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Smart Grievance Redressal System with Multilingual Support Using Django and Automated Translation

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ABSTRACT

In modern governance and institutional management, effective grievance redressal systems play a crucial role in ensuring transparency, accountability, and citizen satisfaction. However, existing systems often suffer from inefficiencies such as language barriers, delayed response times, and lack of proper tracking mechanisms. This project presents a **Smart Grievance Redressal System** developed using the Django framework, enhanced with multilingual support through automated translation services. The proposed system allows users to register complaints in their native language, which are then automatically translated into English using the Google Translate API. This feature eliminates communication barriers between users and administrative departments, ensuring that grievances are accurately understood and processed. The system supports multiple user roles, including citizens (users), departmental staff, and government administrators, each with distinct functionalities and access controls. The application follows a structured workflow where users submit grievances that are assigned unique ticket numbers. These grievances are stored in a MySQL database and can be tracked throughout their lifecycle. Departments can view assigned complaints, update their status (e.g., Pending, Under Processing, Closed), and take appropriate actions. Administrators have a global view of all grievances and departments, enabling efficient monitoring and decision-making. The backend is implemented using Django, which handles request routing, database interactions, and business logic. The frontend is built using HTML templates dynamically rendered with Django's templating engine. The system ensures real-time updates and efficient data handling through structured queries and session-based authentication. Security considerations include user authentication, role-based access control, and validation of input data. However, further improvements such as encryption and protection against SQL injection can enhance system robustness. The system demonstrates how integrating web technologies with natural language processing tools can significantly improve public service delivery. It provides a scalable and user-friendly solution that can be deployed in government institutions, universities, and organizations to streamline grievance handling processes. In conclusion, the proposed system enhances accessibility, efficiency, and transparency in grievance management by



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combining web development with automated translation, making it a practical and impactful solution for real-world applications.

Keywords:Grievance Redressal System, Django Framework, Multilingual Support, Google Translate API, Web Application, MySQL Database, Role-Based Access, Complaint Management System, NLP, E-Governance

INTRODUCTIONGrievance redressal systems are essential components of modern governance and organizational management. They provide a structured mechanism for individuals to report issues, complaints, or concerns and ensure that appropriate actions are taken in a timely manner. With the increasing adoption of digital platforms, traditional manual grievance handling systems are being replaced by web-based solutions that offer improved efficiency and accessibility. Despite these advancements, many existing systems face significant challenges. One of the major issues is the **language barrier**, especially in multilingual countries where users may not be proficient in a common language such as English. This often leads to misinterpretation of grievances, delays in processing, and reduced user satisfaction. Additionally, many systems lack proper tracking mechanisms, making it difficult for users to monitor the status of their complaints. This project introduces a **Smart Grievance Redressal System** that addresses these challenges by integrating multilingual support and automated translation into a web-based platform. The system is developed using the Django framework, which provides a robust and scalable architecture for building web applications. It allows users to submit grievances in their preferred language, which are then automatically translated into English using the Google Translate API. The system supports three main user roles: users, department staff, and administrators. Users can register, log in, submit grievances, and track their status. Department staff are responsible for reviewing and resolving grievances assigned to their department. Administrators oversee the entire system, manage departments, and monitor overall performance. The use of a relational database (MySQL) ensures efficient storage and retrieval of data, including user details, grievances, and department information. Each grievance is assigned a unique ticket number, enabling easy tracking and management. The integration of automated translation not only improves communication but also enhances inclusivity, allowing users from diverse linguistic backgrounds to access the system. Furthermore, the system's modular design allows for future enhancements, such as real-time notifications, analytics dashboards, and integration with mobile applications. Overall, this project demonstrates how modern web technologies and natural language processing can be combined to create an efficient and user-friendly grievance management system, contributing to improved service delivery and user satisfaction.

