

Uncovering Cyberbullying Themes from Unconsented Facebook Pitik Post Through Text Mining Techniques

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ABSTRACT

Pitik, referred as street photography; is a colloquial phrase for taking random photographs, arbitrarily from people without permission and/or consent. Empirically, numerous comments circulating in Facebook Pitik posts containing words related to humiliation, embarrassment, shaming, stalking, and bullying. There are yet no studies conducted to confirm or prove the existence and extent of cyberbullying themes in Facebook Pitik trends. Cyberbullying is not new to social media environments and as technologies and trends change over time, the medium of cyberbullying also changes. We show in this study the proofs of the existence and the extents of cyber bullying themes in Facebook Pitik posts. In this study, we utilized methods of natural language processing – specifically text mining and emotion polarity computation, also known as sentiment analysis. Using Facepager software, 68,000 documents/comments are collected from select Facebook pages of photographers involved in the trend of Pitik posting. Results showed that the collected documents contain 26.29 % pertaining to harassment; 35.48% to flaming; and 19.45% to denigration. The existence of negative emotions is also seen from collected documents including anger, uncertainty, constraining, fear, sadness, and disgust. Findings may help policy makers to enhance the Facebook community standards making its app safer and free from issues relating to cyberbullying, especially in unconsented Pitik posts.

Keywords: Cyberbullying, Natural Language Processing, Pitik Posts, Sentiment Analysis, Text Mining.

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I. INTRODUCTION

Facebook has gained immense popularity as a social networking and photo-sharing platform, with an astonishing 250 billion images and 350 million new pictures being added daily (Smith, 2020). As of July 2022, the platform has 4.70 billion active users worldwide, accounting for a staggering 59% of the world's population (Kepios, 2023). In the Philippines alone, there were 76.01 million active Facebook users as of January 2022 (Kemp, 2022). The widespread use and popularity of Facebook have even led some individuals to make a living from it by receiving payment for taking or editing photos uploaded on the platform. This has attracted many others who are drawn to and tempted to monetize their contributions as well. Since Facebook has become a popular platform for photo-sharing, many individuals upload images without obtaining consent from those photographed. While Facebook's Community Standards prohibit certain content such as nudity and sexual harassment, users can still upload photos they don't own (Facebook Community Standard, n.d.). Street photography is commonly referred to as Pitik by most Filipinos, which means taking random photographs (SIRMATA, 2022). Many Pitik photographers capture candid shots of individuals without their knowledge at parties, discos, concerts, and other public events. The trend of Pitik has gained traction in the Philippine Facebook community, with users frequently sharing,

reacting, and commenting on such photos. Some even create their own Pitik postings. As shown in Fig. 1, Facebook users are proud and grateful to have their images featured in Pitik posts. However, not all Facebook users wanted their images to be posted on the social media platform (see Fig. 2), especially if it happened without their consent and agreement. The images may also contain potentially embarrassing and humiliating contents and comments for other people.

Cyberbullying occurs on internet media, and it can happen at any time via SMS, text, and applications or online on social media and gaming platforms, where users can access, participate in, and share any content or photos. Sending, uploading, or spreading violent, misleading, or hurtful content from an unknown person is considered cyberbullying (Hackett, 2019). This includes sharing an individual's personal or private information, which may cause embarrassment or humiliation to their reputation and dignity in the general public. Cyberbullying most frequently takes place on social media platforms like Facebook, which are increasingly popular since they allow users to connect with random people freely. Every day on Facebook, this trend spreads through various types of content such as posts, memes, messages, and comments. Additionally, bullying and harassment may occur through activities unique to the internet like tagging and the formation of online communities (Soriano *et al.*, 2022).

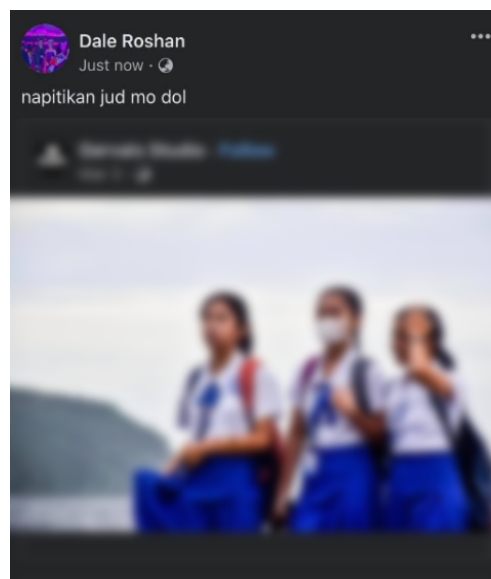


Fig.1. Sample of Pitik Posts on Facebook.

