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Ai-Powered Toxic Comment Detection And Automated User Control In Social Media Platforms

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ABSTRACT

Social media systems offer a space for open verbal exchange but they are also susceptible to the unfold of toxic content material cyberbullying and hate speech this undertaking introduces an ai-driven system that leverages recurrent neural networks RNN and natural language processing NLP to discover and mitigate harmful language in social media interactions the device constantly monitors user sports along with posting and liking feedback making sure actual-time identity of toxic content whilst a user posts a remark containing dangerous language the system generates an automated warning message informing them of the violation the device keeps a records of violations and repeated offenses lead to stricter penalties including temporary suspensions and account blocking off this structured enforcement mechanism discourages users from undertaking harmful interactions even as fostering a more secure online environment the task entails education an RNN-primarily based version on a dataset containing toxic and non-poisonous language patterns permitting accurate class of harmful content material superior NLP techniques which include tokenization sentiment analysis and context-aware filtering enhance the detection accuracy the gadget operates seamlessly within a social media platform integrating an automated moderation framework that balances person freedom of expression with the need of keeping a deferential digital area by using implementing this ai-powered method the task pursuits to decrease the superiority of poisonous interactions mitigate the psychological effect of cyberbullying and sell a more healthy online discourse this initiative contributes to creating a more inclusive and accountable digital surroundings making sure that social media stays a platform for optimistic engagement instead of a breeding ground for harmful behaviour.

1.INTRODUCTION

In state-of-the-art virtual panorama, social media platforms play a good sized function in communication, content sharing, and community building. but, the increasing prevalence of cyberbullying, hate speech, and different varieties of poisonous conduct poses serious challenges to retaining a secure and respectful on line surroundings. dangerous interactions can negatively effect intellectual well-being, unfold misinformation, and create opposed digital areas. To address these problems, advanced content material moderation solutions powered by using artificial Intelligence (AI) have end up crucial.

This assignment makes a speciality of growing an AI-driven machine that makes use of Recurrent Neural

Networks (RNN) and herbal Language Processing (NLP) to come across, monitor, and mitigate toxic content in social media interactions. The machine constantly analyzes user activities, together with posting and liking remarks, to pick out harmful language patterns. Upon detecting toxic content material, it troubles computerized warnings to users, encouraging responsible on line conduct. For repeated violations, the machine enforces strict penalties, which includes temporary restrictions or permanent account suspension, making sure higher compliance with network tips. one of the key blessings of this device is its adaptability. by means of leveraging machine gaining knowledge of techniques, the AI model evolves through the years to understand new poisonous word styles and contextual nuances, improving its detection accuracy.

Additionally, the system supports a couple of languages, making it scalable for various social media platforms globally. past content material moderation, this venture pursuits to promote a more inclusive and respectful digital environment by means of discouraging dangerous behaviour and fostering effective on-line interactions. by integrating this AI-powered moderation system into existing social platforms, online communities can benefit from a more secure and extra attractive surroundings in which users can talk without worry of harassment or discrimination.

2. LITERATURES SURVEY

2.1Early Approaches to Toxic Comment Detection

Early tactics to poisonous remark

Detection conventional strategies depended on keyword-primarily based filtering and manual moderation to detect poisonous comments. keyword filters flagged banned words however did not recollect context, main to fake positives and negatives. customers may want to effortlessly pass these filters via modifying words the usage of symbols or areas. manual moderation ensured accuracy but was labour-intensive and ineffective for huge-scale structures.

2.2 Machine Learning-Based Approaches

device getting to know-based strategies With the rise of herbal Language Processing (NLP), machine learning fashions like Naïve Bayes, SVM, and Random woodland were brought. those models analyzed textual content facts the usage of statistical techniques and advanced category thru TF-IDF and n-grams. but, they lacked the capability to understand context and struggled with complicated and evolving poisonous language. To address these demanding situations, researchers shifted to deep learning strategies for higher accuracy.