I. LITERATURE SURVEY (WITH EXISTING METHODS)



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Grievance redressal systems have evolved significantly with the advancement of web technologies and e-governance initiatives. Early systems were primarily manual, relying on physical documentation and in-person interactions. These systems were inefficient, time-consuming, and lacked transparency. With the introduction of web-based platforms, organizations began implementing **online grievance management systems**. These systems allowed users to submit complaints electronically, reducing processing time and improving accessibility. However, many of these systems were limited in functionality and lacked features such as real-time tracking and automated notifications. Research in this domain has explored various approaches to improve grievance handling. One approach involves the use of **database-driven web applications**, where complaints are stored and managed using relational databases. These systems provide structured data management but often lack advanced features such as automation and intelligent processing. Another significant development is the integration of **Natural Language Processing (NLP)** techniques. NLP enables systems to analyze and process textual data, making it possible to categorize grievances, detect sentiment, and identify key issues. Some studies have proposed using machine learning algorithms to automatically classify complaints based on their content, improving efficiency and accuracy.

The use of **multilingual support** has also gained attention in recent years. In multilingual societies, language barriers can hinder effective communication between users and service providers. Researchers have proposed integrating translation APIs, such as Google Translate, to enable users to submit complaints in their native language. This approach has been shown to improve user satisfaction and accessibility. Furthermore, **role-based access control systems** have been widely adopted to ensure security and proper management of user permissions. These systems restrict access to specific functionalities based on user roles, enhancing data security and system integrity. Despite these advancements, many existing systems still face challenges such as lack of scalability, limited automation, and security vulnerabilities. The proposed system builds upon these existing methods by integrating web technologies, database management, and automated translation into a unified platform.

II. EXISTING SYSTEM

Existing grievance redressal systems are primarily based on manual or semi-automated processes. In traditional systems, users are required to submit complaints through physical forms or emails, which are then processed by administrative staff. These methods are inefficient, time-consuming, and prone to errors. Web-based systems have improved the situation by allowing users to submit grievances online. However, many of these systems lack advanced features such as multilingual support, automated tracking, and real-time status updates. As a result, users often face difficulties in understanding system responses, especially when language barriers exist. Another limitation of existing



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systems is the lack of proper **workflow management**. Complaints are often not categorized or prioritized effectively, leading to delays in resolution. Additionally, users may not receive timely updates about the status of their grievances, resulting in dissatisfaction. Security is another concern in many existing systems. Poor implementation of authentication mechanisms and database queries can expose sensitive user data to potential threats. For example, systems that use unparameterized SQL queries are vulnerable to SQL injection attacks. Furthermore, most systems do not provide centralized monitoring capabilities for administrators, making it difficult to track overall performance and identify bottlenecks. In summary, existing grievance redressal systems suffer from limitations such as lack of multilingual support, inefficient processing, poor tracking mechanisms, and security vulnerabilities. These challenges highlight the need for a more advanced and integrated solution, which is addressed by the proposed system.

III. PROPOSED METHOD

The proposed system is a **Smart Web-Based Grievance Redressal Platform** developed using Django, designed to enhance efficiency, accessibility, and transparency in complaint management. The system introduces multilingual support using automated translation, enabling users to submit grievances in their native language while ensuring departments receive a standardized English version. The architecture follows a **three-tier model**: presentation layer (user interface), application layer (business logic), and data layer (database). Users can register, log in, submit grievances, and track their status using unique ticket numbers. Departments can access grievances assigned to them, update their processing status, and manage resolution workflows. Administrators oversee the entire system, including department management and grievance monitoring. A key innovation is the integration of **automatic translation using NLP tools**, which eliminates language barriers—a challenge highlighted in recent multilingual systems research. The system stores both original and translated text, ensuring transparency and traceability. The workflow is streamlined through status updates such as *Pending*, *Under Processing*, and *Closed*, enabling real-time tracking. The use of structured databases ensures efficient data retrieval and management. Compared to traditional systems, the proposed solution offers improved usability, multilingual accessibility, and better workflow management. It is scalable and can be extended with advanced features such as AI-based complaint classification and analytics dashboards.

