

Research Article

# Smart Control Complaint System for Municipal Corporations

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## Abstract

*In India people's corner will be a web based application which will help the citizen of a municipal corporation to register their complaints about day to day problems in their ward through a web application. People's corner will provide a common man to register his complaints and problems to municipal authority as well as let the municipal authorities to address the issue as soon as possible. This application provides an interface to register one's complaint and follow it up. This interface provides a which help clicking up a picture of any generalized problem that people are facing and will help in uploading the photo along with the complaint. This complaint, once registered, will be redirected to specific department of Municipal Corporation for example; a complaint about damaged road will be redirected to Public Work Department. Once the complaint sent to the respective ward the officers can take the necessary actions as soon as possible.*

**Keywords:** Municipal Corporation, Complaint, Classification, Dataset

## Introduction

The main objective of this Complaint Management system is to focus on the issues related to internal system. Complaint Management system is a platform independent application, so this web application can be accessed anywhere in the system. This is also developed for reduces the communication cost between the staffs and to provide the efficient service to their staffs.

The system needs to provide the services to the user who is accessing this system from the collected information and this system gathering Call Registration about the issues to provide services. This system could enhance the day to day activities of the business with efficiency and correctness. Once the call Registered by the staff/user, it should be assigned to service engineers and update the calls as quickly as possible. There are various modules involved in the system.

In India, the fact is, we don't have any direct communication between the government and public in an efficient way for solving the problems i.e. for getting a problem solved in our place we have to pay off the officials and get them solved in 3 months which can be solved actually in 1 month of time Now-a-days, the scenario has changed. In today's world, more focus is given on the availability of the websites and also the various applications present in the android market we manage our daily work on time, precisely, very fast and with our satisfaction. So we are using various technologies in our life for fulfillment of our daily work. There has been extensive research in the area of e-services for municipal use.

The idea is to understand the utility and usability of services that are provided by a Municipal corporation (MC) using newer, better and efficient technologies. There have also been studies which mark the usability perspective of eservices for physically challenged citizen section. While eservices have been in use in Europe for a while, they have been catching up in India in a big way in large cities, only recently.

The main motivation of the problem solver is to make complaints easier to coordinate, monitor, track and resolve, and to provide an effective tool to identify and target problem areas and monitor complaints. The complaint solver is used to record resolve and respond to customer complaints, requests as well as facilitate any other feedback.

## 2. Literature Survey

**Name-:** Aspiration and complaint system: From literature survey to implementation

**Methodology-:** Whistleblower system, Globaleaks

**Conclusion-:** It is required to have a whistleblower system where the employees can express their opinions efficiently, effectively, and anonymously. In this paper, we study existing whistleblower systems that are already used in several organizations

**Name-:** The early-warning and control of service complaint based on time series forecasting method and SPC model — take Ctrip as an example

**Methodology-:** Early-warning model and text mining based on LDA model

**Conclusion-:** This paper applies theories and methods of time series model, emotional classification model, statistical process control (SPC) model and natural language processing to complaint management, and gives basic framework, processes and methods of collecting, using, predicting and analyzing the complaint data in complaint management.

**Name-:** Complaint Management System

**Methodology-:** Register, service engineer, Engineer performance, Report

**Conclusion-:** This System able to show the reports like department wise pending closed calls, open calls, Daily call registration and Engineer performance Report.

**Name-:** Public Complaint Service Engineering based on Good Governance Principles

**Methodology-:** Service Engineering Framework (SEF), consists of four phases: Identification, Design, Develop and Deploy.

**Conclusion-:** The result from the survey shows that the system fulfillment has 49.48% increases from the initial existing conditions. This study contributes to the technical understanding of service engineering and improves existing service engineering framework through a case study.

**Name-:** Design and Implementation of Online Students' Complaint

**Methodology-:** Online Students' Complaint, information system

**Conclusion-:** Online students' complaint is an information system used to help study program in accepting criticism and suggestions by the students to help it improve the services. This research will reduce paper usage, time and energy.

**Name-:** Automatic Multilabel Categorization using Learning to Rank Framework for Complaint Text on Bandung Government

**Methodology-:** Learning to rank is a technique in machine learning for ranking problem

**Conclusion-:** Paper aims to implement investigate this technique to classify the responsible agencies of each complaint text of LAPOR, which is government complaint management system.

**Name-:** Dealing with customer's complaints regarding PQ issues – from DNO perspective

**Methodology-:** Some PQ problems of customer are discussed.

**Conclusion-:** Customer's complaints related to some specific PQ problems are discussed. Furthermore, a PQ complaint handling methodology is discussed briefly, which gives guidelines to tackle customer complaints efficiently.

**Name-:** Toward Reflective Management of Emergency Department Chief Complaint Information

**Methodology-:** Technique for the management of emergency department chief complaint information

**Conclusion-:** system integrating principles from this approach is described and its performance is evaluated in providing categorical information from free-text chief complaints for use, e.g., in automated syndromic surveillance.