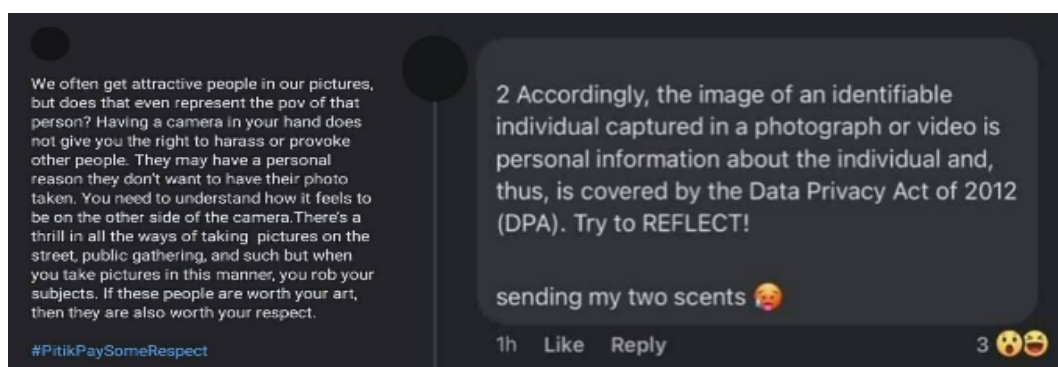


Fig. 2. Sample of Pitik Posts Comments on Facebook.

The "Anti Cyber-Bullying Act of 2015" (Republic Act No. 10627, House Bill 5718, 2015) imposes penalties on those who engage in these illegal actions and serves as a warning to those who publicly humiliate and defame others on social media that such actions are against the law and punishable. This law aims to encourage Filipino people to act responsibly on social media platforms. Pitik photography has become popular in the Facebook community, and it is still deemed legal since most netizens engage in this trend. Taking photos and posting them to social media is a common practice that everyone engages in. Furthermore, since it is a new trend, there is no clear evidence of the volume of cyberbullying acts or themes in Facebook Pitik posts, and no research has explored this area of concern yet. In the study of Ghaderi and Béal (2020) asking how people feel about local photographers taking their photo without permission, findings showed that most participants felt disgusted and afraid when their photo was taken without consent. Some participants believed that taking photos without permission violated ethical values and expressed concerns about photo misuse. Unfortunately, not enough research has been done regarding the potential misuse of unconsented photos getting uploaded on social media platforms.

In this paper, we discuss the utilization of natural language processing methods in uncovering and examining cyberbullying themes linked with the non-consensual sharing of photographs within the Pitik trend in Philippine Facebook community, and thereby addresses the existing gap in research on this topic. Specifically, we utilized text mining and sentiment analysis to extract emotion polarities out from collected Facebook documents/comments and to determine the volume and types of cyberbullying themes associated.

II. LITERATURE REVIEW

A. Facebook Pitik Posts

A Facebook page called Sirmata (2022) has posted an article that discusses the potential risks of Pitik - a colloquial term used to refer street photography. This trend has become popular among local photographers in the Philippines, as they take candid, random shots and post them on Facebook pages to increase engagement on social media. The article explains that Pitik has proven to be an effective marketing strategy, resulting in increased social media publicity for the pages. However, the article also highlights the possible dangers associated with this trend. These dangers include violations of laws such as the Data Privacy Act of the Philippines (Republic Act No. 10173, 2012) and legislation known as the Bawal Bastos Law is also referred to as The Safe Spaces Act (Republic Act. No. 11313, 2019).

