iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** V **Month of publication:** May 2026

DOI: https://doi.org/10.22214/ijraset.2026.82008

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue V May 2026- Available at www.ijraset.com

Smart Gramintel Monitoring System

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Abstract- Public grievance handling plays a key role in governing society, affecting how satisfied citizens feel with the governing body and how effectively they can govern the country. Grievance management in most cases has little or no level of transparency; complaints are not resolved quickly; and there are no mechanisms in place for timely communication.
Consequently, the majority of complaints go unresolved resulting in decreased confidence by the citizenry in the governing authorities. To improve these issues, we are proposing the Smart Gramintel Monitoring System that will allow users to file and track complaint complaints digitally through a centralised system.
This monitoring system will include a multimedia component that supports the creation of a secure database where users may submit their complaints in real-time using text, photo, and/or audio inputs. Structurally, this system will allow administrators to record complaint data in a structured format making it easy to classify and assign priorities to resolve issues as well as update users as to the current status of their complaint.
The web-based application will ensure that both administrators and users will be able to rely on the integrity of the data that they manage, and both parties will only have access to the data required to perform their duties and responsibilities. Thus improving transparency; decreasing the response time to resolving complaints; and increasing the visibility of how intelligent digital solutions can be pervasive in modern governance and public service management.
Keywords- Keywords – Smart Governance System, Public Grievance Redressal, Complaint Management System, E-Governance Platform, Real-Time Complaint Tracking, Citizen Engagement, Multimedia Complaint Submission, Geo-Tagging, Role-Based Access Control, Notification System, Data Management, Transparency and Accountability, Administrative Efficiency.

I. INTRODUCTION

The Smart GramIntel monitoring system is a project focused on using technology to increase the efficiency of services provided by the government to its citizens and communication between them. E-Governance initiatives aim to increase accountability and transparency of governments, improve the effectiveness of government administrative operations, digitise and automate current paper-based administrative processes. e-Governance is especially important in rural areas where many areas lack basic infrastructure and communication methods, so it is critical that citizens can easily report issues and get prompt responses from their local government.

Currently, in rural areas, issues are typically reported by citizens through either written correspondence or verbal communications with local authorities. These reports are often mismanaged and create additional challenges for citizens, such as; delays or an inability to respond; lack of records of what has been reported or actioned; limited visibility of the status of the complaints; no way for the citizen to verify and confirm when an issue has been addressed; and no structured way to manage or monitor priority/urgency for the complaints. Evidence illustrates that citizens will often have to make multiple trips to local offices to ensure their issues are being addressed, and there is high potential for miscommunication or loss of information among staff at local offices. Further, without a structured approach to managing the complaints, cities cannot provide services efficiently.

The proposed Smart GramIntel Monitoring System will establish an electronic mechanism for citizens to report issues through various media, including text, phone calls; and email.The System is developed with current Web Technologies: using HTML, CSS & JavaScript for the user interface and Spring Boot for the backend for secure processing and efficient handling of data. The user interface will have a database to store user profile, their complaint will be recorded, and each step in processing their complaint will be tracked so that the processing of each complaint is reliable and scalable. The Smart Gramintel Monitoring System gives the citizens a reliable and transparent place to bring concerns of the government.

II. LITERATURE SURVEY AND RELATED WORK

With the rapid advancements in digital technology, many systems of governance have improved their efficiency and effectiveness through better communication between citizens and government entities. Examples like the e-Governance platforms provide citizens with a way to submit and track complaints and receive timely feedback from the appropriate authorities.

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By taking advantage of web-based technologies and smart systems, some of these platforms have transformed traditional complaint handling processes into structured and transparent digital mechanisms for the benefit of both parties involved in any type of dispute. These new applications have also been instrumental in decreasing the amount of elapsed time it takes to respond to citizen's grievances, increasing the accountability of government officials and providing citizens with more opportunity to participate in the governance process than ever before.

