Overview of Abusive Comment Detection in Tamil - ACL 2022

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Abstract

The social media is one of the significant digital platforms that create a huge impact in peoples of all levels. The comments posted on social media is powerful enough to even change the political and business scenarios in very few hours. They also tend to attack a particular individual or a group of individuals. This shared task aims at detecting the abusive comments involving, Homophobia, Misandry, Counterspeech, Misogyny, Xenophobia, Transphobic. The hope speech is also identified. A dataset collected from social media tagged with the above said categories in Tamil and Tamil-English code-mixed languages are given to the participants. The participants used different machine learning and deep learning algorithms. This paper presents the overview of this task comprising the dataset details and results of the participants.

1 Introduction

Their distribution of digital information has increased to a greater extent. The importance of the Online Social Networks (OSNs) has grown significantly in recent years, and they have become a go-to source for acquiring news, information, and entertainment (Halevy et al., 2022; Priyadharshini et al., 2021; Kumaresan et al., 2021). However, despite many positive impacts of employing OSNs, a growing body of evidence indicates that there is an ever-increasing number of malevolent actors who are exploiting these networks to spread poison and cause harm to other individuals (Chakravarthi et al., 2020; Chakravarthi and Muralidaran, 2021). The term "Hate Speech" (HS) refers to any form of communication that is abusive, insulting, intimidating, and/or incites violence or discrimination and that disparages an individual or a vulnerable group on the basis of characteristics such as ethnicity, gender, sexual orientation, or religious affiliation (Whillock and Slayden, 1995; Sampath et al., 2022; Ravikiran et al., 2022; Chakravarthi et al., 2022; Bharathi et al., 2022; Priyadharshini et al., 2022). Because of this diversity in thematic foci, we refer to them as themes. Examples of topics include misogyny, sexism, racism, transphobia, homophobia, and xenophobia (Chakravarthi et al., 2020, 2021; Ghanghor et al., 2021a,b; Yasaswini et al., 2021). The abusive comments targeting people have a huge impact on them psychologically (Wiegand et al., 2021). This task lays a foundation on how these comments can be detected for Dravidian language Tamil. Tamil is a Dravidian classical language used by the Tamil people of South Asia. Tamil is an official language of Tamil Nadu, Sri Lanka, Singapore, and the Union Territory of Puducherry in India. Significant minority speak Tamil in the four other South Indian states of Kerala, Karnataka, Andhra Pradesh, and Telangana, as well as the Union Territory of the Andaman and Nicobar Islands (Subalalitha, 2019; Srinivasan and Subalalitha, 2019; Narasimhan et al., 2018). It is also spoken by the Tamil diaspora, which may be found in Malaysia, Myanmar, South Africa, the United Kingdom, the United States, Canada, Australia, and Mauritius. Tamil is also the native language of Sri Lankan Moors (Sakuntharaj and Mahesan, 2021, 2017, 2016; Thavareesan and Mahesan, 2019, 2020a,b, 2021). Tamil, one of the 22 scheduled languages in the Indian Constitution, was the first to be designated as a classical language of India. Tamil is one of the world’s longest-surviving classical languages. The earliest epigraphic documents discovered on rock edicts and “hero stones” date from the 6th century BC. Tamil has the oldest ancient non-Sanskritic Indian literature of any Indian language (Anita and Subalalitha, 2019b,a; Subalalitha and Poovammal, 2018). Since the comments posted online contain mixture of languages that are familiar with the users that are posting the comments, the task also considers detecting
the comments from the Tamil-English code mixed language.

The goal of this task is to identify whether a given comment contains abusive comment. A comment/post within the corpus may contain more than one sentence but the average sentence length of the corpora is 1. The annotations in the corpus are made at a comment/post level. The participants were provided development, training and test dataset in Tamil and Tamil-English languages. The dataset is tagged using various classes namely, Homophobia, Misandry, Counter-speech, Misogyny, Xenophobia, Transphobic and Hope Speech. To the best of our knowledge, this is the first shared task on abusive detection in Tamil at this fine-grained level. 11 teams participated for detecting abusive comments in Tamil language and Tamil-English language tasks.

