

CITYZEN- A Grievance Platform

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Abstract - Citizens of any country face civic problems in their day to day lives. They resort to the one of the several ways provided by the government to file their complaints. As technology has advanced, complaint registration systems have evolved in various ways to simplify the task of registering and handling complaints. This research paper presents the architecture of a GPS-based Complaint Handling System (GPSCRS). Complaints are recorded via a web application. Global Positioning System (GPS) sensors of

smart mobile devices are used to determine the exact location of the complaint. Automatically detect the complaint area and send the complaint information to the central server through the Internet. Complaints are then plotted on a map in the web interface.

Index Terms - Geo-location, PWA, Hybrid rendering, programming Interface, Cameras, Upvotes, DBMS

I. INTRODUCTION

Efficient governance is one of the biggest challenges for the government of every country. An important aspect of this governance is a robust complaint registration system through which citizens can express their grievances. In attempts to make this system accurate, efficient and easy to use, several new ways have been devised.

The current system in most countries provides some or all these ways for citizens to register their complaints: (1) email, (2) helpline number, (3) short messaging service (SMS), and (4) online complaint registration portal. However, all these methods require the complaint to manually to describe the location of the complaint. This approach is prone to human error and thus creates misunderstandings that result in ineffective handling of complaints. The proposed CITYZEN - A Grievance Platform aims to address this issue by recording complaints through a web application.

In recent years, smart mobile devices have become cheaper and cheaper, and they have moved out of the lives of the rich. into the lives of ordinary people. These devices perform functions such as: (1) accessing high-speed Internet, (2) capturing high-quality images, and (3) determining location using GPS sensors. The application fetches the location information through the GPS sensor and the image meta-data present in the device. It automatically determines the administrative area from the location. Additional information regarding the complaint, such as photographs and problem details, can be provided. The complaint information is sent over the internet to a central sever.

Registered complaints can be viewed through the web interface and plotted on a map, allowing authorities to pinpoint the exact location of each complaint. Each registered complaint is initially assigned a default priority. If a complaint is not resolved within a certain time, its priority is automatically elevated and assigned to a senior manager. This allows for quick action on complaints.

Section II gives a brief description of systems proposed in the past to improve the existing complaint registration systems. Section III describes the technologies used in CITYZEN. Section IV goes into the implementation details of the mobile application and web interface. Section V lists down the advantages of CITYZEN over existing systems. Section VI concludes the paper with a brief discussion on the future scope of the system.

II. LITERATURE SURVEY

A. ARCHITECTURE OF A GPS-BASED ROAD MANAGEMENT SYSTEM

Kim Nee Goh, Yin Ping Ng, Kamaruzaman Jusoff, Yoke Yie Chen and Yoon Yeh Tan have developed a GPS-based road management system architecture [2]. The proposed system acquires GPS coordinates on a mobile phone supporting assisted GPS. The complaint is sent by SMS with the GPS information to an SMS server on the GSM network. Data in SMS is tracked and stored in a database. This information is then plotted on Google Maps.

B. GPS based Complaint Redressal System

Vishesh K. Kandhari, Keertika D. Mohinani have developed GPS-based Complaint Redressal System (GPSCRS),[7] which simplifies the process of registering and addressing complaints. The system uses a mobile application with GPS sensors to determine the exact location of the complaint and automatically sends the complaint information to a central server over the internet. The complaints are then plotted on a map in a web interface.

C. Web Portal for Effective Student Grievance Support System

K. Aravindhan, K. Periyakaruppan, Aswini.K, Vaishnavi.S and Yamini.L. have proposed model for a web-based student grievance support system[6] that aims to improve the relationship between students and management. The proposed model transforms the manual grievance process into an automated one, where student complaints are noted and verified. The implementation of this grievance redress portal will ensure transparency and students will benefit from quick action on their complaints. The system is affordable and easy to use.

D. Assessing Grievances Redressing Mechanism in India

In this paper[8] Subhash Chander, Ashwani Kush. mentioned online services provided by Indian states for citizen empowerment and grievance redressal. The Department of Administrative Reforms and Public Grievances (DARPG) manages grievances of various departments in different states. The grievance redressal system of four Indian states is evaluated using a scale, with numerical values assigned to ten services based on their relevance to citizens. The performance of the states is measured and presented graphically. The portals evaluated are HarSamadhan, eSamadhan, SWAGAT, and JanMitra.