B. Cyberbullying Themes

In the studies conducted by Akbulut and Eristi (2011), and Willard (2005) (*as cited in* Kartiwi & Gunawan, 2019), online bullying can take different forms, including flaming, harassment, cyberstalking, denigration, masquerade, trickery, and exclusion. These cyberbullying forms are not mutually exclusive implying that these can overlap over each other. The proceeding discussion elaborates each cyberbullying theme: Flaming. This form of cyberbullying act involves aggressive online messages, posts, or comments online, usually in public form (Bauman, 2015). Moreover, flaming is a form of online harassment characterized by insulting and verbally attacking the victim as a result of online disagreement with someone resorting to name-calling, insults or hostile languages. Harassment. Harassment as a form of cyberbullying act typically involves repetition of intentional behavior causing emotional distress, fear or harm to the victim (Hinduja & Patchin, 2018). It involves repeated and intentional targeting of the victim with hurtful, insulting, abusive or harmful messages and/or comments. Cyberstalking. Although cyberstalking involves characteristics similar to harassment, one distinct characteristic of cyberstalking is that it monitors or tracking online activities of the victim and spreading false rumors, name-calling and aggressive messages, repeatedly (Ali *et al.*, 2018). Denigration. This form of cyberbullying act is usually characterized by sharing, commenting or posting negative and false information about the victim resulting to embarrassment and damage to reputation and social status (Cuervo *et al.*, 2014). Masquerade. This form of cyberbullying act typically creates dummy or fake social media profile or personas aiming to deceive or harm the victim (Styron, 2016). The fake profile may be pretending to be the victim's profile or pretending to be somebody else. Trickery. This type of cyberbullying act involves deceiving others or the victim into revealing personal information or allowing the victim to engage in risky behaviors (Palladino, 2017). Exclusion. This type of cyberbullying act intentionally leaving the victim out of social media activities such as in online groups or conversations (Wan *et al.*, 2017).

C. Natural Language Processing

One subfield of artificial intelligence (AI) is the Natural Language Processing (NLP). The main purpose of NLP is that it concerns with enabling computers to understand, interpret and generate human language. NLP involves application of both computational and statistical techniques and models in analyzing and processing data such as text and speech (Natural Language Processing, n.d.) NLP helps computer make sense breaking down human text and voice. Some NLP tasks include speech recognition, speech tagging, word sense disambiguation, named entity recognition, co-reference resolution, natural language generation, text analytics and sentiment analysis.

D. Text Mining

Text mining, according to Hearst (2023), is a natural language technique that uses computer programs to extract useful information from unstructured data sources. This method enables researchers to identify significant words and concepts from large databases, allowing them to gain insights into a particular topic. Text mining can analyze vast amounts of information rapidly, making it an invaluable tool for research. It is particularly beneficial for studying complex topics, as it allows researchers to examine a large volume of data simultaneously, making it easier to identify trends and patterns. Aggarwal and Zhai (2012) explained that text mining, also known as text analytics involves varied tasks such as text preprocessing, feature extraction, data mining, and text evaluation. Text mining has a broad range of application which can be seen in the fields of business, education, healthcare, social media analysis, and scientific research.

E. Sentiment Analysis

Sentiment analysis, also called opinion mining, is a method that enables to investigate the emotions and feelings of individuals from collected text data or documents (Yue *et al.*, 2019). It is used to extract valuable insights from large volumes of text data, enabling researchers to identify sentiments that are difficult to detect. Sentiment analysis can be viewed also as a text classification process where a particular algorithm classifies a document whether it pertains a positive, negative or neutral emotion (Pang & Lee, 2018).

III. METHODOLOGY

The whole methodological procedure is illustrated in Fig. 3. The process started with data collection, followed by text preprocessing, sentiment analysis, identification of most frequent words and tagging of cyberbullying themes, and lastly, the summarization of discovered knowledge.

A. Data Collection

We extracted text data/comments from *Pitik* posts on Facebook social media platform, specifically from Facebook pages involving street photography (*Pitik*). Text documents – which are the comments from Facebook *Pitik* posts is retrieved in a structured format using an application for automated data retrieval on the web called Facepager (Kadhim, 2018). The tool also makes it simpler to accurately and efficiently gather platform posts and comments. The retrieved data, however, was only limited and available from public *Pitik* posts because Facepager has no feature for extracting information from private posts. One document containing more than 68,000 comments from public posts provides a sizable amount of user-generated content for analysis. The data was formatted in CSV and then saved in an Excel file for analysis.

