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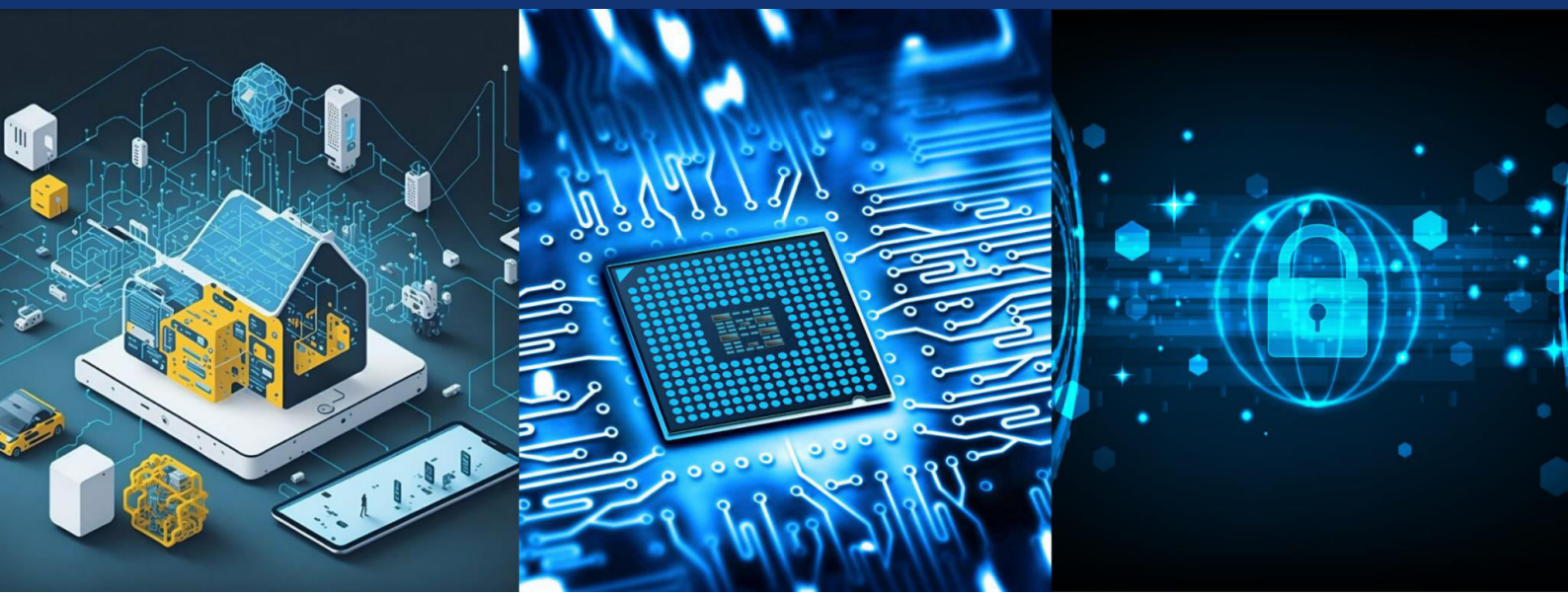

