

# Cyberbullying Tracking System to Mitigate the Effects of Online Harassment

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## 1 Introduction

Cyberbullying is a pervasive problem in today's society, which has negative effects on users of technology, especially youth. Although there are many definitions in various sources, one can define as cyberbullying as a form of bullying or harassment which takes place over the Internet. This includes bullying over social networks, emails, text messaging, web forums, and mobile applications. Some examples of cyberbullying include: sending harassing text messages; spreading of rumours in a web forum; posting of embarrassing pictures without someone's consent; creation of fake profiles on social networks, with the intent to embarrass or humiliate someone [2].

Compared to traditional bullying, cyberbullying poses challenging issues that often worsen a situation. One problem that makes cyberbullying particularly bad is that youth oftentimes don't equate joking around with bullying. Therefore, someone might send a seemingly innocuous message to another, thinking it is a joke, but the recipient of the message is actually offended and hurt by the message. Cyberbullying is usually more impulsive than traditional bullying, and oftentimes youth do not realize the repercussions of their actions before the damage is already done [2]. Due to the speed of information transmission, and the virility of Internet messages, rumours or embarrassing photos can be spread very quickly. In the situation where an embarrassing rumour or photo is circulating around a social network, a youth could be embarrassed to go to school to face his or her peers [7]. This ultimately can lead to truancy, disciplinary problems, and depression for the victim.

Patchin and Hinduja [6] discuss some solutions that educators can make towards ameliorating the issue of cyberbullying. They mention that even though cyberbullying does not occur in the school, it can have a deteriorating effect on the morale of the students in the school, and can cause the school performance of the victim to suffer. They mention a couple different methods to foster a positive climate in a school setting, which would hopefully reduce the effect of cyberbullying:

- Provide students with emotional support, a caring atmosphere, and emphasis on positive self-esteem
- Hold school assemblies regarding cyberbullying which students can heavily relate to. Emphasize that the vast majority of students use technology in responsible ways, while a small minority of students abuse technology and cyberbully others.
- Create a formal contract which students sign, where they promise not to cyberbully others
- Develop an anonymous method for students to report events where they are cyberbullied
- Create an anti-bullying awareness or pledge campaign

The above suggestions ensure that students are educated about the harms of cyberbullying. One can argue that it is the schools' responsibility to educate students about proper use of the Internet. Although some may think that parents should ultimately be responsible for educating their children about Internet responsibility, there is no easy way to make sure that parents do so. Therefore, it is very important for schools to take the initiative to educate students regarding Internet responsibility and the harms of cyberbullying. It is in a school's best interest to reduce the amount of cyberbullying, in order to make sure that students emotional health is high, so that they can be better-educated.

The perceived anonymity of the web can often exacerbate the problem of cyberbullying [3]. Cyberbullies falsely believe that their actions are untraceable and that there will be no repercussions for their behaviour. This leads people to do and say things online that they would not do in a normal setting. [8] writes about an incident where a 12-year-old girl named Rebecca Ann Sedwick jumped from a platform at an abandoned cement factory to her death, after being tormented online and through mobile apps. Rebecca was constantly bombarded by text messages on her phone including, "Go kill yourself," and, "Why are you still alive?" The fact that these digital communications are anonymous made the bullies more likely to send these messages, not believing that there would be

any repercussions. To provide some metrics on the extent of cyberbullying, a study found that about 10% of teens engage in anonymous harassment [4].

The problem of anonymity on the Internet should not be underestimated when it comes to trying to understand the harms of cyberbullying. Several studies have shown that the probability that people behave badly increases when they are anonymous. The 1950's Milgram experiment, in which subjects were instructed to deliver supposedly painful shocks to students (actually actors), demonstrated that people have no problem following orders when instructed by someone of perceived authority. It also demonstrated that those who couldn't actually see their victims were more likely to deliver potentially lethal doses of electric shock. This demonstrates the power that perceived anonymity can have to cause a person to behave in a fashion that they would not in a different setting [5].

