Ultimate Concern Tracking and Response Mechanism

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THE AWARD OF DEGREE OF

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE

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May 2025

DECLARATION

We hereby declare that this submission is our own work and that, to the best of our knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

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CERTIFICATE

This is to certify that Project Report entitled "**Ultimate Concern Tracking and Response Mechanism**" which is submitted by **Aditya Dwivedi**, **Aditya Pandey**, **Akshat Kishore** and **Apurwa Kumari** in partial fulfillment of the requirement for the award of degree B. Tech. in Department of Computer Science of Dr. A.P.J. Abdul Kalam Technical University, Lucknow is a record of the candidates own work carried out by them under my supervision. The matter embodied in this report is original and has not been submitted for the award of any other degree.

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Last but not the least, we acknowledge our friends for their contribution in the completion of the project.

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ABSTRACT

The website is a hassle-free and easy way to register, track and resolve complaints in a college environment. To allow the students to upload their complaints online, a clear and well-defined grievance redressal system will be assured. This system works differently than the others in the market because it allows real-time tracking and submission of feedback and alerts the user about his grievance status. Because the system is admin-controlled, only authorized employees can view and respond to complaints that have been submitted. Its safe authentication mechanism protects privacy and prevents unwanted access. By providing students and administrative staff with an intuitive interface, the system also enhances user experience. The Smart Grievance System reduces response time, improves accountability, and fosters a better student-administration relationship through the use of automation, transparent data management, and structured data management. For speedier issue classification and resolution, future developments may include chatbot support and AI-based sentiment analysis.

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LIST OF ABBREVIATIONS

SDG	Sustainable Development Goals
SDLC	Software Development Life Cycle
CSS	Cascading Style Sheet
DFD	Data Flow Diagram
UI	User Interface
UX	User Experience
XSS	Cross Site Scripting
SQL	Structured Query Language
Web	Website
HTML	Hyper Text Markup Language
PHP	Hypertext Preprocessor
AI	Artificial Intelligence
SSR	Server Side Rendering
SSG	Static Site Generation
JS	JavaScript
JWT	JSON Web Token
JSON	JavaScript Object Notation
ODM	Object Document Mapper
API	Application Programming Interface
UAT	User Acceptance Testing
TC	Test Cases
ML	Machine Learning
NLP	Natural Language Processing

SDG MAPPING WITH JUSTIFICATION

1. SDG 8: Economic Growth and Decent Work

- By removing administrative lags and holdups, the system significantly enhances the efficiency of grievance disposal.
- It helps release staff, employees, and students to focus on their core work by shortening the effort and time taken to lodge and settle grievances.
- The platform creates a healthier and more productive working and studying climate by reducing frustration and enhancing general satisfaction through ease of redressal.
- By removing procedural inefficiencies and making decision-making faster, institutions are able to perform more harmoniously and effectively, leading to economic growth.
- The system promotes operational resilience and contemporary workplace infrastructure through supporting digital transformation in managing grievances.

2. SDG 16: Peace, Justice, and Strong Institutions:

- The integrity and confidentiality of sensitive user information are ensured through secure login and encrypted storage of data.
- The system ensures equitable and auditable processes by logging administrative actions and maintaining a history of grievances.
- By allowing all voices to be heard and appropriately addressed, the portal ensures equal access to justice for users.
- By providing timely resolution, encouraging responsible governance, and digitally enforcing regulations, it supports the development of strong institutions.
- facilitates a peaceful and hospitable institutional culture, allowing users to express concerns without fear of bias or neglect.

CHAPTER 1

INTRODUCTION

1.1 Introduction:

An advanced electronic platform named the Smart Grievance System enables educational institutions to streamline and strengthen their grievance redressal processes. Physical grievance filling processes consume long periods of time, and there can be grievances of students of dissatisfaction, delays, and opaqueness. The system presents a centralized, automatic, and properly constructed way for systematically processing student complaints. The system ensures efficient and confidential complaint resolving through real-time monitoring, authentic user login, and easy use. The main objective of this project is to enhance interaction between students and administration by providing a quick, secure, and easy-to-use grievance filing and redressal platform. By providing accountability and greater transparency, the system renders redressal of grievances effective, systematic, and convenient.

1.2 Project Category:

Web-based applications and management systems are comprised of the Smart Grievance System. The complaint management system utilizes user authentication, automation, and database management to facilitate effective grievance processing. The project primarily belongs to the category of Educational Technology & Institutional Management, and it can be utilized in government, business, and academia.

1.3 Objectives:

The main objectives of the Smart Grievance System are to:

- **Provide an Effective Complaint-**Handling System: Make it easy for students to lodge complaints and ensure an orderly process for their redressal.
- **In order to ensure accountability and transparency:** Utilize real-time monitoring and alerts to inform users on the status of their grievances.
- **To Reduce Manual Intervention:** Automate complaint classification, response, and resolution tracking for faster processing.
- **To Maintain Data Security and Confidentiality:** Implement user authentication to ensure only authorized personnel can access grievances.

1.4 Report Structure:

The structure of this report is the following:

- Chapter 1: Introduction: Provides a synopsis of the project, the category aims, and format of the report.
- Chapter 2: Literature Review – Discusses the failures of present grievance schemes and how the present project can remedy them.
- Chapter 3: System Design addresses the system architecture, the database design, and the run-time flow.
- The non-functional, functional, and system requirements required to develop the portal effectively are elaborated in Chapter 4: Requirement Analysis and System Specification.
- Chapter 5: Implementation elaborates the technologies used, the development approach, and the prominent features of the system.
- Chapter 6 : Test cases, assessment measures, and performance of the system .
- Chapter 7: Conclusion and Future Scope gives an overview of the findings and offers suggestions for possible improvements in the future.

CHAPTER 2

LITERATURE REVIEW

2.1 Literature Review

[1] A thorough summary of numerous studies and research findings on grievance management in organizations is given by Dr. S. Gomathi. It integrates knowledge from various viewpoints, such as how employee demographics, supervisor styles, organizational justice, and training affect grievance resolution. The paper highlights the importance of procedural fairness and how open and honest procedures enhance employee satisfaction and organizational legitimacy. For managers and supervisors to effectively manage employee issues and communicate organizational policies, it also highlights the importance of training programs. Organizations can promote cooperation, further justice, and ultimately enhance overall performance by considering these factors and implementing good grievance management methods.

[2] An effective part of ensuring a positive and supportive learning environment in educational institutions is the effective management of student complaints. Besides providing an avenue for students to express their grievances, a good grievance system enables organizations to identify and solve systemic issues that may impact many students. Institutions can enhance student satisfaction and the overall quality of education by addressing complaints expeditiously and fairly. But establishing a functioning grievance system is not easy. Students' reluctance to complain due to fear of discrimination or retribution is a significant hindrance. In order to overcome this hurdle, an open and friendly environment must be created where students may express their concerns without fear of consequences. Furthermore, sustaining students' trust in the system relies on ensuring that complaints are treated fairly and in a timely manner. Students may lose confidence in it if their complaints are not attended to in a timely manner or if they feel that the resolution process is unfair. Using technology to try to address these issues, institutions can institute user-friendly complaint portals or apps that streamline the complaint submission process and allow for rapid response and resolution. Employees also need to receive proper training in how to treat complaints in an equitable and professional way. Student feedback should be actively sought as well in an effort to review the grievance system's performance and implement needed changes needs and to remain effective.

contemporary web- and application-based systems have numerous advantages such as greater efficiency, accessibility, and management of data. Accepting these innovations and undertaking proactive steps to solve problems will enable educational institutions to establish a responsive and inclusive grievance system that can redress student grievances effectively and foster a healthy learning environment for everyone.

[3] The procedures for addressing grievances and how they impact organizational dynamics underscore just how crucial they are in fostering amicable employee relations as well as maintaining productivity. In the last decade, there have been many studies that have delved into the intricacies of workplace grievances from all aspects, ranging from the causes of grievances to the effectiveness of the existing grievance-handling procedures. Authors such as Manikandan and Gowsalya (2011) emphasize the need to rapidly settle conflicts and dissatisfaction between management and employees but also note that current research lacks a robust theoretical base. Ramya (2014) elaborates on the subject by underlining how procedures for grievances relate to union behavior and broader measures of attitude and how effective management can influence measures of commitment and overall satisfaction. Similarly, Taru (2016) provides usual grievance causes, such as communication and compensation issues failures, underscoring the importance of proactive management strategies. Wable (2017) and Vaitheeswaran (2017) both stress how prevalent grievances are in companies and urge specialized grievance-handling procedures to minimize their adverse impact on productivity and company culture. Sujatha and Sucharitha (2019), however, present a more positive view, contending that although the existing processes may be satisfactory, they can be further optimized to enhance employee satisfaction. These are sentiments echoed by Rathod and Jariwala (2020), who underscore the critical role that sound grievance management plays in fostering a high-performance culture. All these studies highlight the complexity of workplace grievances and the need for companies to keep enhancing their methods of dealing with them in order to maintain productivity, organizational harmony, and employee satisfaction.