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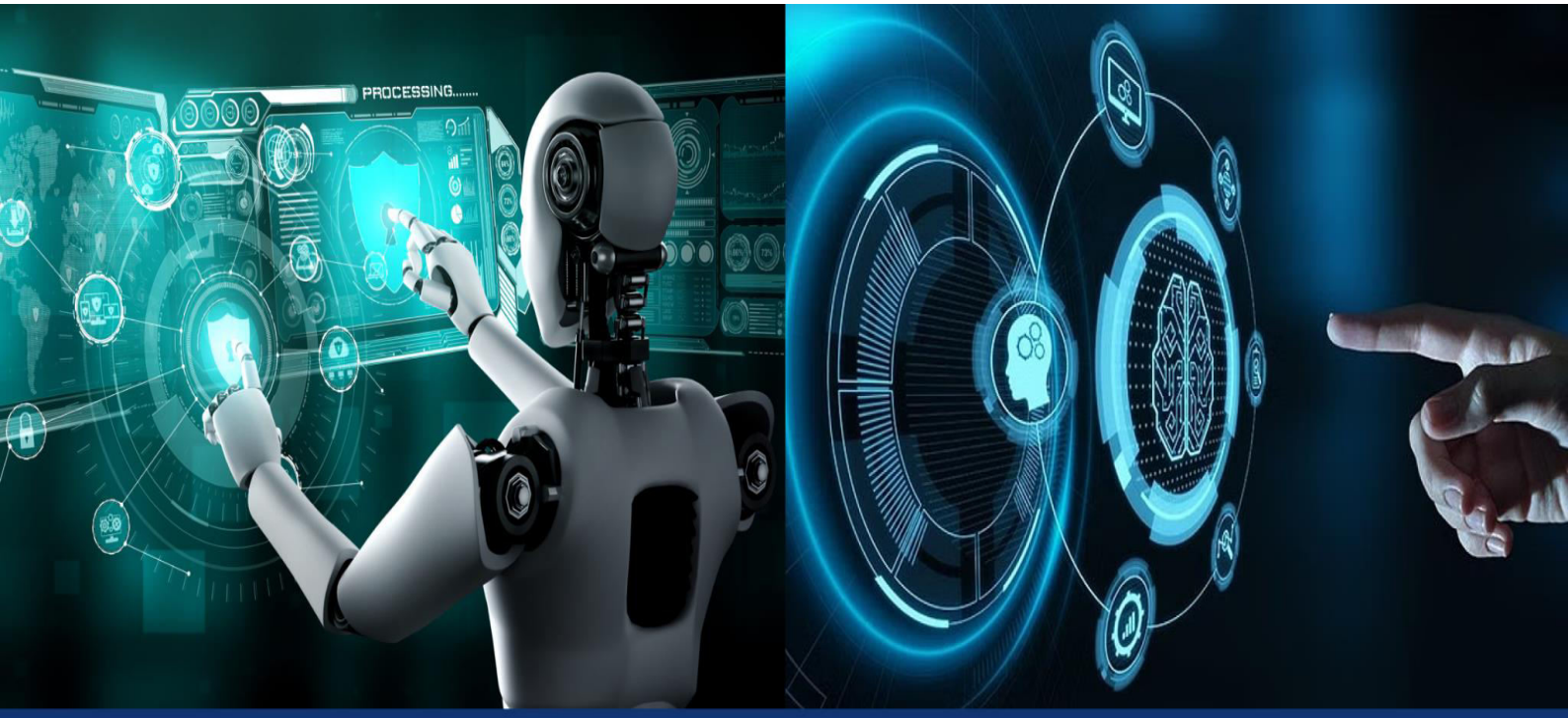

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Smart Petition Management System using Gen-AI

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ABSTRACT: GrievanceAI is an advanced AI-driven petition management and resolution system designed to revolutionize public grievance handling by addressing challenges such as delays, inefficiencies, and lack of transparency. Leveraging Artificial Intelligence and Natural Language Processing (NLP), the system automates grievance categorization and prioritization based on urgency and recurring issues, enabling faster and more effective resolution. It features a Flutter-based mobile application that empowers citizens to seamlessly submit, track, and receive updates on their grievances in real time, while a dedicated dashboard for officials ensures streamlined management, real-time monitoring, and actionable analytics. Additionally, the integration of generative AI facilitates predefined responses for common grievances, further expediting the resolution process. Designed for scalability and adaptability, Grievance AI can be implemented across various government departments to foster accountability, enhance transparency, and rebuild public trust through an innovative, citizen-centric approach to governance.

KEYWORDS: Gen AI, Flutter, Natural language processing, python, Groq API, Firebase.

I. INTRODUCTION

GrievanceAI is a transformative initiative aimed at revolutionizing the public grievance management system through the power of Artificial Intelligence (AI) and Natural Language Processing (NLP). Addressing persistent challenges such as delays, inefficiencies, and lack of transparency in grievance resolution, this system enhances responsiveness and accountability in governance. By automating grievance categorization and prioritization based on urgency and recurring issues, GrievanceAI ensures faster and more effective resolution while minimizing bureaucratic bottlenecks The platform features a Flutter-based mobile application, allowing citizens to seamlessly submit, track, and receive real-time updates on their grievances. A dedicated official dashboard further enables authorities to efficiently manage, monitor, and analyze grievance patterns, providing actionable insights for better decision-making. Additionally, integrated generative AI facilitates predefined responses for frequently reported grievances, expediting resolution times and improving user experience. Designed for scalability and adaptability, Grievance AI can be implemented across multiple government departments, fostering a more transparent and citizen-centric approach to governance. By modernizing grievance handling processes, the system aims to restore public trust, enhance civic engagement, and ensure fair and timely resolution of complaints. This initiative not only empowers citizens but also supports governmental bodies in creating a more efficient, accountable, and technology-driven grievance redressal system that aligns with contemporary digital governance standards.so Effective grievance management is fundamental to good

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governance, ensuring that citizens' complaints are addressed efficiently and transparently. However, traditional grievance redressal systems often face significant challenges, including delayed response times, inefficient tracking mechanisms, lack of prioritization, and minimal citizen engagement. As a result, many complaints remain unresolved, leading to frustration and a decline in public trust in government institutions. The absence of a real-time tracking mechanism and manual sorting of grievances further exacerbates the inefficiency of existing systems.

