American International University-Bangladesh (AIUB)

Department of Computer Science

Faculty of Science & Technology (FST)

Cyberbullying detection, reporting and solution system.

A Software Engineering Project Submitted By

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SN	Student Name	Student ID	Contribution (CO3+CO4)	Individual Marks
1	GHOSH, TUTUL	23-50879-1		
2	SHAIBAL SARKAR DIP	23-50867-1		
3	GAZI MUSHFIQ MUHTASIM	23-50642-1		
4	ABDUL AL-ABRAR SHAHRIYAR	23-50648-1		

Background:

In today's world, most people depend on electronic communication, especially on the Internet or social media. They use the Internet daily for various activities, from studying to socializing. While the Internet has many advantages, it also has its fair share of disadvantages. One of the major issues is cyberbullying, which is also known as digital violence, online violence, or internet violence [1]. Defining cyberbullying can be tricky because it takes on many forms, but it is generally recognized as a type of peer aggression carried out through digital platforms like computers and mobile devices. Cyberbullying typically involves intentional, repeated, and harmful actions by an individual or group aimed at someone who often feels powerless to respond or defend themselves [2]. Unlike traditional bullying, cyberbullying can occur 24/7, can spread quickly, and can reach a massive audience in seconds. Victims often feel alone, powerless, and mentally distressed, which can lead to serious consequences such as depression, anxiety, academic decline, or even suicide.

Sadly, most platforms now in use lack the necessary tools to properly identify, report, and handle cyberbullying. Because of social shame, fear, or a lack of appropriate reporting procedures, victims may be reluctant to disclose incidents. Additionally, a lot of abusive communications go unread or unanswered because content administrators frequently cannot keep up with the enormous number of online conversations. By developing a comprehensive Cyberbullying Detection, Reporting, and Solution System, our project intends to close that gap. The suggested system detects unsafe information, enables safe and anonymous reporting, and offers victims quick care by combining cutting-edge AI technologies with user-centric features. It seeks to provide users with emotional and mental assistance in addition to technical solutions, resulting in a safer and healthier online environment for all.

Literature Review:

A study of 677 multiethnic high school students in Hawai'i found that 56.1% experienced cyberbullying, with Filipino and Samoan youth more likely to report negative self-perceptions [3]. The research revealed a significant association between cyberbullying and increased substance use, with victims being approximately 2.5 times more likely to engage in substance use and 3.2 times more likely to attempt suicide. Research by Lee and Shin found that 34% of Korean high school students were involved in cyberbullying, with 6.3% as bullies, 14.6% as victims, and 13.1% as both [2]. A report by Machimbarrena and Garaigordobil tells us similar trends, with 13.4% as cyber victims and 25.6% as bystanders, emphasizing verbal aggression and offensive messages as prevalent forms (2018). In Belgrade, 10% of students admitted to cyberbullying, while 20% were victims [4]. A Serbian study revealed 66% of students experienced cyber violence, with 27% facing three or more forms. A study with 1,108 students found that 77.6% experienced cyberbullying, while 51.2% acted as aggressors [5]. Male victims showed higher levels of hostility and psychoticism, while female victims experienced greater anxiety.

Root Causes Of cyberbullying:

Anonymity and Lack of Accountability: Online platforms often allow users to hide behind fake identities or anonymous accounts. This gives bullies the confidence to harass others without fearing real-world consequences. The lack of verification and weak enforcement policies make it difficult to hold offenders accountable.

Lack of Digital Literacy and Empathy: Many users, teenagers are not well informed on appropriate online conduct and its implications in real life. They might not be aware of the profound emotional impact their comments can have on other people. This lack of digital ethics leads to an increase in careless or malevolent behaviour.

Peer Pressure and Toxic Online Culture: Some online communities normalize harassment through memes, trolling, or hate challenges. In such environments, users may bully others to gain attention, likes, or approval from their peers. This group mentality reinforces harmful behaviour as acceptable or entertaining.

Constant Connectivity and Accessibility: With smartphones and internet access available 24/7, cyberbullying can happen at any time. Victims have no escape, even in their own homes, as they can be reached through multiple platforms. This persistent exposure leads to increased stress and emotional fatigue.

