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eDali Deborok: Web-Based Barangay Transactions, Announcements, and Email Servicing System with Data Visualization

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Abstract: ***The project aimed to enhance accessibility, simplify workflows, and reduce reliance on physical transactions by allowing residents to access services, view announcements and send direct messages without requiring a login. This setup ensured that essential services were available to residents conveniently and without unnecessary barriers. Meanwhile, barangay administrative staff log in securely, manage all requests, respond to inquiries, and publish announcements, ensuring organized and accountable operations.***

The system fosters improved communication and transparency between the barangay and its constituents by leveraging technology to address inefficiencies in traditional workflows. Designed with both functionality and ease of use in mind, the system ensures that residents and staff can navigate its features effortlessly, regardless of their level of technical expertise. This modernization initiative underscores the value of digital transformation in local governance, providing a responsive framework tailored to the unique needs of Barangay Deborok. Ultimately, eDali Deborok aspired to bridge gaps in service delivery and community engagement by streamlining processes, enhancing transparency, and offering a practical solution to improve the overall efficiency of barangay operations.

Keywords: Barangay Clearance, Web-Based Application, Data Visualization, QR Code, email servicing

I. INTRODUCTION

Barangay Deborok, located in Pagadian City, Zamboanga del Sur, is a local administrative agency facilitating government activities and encouraging citizen participation in public affairs[1]. This project aims to leverage technology to enhance efficiency, transparency, and citizen engagement[2]. By automating administrative processes, offering digital services, and enabling real-time communication, the system seeks to modernize local governance and foster more accessible interactions between residents and the barangay[3]. The Philippine Department of Finance (DOF) has encouraged Local Government Units (LGUs) to embrace digitalization for procedures such as business registration and local tax collection [4]. The system addresses these challenges by modernizing workflows, offering digital services, and including Bisaya translations to improve accessibility for indigenous communities [5]. This initiative aims to enhance governance, stimulate economic development, and increase citizen satisfaction through a streamlined and inclusive approach to local government services.

The system's development follows established research methodologies and software engineering principles to ensure reliability, security, and usability.

Functional testing results indicate a 98% success rate, demonstrating that the core features perform effectively and meet operational requirements. Meanwhile, non-functional testing achieved an 83% success rate, reflecting strong system performance, usability, and security, though some areas may still benefit from further optimization.

This journal documents the development of eDali Deborok, outlining its alignment with the Software Requirements Specification (SRS), Software Design Description (SDD), and Software Test Documentation (STD). Through this initiative, the project aims to help modernize barangay services, fostering a more efficient and connected community.