[4] Through implementing an effective e-complaint handling system, the project aims at enhancing student satisfaction and streamlining grievance settling processes in universities. The status of students toward their institutions is enhanced by the proposed model based on web-enabled technology to support automation and accelerated processing of grievances from students. The proposed system operates autonomously and employs technologies such as HTML, CSS, PHP, and MYSQLXAMPP Server to facilitate uninterrupted complaint

efficiently and promptly while ensuring an open and timely resolution,
which ultimately fosters a more positive and collaborative environment within the university community.

[5] The goal of the web application for the student grievance and support system is to give students a productive way to voice their concerns and look for solutions within academic institutions. Three primary modules comprise the system architecture: departmental clerks, university clerks, and students. Students can sign up and log in to file complaints under a number of headings, including name errors, money problems, or schedule modifications. Valid complaints are reviewed and approved by university clerks before being sent to the appropriate departments for resolution. When a departmental clerk receives a complaint, they handle it and update the status appropriately. By limiting access to authorized users and preserving an intuitive user interface, the system guarantees security and privacy. All things considered, the web application makes it easier for universities to resolve student complaints and communicate effectively.

[6] Any unhappiness or dissatisfaction on the part of an employee resulting from anything connected to the company where they work is referred to as a grievance. It is a type of grievance or unease that a worker in a specific organization experiences. Employers usually implement a grievance procedure to handle complaints. An employee can formally bring up a concern or issue with their employer through a grievance procedure. A successful grievance process offers a means for staff members to address concerns. In order to optimize staff performance and productivity, an organization should prioritize employee harmony. An active grievance handling system is necessary for an organization to have pleasant working relationships. Key words: Grievances, Employee, Relationship, Automobile Industry, Grievance Mechanism .Companies are a part of society, and the company where a person works has a responsibility to meet their expectations. Owing to diverse social backgrounds and psychological characteristics, employees may occasionally experience discomfort or feelings of resentment regarding specific managerial decisions, practices, or service conditions. Employees may file complaints against their employers in some situations, while bosses may file grievances against their staff in other situations. Within a company, grievances can arise at any level of seniority Minor complaints are the root cause of most workplace disputes that have serious consequences. Several of the conflicts may be avoided if these complaints are promptly resolved in an objective manner. It serves as the justification for the grievance procedure's mutual approval.

[7] A complaint is surface-level, whereas a grievance goes deeper. Grievances are expressed through complaints, but a true grievance is one that is so deeply ingrained that the employee must take the proper corrective action in order to find resolution.Workplace grievances must to be grounded in the employer-employee relationship and employment-related issues. Descriptive research was used by the investigator. Create. Fifty employees' data were gathered using a random sampling design. The questionnaire assisted in the collection of the study's primary data. For reference, secondary data was gathered from books and periodicals. The complete paper will address the main findings.The workforce of today is more diverse, with workers representing a range of ages, nationalities, genders, and ethnic and religious backgrounds. Misunderstandings and poor communication are common in such work environments. Such misunderstandings will lower staff morale and decrease productivity if they are not handled appropriately. Social media's widespread use and employees' increased Internet awareness mean that such dissatisfaction might also be shared on Facebook or Twitter. Such unfavorable press might harm the employers' reputation and brand, embarrassing the management unnecessarily. Such grievances may occasionally result in costly and drawn-out lawsuits.By implementing fair employment procedures and fostering a positive work atmosphere, employers can avert such circumstances. Having an appropriate Grievance Procedure (GP) in place to manage complaints is part of this. It is imperative that both employers and employees recognize that it is unfeasible to completely satisfy all parties involved in a grievance resolution process. Most of the time, reaching a compromise that requires both sides to take a "give and take" stance is the most sensible course of action. A GP's primary goal is maintenance rather than grievance settlement or resolution. Any unhappiness or sense of injustice is a grievance, and it must have to do with labor in the workplace. A complaint is surface-level; a grievance is more profound. Grievances are expressed through complaints, but a grievance is more deeply ingrained and involves the employee.Workplace grievances must to be grounded in the employer- employee relationship and employment-related issues. Industrial concerns from the Industrial Relations Act is cited for a better understanding of grievances pertaining to the workplace (emphasis added):"Industrial matters" refers to issues involving the interactions between employers and employees that are related to a person's employment, non-employment, terms of employment, transfer of employment, or working conditions.

[8] The foundation of workplace grievances is the relationship between an employer and an employee. Grievances have a long history and are connected to work. The topic was selected by the author because the management was interested in hearing what the staff thought of the company's current operating procedures. The research design used by the author was descriptive. The questionnaire approach is utilized to collect data, and the random sampling method is employed. Data analysis has been completed, and the results are emphasized.

The study's findings form the basis for the recommendations that follow. A grievance is any unhappiness or sense of injustice related to one's employment circumstances that is brought to management's attention. In general, a grievance is any form of unhappiness that negatively impacts productivity and organizational relations. It's important to distinguish between complaints, grievances, and unhappiness in order to comprehend what a grievance is. Any type of unhappiness or dissatisfaction with any part of the organization is one of the key characteristics of grievances.The source of the dissatisfaction must be the job, not personal or family issues. There are both imagined and genuine causes for the unhappiness. Employees have a grievance when they believe they have been the victim of injustice. Such a sentiment may have a genuine or invalid cause, be reasonable or illogical, or be justified or absurd. The unhappiness needs to be expressed, no matter how it is expressed. But unhappiness in and of itself is not a complaint. The employee may file a written or verbal complaint at first. If this is not investigated right away, the staff member feels unfairly treated. At this point, the unhappiness intensifies and becomes a complaint.

2.2 Research Gaps:

In spite of in-depth research on grievance management, a number of gaps still persist:

- **Inadequate Application of AI and Automation in Grievance Redressal:** Although technology has been experimented with for complaint management, there is not enough research on AI-based automated grievance settlement.
- **Insufficiency of Student-Centered Grievance Models**: The majority of the available studies deal with workplace grievance resolution, with few examining resolution of grievances in educational settings.
- **Resistance in Reporting Grievances:** Research does not provide in-depth analysis of the psychological resistance against employees and students reporting grievances.
- **Comparative Analysis of Conventional vs. Internet-Based Grievance Systems:** Empirical study is necessary on the efficiency, accessibility, and success rates of manual and internet-based grievance redressal systems.

2.3 Problem Formulation:

Based on the identified research gaps, this study aims to develop an optimized grievance redressal system that integrates web-based technology for efficient complaint handling in educational institutions. The research will focus on:

- Analyzing the limitations of current grievance management practices in universities.
- Designing a secure, user-friendly digital grievance system to enhance student satisfaction.
- Evaluating the impact of automated grievance handling on issue resolution speed and transparency.

By addressing these areas, this study seeks to contribute to the development of a more inclusive, efficient, and fair grievance management framework

CHAPTER 3

PROPOSED SYSTEM

3.1 Proposed System:

The suggested system adopts a novel and effective method for solving problems with a view to rectifying the deficiencies of previous solutions. Using technology and complex procedures, the system is tailored specifically to improve user experience, performance and reliability.
The following are some of the primary goals of the system suggested to be put into practice:

- **Improved Efficiency**: The core of the system is optimized processes and automation, which minimize manual effort and processing time.
- **Friendly Interface**: Everyone concerned can have the pleasure of a friendly UI/UX interface that is simple to use.
- **Scalability:** Scalable to meet shifting needs and growth in the future.
- **Security and Privacy:** Provides robust security features to support user data system .
- **Real-Time Monitoring and Analytics:** Enabling data-driven decision-making using real-time insight and analytics.

The required system design allows for smooth integration into existing infrastructure, making this easier for organizations.

3.2 Unique Feature of the System:

The system has several unique features that make it superior to the current solutions. These features improve functionality, efficiency, and guarantee a hassle-free user experience.

- **Automated Workflow Management:** To minimize manual intervention and enhance efficiency, the system deals with repetitive processes automatically.
- **Intelligent Error Detection and Correction:** Enhances accuracy and reliability by locating and correcting errors in real time.
- **Multi-platform compatibility:** Guarantees access through a range of devices and operating systems.
- **Customizable User Dashboard:** Offers a personalized experience via dashboards that are customizable based on different user roles**.**
- **Secure Authentication and Data Encryption**: Utilizes multi-factor authentication and robust encryption to protect data.

- **Real-Time Alerts and Notifications:** Offers timely notifications regarding important system activities and abnormalities**.**
- **Simple Integration with Third-Party Tools:** Facilitates easy integration with current enterprise solutions and APIs.
- **Automated Reporting and Analytics:** Provides detailed reports for effective decision-making.
- **Email Notification for Total Solution:** An email notification will be sent to the users when the problem is resolved completely in order to inform them and be transparent.

CHAPTER 4

REQUIREMENT ANALYSIS AND SYSTEM SPECIFICATION

4.1 Feasibility Study:

- **Technical Feasibility**: Assesses if the intended system can be implemented utilizing current technology and infrastructure.
- **Economic Feasibility:** Examines cost-effectiveness, such as development, maintenance, and operational costs.
- **Operational Feasibility:** Determines the extent to which the system will operate in the specified environment and satisfy user requirements.

