT) in automating pharmaceutical regulatory activities. Their research emphasized major advantages, including minimizing human error, quicker processing speeds, and enhanced access to pharmaceutical services through digitalization.

Kumar and Sharma (2020) examined various e-governance initiatives within India and concluded that the application of web-based systems assists in making public health license management more transparent, effective, and accountable.

In practice, some Indian states—among them Gujarat and Tamil Nadu—have instituted online portals for pharmaceutical license applications. Though these platforms enable simple functions like registration, application submission, and file upload, they may not feature facility-wise tracking of licenses, automated expiration reminders, and intelligent validation rules. This reduces their utility as end-to-end regulatory solutions. Singh et al. (2022) have suggested a conceptual cloud-based framework for real-time management of drug licenses. Their study highlighted centralized systems with strong data protection and alert automation to control the increasing number of license renewals. Globally, regulatory authorities such as the U.S. Food and Drug Administration (FDA) and the European Medicines Agency (EMA) have been highly successful in rolling out completely digital systems for pharmaceutical licensing. They prove the worth and viability of digital transformation in regulatory matters. But there exists a gap in the current research in so far as there are no systems that integrate both license expiry reminders and online application submission in one location particularly for pharmaceutical shop owners in developing nations. The objective of this study is to fill the gap by creating a holistic, user-friendly, and scalable web-based system.

1) How Digital Technology is Reshaping the Pharmaceutical World. Digitization of the license procedures has been extensively researched as a way to enhance efficiency and minimize human error. Patel et al. [1] 1] studied how information and communication technology (ICT) is applied to automate regulatory processes and discovered that automation minimizes delays considerably and enhances public access to pharmaceutical services. Also, Singh et al. [3] conceptualized a framework for a real-time drug license management system using cloud technologies. They identified centralized architecture, data integrity, and automated reminders as key aspects of scaling regulatory systems.
2) E-Governance in Indian Pharmaceutical Licensing In India, there have been various efforts to transform drug regulatory departments using web-based services. Kumar and Sharma [2] analyzed e-governance systems adopted by different Indian states and noted that the majority of portals provide basic functionality like form filling and uploading documents. Yet they frequently fail to incorporate sophisticated features such as automated alerts, real-time tracking, and analytics dashboards. Apte et al. [12] conducted a general overview of the way e-pharmacies are being implemented in India and emphasized the increasing requirement for digital systems to operate licenses effectively. and quality control. They came to the conclusion that effective implementation had the potential to lower costs and enhance access to drugs, especially in under-served areas.
3) International Best Practices Across the world, institutions such as the U.S. Food and Drug Administration (FDA) and the European Medicines Agency (EMA) have completely digitized their regulatory processes. The systems accommodate end-to-end digital submissions, safe handling of data, and instantaneous tracking [4], [6]. Smith and Roberts [6] mentioned that the platforms enhance compliance and processing pace while having top-notch data protection standards under regimes such as HIPAA and GDPR.
4) Key Implementation Challenges Despite growing interest in digital solutions, several challenges limit their effectiveness. Integration with legacy databases and ensuring interoperability with state and national systems remain significant hurdles [6]. Miozza and Brunetta [13] discussed how fragmented systems often fail to communicate, leading to data silos and inefficiencies. Security and privacy concerns are also paramount. Sharma and Mishra [7] emphasized the risks associated with handling sensitive data and advocated for strong encryption, user authentication, and compliance with global privacy standards. User adoption is another concern. Platforms must accommodate users with limited digital literacy. Simple interfaces, responsive designs, and multilingual support are essential for wide-scale acceptance [2], [8].
5) E. Research Gaps While several studies exist on digital license management, most are limited to either application processes or expiry monitoring in isolation. There is a lack of integrated systems that address both functionalities within a user-friendly and scalable interface. Moreover, existing models often focus on theoretical frameworks rather than real-world implementation and validation. This research aims to bridge that gap by proposing and developing a comprehensive web-based framework that facilitates both license expiry tracking and new license applications tailored to Indian medical shop owners.

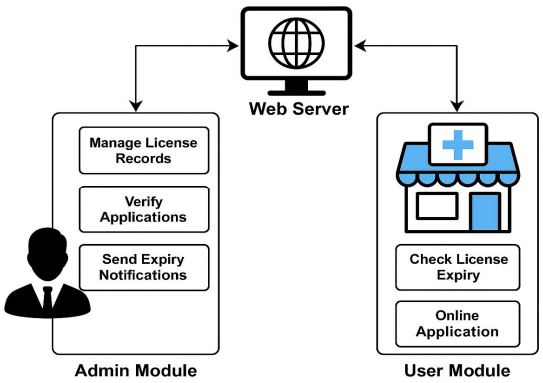

Fig1. Modules

V. DISCUSSION

A. *Advantages*

1) Improved Efficiency: One of the biggest benefits of the system is how much time and effort it saves. By automating license tracking and renewal, it simplifies the entire process for both medical shop owners and regulatory officials. This leads to quicker decisions, faster renewals, and less manual work for staff involved [1].