Narasiman and colleagues [1] created IndQuery, an online application that enables citizens to register complaints via an intelligent chatbot. Through this application, citizens can also track their complaints as well as communicate directly with the persons assigned to investigate and resolve their complaints. Thus, IndQuery exemplifies how user interaction via a conversational interface can be enhanced through improved ease-of-use compared to traditional methods for registering complaints. However, because IndQuery is primarily a chatbot-based application, it does not have sufficient Advanced Multimedia capabilities or Real-time Monitoring functions.

In addition to examining challenges associated with traditional systems of grievance redressal, Oreste and colleagues. [2] discussed challenges related to transitioning from traditional grievance redressal systems to e-Governance systems. They concluded that many of the challenges faced by traditional grievance redressal systems are also present in e-Governance systems; and they identified four major obstacles to efficiently transitioning from traditional grievance redressal systems to e-governance systems: lack of infrastructure; insufficient user awareness; and poor data management methods.

A customer complaint is defined by [3] as a formal complaint by a customer to a service provider expressing dissatisfaction with the products and/or services, and serves as an important part of improving the quality of services provided. Therefore, it is vital that a proper system is in place for recording, processing, and resolving customer complaints as part of a service provider’s governance model in order to enhance the overall service quality provided to customers.

An Android-based complaint management system was created by M. Fernandes et al. [4] to allow customers to capture and track complaints using mobile devices. Their system supports mobile devices and is accessible; however, they did not incorporate certain features into their system such as: real-time notifications, multimedia submissions, central location for administratorsto monitor all the complaints

An online complaint management system was created by S. Balakrishnan et al. [5] that allows customers to send images of their complaints to be recognized by an image recognition algorithm and processed automatically. This greatly increased the level of automation for understanding what the issues were with customer complaints; however, enhancements to the system are necessary to improve the scalability, level of interaction provided to customers, and integration between administrative workflows and the system.

As a result of the research studies referenced above, complaint management systems have progressed from basic manual and electronic complaint management systems to much more intelligent, sophisticated, and automated systems. Nevertheless, there are several existing complaint management systems that are missing many of the critical components to provide complete and effective solutions, including: multimedia complaint submission, real time tracking, centralized dashboards, and efficient communication methods between customers and administrators.The limitations noted above provide the basis for implementing a Smart Gramintel Monitoring System, which consists of an integrated e-governance system that includes text.

III. PROPOSED SYSTEM

The GramIntel Monitoring System is a website-based digital platform for monitoring and managing the village complaints in a transparent, organized manner and can be used by township residents to file complaints with text, images or voice messages and can automatically use GPS location for accurate reporting. Administrators may keep track of the status of complaints filed by township residents in the system and update it with a resolution proof image, announce news to the entire township or communicate directly with residents through a built-in chat window. The system will allow residents to have multilingual input (in Tamil and English), prevent filing duplicate complaints, receive real-time notification and include a secure, centralized database to store all complainant information. The system will also collect feedback, classify complaints as priority one through priority three types, record an automated administrative audit trail of all transactions to demonstrate transparency, accountability and effective decision making by administrators. Additionally, the GramIntel Monitoring System will provide analytics dashboards and report generation of complaints and also provide a scalable platform for the future deployment of additional features, such as automated notification to complainants or AI based complaint prioritization. Ultimately, theSmart GramIntel Monitoring System will greatly enhance the overall efficiency, responsiveness and satisfaction of residents in addressing complaint against rural government services.

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IV. SYSTEM ARCHITECTURE

The overall architecture consists of three main components: a user-friendly front-end interface for users to create accounts, submit complaints and receive notifications of changes to the status of their complaints; a back-end application that was developed using Spring Boot technology to perform all necessary business logic and processing related to the submitted complaints; and a data layer that is responsible for the secure and efficient persistence of the complaints that have been submitted. Lastly, an integrated real-time notifications mechanism will be provided to keep users informed about the status of their complaints in real time. This architecture has been designed with a primary focus on providing reliable, scalable, and transparent operational support to promote effective governance and enhance the delivery of public services.

