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Department of Computer Science and Engineering
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Synopsis

TITLE : Complaint Classification and Management using NLP		
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1. Introduction

Customers are the essential factor in a banking organization. The business has to support the customers' preferences and demands for creating customer loyalty, which makes the customer still make purchases with the particular company. The customer may feel dissatisfied with the service when he or she receives the delay of services and they do not know the channel for filing the complaint, and also the current complaint handling in the organizations still has the problems. This Smart complaint management system has the service for classifying the complaint, then automatically directs to the responsible department using NLP.

2. Existing System

The current system for addressing complaints for small scale businesses includes a single email for submitting complaints. These complaints are manually classified by an employee to the respective departments and are then addressed by the employee of the respective department.

Other complaint systems also include a list of departments to choose from in the company website and various subcategories under that. The customer has to make various choices related to the category the issue comes under before submitting the complaint.

3. Proposed System

In the proposed system , a registered customer can login to the portal and submit a complaint.

The complaints received from the customers are classified into one of the 18 commonly addressed classes automatically by the NLP model and pushed into the respective databases.

There is a collection for every department which stores the complaints. These complaints are then addressed by the employees of the respective department.

The need for manual classification is no longer needed. The customer can focus on the issue at hand rather than deciding the department and the subcategory the issue comes under. This also helps in swiftly addressing the issues by the company and replying back rather than focussing on manual classification and distribution of complaints and wasting manpower for it.

The customer is notified whenever the complaint is under review and when the issue is resolved. This system provides an efficient complaint tracking system as well.

4. Relational Database Structure

Employee database- Employee id, name, address, phone no, email, salary, date of birth, gender
Customer database- Customer id, name, address, phone no, email, date of birth, gender.
Department database- Department id, name
Every employee works in a department.
Employee/Customer login into the portal with their respective email id and customer/employee id.
Each Department id is linked to its corresponding collection in the NoSql database.

5. RDBMS and NoSQL Integration

A complaint management system is required to maintain a database containing all the complaints filed by the customer. Optionally, he should also be able to upload related pictures if required. As there is no fixed structure for this database, using NoSql for this purpose is more beneficial. The NoSql database has 18 collections, one each for each category of complaint. The NLP model classifies the complaint filed into one of the 18 classes and it is inserted into the corresponding collection of the NoSql database. This database can be retrieved by the corresponding banking sector official and viewed. When a complaint is filed by a customer, the corresponding official is notified regarding the same through mail.

The department of each complaint will be identified by the NLP model and the complaint will be stored under the respective department collection with a complaint id. Along with a complaint id it'll also contain a customer id and employee id of the employee reviewing and resolving the issue. It'll also save the time stamp. The customer can choose to upload an image to explain the issue better. Each collection can be accessed by the employee of the particular department.

6. Societal Concern

This kind of model will be very useful for a customer service department of a small scale bank, that has a single email id to receive customer complaints . This model classifies the complaints they receive from their customers. The complaints need not be classified manually by employees. The issues they have received from customers will be classified into buckets automatically. This results in a quick response for the corresponding complaint. This will help the department to provide customized solutions to the customers in each group. There need not be a complaint department selection option in the GUI of the system. Providing an option for the customer to choose the respective department is not ideal when the bank has many departments to handle and the customer is not knowledgeable to make the choice of department themselves.

NLP and Deep learning will be used to classify the customer complaints into its respective department. After analysing past complaints in banks, it is observed that the complaints are usually classified into 18 classes.

NLTK can be used for pre-processing the data. Various machine learning classification algorithms like random forest give great accuracy which can be utilised.

Pre-trained embeddings, like GloVe or universal-sentence-encoder-large can be used. Embeddings are very accurate models trained over large dataset and these models can be utilised for other purposes. These convert the complaint text into high dimensional text vectors.

CNNs or RNNs can be used to train the model with accurate layers, batch size, epochs and hyperparameter tuning. Various variations can be used to find the most accurate model.