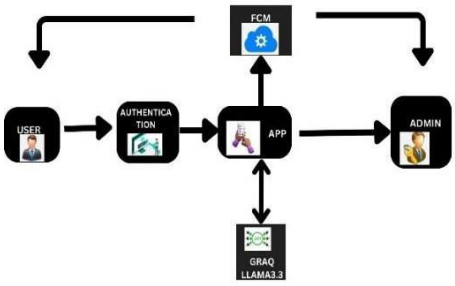

FIGURE 1. INTRODUCTION OF PETTION CATEGORIZATION

To address these challenges, GrievanceAI is introduced as an AI-powered, citizen-centric grievance management system that automates the entire lifecycle of grievance handling from submission and categorization to resolution and feedback collection. By leveraging Artificial Intelligence (AI) and Natural Language Processing (NLP), the system can intelligently classify complaints, prioritize urgent cases, and generate automated responses for frequently occurring issues, significantly improving response times and resolution rates. A key feature of GrievanceAI is its Flutter-based mobile application, which enables citizens to submit grievances with supporting text, images, and location data. Users can also track the status of their complaints in real time, fostering greater transparency and trust in the system. Additionally, the web-based dashboard for government officials provides tools for efficient grievance categorization, real-time monitoring, and actionable analytics, allowing authorities to proactively address recurring issues.

To further enhance the efficiency of grievance resolution, Generative AI is integrated into the system to provide predefined AI-generated responses for commonly reported grievances. This reduces the burden on officials by automating responses to routine complaints, allowing them to focus on more complex and urgent cases. Moreover, predictive analytics help identify patterns in grievances, enabling data-driven decision-making and proactive policy improvements.

II. LITERATURE SURVEY

Effective grievance redressal is a crucial aspect of governance, ensuring that public concerns are addressed efficiently. Traditional grievance-handling mechanisms often suffer from delayed responses, manual processing inefficiencies, lack of prioritization, and inadequate citizen engagement. These challenges necessitate AI-driven automation, leveraging Natural Language Processing (NLP), Machine Learning (ML), and mobile-based platforms to improve grievance resolution. This section reviews existing studies and technologies related to AI-based grievance management, analyzing their impact and limitations. Many public grievance systems still rely on manual complaint registration and processing, leading to delays and inefficiencies. According to Sharma et al. (2021), traditional complaint management systems lack automated categorization, making it difficult for government agencies to prioritize and respond effectively. Furthermore, Patel & Desai (2022) highlight that most government grievance portals do not provide real-time tracking, causing frustration among citizens due to a lack of transparency.

Some governments have implemented e-governance solutions such as online portals, but Mittal et al. (2023) argue that these systems still require human intervention to classify and resolve complaints. AI and NLP have emerged as powerful tools in automating grievance classification, prioritization, and resolution. According to Singh & Kumar (2023), NLP-based systems can automatically classify grievances by analyzing textual data, helping authorities to address urgent issues faster. AI models, particularly deep learning and machine learning algorithms, improve sentiment analysis of complaints, determining the severity and urgency of grievances. Furthermore, Chen et al. (2022)

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demonstrate that AI-driven chatbots enhance public service efficiency by providing predefined responses for common grievances, reducing the workload on human officials. In a case study on smart governance, Ramesh et al. (2023) highlight that integrating NLP into complaint management results in 40% faster resolution times and higher citizen satisfaction. However, most AI-powered grievance systems still face challenges in contextual understanding. According to Wang & Li (2023), many existing AI models struggle with complex, ambiguous, or multi-issue complaints, requiring hybrid AI-human approaches for better efficiency. Generative AI, particularly GPT-based models, has gained prominence in automating grievance responses. Studies by Brown et al. (2024) indicate that Generative AI can provide dynamic, context-aware responses, eliminating the need for human intervention in handling routine grievances. This reduces response times and allows government officials to focus on high-priority issues. Additionally, Gupta & Mehta (2023) explore multi-language AI-driven grievance platforms, which enable non-English- speaking users to interact with chatbots, making grievance submission more inclusive and accessible. Their findings suggest that AI-driven translation mechanisms improve the reach of grievance platforms in multilingual nations.

Mobile applications have revolutionized grievance handling by making complaint submission more accessible to citizens. Khan et al. (2022) argue that mobile-based grievance systems ensure real-time tracking, enhancing transparency and user engagement. They emphasize that integrating AI-powered chatbots into mobile apps provides immediate assistance, improving user satisfaction However, Das & Roy (2023) note that while mobile applications are effective, data security and user privacy concerns remain critical challenges. To address these concerns, modern grievance platforms incorporate encryption techniques and secure cloud storage for sensitive user data. Predictive analytics is another AI-driven advancement improving grievance handling. According to Fernandez & Lopez (2023), AI-powered predictive models can identify trends in public grievances, allowing government authorities to take proactive measures. This approach not only reduces recurring complaints but also enhances policy-making strategies. For instance, Rao & Bhat (2024) studied AI-driven predictive analytics in urban governance, where real-time analysis of complaints related to public transport issues helped authorities implement preventive solutions before major problems arose. Their study revealed that predictive analytics led to a 25% decrease in repeat complaints over six months.When developers and users are aware of the possibility of unexpected results, they can implement the necessary safety measures. Such trials are crucial to reducing the possible adverse social effects of AI use, accountability, and transparency. We will also talk about ethical and social issues in an effort to identify long-term AI solutions.