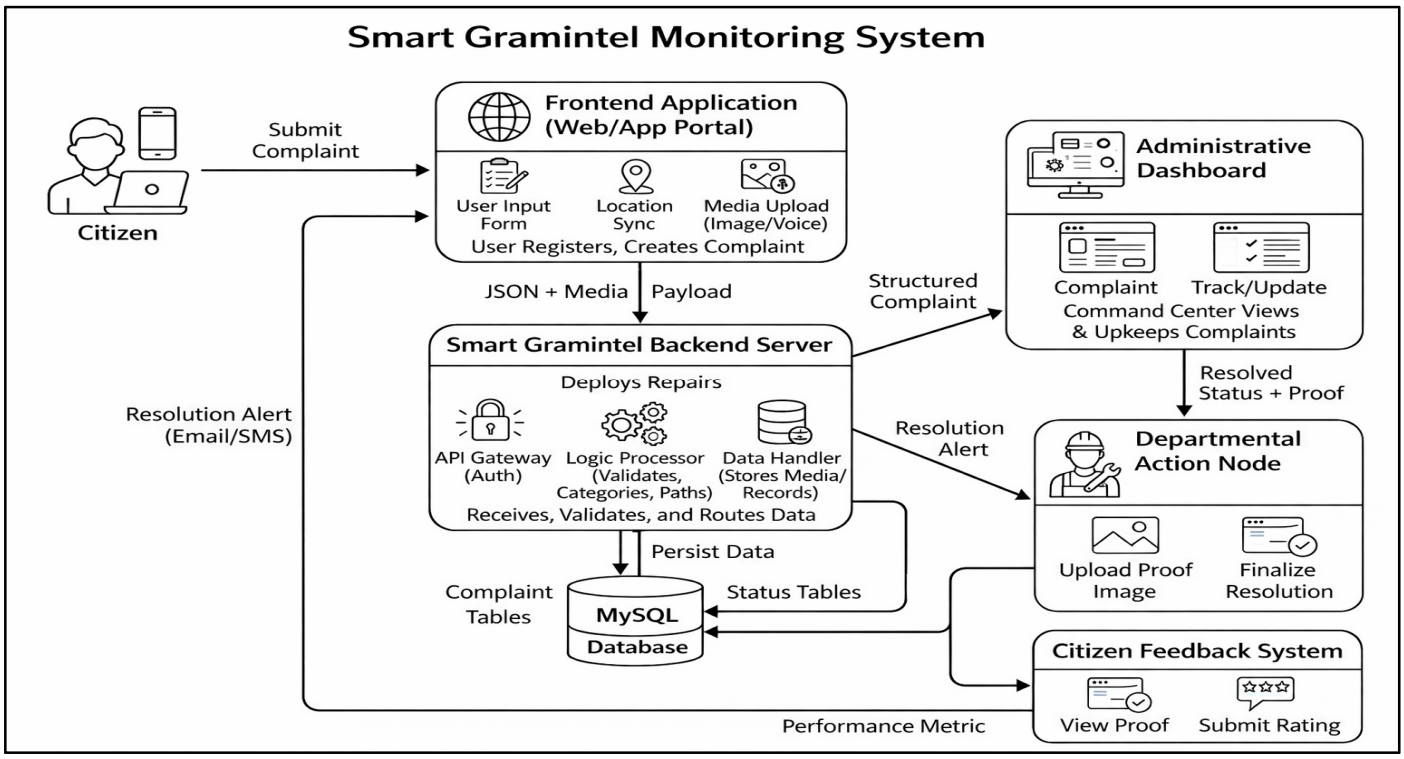


Fig1:SystemArchitecture

V. IMPLEMENTATION

Smart GramIntel's Monitoring System is an online-based grievance management application which will connect the villagers to the local Panchayat authorities through a common interface for improved communication. All elements of the grievance lifecycle are managed by using one common system; therefore, all of those components can be managed using one application. The Monitoring System consists of several individual modules that perform specific functions, enabling a single, efficient method of managing grievances; as well as the simplicity and ease-of-use required by both villagers and administrators during the entire grievance management process.

