

# Enhancement and Suggestion System using NLP and ML for Response Classification

Mr. Abhijit Uttam Shelake, Mrs. Hetal V. Gandhi

Computer Science and Engineering,  
Walchand College of Engineering,  
Sangli, India.

shelake.abhi@gmail.com, hetal.gandhi@walchandsangli.ac.in

**Abstract-**This paper offers the architecture and layout specification for a campus assistant software on an Android platform. While taking clearance, students need to approach the respective staff member and have to face difficulty in case they are unavailable. In this proposed system, students need not go to every staff for clearance. Instead, they can send request directly to respective staff members and if the staff does not have any issue with that student, they accept request. And when all such requests are accepted by the staff and also higher authorities in some hierarchical order, the clearance form will be submitted. This procedure will save lots of time and efforts of the students. The other problem in an institute which we address is related to Feedback. We collect feedback from stakeholders related to any of the concerned issues and classify them so that they can be forwarded only to the appropriate staff members and incharge of respective department to take cognizance of it and also take corrective action if required. The system enables tracking the status of each feedback and also provides facility to each of the concerned to track and update the actions undertaken with status. For implementing this feedback system, we make use of Natural Language Processing and Machine Learning tools and techniques. Our system also provides the facility for naïve people to find location within the institute.

**Keywords-**Natural Language Processing, Machine Learning.

## I. INTRODUCTION

In many institutions, currently there is no system for feedback analysis or for registering any complaints. Students need to personally meet the respective staff to give their feedback or for requesting for some particular work to be done. As a result, this dissertation work would be moving in this direction a step ahead and making all the activities and allowing all the activities to be done online at just one click. Students need to move individually in college for clearance form and this system would help in overcoming tedious task by providing this activity in this system. Thus it would save the time and efforts of students. We also provide the system to provide map of internal locations within institute. When new person comes to college, that person might not know where the particular location is. Our system will provide this facility, so that no one including new comers will have to face the problem of finding location internally.

## II. LITERATURE SURVEY

**Alexandr Petcovici et al. [1]** proposed a system which based on user location for smart campus environments. Software supports two types UIs; Android-based UI and Web-based UI. Android application utilized for tracking the area of client and give the services to them and web

application which allows client to get to the accessible services and it likewise for supervisors to determine what services available on particular area. A server and PostgreSQL database was used for creating software.

**Mihaela Cardei et al. [2]** proposed an online feedback system which was a web based system that provides the way for colleges to permit students to provide feedback for staff online to enhance their teaching. Students need to provide feedback using one standard feedback form. The safety was additionally maintained by results of feedback which was only visible to authentic user. It helps lecturers to enhance the performance by analysing the feedback given by students.

**Dirk Van Merode et al. [3]** has proposed a BLE 4.0 based advertisement network which has facilities to build up smart campus infrastructure. The network provides dynamic information to its audience. The article also talks about the features and implementation of the system. The author also explains about vendor usage and back-ends needed to provide flexible usages. According to the Dirk Van Merode, “The Smart Campus is an indoor wireless network to deliver location and user based dynamic information to the different visitors, teacher or students of a university campus, both for day-to-day use as for specific events” which requires content a dedicated content management system.

**Vandana korde et al.** [4] as most information was kept as content. Data was additionally found from a few wellsprings of data, In his paper they were attempted to pass on the presentation of text classification, strategy for text classification likewise in light of the fact that the outline of the classifiers and attempted to coordinate the classifier on different criteria.

**Jingjing Cai1 et al.** [5] Proposed a system that Classified text using different algorithms. Classification application related to text includes Sentiment Analysis, Market research, Language Detection, news text classification. Machine learning methods of text classifiers have defects like data sparsity, low generalization ability while classifiers base on deep learning like convolution neural network overcome these defects, and deep learning methods have high predication accuracy and strong learning ability. The authors have given a spotlight on the model presentation used in the text classification while presenting the process of text classification.