IV. IMPLEMENTATION

The implementation of the Smart Grievance Redressal System is carried out using the Django web framework, combined with MySQL for database management and Python libraries for backend processing.



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1. Frontend Development

The frontend is developed using HTML templates rendered through Django's templating engine. Dynamic content is generated using context variables passed from views. Users interact with the system via forms for registration, login, and grievance submission. The interface is designed to be simple and user-friendly.

2. Backend Development

The backend is implemented using Django views, where each function handles specific operations such as:

- User registration and authentication
- Grievance submission and tracking
- Department login and grievance handling
- Admin monitoring The system uses global session variables (e.g., username, department) to manage user states.

3. Database Integration

The application uses MySQL with tables such as:

- **signup** (user details)
- **department** (department information)
- **grievance** (complaint records)

SQL queries are used to insert, update, and retrieve data. Each grievance is assigned a unique ticket number for tracking.

4. Multilingual Translation

The system integrates the **Google Translate API (googletrans library)** to convert user-submitted text into English. This ensures departments can process grievances regardless of the original language.

5. Workflow Execution

- User submits grievance
- System translates (if needed)



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- Ticket generated and stored
- Department views and updates status
- User tracks progress

6. Threading & Performance

The system processes requests efficiently using Django's request-response cycle. However, improvements such as asynchronous processing can be added.

7. Security Considerations

Current implementation uses direct SQL queries, which can be vulnerable to SQL injection. Future improvements should include:

- Django ORM
- Input validation
- Password hashing

8. Scalability

The modular design allows integration with:

- Notification systems (SMS/email) ,AI-based classification

V. ALGORITHMS

1. Ticket Generation Algorithm

Generates a unique ticket number for each grievance.

Steps:

1. Retrieve maximum ticket number from database
2. Increment value by 1
3. Assign to new complaint

2. Translation Algorithm

Converts grievance text into English.



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Steps:

1. Input user text
2. Detect language
3. If not English → send to translation API
4. Store translated output

This aligns with multilingual AI systems that enhance accessibility .

3. Status Management Algorithm

Controls grievance workflow.

States:

- Pending
- Under Processing
- Closed

Steps:

1. Retrieve grievance
2. Update status based on department action
3. Store updated status

4. Authentication Algorithm

Validates user credentials.

Steps:

1. Input username & password
2. Compare with database
3. If match → grant access
4. Else → deny access



5. Data Retrieval Algorithm

Fetches grievances based on role.

Steps:

- For users → filter by username
- For departments → filter by department
- For admin → retrieve all

VI. SYSTEM DESIGN

The system design follows a **modular and layered architecture**:

1. Architecture Overview

The system uses a **three-layer architecture**:

- Presentation Layer (UI)
- Application Layer (Django logic)
- Data Layer (MySQL database)

2. Modules

a) User Module

- Registration & login
- Submit grievance
- Track status

b) Department Module

- View assigned grievances
- Update status
- Manage workflow

c) Admin Module

- Add departments



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- View all grievances
- Monitor system

3. Data Flow

1. User submits grievance
2. Data stored in database
3. Translation applied
4. Department retrieves complaint
5. Status updated
6. User views result

4. Database Design

Tables include:

- Users
- Departments
- Grievances

Each grievance includes:

- Ticket ID
- Username
- Department
- Original text
- Translated text
- Date
- Status

5. Security Design

- Authentication system
- Role-based access
- Session handling

Future enhancements:



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- Encryption
- ORM-based queries

6. System Workflow

The system ensures smooth interaction between modules, enabling efficient complaint handling.

7. Scalability

The system can be extended with:

- AI-based classification
- Chatbot support
- Cloud deployment

Modern systems emphasize multilingual and explainable architectures for better performance .