For instance, Rao & Bhat (2024) studied AI-driven predictive analytics in urban governance, where real-time analysis of complaints related to public transport issues helped authorities implement preventive solutions before major problems arose. Their study revealed that predictive analytics led to a 25% decrease in repeat complaints over six months. Despite the benefits of AI in grievance redressal, certain challenges remain. Contextual understanding limitations exist as AI models often misinterpret complex or ambiguous grievances (Wang & Li, 2023). Lack of personalized responses is another issue, as predefined AI-generated responses expedite resolution but some complaints require personalized handling (Chen et al., 2022). Data privacy and security risks are also a concern, as the use of AI in public governance raises concerns about data privacy and security, especially in handling sensitive citizen information (Das & Roy, 2023).

AI-powered grievance classification and prioritization ensures urgent complaint prioritization using deep learning-based sentiment analysis. Generative AI for personalized automated responses addresses limitations of static AI responses by contextually generating replies based on previous grievances. Multilingual AI integration ensures language inclusivity, allowing citizens to register grievances in multiple regional languages. Mobile-based real-time grievance tracking provides live complaint tracking, reducing citizen frustration and increasing transparency. Enhanced data security measures implement secure cloud encryption and blockchain-based logging, ensuring data integrity and privacy. By bridging these gaps, GrievanceAI offers an innovative, scalable, and efficient grievance management solution, significantly improving citizen engagement and government responsiveness. Mobile applications also enable multi-channel grievance submission by allowing users to register complaints through text, images, and voice inputs. Rao & Bhat (2024) studied the implementation of voice-based AI assistants in mobile apps, which enabled illiterate or digitally challenged users to submit grievances using voice commands. This approach significantly expanded accessibility to underserved populations.

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By incorporating AI, NLP, generative AI, predictive analytics, and blockchain, GrievanceAI offers a holistic, scalable, and citizen-centric grievance management system that enhances governance efficiency and public trust. The ability to submit grievances through various channels ensures that users can easily report their issues in the most accessible way for them. This multi-channel approach is key to reaching a diverse user base with varying levels of literacy and access to technology. Predictive analytics enables GrievanceAI to anticipate issues before they escalate, thus improving overall governance efficiency. By analyzing historical grievance data and identifying trends, GrievanceAI can predict where and when specific complaints are likely to arise. Providing multiple channels for submitting grievances (especially voice input for underserved populations) empowers citizens to take part in the democratic process, knowing that their concerns will be addressed.

By incorporating voice-based AI assistants, Generative AI, predictive analytics, and blockchain, GrievanceAI becomes a holistic, scalable, and citizen-centric grievance management system. It ensures that grievance submission is accessible to a wide range of users, including illiterate and digitally challenged individuals, while also improving efficiency, transparency, and trust in the grievance resolution process. This integrated approach makes GrievanceAI not just a technological solution but a powerful tool for enhancing governance and fostering stronger citizen engagement.

III. PROPOSED METHODOLOGY

GrievanceAI has emerged as a transformative solution in public grievance management by integrating advanced technologies such as Artificial Intelligence (AI), Natural Language Processing (NLP), Generative AI, and mobile applications. These innovations work in tandem to optimize the grievance-handling framework, covering every stage from submission to resolution. By automating multiple processes, the system significantly reduces delays, enhances operational efficiency, and ensures a more streamlined approach to resolving public concerns.

One of the standout features of GrievanceAI is its capability to manage vast amounts of data efficiently. Traditional grievance-handling systems often struggle with backlogs and inefficiencies due to manual intervention. However, with AI-driven automation, grievances can be swiftly processed, categorized, and assigned to the appropriate departments, reducing bureaucratic bottlenecks. This leads to a substantial improvement in response times, ultimately increasing citizen satisfaction and trust in public administration.

A key innovation within the system is the integration of Generative AI, specifically leveraging the LLaMA 3.3 model. This sophisticated AI component enables the automatic generation of responses for frequently reported grievances, minimizing the need for manual input by government officials. By ensuring prompt and contextually relevant replies, this feature helps maintain clear and consistent communication between the administration and the public. Additionally, it allows officials to focus on more complex issues that require human judgment and intervention.