**Thota Narendrakumar et al.** [6] proposed work Smart Campus system focuses on smart city technologies and services available in the college area. All component of Smart campus software connected to network and communicated through IOT (Internet of Things), also various object and things were sensed and controlled by the system. System brings new features like emergency services, notification, canteen management, temperature monitoring, water monitoring system, college map all in one platform: Android application which was fast and reliable for delivering the information at the real time or run time

**Liang Chee Liang et al.** [7] proposed a plan that can encourage the development of a smart and friendly campus. They focus on three features of smart campus. These are: The arrangement of groups of students dependent on interests mining, the arrangement of educational guidance dependent feeling analysis of data. Development of an optional exchanging platform planned for streamlining the allocation of campus resources. In view of these goals, they planned and executed a mobile platform called on campus as the first step towards the advancement of a smart campus that has been presented in certain colleges. They found that software could effectively achieve the three previously mentioned elements.

### III. METHODOLOGY

1. The step wise methodology consist of following phase

**1.1. Data Collection:** Collecting Student and Staff data from institute, extracting data from Google API and also collecting feedback data from different websites.

**1.2. Services:** The system will provides authentication to students using their registration id and password and allow them to access following services.

- Feedback: The feedback submitted by students analysed by classifiers at the server. The classifier classifies the feedback based on different classes by using sentiment analysis.
- Clearance: The clearance form request by student will be submitted only if all the respective members accepted. If there is any problem then the staff will fire the query and student need to full fill this activity.
- Map: When student open the map in application, the application will check the latitude and longitude and if student is in college area then he will able to view the college map. Which can guide that person to the specific location within campus.

The control flow diagram detecting each of the services which we are looking forward to provide as a part of application are as detected in the figure 1

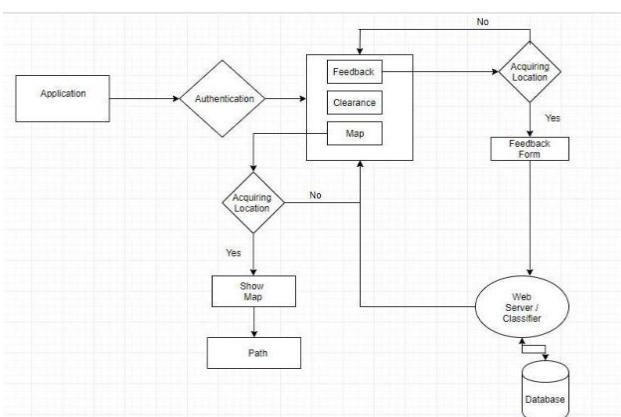


Fig.1 The Control flow of dissertation work.

#### 2. Naive Bayes:

A Bayes theorem is used to classify objects in an algorithm program that is Naive Bayes classifier. This classifier assumes sturdy independence between attributes of knowledge point. Spam filters, text analysis and diagnosis are included in standard uses of Naive Bayes. They are widely used for machine learning and are easy to implement.

#### 3. Text CNN:

Convolutional neural network is used for collection of key data. For example, n-gram in sentences. It has following layers. Information layer in which the pre-processed content of information is the contribution to model. Content component is extracted in Inserting layer. Convolution layer is made up of various sized channels in after effects of acquiring different feature maps. The

element of convolution layer is diminished in Max pooling layer. The likelihood of class in multi category task is yielded in softmax layer.

#### 4. Text RNN:

The size of channel is fixed in CNN. It becomes difficult to demonstrate longer grouping data and parameter change of channel size is also monotonous But, text RNN or bi- directional RNN (bi-directional LSTM) catches bi-directional "n-gram" data with different lengths. Fig shows rule of text RNN model which manages to do the same

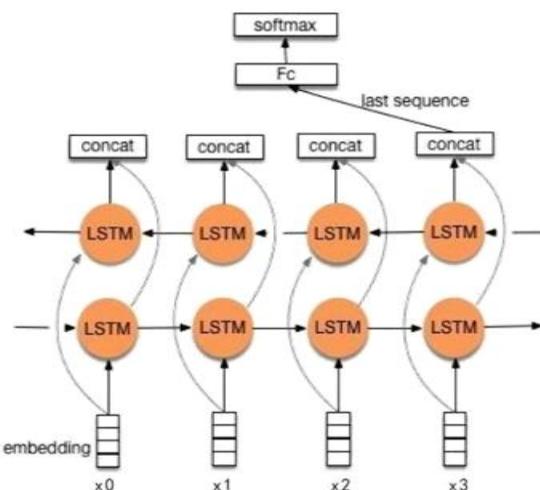


Fig.2 TextRNN model.