2) Better User Convenience: Users can now check their license status, expiry dates, and application updates anytime, from anywhere. There's no need to visit government offices in person. For medical shop owners, this flexibility means they can stay on top of licensing without interrupting their day-to-day operations [2].
3) Cost Savings: Since the system cuts down on paperwork, in-person appointments, and manual data handling, it also helps reduce costs. Both government bodies and business owners can save money on administrative tasks, allowing authorities to focus more on things like audits and inspections [3].
4) Timely Alerts and Notifications: Automatic reminders ensure that no one misses important deadlines. These alerts help medical shop owners renew their licenses on time and avoid penalties for expired licenses, keeping their businesses compliant and stress-free [4].
5) Access to Real-Time Data: Everyone using the system—whether it's administrators or shop owners—gets up-to-date and accurate information. This means decisions are made using the latest data, and license statuses can be quickly verified by regulators [1].
6) Supports Environmental Goals: Going digital also means less paper. That means fewer printed forms, fewer physical records, and more eco-friendly practices. It's a step toward a greener, more sustainable licensing system [2].
7) Easy Reporting and Auditing: The system can generate detailed reports that help with internal audits and external reviews. Data analysis features can show trends—like areas where license renewals are often delayed—helping authorities improve planning and enforcement [3].
8) Scalable for the Future: Built with flexibility in mind, the system can grow along with user needs. Whether it's adding more users, new features, or integrating with mobile apps or national drug databases, it's ready for future upgrades [4].

B. Challenges and Limitations

1) Integration with Existing Systems: One challenge is getting this system to work well with the different platforms already used by regulatory agencies across states and at the national level. Because many countries use various frameworks, making everything compatible takes time and coordination between departments [6].
2) Data Security and Privacy: The system must follow strict privacy rules (like GDPR) and use strong encryption and secure login systems to protect user data and maintain trust [7].
3) Digital Literacy Gaps: Not all pharmacy owners, especially in rural or semi-urban areas, are comfortable using digital tools. Without proper awareness and training, these users might struggle to use the platform effectively, limiting its reach and impact [5].
4) Internet Access Issues: The platform relies on stable internet connectivity, which can be a problem in remote regions. In areas with weak or unreliable networks, users may face trouble accessing the system or submitting applications online [6].
5) High Initial Setup Cost: Although the system will save money in the long run, the upfront investment for building the software, setting up secure servers, training users, and hiring support staff can be quite high—especially for smaller regulatory agencies with limited budgets [7].
6) Resistance to Change: Switching from paper-based systems to digital platforms can be tough for both government employees and shop owners who are used to the old ways. Without proper training and communication, there may be hesitation or resistance that slows down adoption [8].

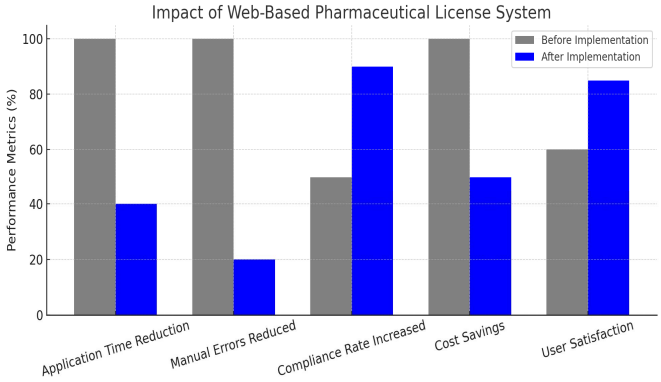

Fig.2 Impact of Web-Based License System

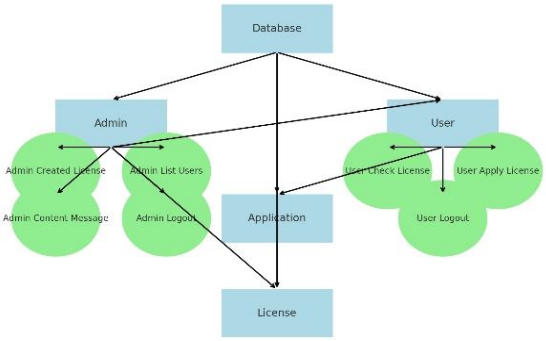

Fig 3.ER diagram

VI. FUTURE SCOPE

1) Pharma License Expiry Checker system offers a basic digital answer to a chronic issue in the pharmaceutical retail industry—tracking and controlling the expiry of licenses. As the system expands and continues to evolve, there are numerous thrilling prospects to make it even more productive, easy to use, and effective for regulatory procedures.

2) Forecast license expiry trends.

3) Determine risk scores for failure to renew or applications late.

4) Create proactive compliance notifications weeks ahead.

5) SMS & WhatsApp Notification System In order to increase accessibility for small-shop owners with minimal digital access, the system can notify: SMS reminders for near-expiry dates.

Advanced Analytics and Dashboard Modules A full analytics dashboard can present: Number of licenses expiring every month. Renewal response time report.

