

SOCIAL NETWORKS APPLICATIONS: DETECTING SCHOOL BULLYING

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Abstract

In this paper, we will study how we can extract information of a school social network to detect possible school bullying cases. Most young people use social networks today. It is better that they are part of a social network in their school, where people interact with classmates or teachers, than be part of another one in other context, avoiding the heterogeneity of the internet. We will see how to extract and process information to analyze whether there is a possible case of bullying.

1 Introduction

Local networks are in expansion, communities represented on the Internet through a social network are growing daily. The Nielsen company performed a statistical report [1] in which it was shown that two thirds of the population connected to the internet uses social networks (See Figure 1).

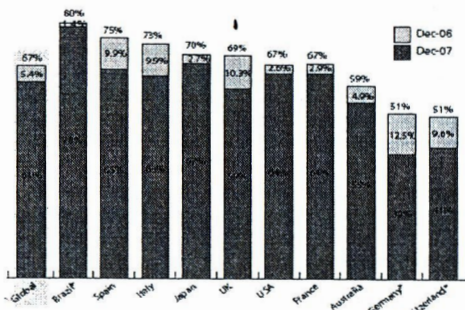


Fig. 1: People connected to the internet using social networks.

Most recent statistical reports done by The Nielsen company reveals that social networks are more used than e-mail (about 65% opposite 68%). It is possible because a social network can be considered as a “mashup application” and it includes the main functionality of email services. Therefore, we can get an idea of expansion and the relevance of social networks are taking today.

There are new business opportunities for companies based on information that can be extracted from social networks. But that information can be used in many ways depending on our goal. Once we have extracted needed information, we can process it to obtain what we want to know.

2 Objectives

The main goal is to detect school bullying through a school social network. Like there are e-learning platforms, next step is use a social network in a school. Most Young people use social networks usually, and the best environment for them could be their school. In that environment we want to detect which students are having problems with which others. This study could be the base of many other researches that could help to finish with school bullying. Most young people would be more participatory and motivated to study by the novelty and potential of social networks and new technologies.

3 Related works

In 1995, Randy Conrads created “www.classmates.com” that is considered the first social networking site. Now, it has more than 40 million active members only in United States and Canada. Facebook, the fastest growing social network, started out as a school social network. Its popularity grew from the college ranks to high schools before its opening to the general public. Today, facebook serves 300 million people across the world. Figure 2 shows the main social networking sites with more users in the world. These are considered the most popular.

There are some schools social networking sites but they are more focused to relationships between students of different schools than the interaction between students of the same school. Usually, those social networking sites cover different schools and allow relations between its students.

According to Dept. of Justice, “bullying is repeated acts over time that involves a real or perceived imbalance of power with the more powerful child or group attacking those who are less powerful”. There are many studies relating to bullying. The pioneer work on bullying was con-

ducted by Olweus (1991) in Scandinavian schools where he found between 5% and 9% of students were bullied regularly [4].

So we have to pay attention to these points, our users will be minors and their teachers. Our purposes are good, but users' parents must know what we will do and accept it.

5 Information extraction methods

We will use Web Mining techniques (it is an application of Data Mining) [3].

Web mining can be defined as to discover or extract useful information from the web [3]. It can be divided into three different types: Web Content Mining, Web Structure Mining and Web Usage Mining. Our research will focus on web content mining, which main objective is text extraction and data processing. Web Structure Mining is a technique to analyze and explain the links and structure of websites. Web usage mining can be used to analyze how web sites have been used.

The main idea is to extract comments published from social network users and analyze if that comments are offensive comments. Bullying can occur in different ways, not only for comments, you can also post offensive photos, sounds or even videos, but this will not be the subject of our study now.

6 Some problems and considerations

Once we have all comments of the social network, we have to parse it to check which of these ones may be offensive. We said "may be" because in everyday language there are many expressions that contain insults or swearing, but depending on the context it can be interpreted as offensive or not. It is a great problem, so we can't predict bullying by a single comment; we need to note all comments from one or more users on the affected user. Faced with this difficulty, we must find help on the environment of the pupil concerned. We can ask the teachers if they have noticed something unusual in the child's behavior and put them on alert for a possible case of bullying. We must not forget that teachers are part of the social network and can play an important role. They can use social network to organize activities where students have to register into these activities through social network and where they have to choose another partner. In those activities, system can register which users have many requests and which are marginalized. That can be a good first idea to center attention in some group of students.

Related to this, another problem arises. If teachers are part of the social network, it is possible that many students do not write with complete freedom for fear that they read their comments. We must look for alternative solutions to this problem. For example, we can create invisible user accounts for the teachers or simply leave them out of the network. In the latter case, we can create an entity "school" to propose the activities, but we cannot allow to the entity do commentaries as the students and we cannot allow that it behaves as any other user. Even of this way, it is possible that many students may be unwilling to use our social network, since it is a network in the school area. Is not our

intention that teachers can read the students' commentaries, because maybe they do not have time to do it (if the social network is used frequently and there are many users it can be impossible), it is not a part of their work and it is not ethical, and that is not probably legal either. So detecting school bullying must be an automatic process that can be guided by school personal and which results must be analyzed by this personal to take appropriate actions.

Another issue is that not all social network users tend to use it frequently, users that don't use it with a minimum frequency should not be considered. We must take into account the frequency of connections, public comment, comments received, and which of these are susceptible to offensive remarks against the total. So we have to use some web usage mining techniques. If we have present these ideas during the implementation phase, this task will be performed easily and maybe we won't have to apply web usage mining, but in general, if the social network exists previously, we will have to use it.