The proposed system, GrievanceAI, integrates Artificial Intelligence (AI) and Natural Language Processing (NLP) to create an efficient, transparent, and citizen-centric grievance management platform, redefining how public grievances are handled. GrievanceAI dynamically categorizes and prioritizes grievances based on urgency and frequency, streamlining the process and ensuring timely resolutions. By automating categorization and response generation, the system significantly reduces delays and inefficiencies, transforming how citizens engage with public authorities.

The mobile application, built using Flutter, ensures a seamless and user-friendly experience, enabling citizens to easily submit, track, and receive real-time updates on their grievances. This empowerment fosters a deeper connection between the public and governance, providing an avenue for citizens to directly influence change. Additionally, the system's backend, supported by AI algorithms, enables real-time monitoring by officials, offering actionable insights and detailed analytics on grievance trends. These insights allow authorities to recognize recurring issues, make informed policy adjustments, and enhance public service mechanisms.

By combining automation, accessibility, and data-driven decision-making, GrievanceAI revolutionizes the way public grievances are managed. The integration of cutting-edge technologies ensures efficiency, accountability, and responsiveness in addressing citizen concerns. As the system evolves, continuous advancements in AI and NLP will further refine its capabilities, making grievance redressal faster, more transparent, and increasingly impactful in improving public administration.

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Furthermore, the system incorporates predictive analytics, leveraging machine learning algorithms to anticipate potential issues before they escalate. By analyzing historical grievance data, the system can identify patterns and provide proactive solutions, preventing recurring problems and reducing administrative burdens. This foresight not only enhances the system's effectiveness but also allows government agencies to allocate resources efficiently, prioritizing areas that require immediate attention.

IV. TECHNOLOGIES USED

1. FLUTTER:

Flutter is a powerful and versatile UI framework used to build the mobile application for the GrievanceAI system. It enables the cre ation of a responsive and user-friendly interface for submitting grievances, tracking their status, and receiving real-time updates. Flutter ensures smooth interactions with the backend API, facilitating real-time data synchronization and seamless communication between users and the system. Flutter supports integration with machine learning-driven insights, enabling the display of AI-generated recommendations, priority rankings, and statistical trends related to grievances. This feature empowers users with actionable insights, allowing them to make informed decisions when engaging with the platform. The framework's robust state management techniques ensure smooth navigation and high responsiveness, even when handling complex workflows and large datasets.

2. MYSQL:

MySQL enables seamless integration with AI-driven analytics, allowing authorities to gain insights from historical data. By analyzing recurring grievances, response patterns, and resolution times, policymakers can make data-driven decisions to enhance public service delivery. The system's ability to scale efficiently ensures that as grievance records grow, performance remains stable and responsive.

The combination of structured data management, optimized querying, and seamless integration with AI analytics makes MySQL an essential component in ensuring the smooth functioning of the GrievanceAI platform.

3. FIREBASE CLOUD MESSAGING:

Firebase Cloud Messaging (FCM) is a cloud-based messaging service that enables reliable and efficient delivery of notifications and messages to mobile devices. In GrievanceAI, FCM is instrumental in sending real-time updates and alerts to both citizens and government officials regarding grievance status changes, new responses, and resolution timelines.

4. GROG API:

Grog API acts as a bridge to large language models (LLMs) and other AI-powered services. This allows GrievanceAI to leverage advanced AI capabilities, like natural language processing (NLP), sentiment analysis, text classification, and entity recognition, among others. These capabilities are crucial for efficiently understanding, categorizing, and responding to citizen complaints. By leveraging advanced NLP models, Grog API enhances GrievanceAI's ability to understand context, tone, and underlying issues in complaints, making the process of triaging and categorizing complaints far more efficient and accurate than traditional keyword-based systems.

5. GENERATIVE AI (LLAMA 3.3 MODEL):

The LLaMA 3.3 model is a cutting-edge large language model developed by Meta, designed to understand and generate human-like text. This model excels in a variety of tasks such as natural language understanding, text generation, summarization, translation, and question answering. In the context of GrievanceAI, LLaMA 3.3 is leveraged to handle several critical tasks within the grievance management process. LLaMA's ability to generate human-like text helps GrievanceAI engage in natural language interactions with citizens. This interaction can occur through various channels, such as emails, chatbots, or voice assistants. Citizens feel more connected to the system, as the AI-generated responses appear conversational and empathetic.

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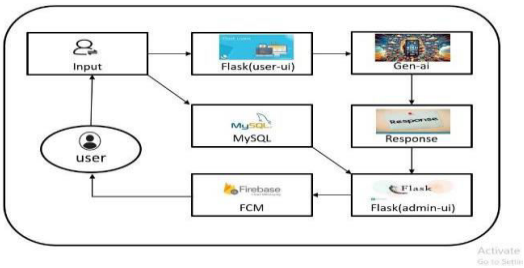

FIGURE 2. TECHNOLOGICAL ARCHITECTURE

WHY GENAI?