4.2 Software Requirement Specification:

4.2.1 Data Requirement:

To hold user profiles, complaints, feedback, and administrator responses, both unstructured and structured data need to be stored. It needs to securely store user authentication details and maintain logs to track system activity. To prevent data loss and ensure consistency, the database needs to have efficient querying, indexing, and backup capabilities.

4.2.2 Functional Requirement:

- Users must be able to register, log in, and manage their profiles.
- The system should enable users to file grievances and monitor their status.
- Admins should have rights to view, update, and close grievances.
- Role-based access control should be used to prevent unauthorized activity.
- The system must provide reports and analytics for admin insights.

4.2.3 Performance Requirement:

- The system should handle multiple concurrent users efficiently.
- Response time for queries should not exceed a couple of seconds.
- The application must be scalable to handle growing users and data.
- Data retrieval and processing should be optimized for fast execution.

4.2.3 Maintainability Requirement:

- The system should follow modular design principles for easy updates and modifications.
- Regular checks should be conducted to ensure smooth operation.
- Proper documentation should be maintained for future reference.
- The code should be well-structured and follow best practices.
- Bugs and errors should be easily traceable and fixable without affecting system performance.

4.2.4 Security Requirement:

- User authentication should use encryption techniques, such as hashed passwords.
- Role-based access control must limit unauthorized users from accessing sensitive information.
- The system should have protection against SQL injection and cross-site scripting (XSS).
- Regular security audits must be carried out to determine vulnerabilities.
- Mechanisms for backup of data should exist to avoid loss of data in the event of a breach.

4.3 SDLC Model Used:

The Agile SDLC model was chosen due to its iterative approach, which allows continuous feedback and improvements. Flexibility towards changing requirements is achieved through frequent testing and modular design. The model enhances collaboration among stakeholders, testers, and developers for better project outcomes.

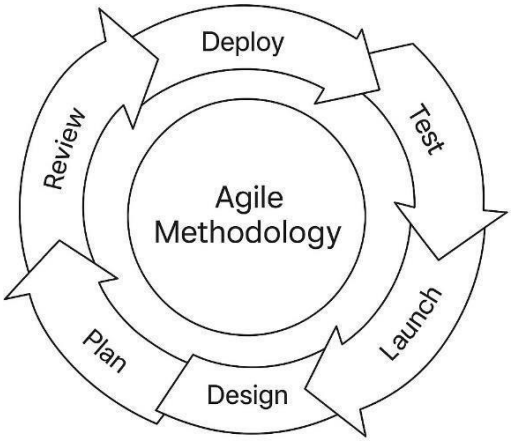

Fig: 4.1: Agile Model

4.4 System Design:

4.4.1 Data Flow diagram

Level 0:

At the highest level of abstraction, the DFD Level 0 provides an overview of the system and its interactions with external entities. It illustrates the flow of data between the main processes within the system.

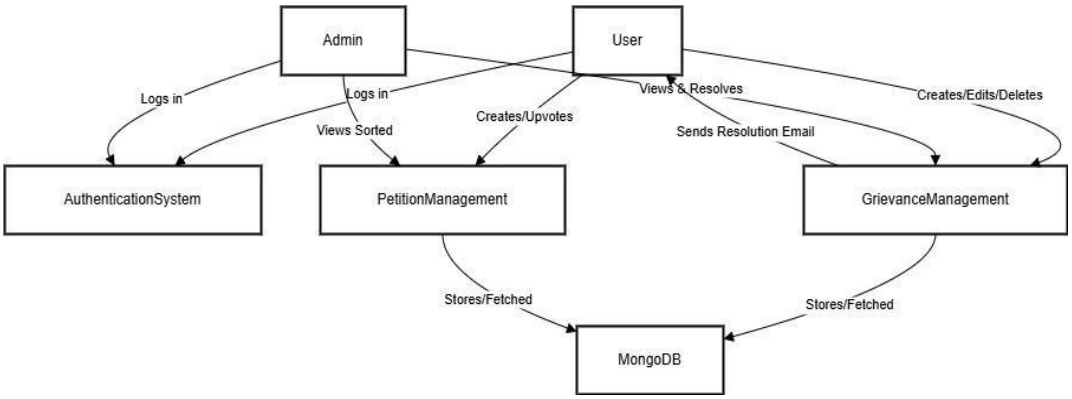

Fig 4.2: DFD Level 0

Level 1:

DFD Level 1, also known as Level 1 Data Flow Diagram, dives deeper into the system compared to the high-level overview of a Level 0 DFD (Context Diagram). Elements of DFD level 1 include processes, data flows, data stores and external entities.

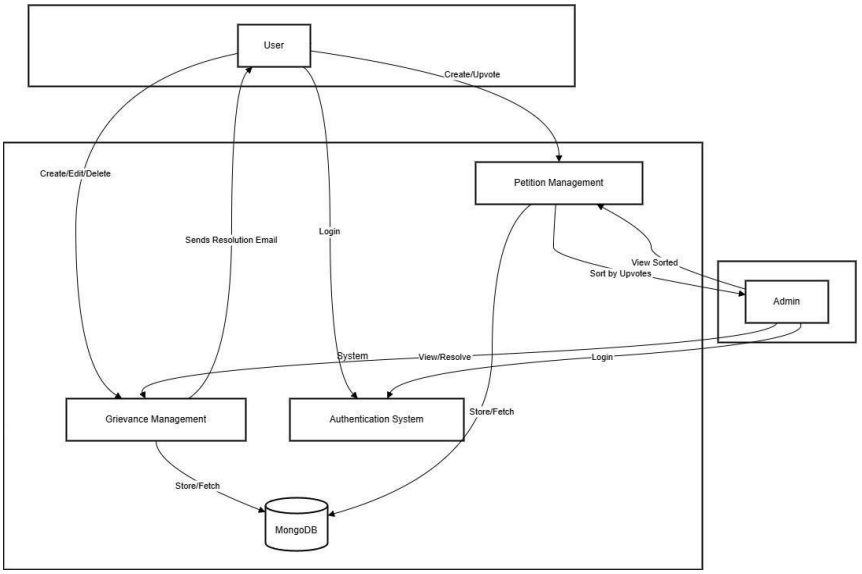

Fig 4.3: DFD Level 1

4.4.2 Use Case Diagram:

A use case diagram is a visual representation of how users (or external systems) interact with a system to achieve specific goals. It's a core concept in Unified Modeling Language (UML), a standard for software design.

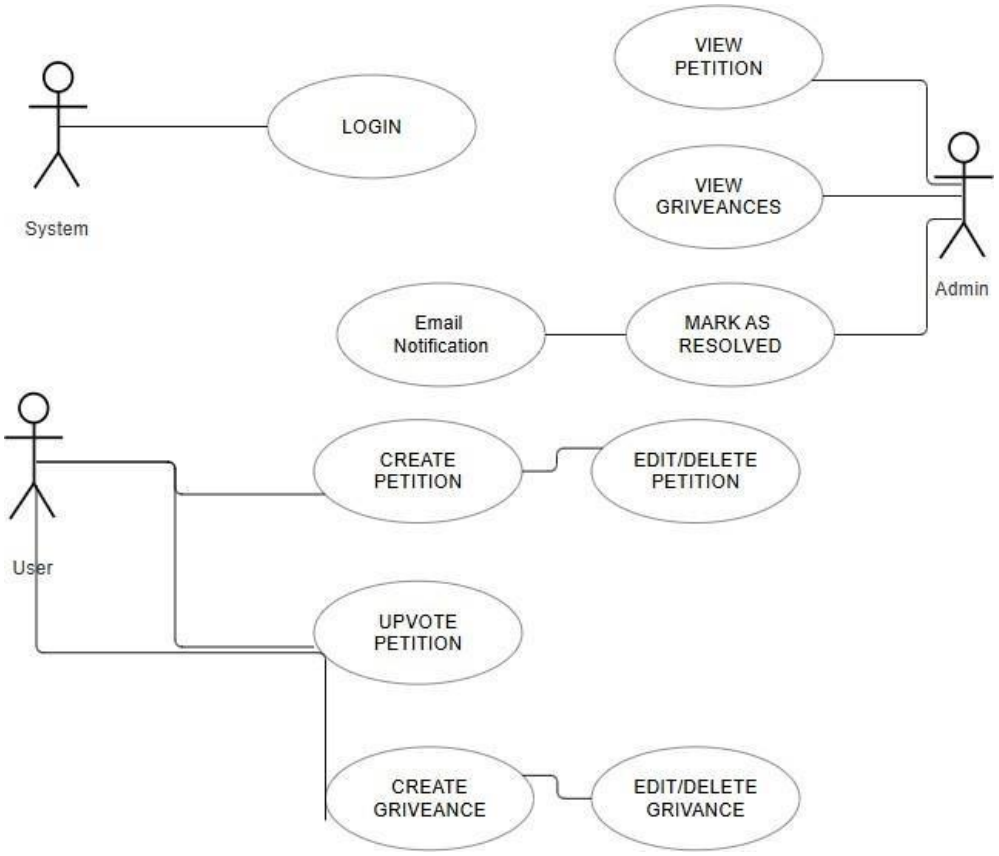

Fig 4.4: Use Case Diagram

4.5 Database Design:

MongoDB, which is based on multiple collections, is used to build the Grievance and Petition Management System database. Since each collection represents a distinct system entity and is NoSQL based, data can be scaled and retrieved effectively.