Several researchers suggest that the combination of relative anonymity of the Internet, combined with a lack of social cues present in a normal setting, is a major cause of cyberbullying on social media networks. 88% of teens on social media sites have said that they have seen someone act cruelly towards another person on the social media site. Of those witnesses, 90% said that they ignored it, and 35% said that they ignore it frequently [5].

Some argue that there is a certain mob mentality to cyberbullying. 21% of teens on social-media networks have admitted to joining in when they witnessed cruelty [5]. This mob mentality can often lead victims to suffer extensively for a long period of time. On Facebook, for instance, one can block a person who sends a harassing message. However, if there is a mob of cyberbullies, than blocking that one person will not prevent the others from bullying.

Let's discuss some statistics of cyberbullying in order to get an idea of the scope of the problem. The Harford County Examiner reports that about half of teens have been victims of cyberbullying. This alarming statistic demonstrates how pervasive cyberbullying is amongst our youth. Also, fewer than 1 out of 5 cyber bullying incidents are reported to law enforcement [1]. This demonstrates a fundamental issue in cyberbullying: it is extremely under-reported, and victims often don't take the action necessary in order to stop it. Victims often just ignore it, or brush it aside. It is the goal of this paper to offer some suggestions to allow for easier and more streamlined reporting of cyberbullying to law enforcement.

As we have seen, cyberbullying is a challenging problem to solve, exacerbated by the anonymity that the Internet can provide. In order to ameliorate the problem of cyberbullying, there should be a better reporting system in place, which prevents and deters others from cyberbullying.

## 2 Solution

We have discussed some information about the problem of cyberbullying, and have concluded that a lack of reporting appears to exacerbate the problem. The bully gets encouraged because of he or she is not reported to the authorities, and hence bullying never stops. If the victim or any of the witnesses start reporting to a reliable source that can either block the bully from posting comments about others or can actually catch the bully, then the problem of cyberbullying can be controlled to a far extent.

### 2.1 Centralized Reporting Platform

Our aim is to provide a reliable reporting platform to the victims or witnesses where they can report the incidents of cyberbullying. This platform is a web portal which could directly be under the control of an authoritative department such as police or any concerned government official. This initiative would require the authorities to work in close contact with the administrative teams of various websites. With the collaboration of admin team and the police department, all the reported incidents can be tracked down and hence the bullies can be accordingly punished. This would instill confidence in people that they have someone to look forward to in case they witness or experience any kind of cyberbullying.

#### 2.1.1 User Side of CBRP

Let us have a look at the Cyber Bullying Reporting Platform (CBRP). Figure 1 is a sample image of the web portal.

CBRP is a basic web portal where the victims or the witnesses can report the incident. They will be required to create a basic username on the website which would keep track of all the incidents related to that user. The form contains personal information like name, age and current university/college/school that the person is attending. The basic purpose of getting this information is to narrow down the scope of possibilities to find the bully. All the information provided will be used to track down the bully.

Further the portal asks for information about the source of the incident like the website on which the unwanted content is published. The victims email Id and username is required and also that userID (or preferably the email address) from which the messages are being sent. All this information would be made visible to the admin of the corresponding website to track down the provided ids and verify if the bullying is being undertaken.

In addition to these there is a provision of uploading exact proofs in the form of images or messages being sent by the bully. All the images posted or the text messages delivered

# C.B.R.P

## Cyber Bullying Reporting Platform

Report New Incident

Update Existing Incident

Report

**Personal Info**

Full Name :

Age :

Uni /College/School:

**Incident Information**

Website :

Your E-mail :

Your UserID :

**Information about Bully**

UserID :

E-mail :

**Uploading Proofs**

Images :

E-mail Header of Bully's mail (if avail):

Chat / Conversation:

URLs of incident page :

Incident #1

Figure 1

can be uploaded by the reporter and later used by the authorities to verify the bullying incident and use as a proof against the bully. Even the email headers (if possible) can be also uploaded by the informer as the headers contain a lot of information about the mail sender. It also has information about the IP address of the person sending the message. With an email header it becomes far easy to get hands on the bully.

