CYBER PROTECTION & AWARENESS FOR FEMALES

BY

ANTORA HOSSAIN BRISTY

ID: 182-15-11394

FARIHA SULTANA

ID: 182-15-11477

TAMANNA MAHMUD MONISHA

ID: 182-15-11516

This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

Supervised By

Prof. Dr. Md. Fokhray Hossain

Professor
Department of CSE
Daffodil International University

Co-Supervised By

Lamia Rukhsara

Lecturer
Department of CSE
Daffodil International University

DAFFODIL INTERNATIONAL UNIVERSITY

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APPROVAL

This Project titled **"Cyber Protection & Awareness For Females"**, submitted by **Antora Hossain Bristy, ID No: 182-15-11394, Fariha Sultana, ID No: 182-15-11477, Tamanna Mahmud Monisha, ID No: 182-15-11516** to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 14 September,2022.

BOARD OF EXAMINERS

21/9/22

Dr. Touhid Bhuiyan — **Chairman**
Professor and Head
Department of CSE
Faculty of Science & Information Technology
Daffodil International University

14.09.22

Al Amin Biswas — **Internal Examiner**
Senior Lecturer
Department of CSE
Faculty of Science & Information Technology
Daffodil International University

14.09.22

Mushfiqur Rahman — **Internal Examiner**
Senior Lecturer
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

14.9.22

Dr. Md Sazzadur Rahman — **External Examiner**
Associate Professor
Institute of Information Technology
Jahangirnagar University

DECLARATION

We hereby declare that this project has been done by us under the supervision of **Dr. Md. Fokhray Hossain, Professor in the Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

Supervised by:

Dr. Md. Fokhray Hossain
Professor
Department of CSE
Daffodil International University

Co-Supervised by:

Lamia Rukhsara
Lecturer
Department of CSE
Daffodil International University

Submitted by:

Antora Hossain Bristy
ID: 182-15-11394
Department of CSE
Daffodil International University

Fariha Sultana
ID: 182-15-11477
Department of CSE
Daffodil International University

Tamanna Mahmud Monisha
ID: 182-15-11516
Department of CSE
Daffodil International University

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ABSTRACT

Nowadays, cybercrime against women is a very familiar issue. According to BTRC, the total number of Internet users in Bangladesh was 120.95 million in June 2021. The total number of social media users in the country is 45 million according to the report released in February 2021. Though it is a boon on one side, on the other side it has created insecurity in the virtual world. The advent of technology has led to cybercrime and the victimization of females, which is a great threat to the security of a person. Understanding the concept of cybercrime is not radically different from the concept of conventional crime. Any criminal activity that uses a computer either as an instrumentality target or a means for memorializing further crime comes within the scope of cybercrime. Although there are provisions like section 57 of the ICT act for cyber violence, these acts are not specific about cyber violence against women or do not recognize the variety of technology-middle violence against women as offenses.

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CHAPTER 1

Introduction

1.1 Background of the project

In this contemporary era, Tele Communication has dramatically expanded in the past few decades as the internet, is one of the significant inventions of this era. Because of this development in academic fields, the government to commercial sectors depend on it at massive global rates. In the last 10 years, digital technology such as the internet, mobile technology, digital gadgets, and enormous smart applications have transformed our day-to-day life, created a huge number of consumers, and introduced a dynamic whole new lifestyle to the whole world. It has minimized the boundaries among individual people as they can maintain good communication even living across the globe. Even so, while internet technology increased significantly last few years, there are still a lot of people who don't have enough knowledge regarding myriad internet threats and their negative perspectives and many of them don't have the minimum required knowledge regarding the protection of their devices. In worst-case scenarios, netizens suffer from harassment because of a lack of cyber awareness. According to a survey, a study shows that the total number of social media users worldwide in July 2022 is 4.7 billion, a huge percentage of the total global population. The number is also increasing in Bangladesh. Studies show that there were 49.55 million social media users in Bangladesh, and the number is still increasing. Nevertheless, Cybercrime has also become a common issue in Bangladesh. Due to the advancement of technology, social networking platforms such as Facebook and Instagram have become part and parcel of our life and are the best communication method. Consequently, the number of cybercrimes is increasing rapidly and women are the main victims of this complexity. A recent study found that 2 out of every 10 women are suffering from cybercrime directly or indirectly.