7 Proposed solution

Our goal is to create a social network in which we can then extract information about users. The application must identify any possible cases of school bullying. In the previous sections we have seen what we have to take into account during implementation. Like in all social networks, most importantly are users and relationships established between them. In our solution we will have two types of users, they are students and teachers.

For social network analysis can distinguish between several representations that allow the study to be undertaken:

- (a) To the descriptive methods we can use a graphical representation. Using graphs we can see interesting information about the behavior or problems of some students. An example can be seen on figure 3:

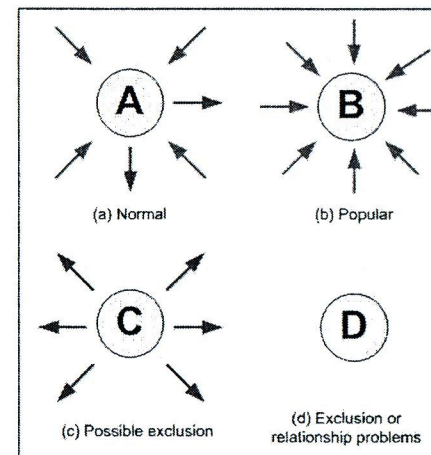


Fig. 3: Graph of relationships

In this figure nodes are students, a red arrow represents relationship requests and a green arrow represents relationship requests that are waiting to be accepted. With this in mind, "A" student type could be a student with normal relationships because he has some request of both types. This means that other students have asked some kind of relationship to student "A" and he has received another one by other students. However, "C" student type might be a student with relationship problems. For some reason, this student has not received any requests of relationship, and has made many requests to other students. Maybe this student is being excluded or has trouble relating to others. The system should display an alert on this case. A more extreme case is "D" student type. If the relationship is established for one concrete activity, this student didn't receive any requests and he didn't send any request either, so it is possible that is not only an exclusion, maybe he has troubles relating to others. "B" student type is a "popular" student, he has received many requests and probably he has not problems relating to others because everybody wants to do the activity with him. It is not our goal discovering these students and what are their characteristics, but it shows that many studies can be done with the information of a school social networking site.

- (b) For analysis procedures usually it's used an adjacency matrix. This adjacency matrix is composed of as many rows and columns as students in our data set, and where its elements represent the ties between the students. If a tie is present, a one is entered in a cell, a zero in another case. In a directed graph, the sender of a tie is the row and the target of the tie is the column by convention. So that representation is equivalent to the graph in (a). We should count ones or zeros by rows or columns to discover if a student could have problems. For example, if we want to count the request done by "A", we have to count the number of ones in his row. However to know the requests he has received we have to count ones in his column.
- (c) Finally, using statistical models based on probability distributions. Binary relations are represented by a matrix where Y_{ij} is 1 if student i is somehow relation to j and 0 otherwise.

That information can be extracted from simply studying the topology of the social network.

By using web mining techniques and by parsing the information, it can be discovered more useful information from the social network. For example, messages can be analyzed comparing it with strong language. Much strong language received by one student can be a cause of an alarm to teachers.

Registered users (in millions)

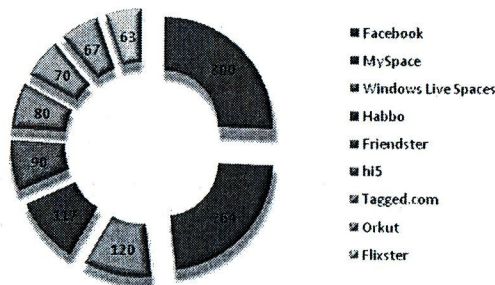


Fig. 2: Main social networking sites.

4 Legal Problems

Before study how can we get information in our social network, we have to think that it could cause legal problems. Although our social network can have our "terms and conditions", we must take care with extracting users' comments because it can be considered as abusive practice.

Social Networking Site Providers are advised that in order to comply with European Union privacy law, must do the following (we can see complete document in [2], The Working Party's "Opinion 5/2009 on online social networking"):

- Inform users in advance of how their personal information will be collected, stored, and used, and should gain user consent to those practices.
- Establish strong default privacy settings to prevent access to user personal information and free and easy-to-use privacy control features.
- Establish a mechanism by which accounts that remain inactive for a long period of time are automatically switched to privacy features that do not allow access to personal information.
- Delete user personal data as soon as possible after users close their accounts, except to the extent data are needed to investigate identity theft, fraud, or other illegal or malicious activity;
- Allow pseudonym registration so long as strong authentication and access controls are in place.
- Pay careful attention to protecting the privacy rights of minor.
- Take responsibility for ensuring that applications made available to site users by third parties also include strong privacy protection features.

8 Conclusions and future works

Bullying is a persistent problem and is being studied from 90. Unfortunately this is a problem quite common in classrooms around the world. This article attempts to present how social networks can facilitate the integration of many students, helping not lose contact with other students in the field of their studies. Furthermore, social networks can share a lot of information between pupils and teachers taking advantage of technology that is designed to introduce and accustom to all young people. In almost all schools are intended to familiarize students with technology. There are many schools that provide a personal computer for each student with the idea that learning to use it. Social networking sites are a good starting point for integrating all aspects of the school and foster integration and exposure of all students in their school. Allowing the exchange of ideas, information, foster new friendships...

The next step in our research is to launch this initiative in a school and study the results after a year of integration. We believe that our initiative will facilitate many of the daily tasks of schools, students and teachers. In addition, many interesting studies such as that proposed in this article can be done with simply using the social networking site.

9 Acknowledgements

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