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Identification and Detection of Cyberbullying on Facebook Using Machine Learning Algorithms

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Abstract

The use of social media platforms such as Facebook, Twitter, Instagram, WhatsApp, etc. have enabled a lot of people to communicate effectively and frequently with each other and this has enabled cyberbullying to occur more frequently while using these networks. Cyberbullying is known to be the cause of some serious health issues among social media users and creating a way to identify and detect this holds significant importance. This paper takes a look at unique features gotten from the Facebook dataset and develops a model that identifies and detect cyberbullying posts by applying machine learning algorithms (Naïve Bayes Algorithm and K-Nearest Neighbor). The project also uses a feature selection algorithm namely x2 test (Chi-Square test) to select important features which can improve the performance of the classifiers and decrease classification time. The result of this paper tends to detect cyberbullying in Facebook with a high degree of accuracy and also improve the performance of the machine learning classifiers.

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1. Introduction

The continuous usage of social media platforms such as WhatsApp, Facebook, Instagram, Twitter, etc., has made it possible for many people to communicate effectively, efficiently and frequently with other people. With this development, the usage of social media has undoubtedly created an opening for some users to intimidate users with mean and nasty comments. They also go a step further by posting derogative messages intending to belittle other users on those same platforms. This scenario is known as Cyberbullying (Al-Garadi et al., 2016; Fridh et al., 2015; Dadvar et al., 2013).

Cyberbullying is the harassment or insulting of an individual caused by global sharing and sending messages of hurting, hostile, aggressive or threatening nature with Information and Communication Technology (ICT) infrastructure as a platform. Cyberbullying poses a significant challenge and the immeasurable threat to the physical and mental health of the victims.

Cyberbullying is known to be the cause of some serious health issues among social media users (Nixon, 2014; Olweus, 2012). It is, therefore, necessary to create a way to identify and detect this threat to prevent its reoccurrence (Rosa et al., 2018a; Chatzakou et al., 2017; Chavan & Shylaja, 2015). Cyberbullying is a form of online bullying with resultant negative impacts on victims (Salawu et al., 2017; Gahagan et al., 2016; Ptaszynski et al., 2016).

Facebook is a popular social media network that allows users to post different and unique comments and share these comments among various social platforms. On Facebook, over 2.32 billion monthly users are active on this platform as of December 2018 (Balakrishnan et al., 2020; Souza et al., 2018). There is an increase of 9% in Facebook monthly active users (MAUs) over the years (Zhao & Mao, 2016a; Zhang et al., 2016). There are more occurrences or instances of cyberbullying on Facebook and more social media platforms these days than before (Kowalski, Limber & McCord, 2019; Dredge, Gleeson & Garcia, 2014). This increase is as a result of the fact that cyberbullying has been found to be easier since the victims are bullied without direct contact or confrontation by the bullies. At the same time, they make use of communication devices like handsets, tablets, computer systems, etc. On the other hand, the traditional way of bullying is harder to practice as it sometimes involves physical contact between the parties and does not involve the use of a phone or computer system. The features of a social media network such as Facebook have enabled cyberbullies to expand their reach to different locations around the world that were not reachable before in different cities and countries (Veiga-Simao, et al., 2018; Facebook, 2015; Dadvar et al., 2012).

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