Bangladesh is still a third-world country where women's Safety is still a significant obstacle. Like in other countries, in Bangladesh, social media has its dark side. A recent study tells that the women in Bangladesh are being victims of cyberbullying. Although

there are laws like section 57 of the ICT act for cyber violence. But none of these acts are not sufficient and not particular about cybercrime or cyber violence against women.

Most of the time, it's the women who target these insulting, disrespectful, assaulting, and aggressive sexual deeds and slanderous texts on virtual sites from unidentified, unknown and fraud users. Fake and modified nude pictures of women, sex tapes, death threats, and inappropriate recommendations are very common forms of activities on social platforms, and these are increased hugely.

There are also several ways through which cybercrime occurs. First, offenders usually blackmail females. Although technology is advancing gradually, it's creating loopholes in the system. Using those, blackmailers get the personal data of females and try to hijack money and another asset. One more thing that is worth mentioning is that cybercrime is one of the most threatening problems in south-east Asia. In an article published by the Daily Star, almost 395 women suicide in 2022 becoming a victim of cybercrime. So, it can be said that it is one of the more threatening issues in Bangladesh. Moreover, much information might be leaked from the job database as the number of working women is inclining exponentially. As a victim of cybercrime, many working women leave their jobs, which might create a negative impact on a country's economy as well as it may create great complexity in the development of a nation. Yet, countries like Bangladesh facing a huge shortage of knowledgeable and experienced cybersecurity plans that can keep pace with the fast rate of this cybercrime and the parallel proliferation of digital risks. By implementing cyber law more accurately, this vicious crime can be diminished. Furthermore, mobile phones and other gadgets are getting improved day by day so that the data can't be theft.

So, in this work of research, we wanted to shed some light on the drawbacks and possible solutions. We asked a myriad of people about their opinion and asked them to share their experiences and what should be possible solutions. As long as collecting data we reviewed many papers from different countries related to our topic. There are different types of papers we read but in this paper, we used a new method that combined machine learning methods. Everyone used excellent models to implement their proposed work. In this

particular research work, we have tried to create useful models and build awareness among females.

1.2 Aim of the project

Women are the worst victims of cyberbullying, extortion, and blackmail, which is a widespread issue. Numerous well-known large cybercrimes have caused thousands of women to experience a range of health problems, including anxiety, melancholy, hypertension, heart disease, diabetes, and thyroid disorders.

One woman in Bangladesh falls victim to cybercrime every two seconds, and the internet has emerged as the new stage on which women's security, privacy, and dignity are constantly being threatened. Social media's growing popularity has exacerbated the risks that come with new technology. Females are frequently the targets of derogatory and aggressive online sexual propositions as well as slanderous communications from phony and anonymous users. The new norm on social media is misleading and modified images of naked female body, combined bait, sex-act videos, and threats of rape and inappropriate suggestions.

Among the principal reasons of such cyber-crimes against women are defamation, vengeance, pressuring the victim for physical relations, blackmailing for money, physiological torture, ego and power trips, preoccupation with love and passion, and so on. This thesis's goal may be summarized as follows:

Individuals' awareness, knowledge, and behavior increase employee and student knowledge of cybersecurity attacks; cultivate new attitudes toward cyber risk and responsibility for organizational data maintenance; translate awareness into action by reducing human factors that lead to cybersecurity vulnerabilities; and develop new rules informing the best cyber practices. Future research should investigate every aspect of this call to action.

1.3 Problem Statement

Bangladesh has a high rate of cyberbullying and 80% of the victims are girls and women (14-22). Women are in doubtful condition for their safety and have fear while going anywhere else outside their home, they aren't in a safer situation in online platforms either. Social media platforms are now a basic thing for human life due to the modernization of communication Technology, and also fueling digitally enabled violence against women. Bangladesh has a high rate of cyberbullying and 80% of the victims are girls and women (14-22). Women are in doubtful condition for their safety and have fear while going anywhere else outside their home, they aren't in a safer situation on the online platform either. Two out of ten women have been victims of cyber harassment, including having received offensive sexually explicit messages or emails, unwanted abusive comments, or inappropriate advances and attitudes from other males on social networking sites. However, cases of revenge pornography, cyberbullying, and cyberstalking are becoming intense day by day.

In this study, we identify certain significant issues that lead to cyberbullying, particularly among women. These are the issues that we have decided to address in this thesis.