These are the main collections:

1. Admin Collection:

- Reserves administrator credentials such as one-time usernames and emails for secure login.
- Supports authentication and authorization with encrypted passwords and tokens.
- Admins can view all user-reported grievances and flag them as resolved.
- When an admin marks a grievance as resolved, an automated email notification is sent to the author of the grievance.
- Developed to handle multiple admins, supporting distributed management and enhanced system scalability.
- Admin actions are logged for auditing, providing transparency and accountability.

2. User Collection:

- A refresh token mechanism supports secure and persistent authentication sessions.
- Users can submit grievances, create petitions, and upvote existing petitions.
- Each user is uniquely identified to enable personalized dashboards and interaction history.
- Supports role-based features specific to the user account, ensuring a clear separation from admin privileges.
- Passwords are securely handled using encryption algorithms (e.g., bcrypt), enhancing system security.

3. Grievance Collection:

- Stores detailed information about each grievance, including:
- User's name and email
- Description of the issue
- Submission date and last modified timestamp
- Contains a status field: false (unresolved) by default and updated to true once resolved.

- Integrated with the email system to send status updates to users automatically.
- Enables filtering and sorting of grievances by date, status, or user ID for admin review.
- Maintains grievance history and allows tracking of edits made by users prior to resolution.

3. Petition Collection:

- Designed to support community-driven issue escalation, allowing visibility to frequent or widespread problems.
- Admin dashboard receives petitions sorted by upvote count, helping prioritize based on community interest.
- Tracks the timestamp of creation to monitor petition trends over time.
- Optimized for quick retrieval and sorting, enabling efficient admin response.
- Holds all user-created petitions, including: Petition ID , Description

5. Upvote Collection:

- Ensures that each user can upvote a petition only once, preventing manipulation.
- Enforces unique constraints between user and petition combinations to avoid duplicate entries.
- Plays a key role in maintaining the integrity and fairness of the petition system.
- Supports analytics for identifying most engaged users and popular petitions.

```
// Upvote a petition (increment upvoteCount)
export const upvotePetition = asyncHandler(async (req, res) => {
    const petitionId = req.params.id;
    const userId = req.user._id;

    const petition = await Petition.findById(petitionId);
    if (!petition) {
        res.status(404);
        throw new Error('Petition not found');
    }

    // Check if the user has already upvoted this petition
    const existingUpvote = await Upvote.findOne({ user: userId, petition: petitionId });
    if (existingUpvote) {
        res.status(400);
        throw new Error('You have already upvoted this petition');
    }

    // Increment the upvoteCount
    petition.upvoteCount += 1;
    await petition.save();

    const upvote = new Upvote({
        user: userId,
        petition: petitionId
    });
    await upvote.save();

    res.status(200).json({
        message: "Petition upvoted successfully",
        upvoteCount: petition.upvoteCount
    });
});
```

Fig 4.5: Upvote Code

CHAPTER 5

IMPLEMENTATIONS

5.1 Introduction Tools and Technologies Used.

The system is designed using modern web technologies to ensure a fast, scalable, and efficient grievance and petition management system. It includes two main sections:

- User Section: Users can register, log in, submit grievances, edit or delete them, create petitions, and upvote petitions (limited to one upvote per user per petition).
- Admin Section: Admins can view all grievances, mark them as resolved (triggering an email notification to the grievance author), and see petitions sorted by upvotes.

5.1.1 Tech Stack & Tools Used -

Frontend Development:

- Next.js (React Framework) – Our project uses Next.js, a powerful React framework that offers Server-Side Rendering (SSR) and Static Site Generation (SSG). This is especially beneficial for enhancing SEO performance, improving initial page load time, and providing better user experience. For example, the landing page and public grievance listings are statically generated for fast access, while user-specific dashboards are rendered dynamically based on user roles (admin or student).

- Tailwind CSS – To establish a clean, responsive, and accessible UI, we used Tailwind CSS, a utility-first CSS framework. This allowed us to quickly develop custom layouts and components that ensured our portal appeared consistent on different devices and screen sizes. Elements such as complaint submission forms, status indicators, and feedback modals were all styled with Tailwind for a smooth UX.

Backend Development:

- Node.js with Express.js –The backend is driven by Node.js, an event-driven, non- blocking runtime that provides scalability. We designed the backend using Express.js with RESTful APIs for different operations like user registration, filing a complaint, adding support to a petition, and resolving by an admin. It also includes support for middleware functions like validation, authentication, and logging to make backend processes smooth.

- Node mailer - In order to update users and keep them active, Node mailer was included to provide automated email alerts. When an admin resolves a complaint, the user gets an update through email, with better communication and transparency.

Database Management:

- MongoDB - We chose MongoDB because of its ability to work with semi-structured data. Our data model where entities (Users, Grievances, Petitions, Upvotes) have varying schemas and relational dependencies is well-suited for it.
- Mongoose (ODM for MongoDB) – To make our interaction with MongoDB more efficient, we utilized Mongoose that offers schema-based modeling. This enabled us to express relationships, validate data, and ease database queries. For example, when retrieving a grievance, we employed populate() to retrieve user information for admin view.

Authentication and Security:

- JWT (JSON Web Token) – To ensure secure and stateless authentication, JWT was implemented. Upon login, a token is issued to the user, which must be sent with subsequent requests. This protects sensitive endpoints and allows for role-based access control (e.g., only admins can view and resolve all grievances).
- BCrypt.js – Hashes user passwords before storing them in the database.
- Express Validator & Middleware Security – Prevents SQL injection, XSS attacks, and unauthorized data access.

CHAPTER 6

TESTING AND MAINTENANCE

6.1 Testing Techniques and Test Cases Used.

To ensure the Grievance and Petition Management System functions smoothly, we employed various testing techniques:

Testing Levels:

- Unit Testing:
  - Conducted on individual functions and API routes using Jest and Mocha.
  - Validate functions like email notification, upvote uniqueness logic etc.
- Integration Testing:
  - Ensured seamless communication between the frontend (Next.js) and backend (Node.js, Express, MongoDB).
  - Validate the integration of petitions sorting according to the upvote.
- User Acceptance Testing (UAT):
  - Verified the system from the perspective of end users and administrators.
  - Check UI elements for clarity.
- Security Testing:
  - Used Express Validator to sanitize user inputs and JWT authentication to prevent unauthorized access.
  - Verify the one user one vote restriction to prevent the multi-vote using middleware checks.
- Performance Testing:
  - Tested API response times, database queries, and system scalability under heavy loads.
  - Evaluated system scalability by mocking large numbers of grievances, users, and petitions to identify any bottlenecks.

Test Deliverables:

Test deliverables are the artifacts produced during the testing phase of a software development project. These deliverables document the testing activities, results, and outcomes, ensuring transparency, accountability, and traceability throughout the testing process. Here are some common test deliverables that are often produced during software testing:

- **Test Plan:** This document outlines the approach, resources, schedule, and scope of the testing activities for the project.
- **Test Cases:** Detailed instructions specifying inputs, execution conditions, and expected results for testing individual features or components of the software.
- **Test Scripts/Automation Code:** Automated test scripts or code used to execute test cases automatically.
- **Test Data:** Data sets used to validate the functionality, performance, and security of the software.
- **Test Reports:** Reports summarizing the results of testing activities, including defects found, test coverage achieved, and overall quality metrics.
- **Defect Reports:** Documentation of issues found during testing, including descriptions, severity levels, steps to reproduce, and status.