This form can be filled by the victims themselves or by any witness of cyber bullying. All the incidents will be under one thread with the created username. The Personal information will not be shared with the admin of websites. Only the information required for tracking and verifying will be shared. All the information will be reported to the higher authority in charge, may be police department. So that in case the bully continues and the seriousness is grave, police can use all the necessary information uploaded to track and catch the bully.

### 2.1.2 Acknowledgement Screen

After the incident is reported the user is presented with an acknowledgement screen. The snapshot of this screen is shown in Figure 2.

## **C.B.R.P** **Cyber Bullying Reporting Platform**

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**We Appreciate Your Courage !!**

The Incident has been submitted to the **admin** of the reported website  
And is being **monitored** by **XYZ Police Department**

You will be hearing from us in next **2 days**

Upon investigation, the account of the person reported will be blocked  
from the website and appropriate legal action would be taken as per  
seriousness of matter.

**Thanks !! Have a Happy Life ahead !!**

Please feel free to **report any further misbehavior** or information  
regarding the incident.

Figure 2

This screen solves various purposes like:

1. It provides **encouragement** to the person who has reported the incident. The immense courage of the person is appreciated.
2. It provides **satisfaction** to the person when he/she knows that administrators and the concerned police department will be looking into the case.
3. Thirdly, it **provides** a hope that the case will be taken care in specified number of days. So this provides a big hope to the person who is being harassed.
4. This page, further **motivates** the person for providing any other information which could be helpful in catching the bully ASAP.

### 2.1.3 View for Authoritative Department

So far, we have seen the users side of the web page. Let us now have a look at the portal available to the police department or other authority in charge. The snapshot is shown in Figure 3.

View By Website

View By Response Date

Website Admin Info

**C.B.R.P**  
**Cyber Bullying Reporting Platform**

**XYZ Police Department – Control Page**

26/01/2014			
S.No	UserName	Website	Status
1	<a href="#">XYZ123</a>	Facebook.com	Resolved
2	<a href="#">ABC123</a>	Youtube.com	Resolved
3	<a href="#">EFG123</a>	Twitter.com	Resolved
27/01/2014			
S.No	UserName	Website	Status
1	<a href="#">XYZ321</a>	Twitter.com	Pending
2	<a href="#">ABC321</a>	Youtube.com	Investigating
3	<a href="#">EFG321</a>	Facebook.com	Investigating
28/01/2014			
S.No	UserName	Website	Status
1	<a href="#">XYZ213</a>	Youtube.com	Pending
2	<a href="#">ABC213</a>	Facebook.com	Pending
3	<a href="#">EFG213</a>	Twitter.com	Pending

Figure 3

The police department or any other authority in charge would have access to this page. They can get the list of incidents arranged by website names or by response date. Since this is trusted authority so they can have access to full information provided by the victim. The whole profile information along with all the materials uploaded under the same thread would be available to the department. In order to have a close monitoring on the response dates, they can directly contact the admin teams of the corresponding websites. This check would make the things moving at the end of websites admin team and will surely help to take action on time. It also provides all the proofs to the police so they can track the person in case further bullying continues from the same person. This could help in producing proofs in legal proceedings as well.

#### 2.1.4 View for Website Admin Team

Similar to the police department section, there is an admin side of the portal as well. This would be available to the admin of the website to trace the incidents. A glimpse of the page is shown in Figure 4.

<b>C.B.R.P</b>				
<b>Cyber Bullying Reporting Platform</b>				
<b>ADMIN PAGE</b>				
<div>View By Response Date</div> <div>Report Incident To Police</div>	<b>26/01/2014</b>			
	<b>S.No</b>	<b>UserName</b>	<b>Bull's ID</b>	<b>Status</b>
	1	<a href="#">XYZ123</a>	Bully1	Blocked
	2	<a href="#">ABC123</a>	Bully2	Reported
	3	<a href="#">EFG123</a>	Bully3	Blocked
<b>27/01/2014</b>				
	<b>S.No</b>	<b>UserName</b>	<b>Bull's ID</b>	<b>Status</b>
	1	<a href="#">XYZ321</a>	Bully4	Verifying
	2	<a href="#">ABC321</a>	Bully5	Blocked
	3	<a href="#">EFG321</a>	Bully6	Verifying
<b>28/01/2014</b>				
	<b>S.No</b>	<b>UserName</b>	<b>Bull's ID</b>	<b>Status</b>
	1	<a href="#">XYZ213</a>	Bully7	Pending
	2	<a href="#">ABC213</a>	Bully8	Pending
	3	<a href="#">EFG213</a>	Bully9	Pending