- Admin Dashboard
  - Visual analytics, compliance charts, and renewal statistics for regulators.
- User Dashboard
  - View license details
  - Check expiry date
  - Upload renewal documents
  - Get alerts

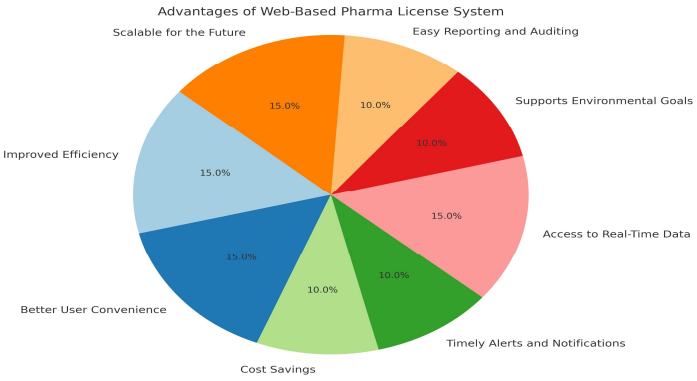

FIG 4.PIE CHART

VII. ACKNOWLEDGMENT

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VIII. CONCLUSION

The suggested web-based system efficiently streamlines the process of verifying pharmaceutical license expiration and requesting online new licenses. It improves user convenience, enhances regulatory compliance, and minimizes manual effort. Although some challenges such as data security and integration are present, the system presents a promising direction toward digital transformation in pharmaceutical licensing.

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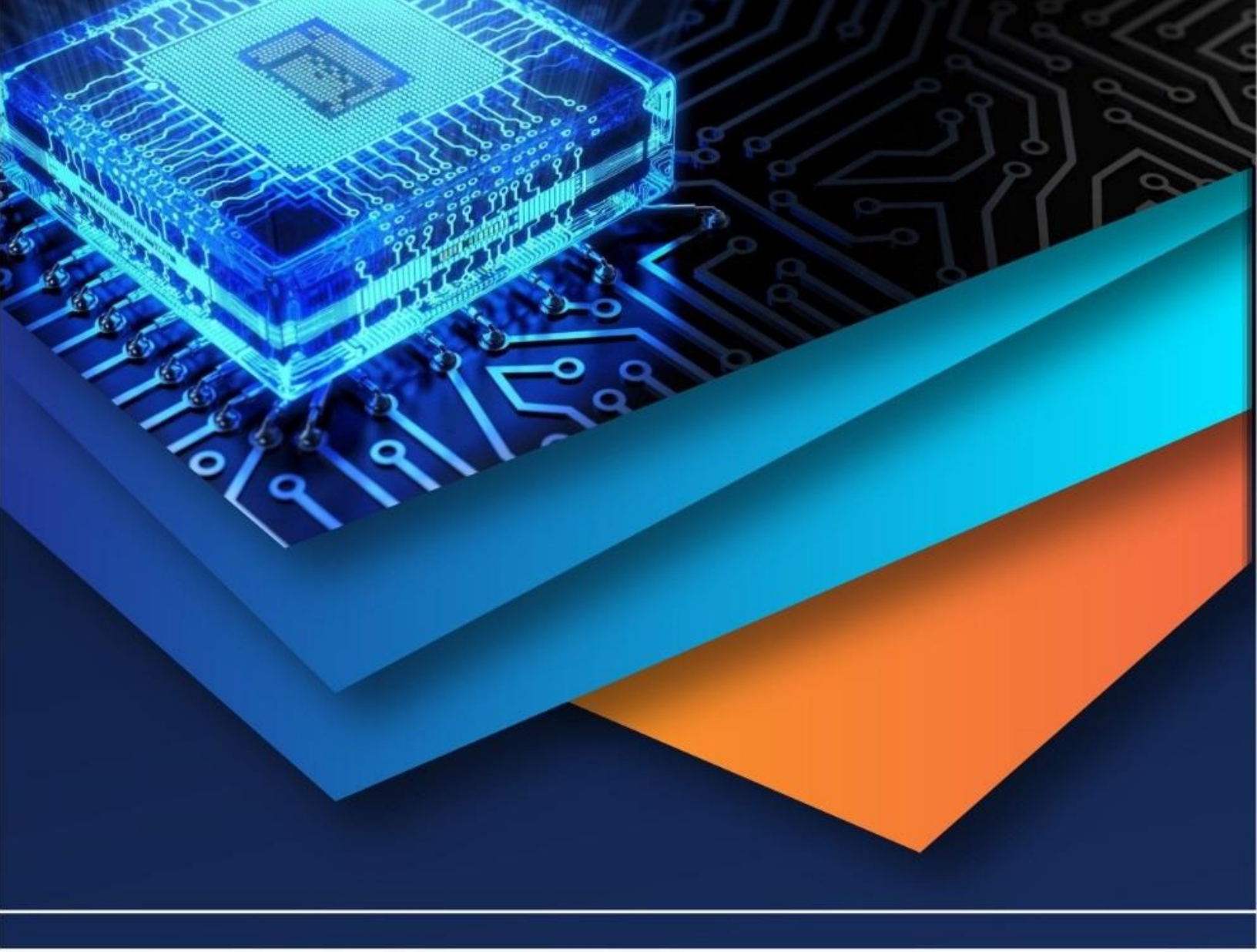

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