SYSTEM DESIGN IMAGES

In above screen python server started and now open browser and enter URL as <http://127.0.0.1:8000/index.html> and press enter key to get below page



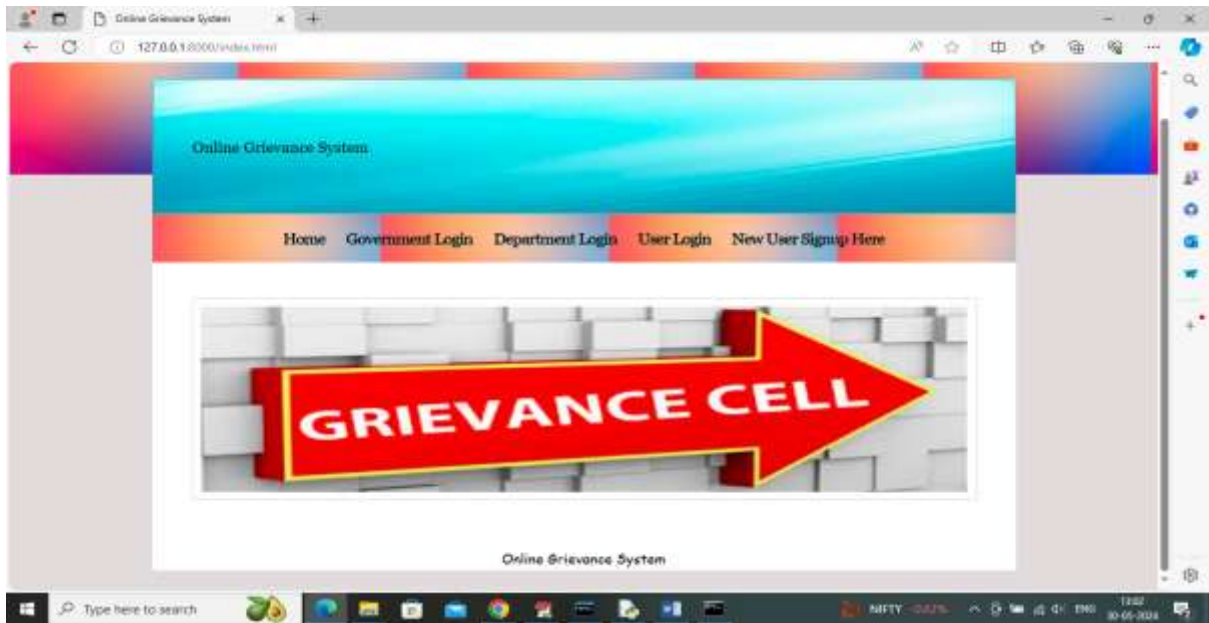
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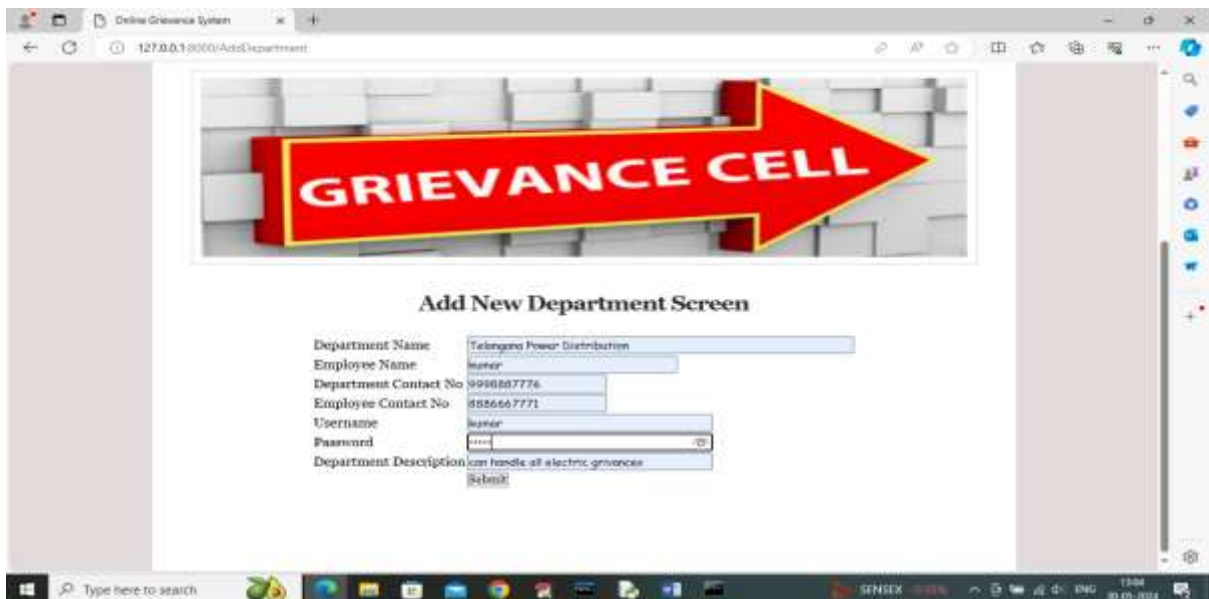
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In above screen click on 'Government Login' link to get below login page