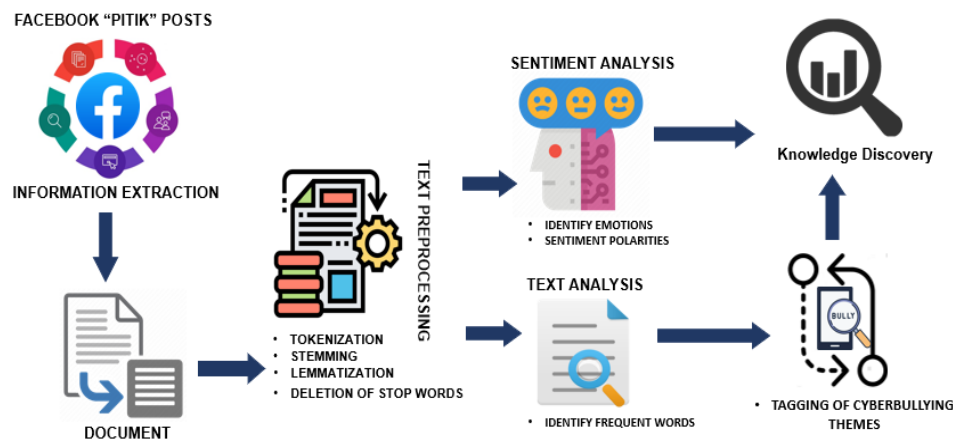


Fig. 3. Methodological Framework.

B. Text Pre-Processing

The preparation of text data involves a critical stage known as text pre-processing, which entails cleaning and refining the text to ensure its suitability for analysis (Kadhim, 2018; Rosid *et al.*, 2020). During text pre-processing, non-informative elements such as special characters and numerical values are removed because these elements do not add meaning to the text and may hinder the analysis (Rosid *et al.*, 2020). By eliminating these elements, text pre-processing helps identify relevant information, making the subsequent analysis more effective. As data obtained from Facebook often contain irrelevant text or information that can impact result accuracy, data preprocessing is commonly used to address this issue. RStudio software using R programming language was utilized under (tm package) for the preprocessing procedure (Kartiwi & Gunawan, 2019). Text preprocessing techniques included are tokenization, stemming, lemmatization and deletion of stop words.

- **Tokenization.** Tokenization, which is the process of removing white spaces and punctuation marks and converting all text to lowercase, involves creating individual tokens that represent the fundamental units of meaning. When the sentence "You are UGLY...!" is tokenized, for example, the resulting output would be tokens such as "you", "are", and "ugly" which can be used for further analysis.
- **Stemming.** Stemming is the process of breaking down a word into its basic form by removing suffixes and affixes. For instance, the words "choosing" and "chosen" would be stemmed to "choos". However, it is important to note that "choos" is not a standard form of the word and would need to be further processed for accurate analysis.
- **Lemmatization.** Lemmatization is a technique that identifies the base form of a word while considering its meaning and context. It determines the standard form of a term, for example, the

word “choos” resulting from stemming would be converted to “choose”. This approach improves the accuracy of text analysis and retrieval by preserving the intended meaning of words.

- **Deletion of stop words.** A stop word list is a collection of language elements that appear frequently in all types of textual content. These elements include coordinating conjunctions such as “and”, “or”, and “but”, as well as common personal pronouns such as “he”, “she”, and “it”. For example, after tokenization, the phrase “you are ugly” would have the words “you” and “are” removed, leaving only the word “ugly”.

C. Determination of Most Frequent Words

Most frequently occurring words in the collected documents/comments are identified using the R function (Term-document matrix) (Feinerer *et al.*, 2008). A frequency distribution is then generated out from identified most frequent words and rank them from the highest to lowest frequency. The results are then subjected to contextual analysis on how each word are used in the context of Facebook *Pitik* posts and determine what kind of cyberbullying theme is associated to each word.

D. Sentiment Analysis

Collected documents – which are the comments in *Pitik* posts are examined through sentiment analysis using the syuzhet, tidytext, tidyverse, and textdata R package (Naldi, 2019; Silge & Robinson, 2017). This technique allowed to determine the extent of emotion polarities such as positive, negative or neutral contained from the collected comments. One of the objectives of this study was to gain a deeper understanding of how people feel about *Pitik*, whether it is related to cyberbullying or other types of issues.

By analyzing the sentiment of the comments, the researchers can provide clarity on the emotional response towards *Pitik* and its emotional impact on individuals involved in *Pitik* posts.

E. Contextual Analysis

Results from identifying the ‘most frequent words’ were carefully analyzed using contextual analysis. Contextual analysis in corpus linguistics study allows researchers to analyze texts and to evaluate the texts within the context of its cultural setting (Behrendt, 2008).