Reasons for Consideration:

High Prevalence Among Students: According to numerous international surveys, a sizable percentage of high school kids have either engaged in or been victims of cyberbullying. In one research, for example, 77.6% of students reported being victims, while 56.1% of students in Hawai did the same. These figures show that cyberbullying is a widespread and growing problem, especially in school environments.

Severe Psychological and Behavioural Impact: Victims of cyberbullying often suffer from serious mental health consequences. The data shows strong links between cyberbullying and increased anxiety, hostility, psychoticism, and substance use. Alarmingly, cyberbullying victims are over 3 times more likely to attempt suicide, underlining the life-threatening nature of the issue.

Cultural and Social Vulnerability: It has been found that specific ethnic backgrounds groups such as female pupils in some studies or Filipino and Samoan youngsters in Hawai‘i are more mentally impacted. This suggests that underprivileged groups are particularly impacted by cyberbullying, which means that comprehensive and socioeconomically appropriate solutions are crucial.

Solution:

A proposed solution is to build a cyberbullying detection and reporting software that automatically detect the harmful content and provide secure reporting tool for users and offer integrated support services for victims. Our system combines Artificial Intelligence (AI),

Natural Language Processing (NLP), mental health resources, and real-time moderation features to create a comprehensive response to cyberbullying incidents.

Our proposed solution is particularly appropriate because it addresses the cyberbullying problem from multiple critical angles like detection, reporting, intervention, and support within a single, user-friendly platform. Unlike the existing system that often follow just one aspect of the problem like only detection or only support. Our system integrates with AI and NLP technologies to automatically detect harmful content while also providing a safe and anonymous channel for victims. Additionally, it will offer immediate primary mental support and mental health advisor if needed.

Target Users:

The primary target users of our system are students and teenagers, as they are the most vulnerable group exposed to cyberbullying through social media, messaging apps, and online classrooms. **Teachers, school administrators, and parents** are also key users, as they need tools to monitor, respond to, and educate about cyberbullying incidents. As our system also provide solution, mental health professionals and counsellors are also a key user for our system.

- Students, Teenagers (Primary Users)
- Teacher, School administrators, Parents. (Secondary Users)
- Phycologist, Doctor, Mental health professionals. (secondary users)
- NGOs, educational institutions. (optional)

Benefits:

Students and Teenagers: Gain a safe space to report cyberbullying anonymously, receive emotional support, and feel empowered knowing harmful content is automatically detected and addressed.

Teachers and School Administrators: access to real-time data and analysis which help them to efficiently execute school-wide anti-cyberbullying policies, monitor trends in student behaviour, and intervene early.

Parents and Guardians: Get notifications and updates about any dangers or emotional discomfort in their kids' online activities, enabling them to take prompt action and continue to be involved in their digital health.

Mental Health Professionals and Counsellors: Use our system to reach out to victims for counselling, track behaviour patterns, and provide mental health support through an integrated platform.

Features:

- **AI and NLP-Based Intelligent Cyberbullying Detection:** Our system will use advanced machine learning and natural language processing (NLP) techniques to instantly read and evaluate articles, comments, and messages and automatically marks

a thing on social media, chat apps, and forums that is rude, abusive, or threatening. Our system will have ability to recognize text-based harassment, including coded language, irony, slang, and changing patterns of cyberbullying.

- **Anonymous Reporting Module:** Our system allows victims to report incidents confidentially. This module provides the option to report both in text and voice.
- **Dashboard for Admins, Teachers, and Moderators:** This will provide real time data visualization for all users and allow user to manage all things.
- **Chat-Based Mental Health Support:** Our system will have a ai chat bot that try to give immediate comfort and guidance according to their submitted events. This ai also record users' mood in different time to give more specific support. Also, this module enables real time chat system with a real counsellors or mental support therapists.
- **Secure and Role-Based Access:** Our system uses strong encryption method to secure all user data. Role-based access for students, parents, teachers, counsellors, and admins.
- **Educational Content and Awareness Hub:** This module allows people access to interactive materials like articles, films, and infographics that promote mental health, internet safety, and cyberbullying. To help users comprehend the effects of online conduct, it incorporates gamified tests and real-world situations. Through interesting, age-appropriate information, this site encourages empathy, responsible digital citizenship, and early intervention.

References:

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