Figure 4

The working of this whole concept drills down to the responsibility of the web admin of the website. All the necessary information uploaded by the victim is available to the admin. Although the personal information can be hidden from the admin, upon request, but rest all the information necessary for tracking is available for use. The admin is responsible for first of all verifying the information uploaded by the victim. He has to make sure that the information provided is actually present on the website so that the incident reported is not a fake. Then he can track down the id provided and can back track the IP of the person. As a second step, he needs to block any further communication on the website from the same IP. This way further harassment to the victim is stopped. Also a feedback can be sent to the victim at this point that the bully will not be able



to harass the victim from the reported user ID and from any other id used on same IP address.

As a next step he can inform the police department about the IP or the persons identity and thereon police can handle the case. In case the bully is using different websites for harassing, still he can be tracked because of this centralized platform. Since police has great authority, they can ask the ISPs to block the Internet access of the person so that bully might not be able to use the network further. This would cut down the bully from doing this crime further.

## **2.2 Impact**

CBRP, if used actively can minimize and can put a stop to the cyberbullying as soon as it starts up on the web. Larger teams of professionals can be used to monitor the website and track down the bullies in no time. It will also be really easy to put them under criminal trial with all the proofs collected against them. The more the incidents this site would be able to stop, the more trust will be built up in the people and lesser the incidents of cyberbullying will be.

Hence, together with the courage of the people to report the incidents and the active participation of police and the admin teams of websites, the cases of cyberbullying can be drastically reduced and the bully can be given their deserved punishment.

## **3 Defence**

### **3.1 Overview of defence**

#### **3.1.1 Centralized data**

Our design for this tracking system will ultimately form a centralized database which will store all incident report information in it. This database will thus help us in many aspects.

#### **3.1.2 Profiling**

Report records stored in the database can be inputted as a source to do data profiling. For example, we can have a better view on the social network distribution of cyberbullying through profiling the URLs those reports provide. We can also profile the age and education background of those reporters based on the information they filled in inside the form.

Different kinds of studies and analysis can be conducted and processed by taking advantage of these first-handed data in our database. Thus, the features and characteristics of cyberbullying on social network can be further observed and studied.

### **3.1.3 Tracking**

Also, we can use this information for tracking purpose. Some people may be victims on several social networks or some people may be bullies and be reported several times. In our system, these records can be combined together to find out those who often bully on others. We can then have exact information about these people. We can obtain bullies' online information through their username and email address, and we can even track down their IP address with the help of local ISPs. This data, especially those snapshots that reporters uploaded can be extremely important evidence when needed.

### **3.1.4 Prevention**

Through this data, we can actually collect some useful information against those who often bully on others. Thus, certain pre-caution or prevention method can be applied upon them. We can even predict bullying incidents based on certain bullying patterns of those offenders. When the same email address or same IP we tracked surfaces several times on our system, we can actually inform the local ISP to prevent them from accessing the network or hand these cases to authorized organizations to deal with them. Some users in a website may be listed in the blacklist and be watched actively by web admins.

## **3.2 Can be used by authorities like government and police department**

Our system can actually be a very useful third-party tool when a trusted and integrated party is in charge of this platform. So government or police department can benefit from this system and use it to further study or deal with the cyberbullying problem. Authorities can seek cooperation of local Internet Service Providers to track offenders IP address and their entire Internet activity histories when necessary. Legal action can be taken when severe cyberbullying incident happens. Once users know that government or police department is behind this system, it will give them more sense of safety to use this report system and will encourage more people to report.