In this stage, each word from the results of ‘most frequent words’ are evaluated on how it was used as comments in *Pitik* posts. These words are then tagged to its corresponding cyberbullying theme whether it is harassment, flaming, denigration, masquerade, trickery, exclusion and cyberstalking. We invited a PhD in Linguistics to cross-validate our results in contextual analysis.

IV. RESULTS AND DISCUSSION

A. Most Frequent Words

A total of 86,000 documents or collected comments from Facebook *Pitik* posts were analyzed to identify the most frequent words. The top 12 most frequent words can be seen in Fig. 4. Only 12 most frequent words are considered in the discussion due to the reason that the top 13th most frequent word has lower instances of 1045 compared to the 12th most frequent word with a recorded instance of 2017. Results of the most frequent words and the corresponding frequency for each word is summarized in Table I.

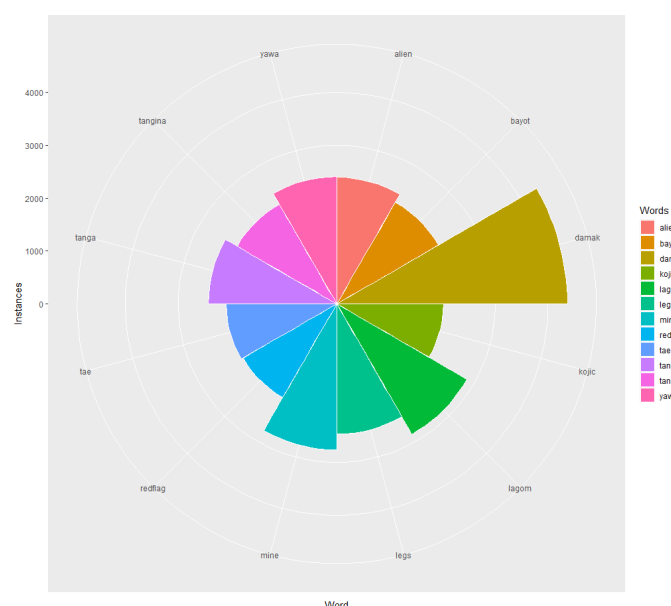


Fig. 4. Polar bar plot of top 12 most frequent words.

B. Sentiment Analysis

Results of the sentiment analysis is illustrated in Fig. 5 and Fig. 6. The determination of the frequency of emotion is assessed per document unlike with the most frequent words that is evaluated per word. Fig. 5 illustrates the emotional content analysis of the collected documents. Results revealed that out of the total 86,000 documents, 1797 conveyed a positive emotion, while 1109 conveyed a negative emotion. The emotion “joy” is present in 1199 documents. The “trust” emotion showed 953 instances. Anticipation and surprise were present in 885 and 369 documents, respectively, and were considered neutral emotions. The documents related to Pitik were also exhibited 605 instances of “sadness”, 516 of “fear”, 610 of “disgust”, and 335 of “anger”. Some of the words from collected documents that falls to positive emotion are like, love, beautiful, good, right, better, peace, wow, top and nice (see Fig. 6). These words are manifested from Facebook Pitik comments with individuals who enjoyed the post of their photos even without their consent. On the other hand, negative emotions expressed towards Facebook Pitik posts include words such as stupid, ugly, sorry, bad, wrong, sin, forbidden, hard, miss, and fat (see Fig. 6). These words may indicate cyberbullying acts or behaviors and so with words that is linked to sadness, fear, disgust, and anger emotions.