III. PROPOSED SOLUTION

'CITYZEN' is a grievance platform for the citizens to address and post their complaints online to their respective Councilors to get them resolved as soon as possible, bridging the gap between the citizens and the councilors. The platform is a PWA (Progressive web application) which uses next gen technologies like Hybrid rendering of pages, Real time chatting, Location based tracking of complaints, etc.

A. CITYZEN platform

'CITYZEN' is a grievance platform for the citizens to address and post their complaints online to their respective Councilors to get them resolved as soon as possible, bridging the gap between the citizens and the councilors. The platform is a PWA (Progressive web application) which uses next gen technologies like Hybrid rendering of pages, Real time chatting, Location based tracking of complaints, etc. CITYZEN is a platform which is developed for the citizens to lodge complaints that they find in their vicinity. The complaints are directly shown to the concerned authorities. On this platform the complaints are divided according to the wards. Each ward has its own councilor or the group of members which are responsible for resolving the public problems.

a. Basic Functionalities

1. User Registration

The user registration process starts with signing up on the platform with the user email address, username and password. User confirmation will be done by sending confirmation email to the user. User email will not be disclosed on mail complaints page. User is anonymity is the priority. After registering on the platform, users can now sign in with email or username and password. Initially user will need to select its ward.

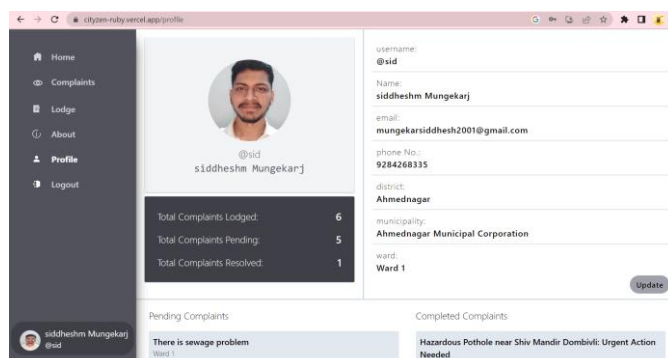


Fig -1: User Profile Page

2. Lodging the complaint

The process of lodging the complaint starts with the user entering the basic information related to the complaint like title and short description about it. Types and sub-types of the public complaints are listed on the platform for user convenience. By default the ward on the users profile is selected but if the user is posting the complaint from the other ward he can change the ward from the listed wards.

The second phase is uploading the image of the complaint. Users can either upload the image from the storage or can capture the image with a camera on the platform itself. The geo-location of the complaint is extracted directly from the image or user can manually select the Geo-location from the map and marker provided on the platform

In the third phase with the provided information platform checks for the existing similar complaints in the same ward and display those to the user. User can either post its complaint or can click on the similar complaint and can upvote for the problem.

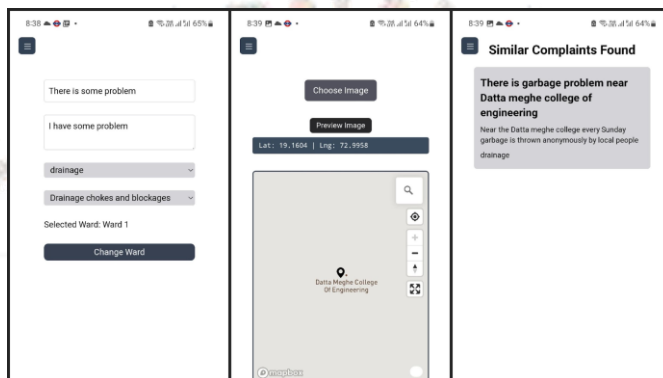


Fig -2: Lodge complaint form

3. Interacting with complaints.

All the complaints of a users ward are shown to the user on complaints page. User can search for the specific complaint or can filter through the complaints. User can change the ward and can see the complaints of other wards as well. User can upvote or downvote and can share the complaint on other platforms like facebook, twitter or whatsapp. User can see more details about complaint by clicking on more button on a complaint. User can discuss about the complaint with other citizens can see the current status and updates on the complaint. The map is provided to view the exact location of the complaint.