Test Cases used:

Table 6.1 Password Test Case Table

TEST CASE ID	INPUT PASSWORD	EXPECTED RESULT	DESCRIPTION
TC01	Abc@12	Pass	Valid password meeting all criteria
TC02	abc123	Fail (No Special Character)	Missing special character
TC03	ABC@#$	Fail (No number)	Missing at least one numeric character
TC04	A1@bc	Fail (Less than 6 characters)	Not meeting the minimum length requirement
TC05	123456	Fail (No special character)	Missing special character
TC06	@#$%^&	Fail (No number)	Missing numeric and alphabetic characters
TC07	Abcde@	Fail (No number)	Missing numeric character
TC08	Ab1@#c2	Fail (More than 6 character)	Exceeds the max required length
TC09	Ab1#cD	Pass	Valid password with mixed case, number, special character
TC010	AB12@#	Pass	

Table 6.2 Upvote Test Case Table

TEST CASE ID	DESCRIPTION	INPUT DATA (USER, PETITION)	PRECONDITION	EXPECTED RESULT
TC01	Valid upvote	Existing user, existing petition	User has not upvoted yet	Upvote successful (201/200 OK)
TC02	Duplicate upvote attempt	Existing user, existing petition	User has already upvoted	Error: Already upvoted (409)
TC03	Non-existent user	Invalid user ID	-	Error: User not found (404)
TC04	Non-existent petition	Valid user ID, invalid petition ID	-	Error: Petitions not found (404)
TC05	User not authenticated/ not logged in	No token or invalid token	-	Error: Unauthorized (401)
TC06	Upvote by user after removing their previous upvote	Valid user and petition	User un-upvoted earlier	Upvote successful (201/200 OK)
TC07	User tries to upvote with malformed request body	Malformed or missing fields	-	Error Bad Request (400)
TC08	Database failure during upvote	Valid date	Simulate DB connection error	Error: Internal Server Error (500)
TC09	Concurrent upvotes by the same user	Multiple upvote requests simultaneously	User has not upvoted yet	Only one upvote recorded
TC010	Valid upvote with extra irrelevant fields	Valid user, petition extra fields	User has not upvoted yet	Upvote successful (201/200 OK)

CHAPTER 7

RESULTS AND DISCUSSIONS

7.1 Description of Modules with Snapshots:

The system consists of two key modules:

7.1.1 Grievance Module:

1. **User Side:**

- Users can submit grievances with relevant details such as title, description, and category.
- Users can edit or delete their grievances anytime before they are marked as resolved.
- Grievances are displayed in a structured and chronological manner on the user's dashboard.
- Each grievance displays its current status (e.g., pending, resolved) to keep users informed.
- A clean and intuitive form interface ensures easy submission with proper validations.
- Users receive an automated email confirmation upon successful submission of a grievance.
- Option to track multiple grievances from a single dashboard view.
- Users can filter their grievances based on status or submission date for better navigation.

2. **Admin Side:**

- On one dashboard, administrators are able to view all grievances that have been submitted.
- Each grievance entry includes the user's name, submission time, and complete description.
- Administrators can indicate complaints as resolved, which will automatically send an email notification to the user.
- For easier management, grievances may be filtered or sorted by status, category, or submission date.
- For quick retrieval, administrators are able to search grievances by keyword or user name.
- To monitor progress, the admin panel includes a resolution status tracker.
- Access to a secure login system is available only to authorized administrators.

Snapshots:

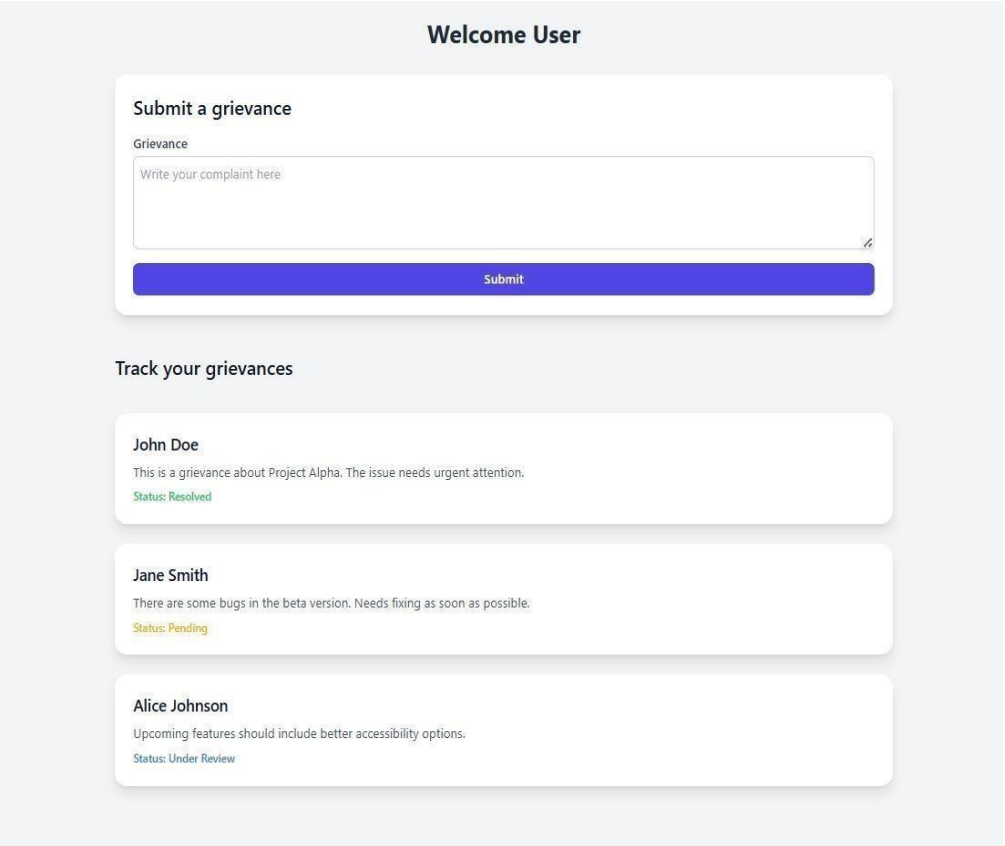

Fig 7.1 User Login

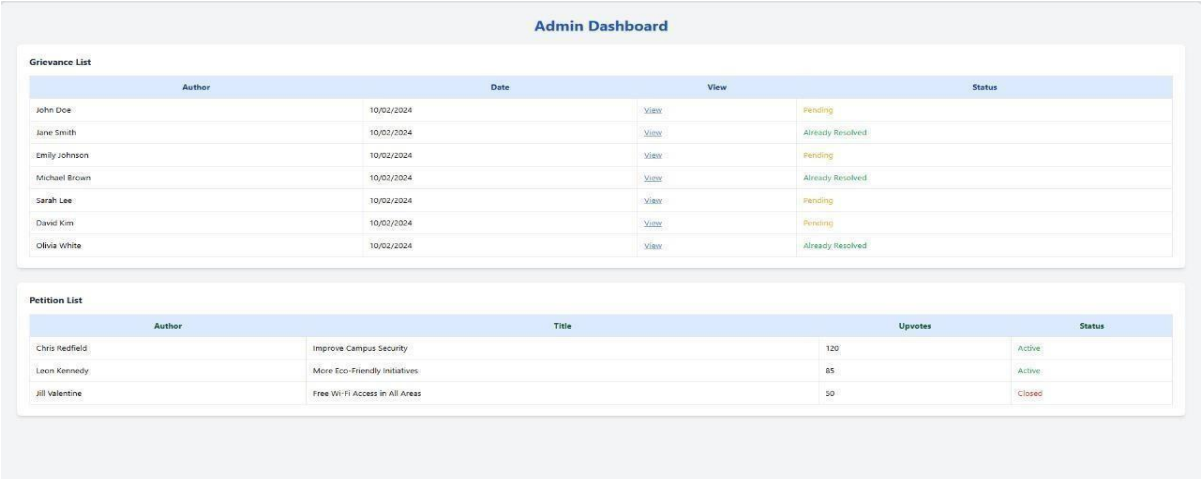

Fig 7.2 Admin Dashboard

7.1.2 Petition Module:

1. User Side:

- Users can create petitions to highlight significant issues.
- Other users can upvote petitions, ensuring priority is given to the most critical concerns
- A user cannot upvote the same petition more than once.
- A live upvote count is displayed next to each petition
- Petitions with high upvotes may be highlighted or featured on the user dashboard.
- Users get notified if a petition they supported is marked as resolved or reviewed.

2. Admin Side:

- Admins can view all petitions sorted in descending order of upvotes.
- This allows them to focus on the most urgent and widely supported issues.
- Admins can export petition data for reports or meetings.
- Each petition is displayed with the creator's details and upvote statistics.
- Admins can respond to petitions with remarks or next steps.

Snapshots:

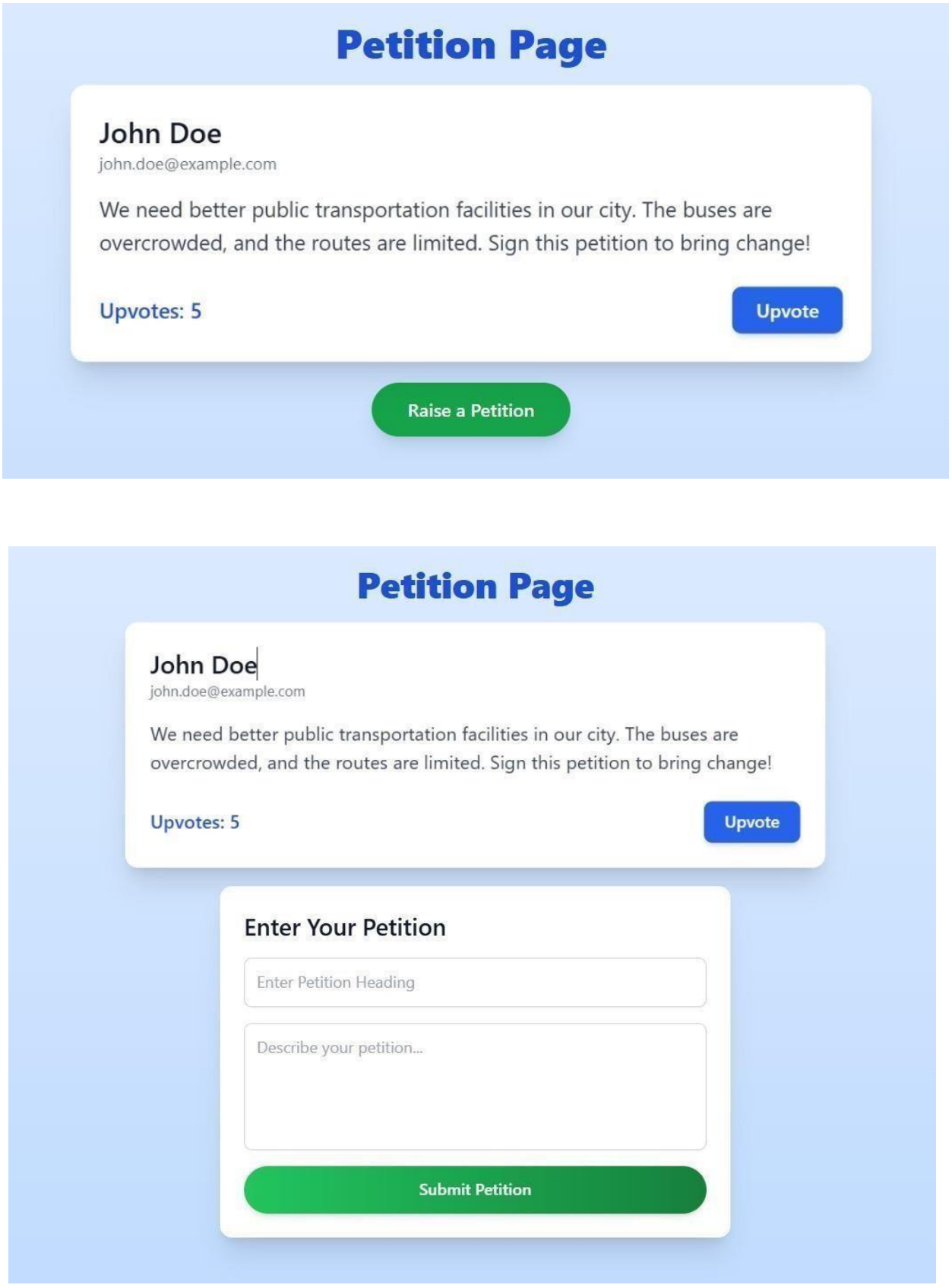

Fig 7.3: Petition Page

7.2 Key Findings of the Project:

The system effectively automates grievance management by facilitating simple submission, tracking, and resolution.

- The email notification system keeps users updated when their grievances are addressed.
- The petition module efficiently collects community support by facilitating upvotes, so important issues receive prompt attention.
- MongoDB and Next.js with Node.js greatly enhanced scalability and response time.
- Role-based authentication for admin and users provides secure access and prevents unauthorized activities.
- The UI is intuitive and easy to use, providing a high level of user experience and minimizing the learning curve.
- Up-to-date status notifications and resolution following enhance openness between users and administrators.
- One-upvote-one-user policy avoids cheating on petition popularity and promotes fair usage.
- Admin interface accepts petitions in the order of upvotes, aiding prioritization of the most popular issues.
- The modularity of the backend design enables simple addition of new features and services in future releases.
- The user grievances can be edited and deleted prior to resolution, providing flexibility .
- Clean and meaningful form validation is achieved through proper form validation.
- Responsive web design provides usability across devices—desktop, tablet, and mobile.
- Email integration is automated from the backend, which minimizes manual effort in case of admin communication.

```
const senderEmail = process.env.ADMIN_EMAIL;
const senderPass = process.env.ADMIN_PASS;

const transporter = nodemailer.createTransport({
    service: 'gmail',
    secure: true,
    port: 465,
    host: "smtp.gmail.com",
    auth: {
        user: senderEmail,
        pass: senderPass,
    },
});

export const sendGrievanceResolvedEmail = async (grievance, author) => {
    const mailOptions = {
        from: "aditya.pandey.1018@gmail.com", // sender
        to: author.email, // receiver
        subject: 'Your Grievance Has Been Resolved',
        text: `Dear ${author.name},\n\nYour grievance has been resolved.\n\nGrievance
        Details:\n${grievance.grievance}\n\nResolved At: ${new Date()}`,
    };

    try {
        await transporter.sendMail(mailOptions);
    } catch (error) {
        console.error('Error sending email:', error);
    }
};
```

Fig 7.4: Email Code

7.3 Brief Description of Database with Snapshots:

The database is designed using **MongoDB** with four main collections:

- **Users Collection**
    1. Stores user/admin credentials and profile details.
    2. Passwords are hashed before being stored.
- **Grievances Collection**
    1. Contains grievance details, submission timestamps, and status (resolved/unresolved).
- **Petitions Collection**
    1. Stores petition descriptions and upvote counts.
- **Upvotes Collection**
    1. Manages user upvotes on petitions to prevent multiple upvotes from the same user.

```
const respondToGrievance = asyncHandler(async (req, res) => {
    const { id } = req.params;
    // Validate the grievance ID
    if (!id) {
        throw new ApiError(400, "Grievance ID is required");
    }
    // Find and update the grievance
    const updatedGrievance = await Grievance.findByIdAndUpdate(
        id,
        { status: true },  // Mark as 'solved'
        { new: true }  // Return the updated document
    );
    if (!updatedGrievance) {
        throw new ApiError(404, "Grievance not found");
    }
    // Notify the grievance author by sending email
    try {
        await sendGrievanceResolvedEmail(updatedGrievance, {
            name: updatedGrievance.name,
            email: updatedGrievance.email
        });
    } catch (error) {
        console.error('Error sending resolution email:', error);
    }
    return res.status(200).json(new ApiResponse(200, updatedGrievance, "Grievance responded to and marked as complete"));
});
```

Fig 7.5: Grievance resolved Code

CHAPTER 8

CONCLUSION AND FUTURE SCOPE

8.1 Future Scope:

There are some most beneficial factors to add in our system are follows:

- **Applying Natural Language Processing (NLP):** to incorporate sentiment analysis can assist administrators in prioritizing tasks and taking more efficient action by categorizing complaints based on their urgency or emotional tone (e.g., critical, neutral, or appreciative).
- **Creating Mobile Applications:** By allowing users to report grievances and vote on petitions on the move, an Android or iOS mobile application would enhance accessibility and user engagement.
- **Real-Time Notifications:** Integrate SMS notices or push messages to immediately alert users of recent petitions, responses from admins, or updates regarding grievance statuses.
- **Multilingual Support:** Incorporating regional languages' support makes the platform friendlier and accessible to a more diverse group while reaching more diverse users.
- **Dashboard and Analytics:** Provide administrators access to graphical dashboard displays indicating numbers of complaints filed, resolution figures, user participation, and high- demand petition topics.
- **For better organization and faster routing:** utilize AI/ML for automated classification of grievances into pre-defined tags or categories (e.g., academic, infrastructure, or harassment).
- **To decentralize grievance handling and improve workflow:** use role-based access control by introducing new user roles with customized permissions, such as grievance officers, moderators, and reviewers.
- Allow users to complain anonymously to encourage reporting of sensitive issues without fear of being found out.
- **Social Media Sharing of Petitions:** Allow individuals to share petitions on social media platforms for more visibility and support from a larger body of people.
- **Audit Logs and History Tracking:** In the interest of accountability, transparency, and administrative scrutiny, track all the steps taken against complaints and petitions.

8.2 Conclusion:

The project's grievance and petition management system offer a thorough, safe, and intuitive platform for addressing user concerns and encouraging group action via petitions. By maintaining the administrator and user roles separate, it provides transparency and accountability in operations. Administrators can view and resolve issues as well as send automated resolution emails to the affected users, and users can update, delete, and create grievances with ease. Through the petition, users can raise concerns about more critical issues and gain support through upvotes.The system also has an easy-to-use interface, authentication for secure access, and a formalized grievance life cycle that speeds up resolution. It is perfect for organizations, colleges, or institutions trying to simplify issue management because it is perfect for groups or institutions seeking to encourage active engagement, two-way communication, and active participation. This project is scalable and adaptable enough to develop into a comprehensive public grievance redressal system with broad influence because it offers a solid basis for future improvements like sentiment analysis, real-time alerts, and sophisticated analytics.

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(57) Abstract :

The present invention provides centralized digital platform designed to streamline and enhance user experience that is designed for organizing and participating in academic quizzes and coding competitions. It eliminates the need for third-party support by offering integrated functionalities, including two-step verification, feedback mechanisms, and an inbuilt coding compiler. The unique addition of resources for practicing frontend programming languages sets it apart, fostering both participation and skill development. No Figure

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ultimate concern Tracking and Response Mechanism

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***Abstract*— The research work aims to develop a Smart Grievance Portal that streamlines the process of registering and managing student grievances in colleges. The portal enables students to submit complaints, track their status, and receive updates, ensuring efficient communication and resolution. The analysis focuses on categorizing grievances based on type, frequency, and resolution time to identify recurring issues and improve administrative responses. The dataset is utilized for visualization to provide a comprehensive view of grievance trends, helping institutions enhance their resolution strategies. This system enables authorities to address concerns effectively and improve student satisfaction. The task is performed using data preprocessing, analysis, and visualization through various tools. From the current research, it becomes evident that infrastructure-related issues are among the most frequently reported grievances.**

Keywords*— *Smart Grievance Portal, student complaints, issue resolution, data analysis, feedback system, visualization.

