Slides Description

Slide # 4: As the dataset very badly class imbalance dataset. We perform the down sampling the dataset and class balance the dataset. The count of class samples is presented in slide.

Slide # 5: For the cleaning of the data, we abolish all stop words (like coma, punctuation marks etc.) from tweets texts. Additionally, we also remove commas, special characters, integers between the words, and URLs from the tweet's content. Lastly, we also remove the emojis character from the tweet text and convert the rest of the text into lower case letters. The ending step in the data preprocessing was words stemming that transformed the words into their conventional form. For converting the words into their original case, a well know stemming algorithm label as Porter Stemmer was used from NLTK library.

Slide # 6: For the features extraction from hate speech and offensive language dataset, we used the built-in Count Vectorizer function of scikit-learn library. It converted the distinct words into bag of words and for each tweet text, it placed 1 for existing words and 0 for missing words. Resultantly, all tweets were converted into asperse matrix of numerical features using the Count Vectorizer.

Slide # 7: For the classification of tweets sentiment, we used the support vector machine (SVM) machine learning model. Model was initialized using the scikit-learn library of python. Use all the default parameters of SVM except kernel. Tuned the kernel parameter of SVM for multi label classifiers (Chainer and powerset) separately.

Slide # 8: Pass the initialized SVM model to the chainer model for multi label classification. Chainer classifier use the text features to predict the three labels including the hate speech, offensive language, neutrality. Set the linear kernel of SVM with chainer classifier.

Slide # 9: Pass the initialized SVM model to the powerset model for multi label classification. Powerset classifier use the text features to predict the three labels including the hate speech, offensive language, neutrality. Set the linear Sigmoid of SVM with Powerset classifier.

Slide # 11 & 12: By following the complete learning of the model, the 980 tweets of test set were used for the evaluation of the model. Model showed the 0.8083% test accuracy. SVM Chainer classifier also showed the 0.8171% and 0.8125% precision and recall scores respectively. For the calculation of evaluation measures, the complete classification report was calculated with test samples and predicted samples. The confusion matrix of the model showed the graphical representation of model performance.

Slide # 13 & 14: By following the complete learning of the model, the 980 tweets of test set were used for the evaluation of the model. Model showed the 0.8018% test accuracy. SVM Chainer classifier also showed the 0.8038% and 0.8028% precision and recall scores respectively. For the calculation of evaluation measures, the complete classification report was calculated with test samples and predicted samples. The confusion matrix of the model showed the graphical representation of model performance.

Slide # 15: Compare the results of both models using the selected evaluation measures. Got the approximately equal; accuracy with both models. But SVM Chainer showed the slightly higher precision and recall score.

Slide # 16: In the proposed study we got the approximately 80% accuracy score with SVM chainer and SVM powerset. For the recognition of hate speech and offensive language in tweets text, the performance of the machine learning model may be increased in future studies. For increasing the performance of the recognition, the combination of datasets from different sources can be used in future work. Different feature extraction methods and combination of different features set can used for the increased performance of the prediction model. Lastly, the machine learning and deep learning models from different domain like ensemble learning can be used increase the efficiency of hate speech and offensive language recognition. Collectively, the different feature extraction techniques, different set of features and transfer learning technique with different models be used to increase the performance of the prediction model.

Slide # 17: We got the approximately balance accuracy score (80%) for both models. As the processed dataset was the class balanced dataset and the accuracy is best evaluation measure for class balance corpuses, we select the accuracy score as the base evaluation measure. But in the evaluation process, we got the approximately same accuracy score for both models. The SVM with chainer classifier showed the high precision and recall score compare to the powerset classifier. Although our base measure is accuracy and it is best for class balance corpuses, but for selecting the best model in case of equal accuracy score, we refer to other selected evaluation score. By considering the all-evaluation scores, we analyze that performance of the SVM with chainer classifier is more robust as compare to the SVM with powerset classifier.