A. Register Complaint Module

The Register Complaint Module allows users of the system to create and submit complaints. For instance, inputting the details of a complaint (such as road damage, water shortages or power outages), including dispatch of multimedia evidence reports (photo(s), voice recordings and a map/gps location), etc.The module also provides for secure user authentication and verification of completeness of the complaint information provided and organizes the data in a structured format in the database.The module enables the accurate recording of complaints and makes the complaint information available for processing later.system.

B. Analuze ComplaintsModule

The Analyze Complaints Module provides a mechanism for systematically reviewing each and every complaint received from users; then classifying them into predetermined categories such as by complaint type,by urgency, and by location.

This allows administrators to quickly identify business critical incidents and give higher priority to complaints of great importance asopposed to routine complaints, thereby ensuring all critical issues are reviewed first. The use of automated classification reducesthe need to manually sort through received complaints, increases the speed of handling received complaints, and gives the administratorassurance that all critical complaints are being addressed in a timely manner.

C. Progress Tracking Module

The Progress Tracking Module provides both users and administrators with real-time information about the current status of all complaints. Administrators are able to change a complaint's status to “Pending,” “In Progress,” or “Completed” and can add evidence to show that the complaint has been resolved (pictures, reports) prior to the resolution of the event. Users will receive a notification whenever the status of their complaint changes, which will keep them informed about the status of their complaint throughout the entire process of resolving the complaint. Block 3 of the Progress Module improves the amount of transparency and accountability in relation to complaints that have been made and reduces the amount of manual follow-up required by administrators regarding the status of any complaints. It also improves the speed at which the authorities communicate with residents in relation to a complaint.

D. Manage UsersModule

The User Management module, users can be created as needed, with their role assigned (Villager or Panchayat Officer), edited and deactivated, all in one place. There is also activity and permission tracking of all activity performed by the Users to make it clear that Administrators are the only people who can access Sensitive Administration Functions as defined by User management. This centralized User Management also provides enhanced security by eliminating unauthorized access and allows better tracking of all Stakeholder interactions with the System. The User Management module is essential for ensuring data integrity, and the proper working of the Platform.

VI. RESULTS AND DISCUSSION

The Smart Gramintel Monitoring System is an innovative step toward creating transparency, accountability, and efficiency regarding how complaints are managed in communities. This system will help bring together the communication lines between citizens and their local governments and provide a reliable digital channel for organized, structured, and timely processing of public issues.In addition, this project shows the usefulness of the latest web-based technologies and intelligent processing methodologies within the context of governance and public service systems. Active involvement by citizens promotes a more responsive administrative climate. By increasing the effectiveness of reporting and resolution of issues, this system can help make a positive impact on society's well-being by improving the management of the infrastructure, increasing public satisfaction, and helping to develop a more intelligent, connected global society.

Analysisof Results

The system also enabled users to track their complaints in real-time, resulting in better transparency to improve user satisfaction. The administrator module improved the efficiency in categorizing, prioritizing and processing complaints so that they could beresolved as quickly as possible, and allocated resources in a more effective manner.

The addition of a notification service allowed users to receive updates on the status of their complaints, which enhanced communication between the citizen and the administrator, and reduced uncertainty.

The capability of accepting multimedia input into the complaint file enabled a richer understanding of the problems and created a higher level of accuracy and effectiveness with the solution. A centralized database provided a safe and accessible repository for complaint data, thereby increasing the dependability of the system overall.

A. SystemPerformanceComparison

A comparison was made between two different systems (traditional method and proposed system) in their approach to handling customer complaints. This comparison was based on performance indicators of efficiency, transparency, and usability.