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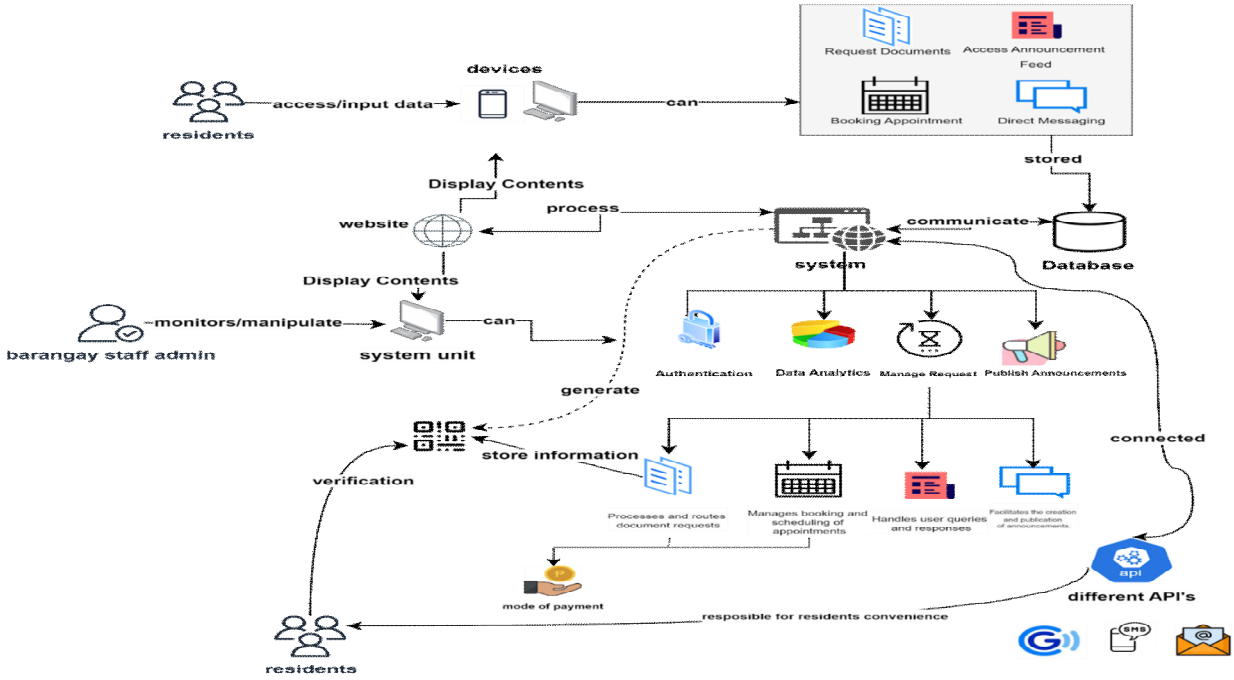


Figure. 1.

Product Perspective

The system will consist of two interfaces: User webpage which will be used to view and interact with the barangay offered services. Admin Dashboard, which accommodates a variety of user requests, barangay announcements, and barangay update posting.

The system user will interact with the system, which offers a wide range of essential services, namely, inquiry to the attending secretary, barangay announcements and status, and a Request Submission System in a fill-up form to accommodate specific requests. A web server then handles user requests and stores them in the online database ensuring a quick, secure, and seamless operation for reflecting it into the admin's dashboard. The system will require administrators to log in to ensure security and accountability. This ensures that only authorized personnel, such as barangay officials, can access and manage the application. The database will also store logs for data analysis and future collection for the barangay report needs. The barangay secretary is then tasked to view, approve, or deny requests based on the requirements in the Request Submission System. The system will contain a notification service to notify the user's request status. The final PDF document will be delivered through an email.

II. METHODOLOGY

A. Research Design

The development of the eDali Deborok system follows a structured approach to ensure efficiency, security, and usability. The system is designed with two primary interfaces: a user webpage that allows residents to access and interact with barangay services, and an admin dashboard that enables barangay officials to manage user requests, post announcements, and update barangay information.

Residents interact with the system through various essential services, including inquiries directed to the barangay secretary, access to announcements and barangay status updates, and a Request Submission System that allows users to submit specific requests via an online form. These requests are processed through a web server, which securely stores data in an online database. This ensures real-time reflection of transactions on the admin dashboard, facilitating a seamless and efficient workflow.

To maintain security and accountability, administrators must log in before accessing the system. Only authorized barangay personnel can manage requests and oversee system operations. The database also records logs for data analysis and future reporting needs. The barangay secretary is responsible for reviewing, approving, or denying requests based on predefined requirements. Once a request is processed, the system generates a notification to inform the user of the status. Finalized documents are then emailed to the requestor in PDF format, ensuring a smooth and transparent service process.

This methodology ensures that eDali Deborok is a structured, secure, and responsive system. It effectively addresses the inefficiencies of manual barangay operations while improving service accessibility and governance.