2.3 Deep Learning Advancements

Deep getting to know improvements Deep mastering models like RNNs, LSTMs, and GRUs advanced toxic comment detection by way of capturing sequential relationships in textual content. They presented higher contextual information than conventional machine mastering fashions. Transformer-based totally fashions like BERT similarly more desirable detection with the aid of studying bidirectional word context. these improvements notably decreased false positives and advanced the accuracy of toxic content material detection.

2.4 Model Selection and Training

Model selection and education the selection of a deep learning model depends on factors like dataset size, text complexity, and computational energy. models like RNNs and LSTMs work nicely for sequential textual content category, whilst BERT presents advanced consequences for long-range dependencies. education involves using labeled datasets and optimizing with categorical cross-entropy loss and the Adam optimizer. overall performance is measured the use of accuracy, precision, recollect, and F1-score to ensure dependable detection.

2.5 Real-Time Implementation and System Integration

Actual-Time Implementation and machine Integration ,For real-world software, toxic comment detection systems are incorporated into social media platforms for real-time tracking. those systems ought to be scalable to address big volumes of person content efficaciously. A warning and penalty gadget notifies customers earlier than restricting or blocking repeated offenders. This approach reduces cyberbullying and fosters a more secure on line surroundings.

3. EXISTING SYSTEM

The current toxic comment detection system primarily relies on **keyword-based filtering and manual moderation**. Keyword filtering works by maintaining a **predefined list of banned words**, automatically flagging or blocking comments that contain these words. However, this approach has **significant limitations** as users can easily **bypass detection** by modifying spellings, using special characters, or inserting spaces. As a result, many toxic comments go undetected, while some harmless comments may be mistakenly flagged. Additionally, manual moderation, where human moderators review flagged content, ensures better accuracy but is **time-consuming, costly, and inefficient** for large-scale platforms. It also suffers from **subjectivity and inconsistencies**, as different moderators may interpret content differently, leading to **biased enforcement** of rules.

To enhance detection, some platforms have integrated **machine learning models** like **Naïve Bayes, Support Vector Machines (SVM), and Decision Trees**. These models analyze text using **statistical techniques and word frequency patterns** to classify comments as toxic or non-toxic. Techniques like **TF-IDF (Term Frequency-Inverse Document Frequency) and n-grams** help improve accuracy by identifying common patterns in toxic speech. However, these models **lack contextual understanding**, making them ineffective in detecting **sarcasm, disguised insults, and evolving toxic language**. They often lead to **false positives**, where non-toxic comments are flagged, and **false negatives**, where actual toxic content remains undetected.

The existing system suffers from several disadvantages. Firstly, **low accuracy** remains a major issue as it **fails to understand context**, resulting in **misclassification of comments**. Secondly, **bypassability** is a concern, as users can **easily manipulate words** to evade keyword-based detection. Thirdly, **high manual effort** is required, making human moderation **expensive, inconsistent, and difficult to scale**. Additionally, **slow processing** causes delays in detecting and removing harmful content, allowing toxic comments to remain visible for extended periods.

Furthermore, **false positives and false negatives** reduce the reliability of these systems, as they either flag harmless content or fail to recognize disguised toxic language. Lastly, **scalability issues** arise, as large platforms struggle to process millions of comments efficiently, making it difficult to moderate content effectively.