1) *Usability:*The proposed system has a user-friendly design and supports both Tamil and English languages; thus, it is more easily accessible by many customers, especially those with limited computer skills.
2) *Efficiency:* With the proposed system, there was a significant reduction in length of time it took to register and process complaints due to increased automation of workflows and significantly less manual processes being involved.
3) *Transparency:*The proposed system uses an online platform so that customers can monitor the status of their complaints daily, therefore holding agencies accountable.

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Based on the displayed graphs, it is evident that the proposed system performs much better than the traditional method for each area listed above and that it has the potential to provide a viable and effective complaint management system.

B. Overall Outcome

The results of Smart Gramintel Monitoring System provides examples of effective governmental engagement resulting in an increased ability to respond quickly and improved levels of transparency within governing bodies; thus providing accurate, dependable performance while processing data efficiently and providing interactive means for citizens to communicate with eachother.

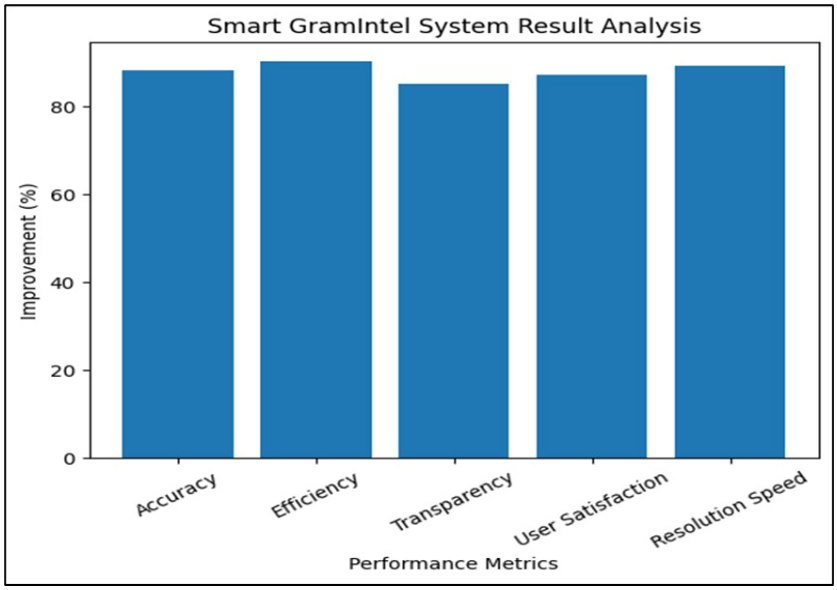


Fig2:SystemPerformanceComparison(CodeSummarization,Debugging,Skillswap)

VII. CONCLUSION

Smart Gramintel Monitoring System is a viable and consumer-friendly way to handle and address citizen's complaints in an organized format using a user-friendly interface, secure authentication, and a systematic method of processing complaints; as such, this system helps ensure proper monitoring and timely feedback for the resolution of issues being resolved by various governmental organizations. Features such as media support, real-time notifications, and role-based access to provide additional functionality to the system and increases reliability.Using current web technologies, this system provides smooth functionality, security of data, and consistent performance of software, thus enhancing the user's experience regardless of whether they are citizens or administrative officials. This system increases governmental transparency and accountability by continually updating the status of each complaint and allowing users to check the status of their complaints as they are processed. The modular design of this system also allows for future expansion (e.g., integration with a mobile application) and the potential for more sophisticated analytical capabilities. Accordingly, the Smart Gramintel Monitoring System demonstrates well how digital tools can improve governance, enhance the relationship between citizens and government, and help create more responsive and effective communities.