Process Model

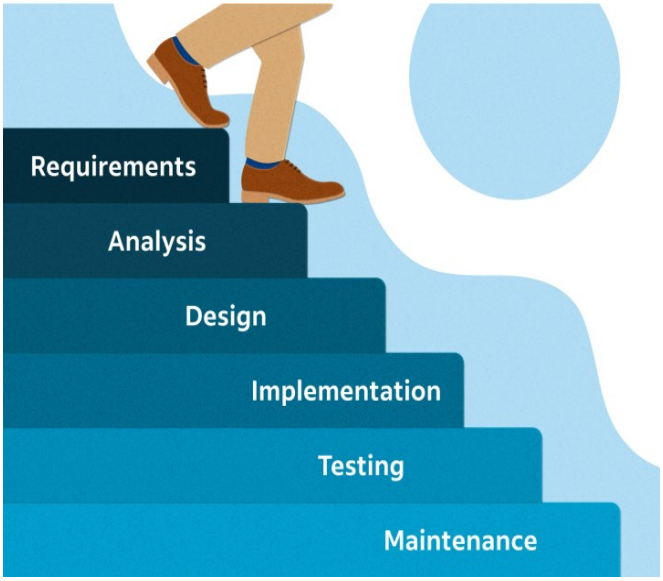


Figure 2

III. RESULTS

The development and implementation of the eDali Deborok system significantly enhanced operational efficiency and user experience within barangay services. The system streamlined interactions between residents and barangay officials by digitizing processes such as request submissions and announcements, resulting in faster response times and improved service delivery. Integrating a secure admin dashboard facilitated effective user requests and data management, fostering transparency and accountability. Additionally, the notification service ensured timely communication of request statuses to users, further enhancing engagement and satisfaction within the community. Overall, the system established a solid foundation for modernizing barangay operations and improving governance.

A. Review

The requirements-gathering phase was crucial in laying the foundation for the system, with consultations involving stakeholders such as barangay officials, community organizers, and technical staff to identify the shortcomings of traditional manual methods, including delays, inaccuracies, and inefficiencies. These discussions led to developing key system features like automated transaction management, real-time announcements, email notifications, and data visualization tools to address these challenges. Both functional and non-functional requirements were carefully documented to ensure alignment with the barangay's needs, with stakeholders emphasizing role-based dashboards, scalability for future integrations, and data security to protect sensitive information. This review phase ensured the system met operational and administrative requirements while enhancing community engagement and operational efficiency.

B. Planning

The planning phase was crucial in ensuring the successful development of *eDali Deborok: Web-Based Barangay Transactions, Announcements, and Email Servicing System with Data Visualization*. It gave the team a structured foundation to effectively define and organize the project's objectives, requirements, and resources. This phase established a clear and comprehensive roadmap for the project's execution.

The planning phase officially commenced on May 1, 2024, and concluded on May 14, 2024, spanning two weeks. During this period, the team conducted regular meetings to brainstorm ideas, align on project goals, and solidify their understanding of the system's

purpose and scope.

These discussions were instrumental in creating a detailed Work Breakdown Structure (WBS), breaking the project into manageable tasks and ensuring a systematic approach to its development.

A key output of this phase was the preparation of extensive project documentation, including the project summary, scope, objectives, and the identification of constraints that could potentially impact progress. Recognizing the importance of efficient resource allocation, the team developed a detailed schedule and budget plan, blueprinting project milestones and task assignments.

Each team member was assigned specific roles and responsibilities to streamline workflow and accountability. Plans for risk management, requirements control, and quality assurance were also formulated, providing mechanisms to address potential challenges and ensure the system met its intended purpose. The team incorporated regular reviews into their schedule, allowing for adjustments to accommodate evolving requirements or unforeseen issues.

This phase also involved selecting tools and techniques to be used during the development process, ensuring the team was equipped with the necessary resources to achieve their objectives. The team's collaborative efforts during this phase fostered a shared understanding of the project's vision and set clear expectations for each stage of development.

The planning phase set a solid foundation for the design, development, and testing phases by organizing tasks, allocating resources judiciously, and preparing for potential challenges. This structured approach ensured the project team was well-prepared to navigate the complexities of implementing the system while remaining focused on delivering a reliable and effective solution.