Fig -3: List of all complaints

B. CITYZEN - Governance platform

CITYZEN governance platform is for the responsible authority for resolving the complaints. Authority will be able to see the complaints of their ward only. They can manage the complaints their and can filter through complaints, with types, date, recency. Authority can send updates on complaints and once the complaint is resolved it can mark it as completed.

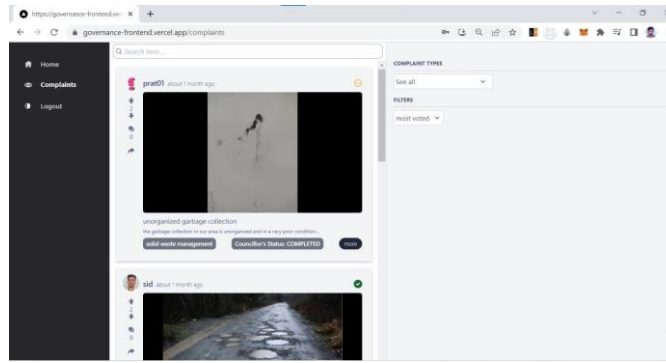


Fig -4: Dashboard for Governance platform

C. Marking complaint as resolved

As complainant encounters the public problem in his vicinity he is able to know whether the complaint is resolved or not. Once the complaint is marked as resolved from the governance side the email is sent to the complainant. Once the complainant marked the complaint as resolved only then the status of the complaint is marked as completed on the CITYZEN platform.

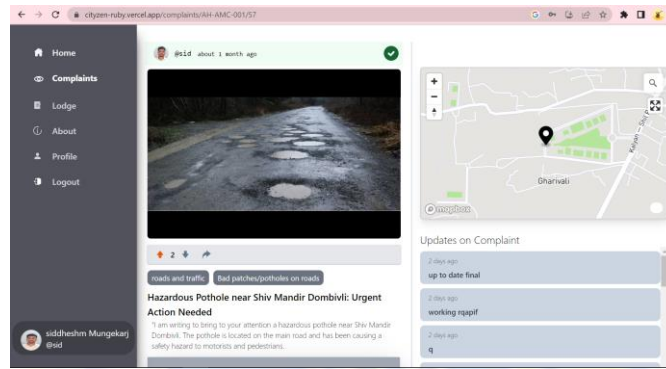


Fig -5: Complaint Details

IV. Technology used

Table -1: Technology stack

Frontend	NextJS, React, Zustand, TailwindCSS
Backend	FastAPI, SQLAlchemy, Alembic
External APIs	Algolia, mailcheck, cloudinary
DBMS	PostgreSQL

NextJS

NextJS is a React framework that enables several extra features, including server-side rendering and generating static websites. React is a JavaScript library that is traditionally used to build web applications rendered in the client's browser with JavaScript.

FastAPI

FastAPI is a Web framework for developing RESTful APIs in Python. FastAPI is based on Pydantic and type hints to validate, serialize, and deserialize data and automatically auto-generate OpenAPI documents .It fully supports asynchronous programming and can run with Gunicorn and ASGI servers for production, such as Uvicorn and Hypercorn.

Mapbox

Mapbox is a mapping and location data platform that offers a suite of tools and APIs for developers to add customizable maps, navigation, and spatial data analysis to their applications. We have utilized this API to show maps on platform. With features like geocoding, routing, and real-time location tracking, Mapbox provides developers with the tools they need to create dynamic and interactive maps that can be tailored to meet the specific needs of their users.

Cloudinary

Cloudinary is a cloud-based image and video management platform that enables developers to easily upload, store, manipulate, optimize, and deliver visual content to their users. We utilized cloudinary for storing media files of CITYZEN platform. It provides features like automatic optimization, responsive delivery, and advanced manipulation capabilities

PostgreSQL

PostgreSQL, often referred to as simply "Postgres," is a powerful open-source relational database management system. It offers advanced features such as data integrity, concurrency, and extensibility, making it a popular choice for data-driven applications, especially those requiring high levels of scalability and reliability.

Algolia

Algolia is a powerful search-as-a-service platform that enables developers to add fast and relevant search capabilities to their websites and applications. In CITYZEN for searching and filtering through complaints we have used Algolia services to provide better user experience. With features like real-time indexing, typo tolerance, and customizable ranking, Algolia makes it easy for developers to create a search experience that is both intuitive and efficient.

