Pattern Recognition

Mitigating Bias in Real-Time Cyberbullying Detection

CSE424

Group 02

01/ Maliha Binte Masud
02/ Abdur Rahman Shafi
03/ MD Rakibul Hasan Talukder
04/ Amina Zannat Nurhan
05/ Sabbir Hossain Mirza
06/ Fahmid Hasan Chowdhury
07/ Radito Dhali
08/ Zakaria Ibne Rafiq

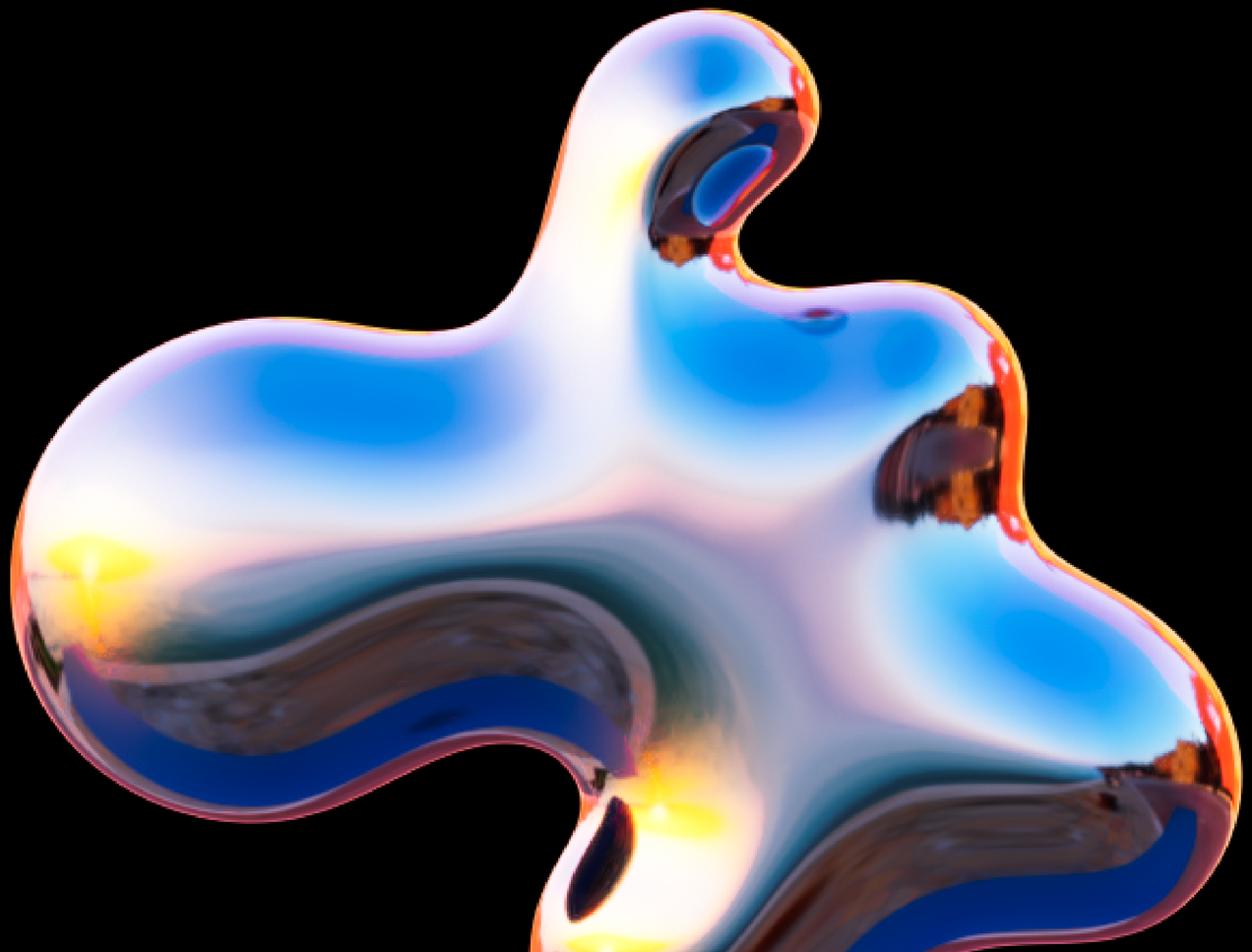
Introduction

The exponential growth of social media has brought with it a serious challenge: cyberbullying. While numerous solutions have been proposed to combat this issue, achieving unbiased detection of online harassment in real-time remains a significant hurdle. Our project aims to strike a critical balance – effectively mitigating biases based on factors like gender, language, recency, religion, race, and nationality – while simultaneously classifying text that constitute harassment with exceptional accuracy.

01 - Investigation

01/ Investigation

- Unintentional biases in cyberbullying detection based on gender, language, recency, religion and race.
- Studies are mostly based on datasets from specific social media platform.
- Imbalanced datasets hampers accuracy.
- The model was on based on lexical analysis and only tackles textual form of bulling.
- Studies that specialized in identifying various manifestations of cyberbullying on Twitter, but limited to processing text written in English fonts.



03 - Analysis

02/ Analysis

Our project tackles dataset bias and enables real-time text classification. We found Transformer Networks (powerful for text analysis) and Sentence-DistilBERT (efficient multilingual model) as suitable classifiers.

- Transformer Networks: Ideal for cyberbullying detection due to its ability to analyze complex text relationships.

- Sentence-DistilBERT: Offers low computational cost and strong performance for real-time multilingual classification.

Selenium WebDriver is a strong candidate for real-time data scraping to feed our classifiers with fresh data.

04 - Datasets

04/ Datasets

This project utilizes a dataset compiled by Jason Wang. Employing Dynamic Query Expansion (DQE), a semi-supervised technique, he extracted natural data points from Twitter focused on specific cyberbullying categories. The DQE algorithm was connected through the GetOldTweet3 library, automating a significant portion of the data collection process.

Jason Wang, Kaiqun Fu, Chang-Tien Lu, November 12, 2020, "Fine-Grained Balanced Cyberbullying Dataset", IEEE Dataport, doi: https://dx.doi.org/10.21227/kn1c-zx22.

05 -Conclusions

05/ Conclusions

Our project proposes a real-time cyberbullying detection system using Transformer Networks for accuracy and Sentence-DistilBERT for efficient multilingual processing. By combining these with Selenium WebDriver for data scraping, we aim to achieve real-time and unbiased classification of cyberbullying text.

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Thanks

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