### Proposed Methodology

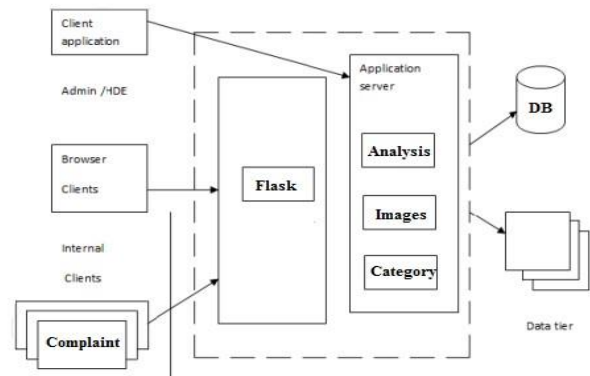


Fig. 1 System Architecture

The architecture of the proposed system is as shown in fig.1. The whole application is based on flask framework of web for python. Dataset for various department keywords is maintained here. When user enters a complaint it is mapped with dataset and automatically assigned to respective department by classification technique. The user as well as admin is able to track the complaint status in the system.

There is no standard dataset of municipal complaints so that we have to create our own complaint dataset referring data.gov website for consumer complaint database. Also we will be using NLTK package for performing NLP operations to detect if it is actually a complaint or compliment. TF-IDF algorithm will be used to compare keywords from complaint with keywords in database of complaints.

### A. Project Modules:

#### User Complaint:

Whenever user see some problems around itself like garbage overflowing, drainage leakage, traffic issues, burglar etc. he/she can take picture and add some description about the situation. Once complaint is made municipality admin can view the complaint.

#### Administrator

View Administrator can view the complaints raised by the users and will provide the updates depending on the work done. Admin will promote the problems to IN WORK status whenever problem solving is started. Once problem is solved admin will promote it to complete stage.

**B. Algorithm:**

**1. NLP:**

NLP is used to perform sentiment analysis with NLTK to get pos tagging and stop words from complaints and detect if it is actually a complaint or compliment. NLP algorithm in proposed system will work as follows,

- Load Corpus for positive, negative and stop words
- Tokenize complaint system
- Pass tokens to NLP engine
- Get pos tagging
- Detect sentiment of sentence
- If sentiment is negative or neutral then it is actually a complaint
- If sentiment is positive then it may not be a complaint

**2. TF-IDF:**

TF-IDF algorithm is used to actually comparing complaint keywords database with actual input complaint. This algorithm will help to classify the complaints as follows

- Get the sentiment from NLP algorithm
- If sentiment is negative or neutral
- Load database of complaint keywords
- Calculate term frequencies from every department of keyword database

$TF(t) = (\text{Number of times term } t \text{ appears in a complaint}) / (\text{Total number of terms in the complaint}).$

- Calculate the inverse document frequency from TF and decide which category of department has higher IDF

$IDF(t) = \log_e(\text{Total number of complaints} / \text{Number of complaints with term } t \text{ in it}).$

- Classify complaint to respective department
- Assign complaint to respective authority

Overall System will follow procedure as mention below,

Step 1: Start

Step 2: Customer Login (email id, Password)

Step 3: Customer can submit complaint using facing problem.

F=complaint (text, area, category)

Step 4: User complaint can analysis Step 5: Remove all unnecessary symbols.

Step 6: Check all keywords and classify one class.

Step 7: Classification (text)

Step 8: Final output can analysis by admin panel actually what type of problem customer can face.

Successfully classify;

O=Output;

Step 9: Stop

**C. Mathematical Model:**

Let S be the closed system defined as,

$$S = \{Ip, Op, A, Ss, Su, Fi\}$$

Where, Ip=Set of Input, Op=Set of Output, Su= Success State,

Fi= Failure State and A= Set of actions, Ss= Set of user's states.

- Set of input=Ip={username, password}
- Set of actions =A={F1,F2,F3,F4,F5,F6} Where,
  - o F1= Authentication of user
  - o F2 = Register complaint
  - o F3 = Classification of complaint
  - o F4 = Assigning complaint to respective department
  - o F5= Status update of complaint resolution
  - o F6= Track status of complaint
- Set of user's states=Ss={registration state, login state, register complaint, classified complaint assigned to department, logout}
- Set of output=Op={classification of complaint and track status}
- Su=Success state={Registration Success, Login Success
- Fi=Failure State={Registration failed, Login failed}
- Set of Exceptions= Ex ={Null Pointer Exception while registration state, Record Not Found (Invalid Password) while login state , Null Values Exception while showing state}

**Result and Discussion**

In the proposed system, the novel approach is presented for complaint classification and management in any municipal corporation. Many times lot of citizens have complaints about municipal services but they are unaware of to which department they should register their complaint. We have achieved the automatic classification of complaints from user using dataset and classification as well as data mining techniques. The status tracking module of complaints enables user as well as admin to monitor actual work and performance.

Comparative results of existing and proposed system is as follow,

**Table 1:** Comparative Results

Parameters	Existing System	Proposed System
Complaint Management	Yes	Yes
Automatic complaint classification	No	Yes
Tracking of complaints	No	Yes
Dataset Support	No	Yes
Data Mining Techniques	Somewhat	Yes

With reference to Table 1 it is clear that we overcome various problems in existing system and our approach works efficiently.

### Conclusion

We proposed and introduced a application for citizens to register complaints against the problems there facing which can be solved by municipal corporations. As nowadays online network are much used by people so we created an app which can be used to lodge a complaint in a very simple way by uploading a picture of suspected place and to provide the location of that place into respective Municipal Corporations. As discussed in the paper it is clear that this system will help authorities to track and get complaints from users in the respective municipal areas. The system will reduce the efforts and time of classifying complaints from various users to respective authorities. Also there is always possibility of people giving positive feedback on the same portal but this sytem will filter those positive feedbacks as compliments using NLP. Another feature of the system for tracking live status will help users as well as admin authorities to track various issues easily.

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