2 Task Description
The task is primarily a comment/post-level classification task. Given a YouTube comment, the systems submitted by the participants should classify it abusive categories. The participants were provided with development, training and test dataset in Tamil and Tamil-English. The dataset is tagged using various classes namely, Homophobia, Misandry, Counter-speech, Misogyny, Xenophobia, Transphobic and Hope Speech. 10 teams participated for detecting abusive comment in Tamil language and 11 teams participated for the Tamil-English language.

3 Data Description
The Tamil language training data contains 2240 comments, the validation set contains 560 comments, and the test data set includes 699 comments. The Tamil-English language test data set contains 5943 comments, the validation set contains 1486 comments and the 1857 test comments. The distribution of the seven categories in the whole dataset is shown in Table 1.

4 Participant’s methodology
4.1 Pre-processing strategies
The participants have predominantly used “transliteration” as one of the pre-processing strategies. The Tamil-English code-mixed texts necessitate this approach. Apart from transliteration, removal of punctuation, stop words have also been used. Class balancing of the data has also been attempted as the distribution of the class labels in the given training dataset.

4.2 Participant’s Systems
Term Frequency- Inverse Document Frequency (TF-IDF) and BERT embeddings have been used to extract and represent the features in the feature extraction phase. The participants have used a wide variety of machine learning algorithms, deep learning models, and transformers. Logistic Regression, Linear Support Vector Machines, Gradient Boost classifier, and K neighbor classifier have been used as machine learning models. Ensemble models attempted composed of a mixture of these machine learning models. Multi-layered perceptron, Recurrent Neural Networks (RNN), Vanilla LSTM (Schuster and Paliwal, 1997) were opted as deep learning models. On the transformers front, mBERT(Devlin et al., 2018), MuRIL BERT (Khanuja et al., 2021), XLM RoBERTa (Liu et al., 2019), and ULMFit (Howard and Ruder, 2018) models have been opted. The MuRIL BERT models have shown the best performance compared to the other models. This is primarily because it is trained exclusively for Indian languages. The ranking of the teams for both of the language tasks is shown in Tables 2 and 3. The ranking is given based on their f1 score and how intense their system is, which counts their pre-processing techniques and the number of models used to prove their performance.

5 Error Analysis of the Systems
The participants have used the standard metrics such as Weighted Precision, Weighted Recall, and Weighted F-score to evaluate the performance of their systems. The equations of these metrics are given below.

\[ Precision = \frac{TP}{TP + FP} \]  \hspace{1cm} (1)

\[ Recall = \frac{TP}{TP + FP} \]  \hspace{1cm} (2)

where, TP= Number of True Positives and FP= Number of false Positives

\[ F - Score = 2 \times \frac{Precision \times Recall}{Precision + Recall} \]  \hspace{1cm} (3)
### Table 1: Distribution of Comment Categories in the dataset

| Comment category | Count in the datasets |
|------------------|-----------------------|
| None of the above | 5011                  |
| Misandry         | 1276                  |
| Counter-speech   | 497                   |
| Xenophobia       | 392                   |
| Misogyny         | 336                   |
| Hope Speech      | 299                   |
| Homophobia       | 207                   |
| Transphobic      | 163                   |

### Table 2: Rank list based on weighted average F1-score along with other evaluation metrics (Precision and Recall) for Tamil Language

| TeamName                                | Precision | Recall | F1-Score | Rank |
|-----------------------------------------|-----------|--------|----------|------|
| CEN-Tamil(S N et al., 2022)             | 0.380     | 0.290  | 0.320    | 1    |
| COMBATANT                               | 0.290     | 0.330  | 0.300    | 2    |
| DE-ABUSE(Palanikrmr et al., 2022)       | 0.330     | 0.29   | 0.290    | 3    |
| DLRG(Diraphe et al., 2022)              | 0.340     | 0.260  | 0.270    | 4    |
| TROPER                                  | 0.400     | 0.230  | 0.250    | 5    |
| abusive-checker                         | 0.140     | 0.140  | 0.140    | 6    |
| Optimize_Prime(Patankar et al., 2022)   | 0.130     | 0.130  | 0.130    | 7    |
| GJG                                     | 0.130     | 0.140  | 0.130    | 8    |
| umuteam                                 | 0.130     | 0.130  | 0.130    | 9    |
| MUCIC                                   | 0.120     | 0.130  | 0.120    | 10   |
| BpHigh(Pahwa, 2022)                     | 0.180     | 0.120  | 0.060    | 11   |
| SSNCSE_NLP(Varsha and Bharathi, 2022)   | 0.130     | 0.140  | 0.090    | 12   |