C. Design

The design phase played a crucial role in shaping the structure and functionality of *eDali Deborok: Web-Based Barangay Transactions, Announcements, and Email Servicing System with Data Visualization*. During this phase, the team transformed the project's requirements into a clear and organized system blueprint, focusing on developing key components such as the system's architecture, user interfaces, and core functionalities. By creating diagrams, prototypes, and security measures, the team ensured that the design was robust, scalable, and user-friendly, establishing a strong foundation for the subsequent development and testing stages.

1) Technical Specification

eDali Deborok: Web-Based Barangay Transactions, Announcements, and Email Servicing System with Data Visualization has several key components. First is a web-based portal where users can access the system's services. The necessary hardware includes devices such as PCs, laptops, or smartphones. Residents act as end-users by requesting documents and accessing announcements through the system. Barangay administrative staff manage requests, queries, and publishing announcements. Additionally, the system includes an email servicing feature to enhance communication and data visualization tools to support decision-making. These components serve as the fundamental building blocks of the system.

- HTML
- CSS
- Prisma
- Mongo DB
- JavaScript
- TypeScript
- Bootstrap

2) Use Case Diagram

The use case diagram outlined user interactions and system interactions, highlighting processes such as document requests, announcement management, direct messaging, and email notifications. It provided a clear overview of user roles and access to the system's key features, ensuring alignment with functional requirements and an efficient system design.

Use Case Diagram

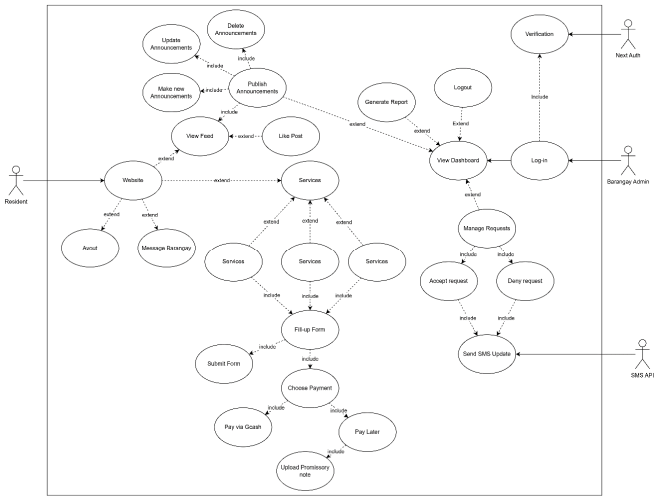


Figure 3

Figure 3 illustrates the use case diagram for the system, showcasing the interactions between various user roles, including residents and barangay administrative staff. The diagram highlights key system functionalities such as processing document requests, managing announcements, handling direct messaging, and sending email notifications. Specific features like reviewing and approving requests, publishing barangay updates, and responding to resident inquiries are shown to extend or include related actions, ensuring comprehensive functionality. The visual representation ensures clarity in how each role accesses and interacts with the system's features, aligning with operational objectives and enhancing user engagement.

3) Interface Design

Interface design plays a vital part in the system's development. It organizes visual components, such as buttons, input fields, and navigation menus, to optimize user interaction and improve the overall user experience. The main objective of interface design is to provide a smooth and user-friendly experience by ensuring the layout is clear and visually appealing. The design refers to a graphical user interface (GUI) that users interact with to perform tasks or access system features.