I. Introduction

In instructive establishments, understudy complaints connected with scholastics, foundation, and organization frequently go neglected because of wasteful detailing frameworks. Customary complaint redressal components depend on manual protest entries, which lead to delays, absence of straightforwardness, and unfortunate goal following. This requires a shrewd and computerized framework that works with consistent correspondence among understudies and the organization while guaranteeing speedy and powerful goals.

The Brilliant Complaint Entry is intended to smooth out the complaint accommodation and goal process by giving a natural stage where understudies can log their grumblings, keep tabs on their development, and get ideal updates. The framework classifies protests in view of their temperament and desperation, assisting heads with focusing on basic issues. This guarantees that grumblings are tended to efficiently and reasonably.

Data analysis and visualization play a crucial role in this system by **identifying trends and patterns in student grievances**. By analyzing the frequency and types of complaints, institutions can gain insights into recurring The entry incorporates dynamic dashboards that give continuous bits of knowledge into grumbling goal rates, reaction times, and classification wise conveyance of complaints. This information driven approach assists executives with upgrading their strategies and further develop grounds offices. Moreover, the framework guarantees straightforwardness and responsibility by keeping a safe and legitimate record of protests and their goals.

By carrying out a Shrewd Complaint Entry, establishments can overcome any issues among understudies and the executives, encouraging a more responsive and understudy driven climate. The framework fills in as a fundamental device for institutional improvement, empowering instructive foundations to address concerns actually, upgrade authoritative productivity, and guarantee understudy fulfillment.

A. Major Contribution

This exploration presents a Brilliant Complaint Gateway that upgrades the complaint redressal process through mechanized grumbling accommodation, constant following, and information driven examination. The gateway empowers understudies to enroll objections flawlessly, while directors get ordered complaints for effective taking care of. The framework likewise gives information representation devices to examine patterns, permitting foundations to work on their approaches and framework. By coordinating straightforwardness, responsibility, and robotization, this entry further develops understudy fulfillment and improves institutional administration.

B. Problem Statement

Numerous instructive organizations battle with wasteful complaint redressal frameworks, prompting delays, annoying issues, and absence of straightforwardness in objection taking care of. Conventional frameworks neglect to give appropriate following systems, making it hard for understudies to screen the situation with their complaints. The shortfall of information driven experiences further keeps foundations from distinguishing and resolving repeating issues proficiently.

The paper is divided into various sections. The first section introduces the research project. The related work by different authors is presented in section 2. The methodology is presented in section 3. consisting of Preprocessing and Visualization. Results are presented

in section 4 while the conclusion and future work is presented in section .

II. Related Work

Considering the rapid growth in the adoption and usage of grievance management systems across various organizations, a significant amount of research has been directed toward improving complaint handling mechanisms in recent years.

A few examinations have investigated the meaning of protest taking care of in associations, stressing its effect on representative fulfillment and hierarchical proficiency. Manikandan B and Gowsalya G (2011) featured that while research on objection dealing with has improved hypothetically, it stays deficient by and by. Ms. G. Ramya (2014) found that viable objection instruments improve hierarchical fulfillment, representative responsibility, and by and large adequacy by recognizing risky practices. Rupali Dilip Taru (2016) underlined that working environment complaints frequently originate from issues like wages, working circumstances, and correspondence, submitting effective question dealing with pivotal for efficiency. Sayli Wable (2017) focused on the significance of complaint components in both unionized and non-unionized work environments, supporting for modified protest the board frameworks. K. Vaitheeswari (2017) called attention to that unfortunate complaint dealing with adversely influences working environment confidence and efficiency, recommending enhancements in objection goal systems. K. Naga Sujatha and Dr. M.M. Sucharitha (2019) found existing complaint taking care of strategies palatable yet recommended improvements for better worker results. Payal Rathod and Nimisha Jariwala (2020) underscored that successful grumbling goal encourages an amicable workplace. In view of these bits of knowledge, this exploration proposes a structured complaint goal system with distinct strides for objection recording, heightening, and goal to guarantee straightforwardness and consistency. It likewise suggests reinforcing the entryway strategy for quicker and more attractive issue goal, integrating worker criticism into the grumbling taking care of interaction for ceaseless improvement, and tending to work environment and social treacheries by investigating arrangements and cultivating inclusivity.

A few investigations have inspected the viability of complaint taking care of components and their effect on worker fulfillment and work environment productivity. Adithi Pradeep and Alfiya Niha (2018) surveyed worker fulfillment with the complaint the board framework in Kerala, reasoning that tending to weaknesses could reinforce work environment connections. Arindam Garg (2018) concentrated on complaint goal in Arunachal Pradesh State Co-Usable Apex Bank Ltd., tracking down the framework viable in guaranteeing representative fulfillment. Ms. G. Ramya (2014) examined complaint taking care of at Swastik Clothes and tracked down an immediate connection between viable complaint the executives and further developed boss representative relations. Enochkwsi Assafuah (2017) investigated how complaint components impact representative execution, inferring that an organized protest dealing with process adds to work environment congruity and efficiency. Dr. G. Balamurugan and V. Shenbagapandian (2016) inspected complaint dealing with viability at Tiruchirappalli Global Air terminal, suggesting further developed correspondence, less procedural deferrals, and expanded representative preparation to upgrade fulfillment and efficiency. In light of these examinations, this exploration proposes a structured complaint taking care of system with clear cycles for objection accommodation, survey, and goal, guaranteeing constant correspondence among representatives and the executives. Moreover, it underlines the significance of regular appraisals of complaint dealing with policies to upgrade their viability and address arising representative worries.

This study expands after existing exploration on complaint taking care of systems, which generally underline reasonableness as a vital calculate viability. While past examinations have analyzed procedural angles, partner contribution, and results, they have frequently neglected basic components, for example, goal speed and dynamic quality in deciding representative fulfillment. Existing exploration recognizes reasonableness as a fundamental part of complaint dealing with yet neglects to examine how elements like the time taken for goal and the job of key partners influence specialist satisfaction. Not at all like past examinations, this exploration moves its concentration toward explicit fulfillment measures — speed, choice quality, and partner commitment — instead of simply procedural reasonableness. Moreover, it assesses the reasonable impacts of altering complaint strategies, for example, diminishing procedural moves toward upgrade goal speed and further develop client fulfillment.

To address these holes, this exploration proposes smoothing out customary complaint methods by diminishing pointless strides while keeping up with dynamic straightforwardness and quality. It presents an inventive methodology utilizing factor examination and numerous relapse investigation to gauge laborer fulfillment in view of variables like goal speed, dynamic proficiency, framework design, and partner cooperation. By limiting regulatory snags, the proposed approach intends to speed up complaint goal, a vital indicator of fulfillment, while thinking about recently disregarded perspectives like administrative mentalities and follow-up systems. This exploration refines existing models as well as gives pragmatic bits of knowledge into further developing complaint taking care of systems for better worker commitment and authoritative viability.

III. Methodology

The philosophy took on in this exploration includes an organized methodology enveloping information assortment, preprocessing, framework plan, execution of AI strategies, representation, and consistent improvement components. The goal is to foster a Savvy Complaint Gateway that smoothes out the grievance dealing with process, guaranteeing opportune goal and improved client fulfillment. The framework is intended to be proficient, straightforward, and robotized, diminishing postpones in tending to complaints while keeping up with high precision and responsibility.

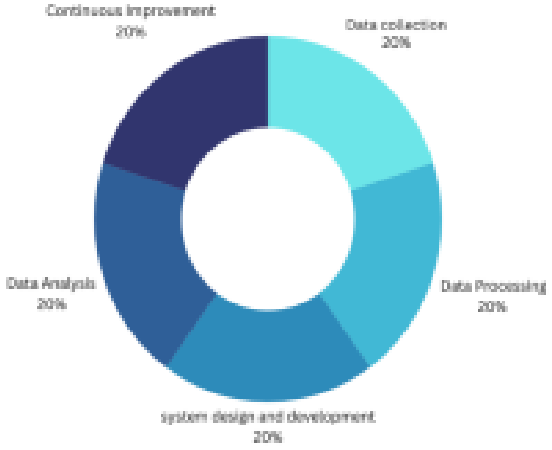

Fig1: Methodology demonstrating the various steps

STEP -1: Data Collection

Data collection involves gathering relevant information from various sources to ensure a comprehensive understanding of the grievance process. This includes **primary data**, which is collected directly from users through surveys, feedback forms, and grievance submissions. **Secondary data** is also gathered from existing complaint logs, historical records, and reports maintained by the organization. The data includes details such as complaint types, user demographics, resolution times, and feedback ratings. This collected data serves as the foundation for further processing and analysis, enabling the identification of patterns, trends, and areas for improvement in the grievance handling system.