### Table 3: Rank list based on weighted average F1-score along with other evaluation metrics (Precision and Recall) for Tamil-English Language

| TeamName                                | Precision | Recall | F1-Score | Rank |
|-----------------------------------------|-----------|--------|----------|------|
| abusive-checker                         | 0.460     | 0.380  | 0.410    | 1    |
| GJG                                     | 0.370     | 0.340  | 0.350    | 2    |
| umuteam                                 | 0.350     | 0.370  | 0.350    | 3    |
| pandas(G L et al., 2022)                | 0.330     | 0.370  | 0.340    | 4    |
| Optimize_Prime(Patankar et al., 2022)   | 0.310     | 0.380  | 0.320    | 5    |
| MUCIC                                   | 0.400     | 0.280  | 0.290    | 6    |
| CEN-Tamil(S N et al., 2022)             | 0.300     | 0.230  | 0.250    | 7    |
| SSNCSE_NLP(Varsha and Bharathi, 2022)   | 0.260     | 0.240  | 0.250    | 8    |
| IIITDWD                                 | 0.380     | 0.170  | 0.180    | 9    |
| DLRG(Diraphe et al., 2022)              | 0.180     | 0.150  | 0.140    | 10   |
| BpHigh(Pahwa, 2022)                     | 0.140     | 0.160  | 0.100    | 11   |
\[ P_{\text{weighted}} = \sum_{i=1}^{L} (\text{Precision}_i \times \text{Weight}_i) \]

, where \( i \) is the test sample size.

\[ R_{\text{weighted}} = \sum_{i=1}^{L} (\text{Recall}_i \times \text{Weight}_i) \]

\[ F^{-}\text{Score}_{\text{weighted}} = \sum_{i=1}^{L} (F^{-}\text{Score}_i \times \text{Weight}_i) \]

The participants have also used accuracy, Macro-Precision, Macro-Recall, and Macro-F-scores to evaluate the system. It can be observed that the highest F-score achieved by the systems is 0.41. This is primarily due to the inability of the techniques to handle the errors observed consistently in all the systems during the classification. The various scenarios of errors are explained below.

**Scenario 1:** The systems fail to classify the sentences whenever the sentences do not contain even a single Tamil word. In other words, the sentences contain only the English transliterated words. For example, the comment, “World health enda ilukara ara kora nayae,” is classified as “Xenophobia” by all the systems while the actual label is “None of the above.” The comment is actually against a xenophobic person. On the other comment, “sornam lakshmi mudiyathu mooditu” is classified as “Misandry” by all the systems while the actual class is “Misogyny.” The name “sornam lakshmi” refers to a woman but none of the systems labeled this right.

**Scenario 2:** The comments contain spelling mistakes and could not be handled during the pre-processing step. For example, This is classified as “None of the above” by all the systems while it is supposed to be “Misandry.” This is due to the spelling mistake in the comment. The word “시티” should have been “시티다.”

**Scenario 3:** The pre-processing strategies have had a harmful effect on the text and have resulted in spelling mistakes. For example, the text, This has lead to the misclassification.

**Scenario 4:** Certain comments were too short and had references that were not captured by the systems. For example, the comment give below is supposed to be classified as “Misandry.” It is instead classified as “None of the above.” Apart from these scenarios, the systems could never classify incomplete comments and double entendre comments correctly. Specific comments had hyperlinks that had the main content, which was missed by the systems.

## 6 Conclusion

This shared task aims at detecting the categories of abusive comments that are posted on social media. This kind of analysis would quantify the negativity that is spread in the society, which in turn should be turned into positivity either by enacting laws to enforce restrictions on posting comments on social media. This has been the motivation behind hosting this shared task which has attempted to aggregate the comments from social media in two languages, namely, Tamil and in code mixed language containing Tamil and English scripts. These comments were trained by various machine learning, deep learning, and transfer learning models. 11 teams participated in Tamil and Tamil-English languages tasks. 7 categories of abusive categories were tagged in the collected comments. The ranking of the teams was done based on the performance shown by the systems that were used by the participants and the in-depth analysis done by them. It was observed that the transformer models showed better performance when compared to that of the rest of the systems.

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