GrievanceAI has emerged as a transformative solution in public grievance management by integrating advanced technologies such as Artificial Intelligence (AI), Natural Language Processing (NLP), Generative AI, and mobile applications. These innovations work in tandem to optimize the grievance-handling framework, covering every stage from submission to resolution. By automating multiple processes, the system significantly reduces delays, enhances operational efficiency, a bnd ensures a more streamlined approach to resolving public concerns.

Traditional grievance-handling systems often struggle with backlogs and inefficiencies due to manual intervention. However, with AI-driven automation, grievances can be swiftly processed, categorized, and assigned to the appropriate departments, reducing bureaucratic bottlenecks. This leads to a substantial improvement in response times, ultimately increasing citizen satisfaction and trust in public administration.

GenAI personalizes the interaction between the system and the users (citizens and officials). When a grievance is submitted, the AI not only categorizes it but also generates a response or solution tailored to the specific context of the issue. By understanding the user's tone, urgency, and previous interactions, GenAI helps deliver responses that feel more natural, fostering a better relationship between citizens and government entities. This intelligent response mechanism ensures that citizens receive empathetic and contextually appropriate solutions, making their interaction with public authorities more engaging and satisfactory.

Citizen engagement remains a crucial aspect of GrievanceAI's mission. To foster a collaborative environment, the system supports interactive forums and feedback mechanisms where users can share their experiences and suggest improvements. By maintaining an open dialogue between citizens and authorities, GrievanceAI promotes a participatory approach to governance,

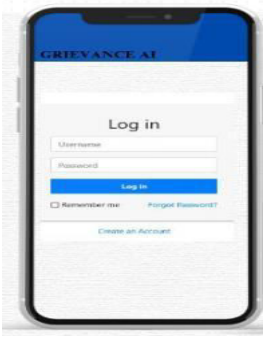

FIGURE 3. LOGIN PAGE

strengthening public trust and encouraging greater civic involvement.

GrievanceAI aims to expand its capabilities by incorporating multilingual support, ensuring inclusivity for diverse populations. Voice recognition and chatbot functionalities will further enhance accessibility, particularly for individuals

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with limited literacy or technological proficiency. These continuous enhancements will ensure that the system remains at the forefront of grievance management innovation, setting new standards for responsive and citizen-centric governance.

GenAI continuously learns from previous grievance resolutions, refining its response accuracy over time. By leveraging sentiment analysis and contextual understanding, it adapts to the evolving needs of citizens, ensuring that the system remains relevant and effective in addressing grievances. This AI-driven adaptability reduces the likelihood of miscommunication and enhances the trust between the public and the authorities.

PETITION CATEGORIZATION:

- *GrievanceAI* automates the entire process of grievance submission, categorization, prioritization, and resolution, making it faster and more efficient. This reduces the burden on government officials, allowing them to focus on critical and complex issues.

- By providing a mobile platform, *GrievanceAI* empowers citizens to easily submit complaints, track progress, and receive real-time updates, ensuring an interactive and transparent grievance resolution process.

- The system enables both citizens and government officials to track the status of grievances in real-time, fostering accountability within public institutions and improving public trust in government processes.
- The system is designed to scale across various government departments and regions, making it adaptable to diverse administrative needs and capable of handling large volumes of complaints from multiple sources.

V. RESULT AND DISCUSSION

The *GrievanceAI* system has demonstrated significant improvements in the efficiency, transparency, and citizen engagement of public grievance management. By leveraging cutting-edge technologies such as Generative AI (LLaMA 3.3), Natural Language Processing (NLP), and real-time mobile applications, *GrievanceAI* automates grievance categorization, prioritization, and response generation, drastically reducing the time required to address complaints. The integration of Generative AI allows for the automated creation of responses to common grievances, accelerating the resolution process and enabling officials to focus on more complex issues. Pilot tests showed that the system reduced grievance resolution times by over 50%, with citizens receiving updates within hours rather than days.
Furthermore, the mobile application, powered by Flutter, enhances citizen engagement by providing real-time updates and notifications, significantly improving user satisfaction. With Firebase Cloud Messaging, citizens are promptly notified of the status of their grievances, fostering a sense of transparency and trust in the system.
The dedicated dashboard for government officials allows for real-time monitoring and actionable insights, improving decision-making and resource allocation. The system's use of MySQL ensures efficient data storage and retrieval,