In above screen government user will enter all department details along with login employee who handle grievances of this department and then press button to save details and get below page



In above screen can see available list of departments and similarly you can add any number of departments and now logout and sign up new user to report grievances



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In above screen user sign up completed and now click on 'User Login' link to get below page





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In above screen user can click on 'Report Grievance' link to get below page to report grievances

In above screen user will select department name and then choose language and then enter grievance data and then press button to send grievance to selected department and get below page



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Ticket No	Grievance Username/th>	Department Name	Original Grievance Language Text	English Grievance Text	Grievance Date	Grievance Handling Status
1	john	Telangana Power Distribution	अमरपेट इलाके में भारी बिजली कटौती का सामना करना पड़ रहा है।	Amirpet area is facing heavy power cuts.	2024-05-30	Pending

In above screen user can view all posted grievance details with original and English translated text and can see Grievance status is in 'Pending' state and now logout and login as department to view and handle grievance



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Ticket No	Grievance Username/th>	Department Name	Original Grievance Language Text	English Grievance Text	Grievance Date	Grievance Handling Status	Under Processing	Closed
1	john	Telangana Power Distribution	अमिरपेट इलाके में भारी बिजली कटौती का सामना करना पड़ रहा है।	Amirpet area is facing heavy power cuts.	2024-05-30	Pending	Click Here (Under Process)	Click Here (Closed)

In above screen department of electricity will see grievance details and then department will work on it and then change status as 'Under Processing' or closed by clicking on last two links and now I am clicking on 'Under Processing' link to get below page



In above screen Government user can see 'Electricity' department successfully handle and closed the uploaded grievance and now logout and login as user to view same status

VII. CONCLUSION

The Smart Grievance Redressal System provides an efficient and scalable solution for managing complaints in organizations and government institutions. By integrating multilingual support and automated translation, the system eliminates language barriers and ensures effective communication between users and departments. The use of Django enables rapid development and structured implementation, while MySQL ensures efficient data storage and retrieval. The system supports multiple user roles, enabling streamlined workflow management and transparency in grievance handling. One of the major strengths of the system is its ability to provide real-time tracking through ticket-based management. Users can monitor the status of their complaints, improving trust and satisfaction. Departments benefit from organized complaint handling and simplified workflow processes. However, the current implementation has limitations such as lack of advanced security features and reliance on basic SQL queries. Future enhancements should focus on improving security, integrating AI-based complaint classification, and enabling real-time notifications. In conclusion, the proposed system demonstrates how web technologies and NLP can be combined to create a robust grievance management



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platform. It is a practical solution that can significantly improve service delivery and user experience in real-world applications.

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