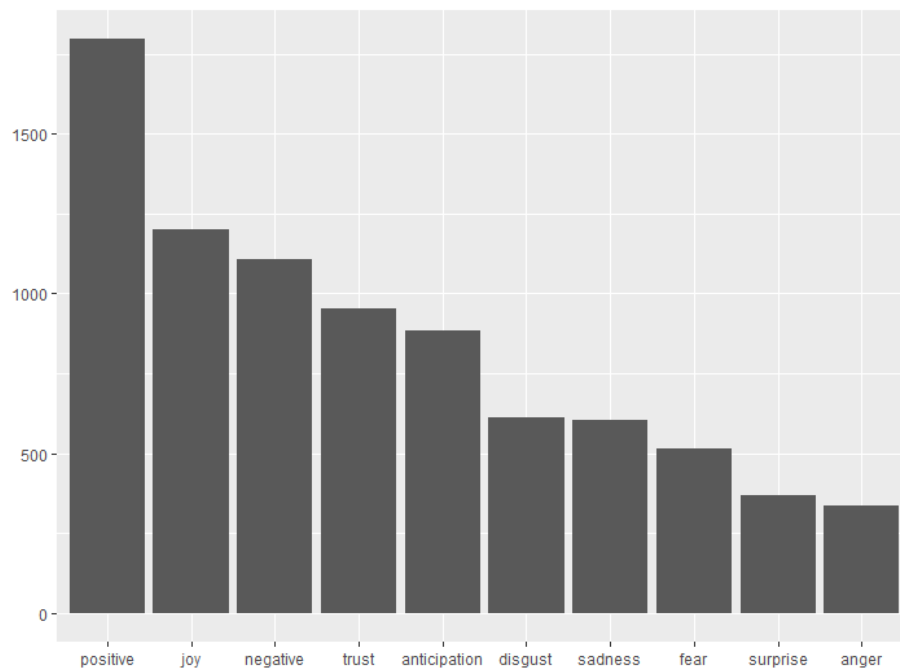


Fig. 5. Histogram of emotions.

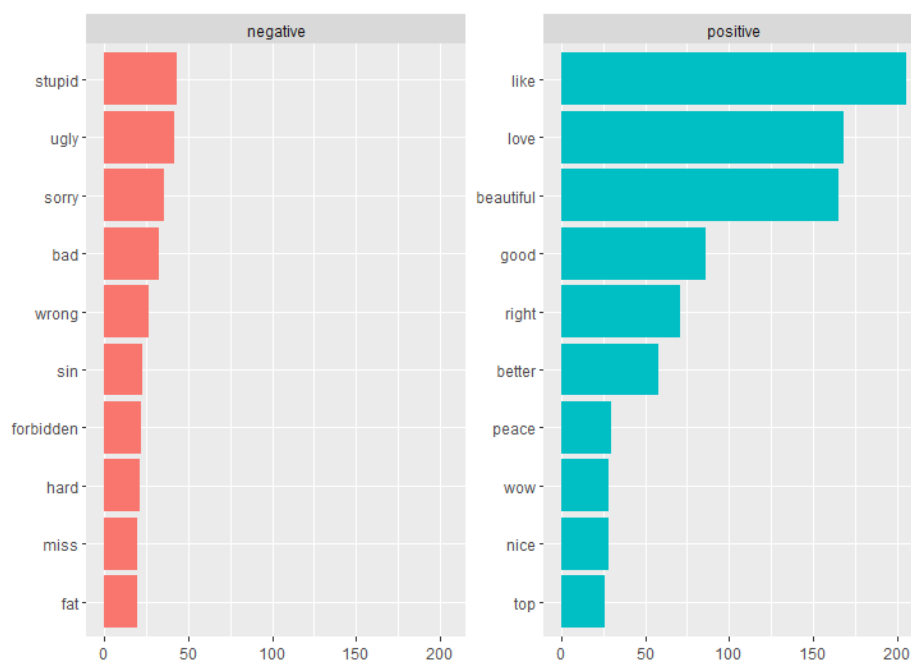


Fig. 6. Contributing words to positive and negative emotion.