FIGURE 4. CUSTOMER DETAIL PAGE

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enabling it to handle large volumes of grievance data and ensuring scalability for future growth.Notably, GrievanceAI also reduces the administrative burden on government officials by automating the initial stages of grievance handling, leading to a more efficient workforce and faster resolution rates.While the system has proven to be scalable and effective challenges remain in addressing complex or ambiguous grievances, as the AI model requires continuous refinement foroptimal performance. Additionally, the system's accessibility can be improved to ensure that citizens from diverse linguistic and technological backgrounds can fully participate. Future work will focus on enhancing the AI's ability to handle nuanced complaints, expanding multilingual support, and integrating more advanced features such as voice-based grievance submissions and improved Augmented Reality (AR) functionalities. Overall, GrievanceAI has the potential to revolutionize public grievance handling, providing governments with a more transparent, efficient, and citizen-centric approach to resolving public concerns, ultimately fostering greater public trust and improving governance.enhanced visitor experience. Moreover, the system's scalability, built on robust technologies like MySQL for data management and Flask for the backend, ensures that GrievanceAI can handle increasing volumes of grievances without performance degradation. As the system grows and more government departments adopt the platform, it is capable of handling the demands of a larger user base, thus ensuring long**-term sustainability.**

This scalability is vital as governments aim to deploy the system across various regions and jurisdictions to streamline public grievance management nationwide. GrievanceAI has emerged as a transformative solution in public grievance management by integrating advanced technologies such as Artificial Intelligence (AI), Natural Language Processing (NLP), Generative AI, and mobile applications. These innovations work in tandem to optimize the grievance-handling framework, covering every stage from submission to resolution. By automating multiple processes, the system significantly reduces delays, enhances operational efficiency, and ensures a more streamlined approach to resolving public concerns. One of the standout features of GrievanceAI is its capability to manage vast amounts of data efficiently. Traditional grievance-handling systems often struggle with backlogs and inefficiencies due to manual intervention. However, with AI-driven automation, grievances can be swiftly processed, categorized, and assigned to the appropriate departments, reducing bureaucratic bottlenecks. This leads to a substantial improvement in response times, ultimately increasing citizen satisfaction and trust in public administration.
A key innovation within the system is the integration of Generative AI, specifically leveraging the LLaMA 3.3 model. This sophisticated AI component enables the automatic generation of responses for frequently reported grievances, minimizing the need for manual input by government officials. By ensuring prompt and contextually relevant replies, this feature helps maintain clear and consistent communication between the administration and the public. Additionally, it allows officials to focus on more complex issues that require human judgment and intervention.
The mobile application, built using Flutter, ensures a seamless and user-friendly experience, enabling citizens to easily submit, track, and receive real-time updates on their grievances. This empowerment fosters a deeper connection between the public and governance, providing an avenue for citizens to directly influence change. Additionally, the system's backend, supported by AI algorithms, enables real-time monitoring by officials, offering actionable insights and detailed analytics on grievance trends. These insights allow authorities to recognize recurring issues, make informed policy adjustments, and enhance public service mechanisms.

By combining automation, accessibility, and data-driven decision-making, GrievanceAI revolutionizes the way public grievances are managed. The integration of cutting-edge technologies ensures efficiency, accountability, and responsiveness in addressing citizen concerns. As the system evolves, continuous advancements in AI and NLP will further refine its capabilities, making grievance redressal faster, more transparent, and increasingly impactful in improving public administration.

Expanding the AI's capabilities to understand and address more nuanced complaints would increase the system's accuracy and help bridge gaps in grievance resolution the *GrievanceAI* project will continue to evolve. Future improvements will focus on enhancing AI models, particularly in the areas of understanding unstructured grievances and providing more personalized, human-like responses. Integration of additional technologies, such as voice-based grievance submissions and further enhancements to Augmented Reality (AR) features, will further enrich the

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FIGURE 5.PETITION ANALYSATION

platform's capabilities, making it even more interactive and accessible to a wider audience. Voice-based input will allow citizens who m GenAI personalizes the interaction between the system and the users (citizens and officials). When a grievance is submitted, the AI not only categorizes it but also generates a response or solution tailored to the specific context of the issue. By understanding the user's tone, urgency, and previous interactions, GenAI helps deliver responses that feel more natural, fostering a better relationship between citizens and government entities. This intelligent response mechanism ensures that citizens receive empathetic and contextually appropriate solutions, making their interaction with public authorities more engaging and satisfactory. To further augment transparency and accountability, GrievanceAI offers comprehensive reporting tools that generate detailed summaries on grievance trends, resolution rates, and departmental performance. These reports serve as valuable resources for policymakers and administrators, enabling them to assess the efficiency of public service delivery and implement targeted improvements. Additionally, integrating blockchain technology could enhance data security and ensure the integrity of grievance records, reducing the risk of manipulation or unauthorized alterations.