### **3.3 Provide a supervision to web admins**

#### **3.3.1 Feedback system**

As the major actions e.g. to delete bullying content, to block the user or to ban the IP, will be taken by webserver admins, certain concerns regarding those admins may be raised. Whether these admins will finish their job in time or whether they will react properly to the bullies. Our system settled these problems down by introducing the feedback system, both for admins and for reporters. Our system needs constant feedback on those reports from the web admins to keep track of the process of solving these incidents.

#### **3.3.2 Pushing on admins work**

Once a report is filed, we will seek individual website admin to deal with that. They need to take immediate action to the reported incident. We can thus keep pushing them through the system asking them to update incident status from time to time to ensure that problem will be solved in time. Also, once this report is solved, we will need a feedback from the admin regarding this incident and notify the reporter. We will report that the incident is solved and also how it is solved. Then, we will let reporters to judge the work of web admins to see if they are satisfied with the result.

### **3.4 Progress feedback to encourage future report**

Most people who see cyberbullying happening on the social network or who are actually the victims of cyberbullying need to be encouraged to do the right thing. In order to encourage users to report cyberbullying incidents to the system, our system will keep them informed while the report is being processed. The result will be delivered to them with inspiring messages to let them know about their contribution to the whole Internet environment. If reporters are not satisfied with the result, they are always welcome to give feedback, and we will re-open the case to do further investigation.

### **3.5 Ensure identity anonymity to web admins**

Another benefit of this centralized platform is that the reporters dont need to worry about their identity to be revealed to the web admin. After our system receive report form, we will only send information regarding the bullying incident and bully to the web admin. For example, we will only send bullys username, email address and uploaded proofs to website admins without sending reporters personal information. In this case, website admin only gets the case with the necessary knowledge to solve the incident and is not able to know the

reporters background information. In this way, reporters identity anonymity is achieved, which should give them more sense of safety when reporting cyberbullying.

## 4 Examples

In order to prove the feasibility of our system, we can give out a live example. Suppose Alice upload a video about herself on YouTube and someone, say Bob, a total stranger, just left some insulting comments to make fun of her under her video. She feels offended by those words and is afraid that her friends would see those comments. Then she goes to our website which is run by the local police department and fills out the report form to report Bob and uploads the screenshot with Bobs comment in it. Once report form is received, an incident case is set up with status processing and Bobs username and screenshot is sent back to YouTubes admin. Admin gets that incident, he investigates into the incident to see if it did have happened and he also finds that user Bob has been reported several times with some severe insulting incidents. Besides deleting that comment, he also bans the associated IP address related to that username and reports back to our system. Then, based on the severity of this case, the police department decide to contact the local ISPs to find out Bobs local address and take some legal action on him. Then the status of this incident case is updated as closed and feedback is sent to Alice describing how this case was dealt with. Finally, Alice is asked to send back the comment about whether she is satisfied with the result of the case. As comments are deleted, username Bob is banned from websites and the person behind this username may be under investigation. If she is satisfied with the result then this case is considered closed. If any problem is raised by Alice, the case will be reopened for further investigation.

## 5 Limitations and suggestions for future work

### 5.1 Response latency and system efficiency

One concern of our system is that, when facing a high amount of reporting incidents, our system could probably be overloaded. Those web admins will suffer large amount of workload to deal with the incidents. They may not be able to handle all incidents in time as well as doing prevention and other daily routine work. Our central system needs to keep track and update the status of all incident to make sure those incidents are taken care of by right website admins. Hence, if the incoming incident reports piles up, it will directly affects both response time and solving time. Thus, the whole system efficiency will go down. It may take reporter quite a long time to get the feedback from the system.

Also, whether certain action taken by website admins is proper or not, this still needs to be judged by our system. We still need a full evaluation system to evaluate the work done by the admins.