TABLE I: SUMMARY OF MOST FREQUENT WORDS AND ITS CONTEXTUAL ANALYSIS

Most Frequent Words	Instances	English Meaning	Contextual Meaning	Sample Comments	Translation and Contextual Explanation of Sample Comments
damak	4367	dirty	Doing offhand or unusual behavior	<i>damaka nimo nah bata oyyy</i>	<i>You're so dirty!</i> (This refers to someone who did an unusual behavior such as related to sexual behaviors, twerking, kissing with someone)
lagom	2849	dark	Pertaining to dark skin	<i>lagoma sa imong ilok oyyy</i>	<i>Your underarm is very dark.</i> (This refers to a dark and filthy underarm)
mine	2761	owning	Sarcastic way of telling to own something that is not really worth to be owned	<i>mine yung kilikili na bulok</i>	<i>I want to own that rotten underarm.</i> (This sarcasm refers that the underarm is foul, disgusting and filthy)
legs	2464	legs	Legs refers to same 'legs' but with sexual intention	<i>lami-a sa imong legs oyyy</i>	<i>Your legs look so delicious.</i> (This refers to fantasizing someone's legs, like to taste it in a sexual manner)
tanga	2431	stupid	Idiot, stupid, foolish	<i>ang tanga mong bata ka</i>	<i>Stupid child.</i> (This refers to someone who acts like an idiot or stupid.)
yawa	2409	devil	An expression like – what the fuck	<i>yawa pangita nimo oyy</i>	<i>What the fuck! You look so ugly.</i> (This refers to someone who has an ugly or weird face.)
alien	2397	alien	Weird face that looks like an alien	<i>mukhang alien ampota</i>	<i>This mother-fucker looks like an alien.</i> (This refers to someone who has an ugly or weird face.)
bayot	2223	gay	Scourge, bad luck	<i>bayot salot sa lipunan</i>	<i>Gay, scourge of the society.</i> (This means that gays are the cause of trouble and suffering in the society)
tangina	2178	son of a bitch	An expression to show discontent of something or someone	<i>tangina kang yawa ka</i>	<i>You, son of a bitch!</i> (This expression refers to contempt that invalidates something or someone)
tae	2090	poop	Something that is filthy and disgusting	<i>ngipon nga murag color sa tae</i>	<i>Your teeth have the same color with poop.</i> (This refers to someone's discolored teeth indicating a bad oral hygiene or a not pleasing teeth)
redflag	2045	untrustworthy	This is a kind of cancel culture which indicates that someone is not capable of in a social group	<i>redflag talaga bxta minor</i>	<i>Minors are really, redflags!</i> (Minors are untrustworthy when it comes to responsibilities and commitments)
kojic	2017	a soap brand	kojic soap is used to refer someone with an ugly skin	<i>maypa ug yarukon nimo ng kojic</i>	<i>It's better that you should drink the kojic soap.</i> (This refers to someone who have an ugly skin complexion and should drink the kojic soap as an exaggeration, to have a whiter skin)

TABLE II: PERCENTAGE RESULT OF CYBERBULLYING THEMES

Cyberbullying Theme	Percentage	Sample Comment
Harassment	26.29%	<i>Imong mama kalapanit</i> (Your mom is a bat)
Flaming	35.48%	<i>Iro kang boanga ka</i> (Crazy dog)
Denigration	19.45%	<i>Kay palaiyot man jud ka nga lalaki. Daghan na kag gitirahan</i> (Because you are a fuckboy. You have sexed with many girls)

C. Contextual Analysis

Results of the contextual analysis have shown that the top 12 most frequent words illustrate cyberbullying behaviors where the word *damak* is the most frequent with 4367 instances. The contextual meaning, English meaning, a sample comment with corresponding translation and contextual explanation for each word in the top 12 most frequent words are displayed in Table I. As seen in the cultural context of Pitik posts, these words appeared to have used as name-calling, sarcasm, indirect attack, aggressive messages and false rumors. Analysis further revealed that out of 86,000 documents, 26.29% of it contains cyberbullying theme pertaining to harassment, 35.48% to flaming and 19.45% denigration – a total of 81.22%. the remaining 18.78% are documents/comments found to have no association with cyberbullying. The findings of this study show consistency with previous surveys and research, as indicated by Anderson (2018), Hinduja and Patchin (2019), and Cruz (2017). Since Pitik is a trend happening in social media, this validates that this trend is immersed with a large volume of cyberbullying activities in the Facebook community.

V. CONCLUSION AND RECOMMENDATION

This study utilized NLP methods specifically, text mining and sentiment analysis in uncovering cyberbullying acts and behaviors from comments found in Facebook Pitik posts. These methods were able to extract evidence of the existence of cyberbullying acts/behaviors from Pitik posts. Text mining method was able to extract words that have greater bearing to cyberbullying and sentiment analysis showed the existence of negative emotions from the comments.

Further, the contextual analysis provided insights on how the interplays of words are used as a cyberbullying act in Facebook Pitik comments.

The analysis showed that out from 86,000 collected documents, cyberbullying themes are found with 26.29% for harassment, 35.48% for flaming, 19.45% for denigration, and 0% for masquerade, exclusion, trickery and cyberstalking. Negative emotions like anger, uncertainty, constraining, fear, sadness, and disgust were also present in the collected documents. These showed that cyberbullying behaviors are evident and do really exists in Facebook Pitik trends.

Results of this study can be useful for Facebook policymakers in addressing issues and concerns related to cyberbullying. By identifying associated emotions and words that has bearing of cyberbullying behaviors, they can take precautions and develop effective solutions to make the platform safer. Additionally, the findings can guide future researchers who are studying cyberbullying on social media platforms like Facebook.

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