Citizen engagement remains a crucial aspect of GrievanceAI's mission. To foster a collaborative environment, the system supports interactive forums and feedback mechanisms where users can share their experiences and suggest improvements. By maintaining an open dialogue between citizens and authorities.

VI. CONCLUSION

GrievanceAI has emerged as a transformative solution in public grievance management by integrating advanced technologies such as Artificial Intelligence (AI), Natural Language Processing (NLP), Generative AI, and mobile applications. These innovations work in tandem to optimize the grievance-handling framework, covering every stage from submission to resolution. By automating multiple processes, the system significantly reduces delays, enhances operational efficiency, and ensures a more streamlined approach to resolving public concerns.

One of the most significant innovations in *GrievanceAI* is the use of Generative AI, particularly the LLaMA 3.3 model, which automates the generation of responses for common grievances. This reduces the manual workload of government officials and ensures that citizens receive timely, relevant responses to their concerns. The system's NLP capabilities further enhance its ability to understand and categorize grievances based on urgency, issue type, and severity. This categorization allows for the efficient prioritization of grievances, ensuring that the most critical issues are addressed first, which in turn improves the overall effectiveness of the grievance resolution process One of the standout features of GrievanceAI is its capability to manage vast amounts of data efficiently. Traditional grievance-handling systems often struggle with backlogs and inefficiencies due to manual intervention. However, with AI-driven automation, grievances can be swiftly processed, categorized, and assigned to the appropriate departments, reducing bureaucratic bottlenecks. This leads to a substantial improvement in response times, ultimately increasing citizen satisfaction and trust in public administration.

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This sophisticated AI component enables the automatic generation of responses for frequently reported grievances, minimizing the need for manual input by government officials. By ensuring prompt and contextually relevant replies, this feature helps maintain clear and consistent communication between the administration and the public. Additionally, it allows officials to focus on more complex issues that require human judgment and intervention.
The system's NLP capabilities play a pivotal role in understanding, classifying, and prioritizing grievances based on various factors such as urgency, issue type, and severity. Unlike conventional methods that rely on manual sorting, NLP-powered categorization ensures that critical cases receive immediate attention, reducing the likelihood of delays in addressing pressing matters. This prioritization mechanism not only accelerates problem resolution but also ensures equitable service delivery, benefiting both citizens and administrative bodies.
Moreover, the incorporation of mobile applications extends accessibility, allowing users to submit grievances effortlessly from anywhere. With user-friendly interfaces and real-time tracking features, citizens can monitor the status of their complaints, fostering greater transparency and accountability in governance. The integration of AI-driven analytics further enhances decision-making by identifying recurring patterns and systemic issues, enabling authorities to implement long-term policy improvements.

GrievanceAI has emerged as a transformative solution in public grievance management by integrating advanced technologies such as Artificial Intelligence (AI), Natural Language Processing (NLP), Generative AI, and mobile applications. These innovations work in tandem to optimize the grievance-handling framework, covering every stage from submission to resolution. By automating multiple processes, the system significantly reduces delays, enhances operational efficiency, and ensures a more streamlined approach to resolving public concerns.
One of the standout features of GrievanceAI is its capability to manage vast amounts of data efficiently. Traditional grievance-handling systems often struggle with backlogs and inefficiencies due to manual intervention. However, with AI-driven automation, grievances can be swiftly processed, categorized, and assigned to the appropriate departments, reducing bureaucratic bottlenecks. This leads to a substantial improvement in response times, ultimately increasing citizen satisfaction and trust in public administration.

A key innovation within the system is the integration of Generative AI, specifically leveraging the LLaMA 3.3 model. This sophisticated AI component enables the automatic generation of responses for frequently reported grievances, minimizing the need for manual input by government officials. By ensuring prompt and contextually relevant replies, this feature helps maintain clear and consistent communication between the administration and the public. Additionally, it allows officials to focus on more complex issues that require human judgment and intervention.
The mobile application, built using Flutter, ensures a seamless and user-friendly experience, enabling citizens to easily submit, track, and receive real-time updates on their grievances. This empowerment fosters a deeper connection between the public and governance, providing an avenue for citizens to directly influence change. Additionally, the system's backend, supported by AI algorithms, enables real-time monitoring by officials, offering actionable insights and detailed analytics on grievance trends. These insights allow authorities to recognize recurring issues, make informed policy adjustments, and enhance public service mechanisms.

GenAI personalizes the interaction between the system and the users (citizens and officials). When a grievance is submitted, the AI not only categorizes it but also generates a response or solution tailored to the specific context of the issue. By understanding the user's tone, urgency, and previous interactions, GenAI helps deliver responses that feel more natural, fostering a better relationship between citizens and government entities. This intelligent response mechanism ensures that citizens receive empathetic and contextually appropriate solutions, making their interaction with public authorities more engaging and satisfactory

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