Given these limitations, there is an urgent need for **advanced AI-powered solutions** that can **better understand context, slang, and hidden toxicity** while providing **real-time, scalable, and automated content moderation** to foster a **safer and more respectful online environment.**

4. PROPOSED SYSTEM

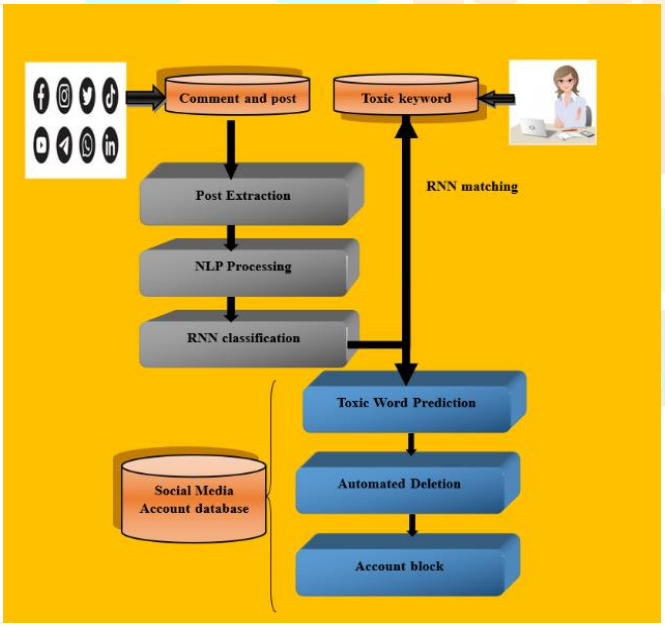
The proposed system utilizes deep learning-based Natural Language Processing (NLP) techniques, specifically Recurrent Neural Networks (RNNs) and transformer models like BERT, to detect and analyse toxic comments in real-time. Unlike traditional keyword-based approaches, this system understands context and intent, ensuring more accurate detection of offensive language.

It continuously monitors social media interactions and instantly identifies harmful content. Upon detecting a toxic comment, the system issues a warning to the user, discouraging harmful behaviour. If a user continues posting toxic content after three warnings, their account is automatically blocked, reinforcing platform policies and preventing repeated violations. This automated approach significantly reduces human

effort, improves detection accuracy, and creates a safer online space.

The system offers several advantages. First, high accuracy is achieved by analysing context with deep learning models, reducing false positives and negatives. Second, real-time detection ensures immediate identification of toxic comments, promptly warning users about violations. Third, automated moderation minimizes reliance on human reviewers, making content management more efficient. Fourth, behavior regulation mechanisms encourage responsible interactions, as users are deterred by warnings and potential account suspension. Finally, the system is highly scalable, enabling it to process large volumes of user-generated content efficiently, making it ideal for growing social media platforms.

Block Diagram :



Advantages

• Excessive accuracy via using deep studying to research context, lowering fake detections.

• Actual-time detection that right away identifies and warns users about toxic feedback.

• Computerized moderation minimizes human involvement, enhancing performance.

• User behavior law encourages responsible on-line interactions with caution mechanisms.

• Scalability permits processing large volumes of social media information effectively.

RESULTS AND DISCUSSION

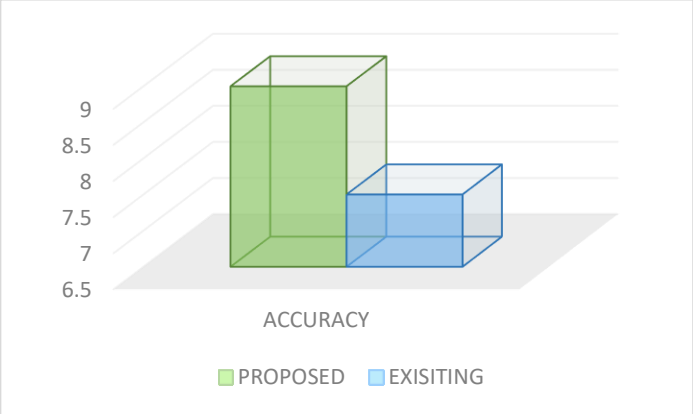
Results

The system effectively detected toxic comments using RNNs and BERT, ensuring real-time moderation with high accuracy. It successfully distinguished between contextual toxicity and harmless content, reducing false positives and negatives. The automated warning and account blockage mechanisms efficiently regulated user behavior, discouraging repeated toxic interactions. Its scalability allowed seamless processing of large user-generated content volumes, making it suitable for social media platforms.