**4.1. TextRNN+Attention:** Attention mechanism is added to the model based on the TextRNN model which helps in solving the problem of long term dependence and present each words contribution to the results and form processing framework of Seq2seq model. Fig.3 shows the structure of TextRNN + Attention model.

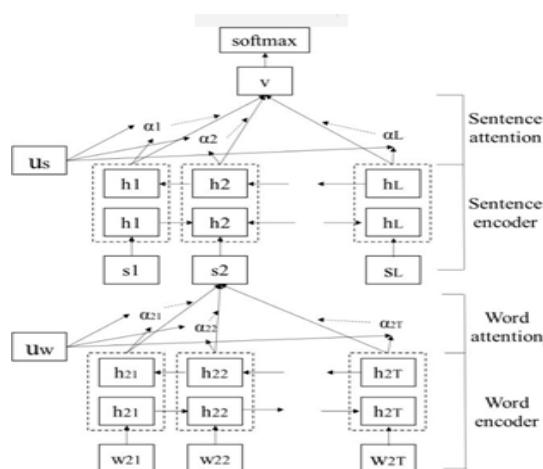


Fig.3TextRNN + Attention.

The text classification models are not only the above three but also TextRNN (2) (TextRNN+ CNN) models. The above three are most commonly used and their operation effects and work efficiency are improved as compared to the previous research. Even though there are many models choice depends on type of task and size of data to be processed.

#### 5. Java:

Java J.R.E 1.5 or more is needed for CMS. Java program run in any platform which supports Java environment. The Java archives contains the compiled files. JavaScript is client side scripting language used for dynamic web pages and it provide special features to web pages. Java have JVM (Java Virtual Machine).

#### 6. HTML:

HTML is the text marker language which is backbone of website as we cannot develop any website without its knowledge. If the web page is made by using only HTML we cannot add any effective features. We can use many static and dynamic methods to make our web page effective. To create effective and interactive web page we need HTML, CSS, PHP and JavaScript.

#### 7. JAVASCRIPT:

Of late, JavaScript is the language of script which has gained fame. It is the language of World Wide Web. Its main use being adding various web functions, validations, detecting and creating cookies etc. Java script is adopted by all the browsers because it is the best scripting language by far.

## IV. EXPERIMENTAL RESULT

Text classification is the method of assigning tags and categorizing text into organized groups. The use of text classification is sentiment analysis, topic detection and language Detection. Sentiment analysis is a process of checking the given text is positive or not. There are different machine learning models used to train a final model. For Text classification we used stochastic gradient descent, support vector machine, decision tree, and random forest algorithm.

#### 1. Accuracy Table

Table I Accuracy Table of Feedback Classification.

Model	Accuracy
Stochastic Gradient Descent	94%
Support Vector Machine	97%
Decision Tree	90%
Random Forest	87%

#### 2. Performance Measures

Table II Performance Measures for different tasks

Classes	Precision	Recall	F1-Score
Sentiment Analysis	0.87	0.83	0.84
Feedback Classification	0.85	0.87	0.86

### 3. Web Application

We developed website which contains different webpages for clearance form system as well as feedback tracking system using HTML5, PHP, JavaScript and Bootstraps. MySQL database was used to store the data. Android app was developed to display google map navigation which shows the direction from origin to destination.

Department	Status	Remark
Maintenance Department	Accepted	
Store Manager	Accepted	
Librarian	Accepted	Done
Hostel Rector	Accepted	
Account Office	Accepted	
HOD	Accepted	
Director	Accepted	
Result	Clearance form successfully submitted	

Fig.4 Clearance Form.



Fig.5 College Map.



Fig.6 Admin Panel.

## V. CONCLUSION

This system is developed to assist the different stakeholders in the institute. The system provides information with just one click. The map functionality helps the students and new comers in college to easily find the particular location. This system saves the paperwork and time and speedup the clearance activity. The feedback and suggestion mechanism serves to enhance the overall code of conduct. This system is highly beneficial for students and institution as a whole.

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