Dashboard Interface

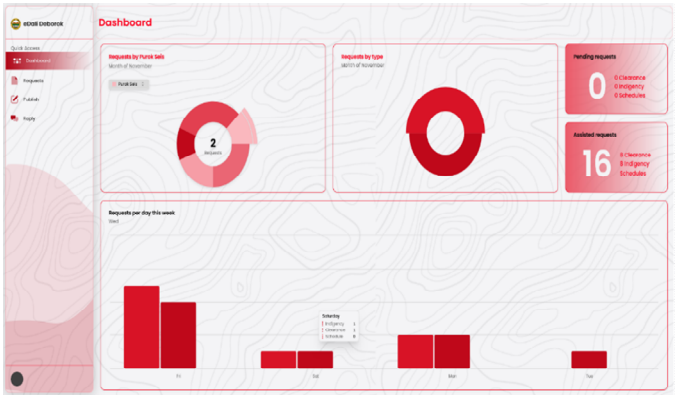


Figure 4

Figure 4 illustrates the Dashboard Interface, which is the first screen barangay administrators and staff will see upon logging in. It displays an overview of document requests, including requests by purok and request type, along with the number of pending and assisted requests. Additionally, the dashboard tracks the daily request trends for the current week, providing a clear and organized view of system activity to support efficient request management.

Request Interface

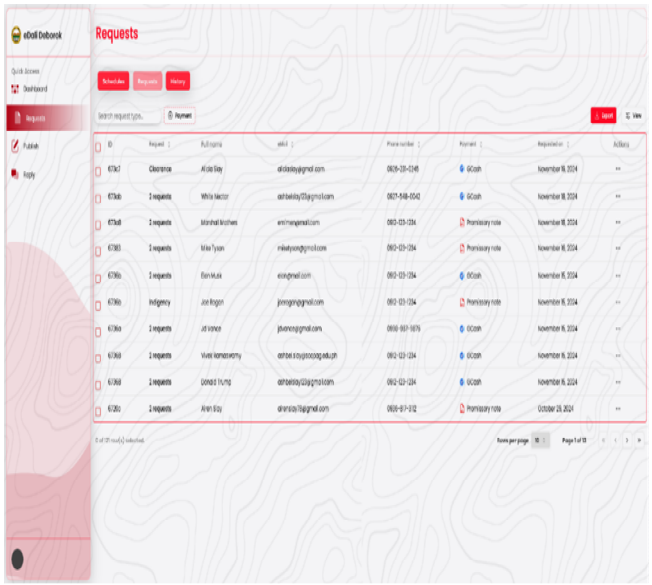


Figure 5

Figure 5 illustrates the Request Interface, where the barangay administrator and staff can manage document requests. This interface allows administrators to view all requests, approve or deny submissions, export request data, and delete requests when necessary. The structured layout ensures efficient request handling, providing a clear and organized view for streamlined processing.

Feed Interface



Figure 6

Figure 6 illustrates the system's Feed Interface. It is a digital gathering place that is always open and accessible, no matter where you are or what time it is. Important updates from the barangay or community events you should not miss are displayed here, ensuring you stay informed and up-to-date. The interface provides an easy way to access timely announcements and news, keeping everyone in the loop.

IV. DEVELOPMENT

The development process required careful coordination among team members, ensuring all stakeholders' requirements were addressed and the implemented features aligned with institutional goals. Adherence to best practices in software development and documentation was maintained throughout, with all prior work adequately cited to ensure credibility and compliance with academic and professional standards.

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V.CONCLUSION

The eDali Deborok system effectively modernizes barangay operations by streamlining transactions, improving accessibility, and enhancing communication between residents and officials. Functional testing achieved a 98% success rate, confirming the reliability of core features, while non-functional testing at 83% highlights strong performance with room for refinement. By integrating software engineering best practices, the system ensures efficiency, security, and scalability. This project not only addresses current administrative challenges but also establishes a foundation for future enhancements, such as mobile accessibility and expanded functionalities, to further improve governance and service delivery in Barangay Deborok.

VI. APPENDIX

Appendixes, if needed, appear before the acknowledgment.

