SRS(Software Requirement Specification)

Project Title:

Cyberbullying detection on social media using machine learning

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Category: Web Application

Purpose: Implement cyberbullying detection system using given dataset.To study impact of various standard ml algorithms along with different data processing techniques in improving accuracy.

Scope: The study will show the effects and the consequence of cyberbullying today in our society, especially to those teen agers who are most affected. This will answer the question about how we can prevent from being cyberbullied. This study will show us how are teens cyberbullied and the fact that being a victim of cyberbullying can be a common and painful experience.

Early detection of harmful social media behaviors such as cyberbullying is necessary for identifying threatening online abnormalities and preventing them from increasing. So, In this project we successfully fetched the comments from the subreddit using praw, and I also able to identify the vulgar comments by using three machine learning algorithm bag of words, term frequency inverse document frequency, support vector machine.

Introduction: Cyber bullying is the use of technology as a medium to bully someone. Social networking sites provide a fertile medium for bullies, and teens and young adults who use these sites are vulnerable to attack. Through machine learning, we can detect language, patterns used by bullies and their victims and develop rules to automatically detect cyber bullying content.

- Popular social networks like Facebook, Instagram, Twitter and Snapchat
- Text messages sent via direct devices (SMS)
- Instant messaging features offered by e-mail providers, applications or social networks
- Chat rooms and e-mails
- Although symptoms of cyberbullying vary, children and adolescents who are victims of bullying usually have the following symptoms:
- Emotional anger after using the Internet or mobile devices
- Overprotective behavior about digital life
- Getting away from family members, friends and general routine activities
- To exhibit angry and irritated behavior at home

Existing System:

- Techniques like unsupervised labeling methods which use N-gram, TF-IDF methods to detect cyberbullying are used which use the youtube dataset to detect attacks.
- A support vector classifier is used to train models for detection.

Proposed system:

Cyberbullying detection is designed using machine learning techniques. Twitter data set is collected with features and labels and mode is trained using **the Naive** Bayes algorithm and trained model is applied to live chatting application which has multiple clients and a single server. For each message, cyberbullying is detecting using the model and then alert messages are posted on chat boards.

Advantages:

- Cyberbullying detection process is automatic and time taken for detection is less and it works on the live environment.
- The latest machine learning models are used for training models that are accurate.

Functional Requirements of the System:

- Following are the functional requirements on the system:
- For detecting bullying content we need a proper data set which is implemented in real time.
- A proper algorithm for analyzing the data set.
- The model should give a respective output and it should not deviate from the expected output.

Non-Functional Requirements of the System:

- **Correctness:**

1. Model should have accuracy between 60-90%
2. Data privacy should be maintained

- **Ease of Use:**

1. Algorithm should not take more than 10 mins for execution
2. Model Coder provides an interface which allows the user to interact in an easy manner

- **Modularity:** The complete product is broken up into many modules and well-defined interfaces are developed to explore the benefit of flexibility of the product
- **Robustness:** This software is being developed in such a way that the overall performance is optimized and the user can expect the results within a limited time with utmost relevancy and correctness. Non functional requirements are also called the qualities of a system. These qualities can be divided into execution quality & evolution quality. Execution qualities are security & usability of the system which are observed during run time, whereas evolution quality involves testability, maintainability, extensibility or scalability

Software tools:

GitHub Desktop, MlFlow, DVC, Tox, Postman, Heroku

Deployment:

Ubuntu 20.08, Python3.9, 4Gb ram, Web browser.

Hardware specification:

Windows 8, 8Gb ram, Intel I5 processor.

Conclusion: Using ensemble learning to combine different machine learning models (such as Naive Bayes classifier with the TF-IDF word vectors and the Support Vector Machine using our custom word vectors) to improve the model evaluation metrics. Creating more detailed custom word vectors for the SVM to train creating more detailed custom word vectors for the SVM to train. As we know, social media became a common platform for most of the people where they share their views but few teenagers are there who perform bullying on these types of platforms and that bullying may disturb someone mentally and emotionally. So, In order to stop this type of teasing or bullying, we developed our project to detect cyberbullying using machine learning.