STEP-2: Data Processing

Data processing involves cleaning and organizing the collected information to make it useful for analysis. This step includes removing any duplicate or irrelevant data, fixing errors, and ensuring consistency across records. The complaints are categorized into relevant groups, such as the type of issue or the department involved, to help identify common trends. Once cleaned and organized, the data is structured in a way that allows easy access and analysis, helping to identify key patterns and improve the grievance handling process. This ensures the system runs efficiently and accurately reflects the complaints raised by users.

STEP-3: System Design

The system design focuses on creating a user-friendly and efficient platform for handling grievances. It involves defining the structure of the platform, ensuring that each user has appropriate access based on their role. This is achieved through role-based access control, which assigns different permissions to admins, managers, and regular users. The system also includes an automated notification feature, which alerts users about the status of their complaints and ensures timely follow-ups. Additionally, a dashboard is created to provide real-time tracking of complaint statuses, resolution times, and trends. The design ensures that the system is easy to navigate, transparent, and facilitates quick resolution of grievances.

STEP-4: Data Analysis

Data analysis involves examining the processed complaint data to identify trends, patterns, and areas for improvement. Key metrics such as the number of complaints received, average resolution time, and most common grievance categories are analyzed to evaluate system performance. Comparative analysis helps track improvements over time and assess the efficiency of complaint resolution. Additionally, feedback data is studied to measure user satisfaction and identify areas that require further optimization. The insights gained from this analysis support data-driven decision-making, allowing for continuous enhancement of the grievance management system.

STEP-5: Continuous Improvement

Continuous improvement ensures that the grievance management system evolves to meet user needs effectively. Regular user feedback collection helps identify issues and areas for enhancement. System audits are conducted periodically to evaluate performance and detect inefficiencies. Updates and modifications are made based on insights from data analysis, improving complaint resolution speed and accuracy. Additionally, policies and workflows are reviewed and adjusted to align with changing requirements, ensuring a seamless and transparent grievance-handling process. This ongoing refinement enhances user satisfaction and ensures the system remains efficient and reliable.

IV. Result

The results of the grievance management system are assessed based on key performance indicators (KPIs) such as **complaint resolution time**, **user satisfaction**, and **system efficiency**. The data analysis shows a reduction in the average time taken to resolve complaints, indicating an improvement in process efficiency. User satisfaction surveys reveal higher ratings for the grievance handling process, particularly in terms of transparency, communication, and timely updates. Additionally, trends and patterns identified from the data allow for better prioritization of complaints, ensuring that urgent issues are addressed promptly. Overall, the system demonstrates a significant improvement in managing and resolving grievances, leading to a more efficient and user-

friendly experience.

V. Future Work

Future work expects to improve the complaint the board framework by integrating progressed mechanization for grumbling order and prioritization. Executing simulated intelligence driven prescient investigation can assist with expecting normal complaints and recommend proactive arrangements. Moreover, growing the framework to help multi-language openness will further develop ease of use for a different client base. Upgrading versatile similarity through a devoted application can guarantee clients can stop protests and track refreshes consistently. Moreover, incorporating the framework with outside administrative bodies can further develop straightforwardness and responsibility. Future examination can likewise investigate blockchain-based security for objection following to guarantee information trustworthiness and forestall control.

VI. Strength of Papers

The examination covers different parts of grievances, including workplace decency, worker fulfillment, hierarchical strategies, between representative relations, and the effect of objections on efficiency. This complete methodology offers a comprehensive perspective on the issues encompassing grievances inside associations. The examinations accentuate the significance of adjusting grievance the board frameworks to meet the developing necessities of associations, making the discoveries especially pertinent for contemporary work environments. By giving a reasonable survey of the examination led over the course of the last ten years, the paper features key patterns and improvements in the field.

Besides, the exploration distinguishes holes in hypothetical establishments and proposes an organized methodology for future examinations. It energizes the utilization of explicit humanistic speculations to extend understanding specifically areas of grumbling taking care of. The approach stands apart for its oddity, broad extension, and hearty outcomes, contributing essentially to propelling information in the field. This examination resolves the issue more really than past methodologies, offering down to earth answers for further developing protest the board frameworks in associations.

VII. Limitation of the Papers

The examination features a few impediments, including difficulties looked during execution, requirements on information assortment, and expected issues with summing up the outcomes to more extensive settings. Recognizing these impediments exhibits a fair viewpoint and guarantees straightforwardness in the discoveries. One critical restriction is the absence of exact proof to help the proposed arrangements, as the examination essentially depends on hypothetical ideas. Also, the proposed frameworks approach, while significant, may require significant assets and rebuilding, making it challenging for certain associations to carry out. The review's discoveries are additionally well defined for Sumul Dairy in Surat, which may not be relevant to different associations or businesses with various workplaces and complaint related issues.

The utilization of comfort inspecting and the somewhat little example size could restrict the generalizability of the outcomes, decreasing their materialness to bigger, more assorted populaces. Besides, the time limitations of the review might have affected the profundity of information assortment and examination, restricting the capacity to catch long haul protest patterns or changes in representative fulfillment over the long run. These elements ought to be thought about while applying the discoveries to different settings or making inferences about more extensive hierarchical practices.

VIII. Ethical Considerations

Ethical contemplations in this examination include guaranteeing the protection, privacy, and assent of all members associated with the complaint the board framework. Information gathered from clients should be dealt with capably, guaranteeing that individual data is shielded from unapproved access or abuse. Assent ought to be acquired from all members, obviously illustrating how their information will be utilized and guaranteeing them that it may be utilized for the planned reasons for the exploration. Also, it is critical to guarantee that the complaint framework is fair and straightforward, permitting all clients to communicate worries unafraid of counter or separation. Endeavors ought to be made to keep away from predispositions in information assortment and examination, guaranteeing that all objections are dealt with similarly and without bias. Moreover, any proposals for upgrades ought to be made with the prosperity of the representatives and the association as a top priority, lining up with moral guidelines and advancing a positive, comprehensive workplace.

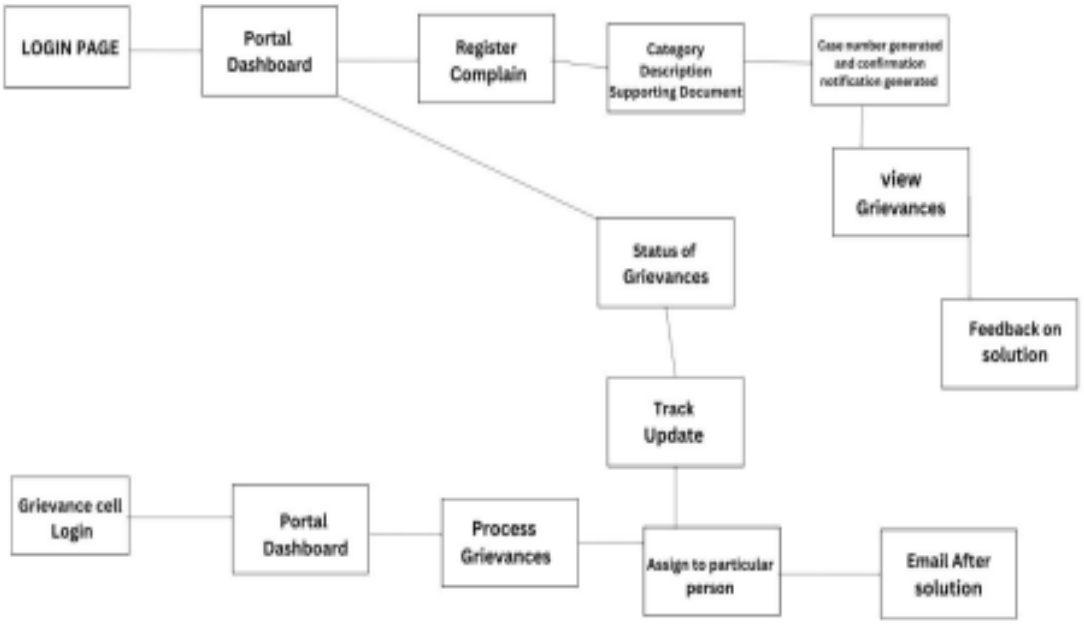

Fig 2: Flow Chart of website

Fig 3: ER Diagram

IX. CONCLUSION

All in all, the turn of events and execution of a proficient complaint the board framework are significant for encouraging a fair, straightforward, and responsive workplace. The examination features the significance of smoothing out protest processes, guaranteeing opportune goals, and further developing correspondence among workers and the executives. By breaking down the viability of existing frameworks and proposing enhancements, the review contributes important experiences into what complaint taking care of can mean for representative fulfillment, efficiency, and in general authoritative achievement. While difficulties, for example, asset restrictions and generalizability stay, the discoveries highlight the requirement for associations to consistently adjust their grumbling administration techniques to address advancing issues. Future work can expand on these experiences to make more comprehensive, effective, and manageable complaint goal structures.

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