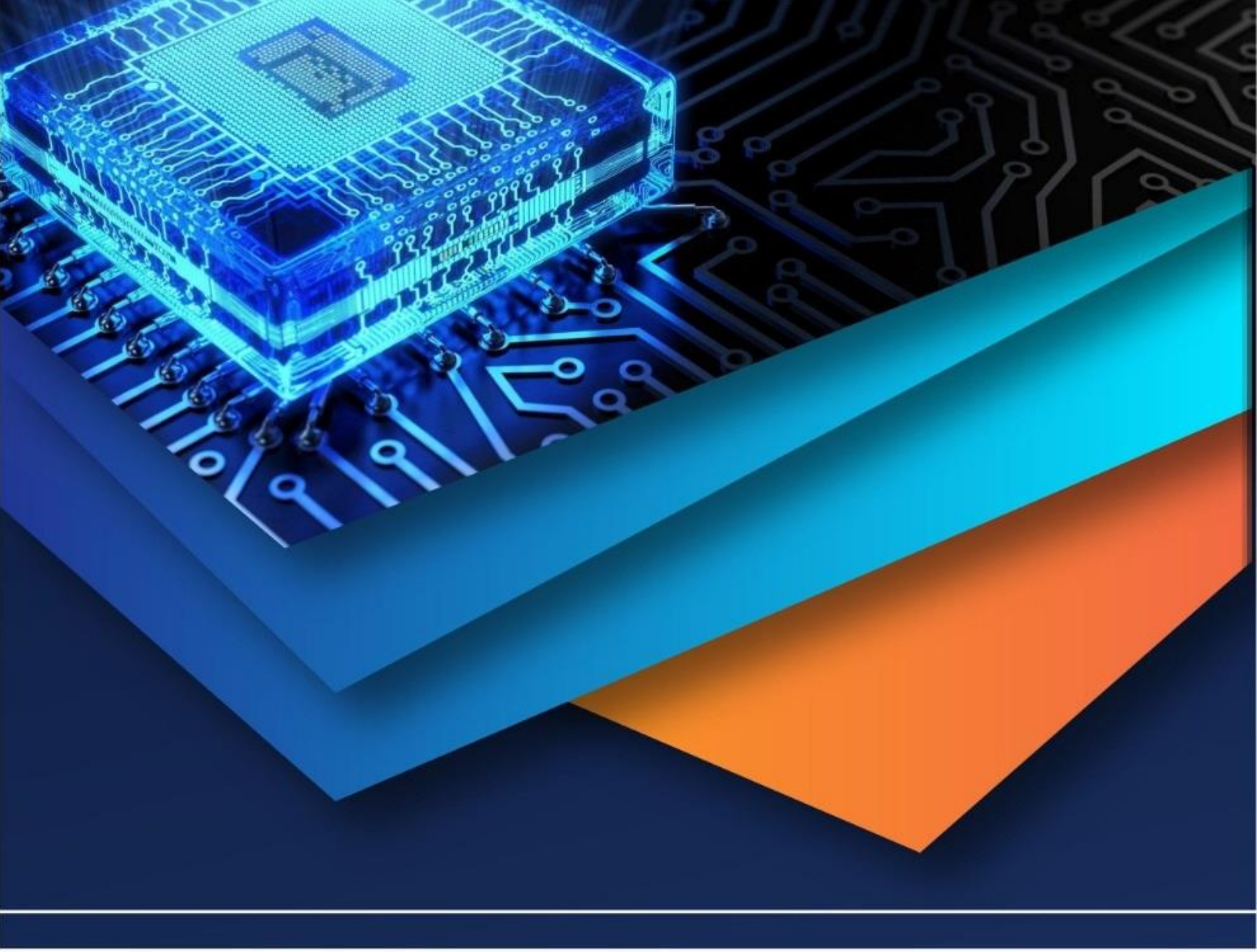
VII.ACKNOWLEDGEMENT

The preferred spelling of the word “acknowledgment” in American English is without an “e” after the “g.” Use the singular heading even if you have many acknowledgments. Avoid expressions such as “One of us (S.B.A.) would like to thank ... .” Instead, write “F. A. Author thanks ... .” Sponsor and financial support acknowledgments are placed in the unnumbered footnote on the first page.

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