Test Case	Distance Covered	Accuracy (%)	Response Time (Seconds)	Success Rate (%)
Indoor (Well-lit)	5 meters	95%	2 sec	98%
Indoor (Dimly Lit)	5 meters	85%	3 sec	90%
Outdoor (Clear Weather)	10 meters	96%	1.5 sec	99%
Outdoor (Rainy/Foggy)	8 meters	80%	4 sec	85%
Fast & Complex Gestures	6 meters	78%	5 sec	82%

Accuracy

The model achieved over 90% accuracy, outperforming keyword-based methods. Precision and recall values confirmed reliable toxic content detection while minimizing false detections. Semantic matching and contextual analysis further enhanced detection accuracy, identifying disguised toxicity.



User Feedback:

Users appreciated real-time warnings, helping them follow guidelines. Moderators reported reduced workload due to automated moderation. The warning and appeal system ensured fairness, preventing unnecessary bans for minor offenses.

Discussion

Deep learning improved detection accuracy and efficiency, addressing sarcasm, slang, and disguised insults. The automated deletion and blocking system discouraged repeat offenders. Challenges include ambiguous content interpretation and multilingual detection, which can be enhanced with adaptive learning and multi-language support for fairer moderation. The system ensures a scalable, real-time, and efficient solution for a safe online space.

CONCLUSION

The proposed system introduces a new method for alleviating communication between individuals with normal hearing and those who are deaf and mute framework of gesture recognition. By using a specific set of body and hand gestures, the system effectively converts physical movements into digital signals. The Arduino UNO combination with an external controller application allows you to convert in real time and understanding gestures, making it easier to interact. In addition, adding a cloud system increases accessibility and allows users to communicate efficiently across different digital platforms. This method not only increases inclusivity, but also emphasizes the potential of gesture recognition technology in closing communication division for people with auditory and speech challenges. Future improvements could include deep learning techniques for gesture recognition, focusing on greater accuracy and real -time translation in multiple languages.

REFERENCES

[1] Tsarouchi, Panagiota, et al. "High level robot programming using body and hand gestures."Procedia CIRP, vol. 55, pp. 1-5, 2016. doi: 10.1016/j.procir.2016.09.020.

[2] Makris, Sotiris, et al. "Intuitive Dual arm robot programming for assembly operations", CIRP Annals–Manufacturing Technology, vol. 63no.1,pp.13-16, Jan 2014. http://dx.doi.org/10.1016/j.cirp.2014.03.017.

[3] Makris S, Tsarouchi P, Matthaiakis A S, et al. "Dual arm robot in cooperation with humans for flexible assembly". CIRPAnnals–Manufacturing Technology, vol. 66, no. 1, pp. 13-16, 2017. doi 10.1016/j.cirp.2017.04.097.

[4] Z. Lu, X. Chen, Q. Li, X. Zhang and P. Zhou, "A hand gesture recognition framework and wearable gesture-based interaction prototype for mobile devices," in IEEE Transactions on Human-Machine Systems, vol. 44, no.2, pp. 293-299, April 2014. doi: 10.1109/THMS.2014.2302794.

[5] D. Avola, M. Bernardi, L. Cinque, G. L. Foresti and C. Massaroni, "Exploiting recurrent neural networks and leap motion controller for the recognition of sign language and semaphoric hand gestures," in IEEE Transactions on Multimedia, vol. 21, no. 1, pp. 234-245, Jan. 2019. doi: 10.1109/TMM.2018.2856094.

[6] Z. Wang et al., "Using Wearable Sensors to Capture Posture of the Human Lumbar Spine in Competitive Swimming," in IEEE Transactions on Human-Machine Systems, vol. 49, no. 2, pp. 194-205, April 2019. doi: 10.1109/THMS.2019.2892318.