## **5.2 Combine external source with internal ones, collaborating with social media using same API of reporting system.**

As for now, social networks also have their own report system embedded in their web pages. People only need to click the report button beside the comments or person profiles to report that comment or person to web admins. These cases will then not go into our system but directly to web admins. There's a way to combine both our system, an external reporting platform, and embedded internal report system together to make it a fully functional report environment. What we need to do is to collaborate with these social networks, inserting unified reporting APIs in their web pages. When user hit the report button inside those webpages, at the same time web admin receives that incident, the API will automatically send the report information to the our central database to store it as a record. The API will basically fill out the report form automatically, when reporting happens, with reporters information possibly matching our external report form.

## **6 Conclusion**

In this paper, we have discussed the issue of cyberbullying in our modern society. The advent of technology has brought the world many blessings. Increased productivity, connection to our loved ones, and educational advancements are just a couple of the cornucopia of good things that technology has brought us. However, in order for technology to help us in our lives, it must not be abused. Cyberbullying is one of several negative issues that technology has brought. Before the advent of technology, when a student was bullied in school, it ended after the student came home at 3pm. However, nowadays, children can be relentlessly bullied even while they are in their home, which is supposed to be a place where one should feel safe.

We discussed our idea for a Cyberbullying Reporting Platform (CBRP). This idea is to allow for cyberbullying to be reported to the authorities as soon as it happens. This allows for prosecution of cyberbullies, which ultimately makes the Net a safer place for both children and adults. Increased prosecution of cyberbullies will ensure that those who commit these crimes are brought to justice, and acts as a deterrent for others who would consider bullying someone online. Our CBRP idea allows for greater communication between victims, police, and web admins. This gives victims a place to report online

harassment, so that police and web admins can be notified, and proper action can be taken.

As we mentioned, our idea has some limitations. One problem mentioned is that our system can be overloaded, due to the fact that there is a latency from the time when a user submits an incident, to the time that web admins can be notified and handle it. As a solution to this, we proposed the development of an API to our database, which allows an application to directly send incidents over HTTP. This would allow for every social network to allow their Report button to directly submit an incident to our database. This would allow for the instant logging of the alleged cyberbully's IP address, which would allow for easier tracking of cyberbullies.

Overall, we believe our proposed system is a good launching point for a future cyberbullying tracking and reporting system to be used by the masses. Although it has some limitations, the concept at least provides an initial platform which can be modified over time to better serve the community. Eventually, we hope that a tool such as this can be developed to assuage the prevalent problem of cyberbullying.

## References

- [1] Cyber Bullying Statistics . <http://www.bullyingstatistics.org/content/cyber-bullying-statistics.html>. [Online; accessed 25-January-2014].
- [2] What is Cyberbullying. <http://www.stopbullying.gov/cyberbullying/what-is-it/>. [Online; accessed 22-January-2014].
- [3] Invisible Online: How Anonymity Effects Cyberbullying. <http://www.trulioo.com/blog/2013/10/25/invisible-online-how-anonymity-effects-cyberbullying/>, 2013. [Online; accessed 22-January-2014].
- [4] Anne Collier. The anonymity factor. *Bullying or Cyberbullying*,, 2013.
- [5] Andrea Eldridge. Anonymity: The Key To Social Media Cyberbullying? . <http://www.netnanny.com/blog/anonymity-the-key-to-social-media-cyberbullying/>, 2013. [Online; accessed 22-January-2014].
- [6] Ph.D. Justin W. Patchin and Ph.D. Sameer Hinduja. School-based efforts to prevent cyberbullying. *The Prevention Researcher*, 2012.

- [7] L.P.C. Raychelle Cassada Lohmann, M.S. Cyberbullying versus Traditional Bullying - When joking crosses the line. . <http://www.psychologytoday.com/blog/teen-angst/201205/cyberbullying-versus-traditional-bullying-1>, 2012. [Online; accessed 22-January-2014].
- [8] Randy Taran. Cyberbullying Apps - Why Are We Allowing Anonymous Cruelty? . [http://www.huffingtonpost.com/randy-taran/cyberbullying-apps\\_b\\_3941599.html](http://www.huffingtonpost.com/randy-taran/cyberbullying-apps_b_3941599.html), 2013. [Online; accessed 22-January-2014].