VIII. FUTURE WORK

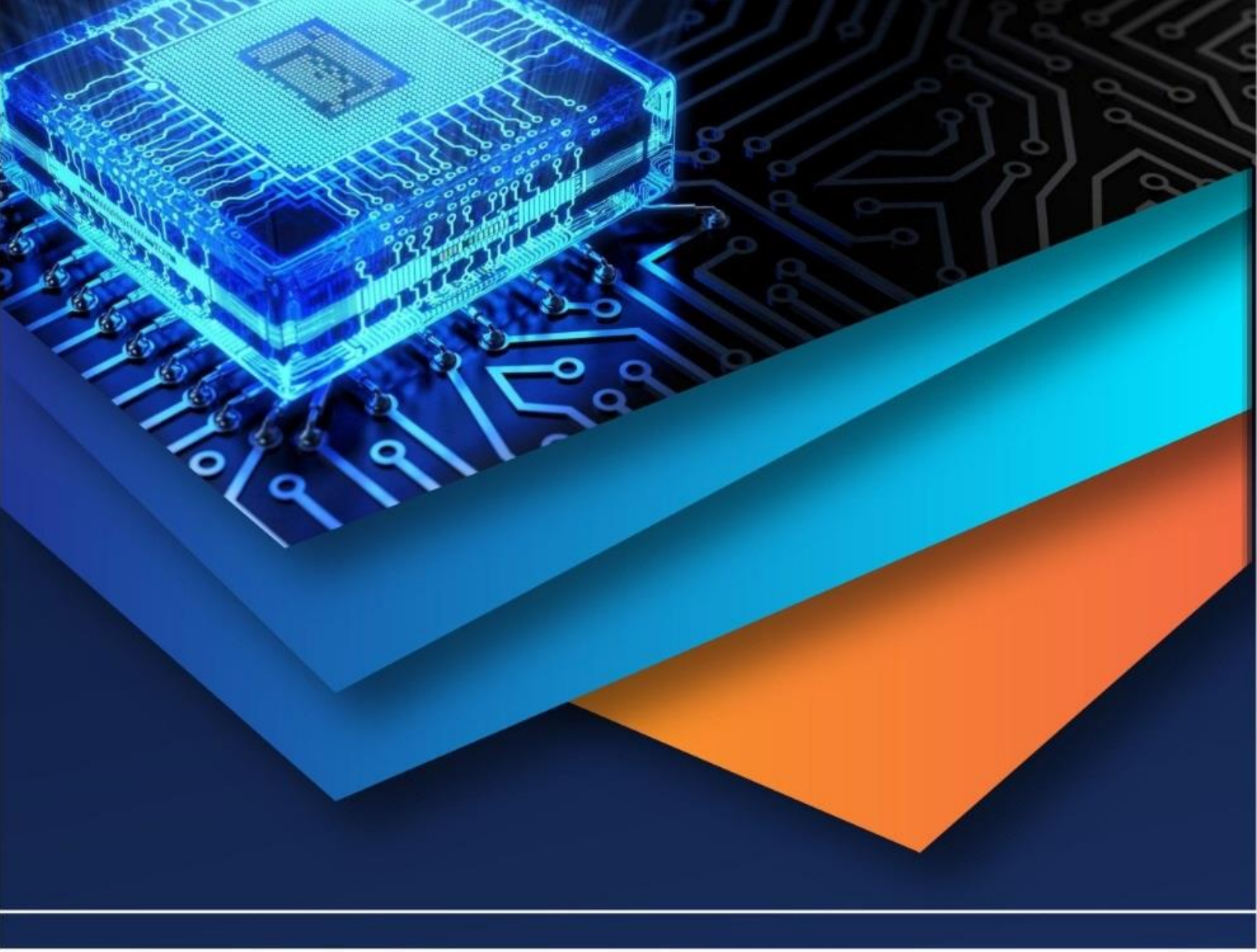
A Dedicated Mobile Application would increase access to the Smart GramIntel Platform by allowing citizens to actively report incidents (e.g., voice shards and image evidence) while they are on the go, and would have enhanced background sync. Integration of AI-based Image Recognition could further improve the accuracy of the audits by automatically determining theseverity of issues such as road potholes or water leaks based on the evidence submitted.

The above enhancements to the Smart GramIntel System will allow the systems to become more intelligent, user-friendly and versatile, providing citizens with a seamless way to monitor their entire ward and all types of infrastructure.

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