V. Advantages over existing systems

Faster Reach

Cityzen is a unique platform that serves as a grievance portal for citizens to address their concerns and complaints directly to their respective councilors. One of the most significant features of Cityzen is its ability to facilitate a faster reach of complaints from citizens to their councilors. With the help of advanced technology and a user-friendly

interface, Cityzen ensures that every complaint posted on the portal is forwarded to the concerned councilor within a short period. This feature not only makes the complaint resolution process quicker but also enhances the accountability of the councilors towards the citizens they represent. Overall, Cityzen is a powerful tool that empowers citizens to voice their grievances and brings them closer to the authorities responsible for addressing them.

Ward wise allocation of complaints

The ward wise division of complaints is another essential feature that sets it apart from other grievance portals. This unique feature ensures that complaints are appropriately categorized and directed to the councilors responsible for the specific wards. By dividing complaints based on the ward, Cityzen makes it easier for councilors to identify and resolve issues that are specific to their areas. This feature also enhances transparency and accountability, as citizens can track the progress of their complaints and see if they are being addressed promptly. The ward wise division of complaints ensures that every citizen's grievance is given equal importance, irrespective of their location or social status. Overall, this feature plays a crucial role in making Cityzen an efficient and effective platform for citizens to voice their concerns and get their complaints resolved.

User Anonymity

One of the most crucial features of Cityzen is user anonymity. This feature ensures that citizens can voice their concerns without fear of retaliation or intimidation. When citizens post their complaints on Cityzen, their identity is kept confidential and is not disclosed to anyone, including the councilors. This anonymity empowers citizens to raise their grievances without any hesitation and helps to create a safe and secure environment for all.

Geo-location of Complaint

Cityzen's geo-location feature is another powerful tool that enables citizens to report complaints from specific locations. When citizens post their complaints, Cityzen automatically captures the geo-location of the complaint, making it easier for councilors to identify and locate the problem. This feature not only streamlines the complaint resolution process but also helps councilors to prioritize and allocate resources effectively.

Image Validation

Cityzen's image validation feature is designed to ensure that citizens post only genuine and relevant images related to their complaints. When citizens upload images, Cityzen automatically verifies their authenticity and relevance, reducing the risk of fake or misleading information. This feature helps councilors to identify and prioritize complaints effectively and ensures that resources are allocated appropriately.

Multi-Platform Sharing

Cityzen's multi-platform sharing option is a valuable feature that enables citizens to share their complaints on multiple social media platforms. When citizens post their complaints on Cityzen, they can also choose to share them on various social media platforms, such as Facebook, Twitter, or WhatsApp. This feature helps to create awareness among a broader audience and enables citizens to get their grievances addressed more effectively. Overall, Cityzen's multi-platform sharing option plays a crucial role in empowering citizens and ensuring that their complaints are heard and addressed promptly.

VI. Conclusion

In conclusion, Cityzen is a powerful grievance platform that empowers citizens to voice their concerns and get their complaints resolved quickly and efficiently. Its advanced technology and user-friendly interface make it easy for citizens to report their complaints, and its unique features, such as user anonymity, geo-location of complaints, image validation, and multi-platform sharing option, ensure that every complaint is addressed promptly and effectively. Cityzen not only streamlines the complaint resolution process but also enhances transparency, accountability, and citizen participation in local governance. Overall, Cityzen is a vital tool that bridges the gap between citizens and the authorities and plays a crucial role in creating a more responsive, efficient, and inclusive society.

VII. Future Scope

The future scope of Cityzen is immense, with the potential to transform the way citizens interact with their local authorities. As technology advances, Cityzen can incorporate more advanced features, such as artificial intelligence, machine learning, and natural language processing, to provide more personalized and efficient services to citizens. With the growing use of smartphones and social media, Cityzen can also leverage these platforms to reach a wider audience and engage with citizens more effectively. Furthermore, Cityzen can expand its services beyond grievance redressal to include citizen participation in local governance, such as budgeting, planning, and decision-making. As more citizens become aware of their rights and responsibilities, Cityzen can play a crucial role in creating a more accountable, transparent, and responsive local governance system. Overall, the future of Cityzen is bright, and its potential to empower citizens and enhance local governance is immense.

VIII. Acknowledgement

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