1. About 80% of Bangladesh's population uses Facebook, Instagram, and What's App. Even a few years ago, the total number of female social media users was fairly low, but today, the practice has become extremely popular among young people, especially girls and women. According to a survey, young females make up around 70% of the victims of cybercrime in our nation. Actually, they are not properly IT literate and are unaware of "safe social site usage." As a result, kids are interacting with a lot of strangers on social media and becoming deeply interested in the criminal. The crooks make use of this chance to do their horrific crimes, such as acquiring private photos, making offensive movies, and sometimes making pornography.

2. Very few female users of social networking sites are aware of their legal entitlement to privacy protection from any foreign policy. Although there are many methods people may keep their profile secure and prevent themselves from being harassed, such as installing security measures and providing the ability to lock their private photographs, albums, and

messages. A user may also permanently conceal a harasser's profile by blocking them. Additionally, they may choose with whom to share their information. However, the users' ignorance and irresponsibility cause them to suffer.

3. The victim's hesitation, shyness, and concern about tarnishing the family's reputation are the key reasons why the majority of cybercrime goes undetected. Since the perpetrator's identity is unknown and he may repeatedly threaten and blackmail the victim using a different name and identity, women are more defenseless against the risk of cybercrime. Women worry about whether their friends and family will support them. Without help, women are afraid to disclose the crimes they are experiencing, which raises the criminals' spirits.

4. Many women and girls in our country post practically all of their personal information on social media, including their travel destinations, favorite foods, and dislikes. Some of them are too crazy to post images of their loved ones and family, which gets them into trouble. Many times, because the lady and children are uninformed of the process for making a complaint, the offenders have an easier time harassing, abusing, blackmailing, etc. the family. Cybercriminals target women by creating bogus identifications on social networking sites like Facebook, Twitter, and others. This causes great harm to women because of the huge blackmailing, threatening, harassing, and cheating that takes on on these sites via email and messenger. Men with malevolent motives commit various cybercrimes, such as for ill-gotten wealth, retaliation, insulting a woman's modesty, extortion, blackmail, sexual exploitation, defamation, inciting hatred against the community, the gratification of taking power, and information theft.

1.4 Research Methodology

In this paper, there are three stages of methodology that are going to be used. In the first stage, we will create a survey questionnaire where working bodies and students will answer various questions about their online life and cybersecurity. This survey will provide information on cyberbullying and blackmail on social media; how women who are

cyberbullied and blackmailed seek legal help; how women get help from conventional anti-cybercrime communities; etc.

In the second stage, used machine learning algorithms to find out the exact ratio by mathematically and theoretically analyzing the data from the survey. The exact ratio of cyberbullied, blackmailed, helped from cyber help from anti-cybercrime communities and support from society.

In the third stage, we will review the analyzed data. Tried to find how to build awareness about cyberbullying, and how they can protect themselves.

1.5 Problem Solution

From this research, our target will be to find out the real scenario of cyberbullying, and cyber harassment and will bring a real-life solution to solve this chaotic challenge. The first way to solve or overcome the challenge is to educate youngsters, especially teenagers about the consequences of cyberbullying and harassment. Furthermore, schools should introduce to every student an atmosphere in which students feel free to disclose and report to adults without any hesitation. Else ways to solve the issue could be to keep an eye on Internet usage by parents. Nonetheless, some parents have very limited technical skills in Internet use. Hence, an effective approach toward cyberbullying can be if they educate themselves and educate their child and monitor them. Government has a huge responsibility they can legislate against online harassment by regulating social websites and applying effective and realistic laws very strictly. Lastly, if schools, parents, and government can unite, they can become a supreme force to combat online harassment.

1.6 Conclusion

This work is mainly research-based. Nevertheless, our main goal is to publish journal articles on projects that are related. Usually, research paper allows for a myriad of analysis to reach goals. Our proposed work is under the sentiment analysis (SA) domain. Our

overall goal is to find out the real scenario or the facts and reason for online bullying or harassment towards women and find out the solution to solve those and clarify the government rules to bring justification towards the victim women and also to prevent and reduce the ratio of cyberbullying. Also, we have some of our goals for the future to make design and develop an automation system for cyberbullying. But for now, we just want to focus on only online cyberbullying. So, our main expectation is to make women feel safe on online platforms and make people more aware of cyberbullying and crimes.

CHAPTER 2

Background Studies

2.1 Introduction

We began this research by reading related literature reviews. Specifically, our thesis is based on Cyber Protection & Awareness For Females. Our proposed work will be done by Data Analysis. The practice of methodically applying statistical and logical approaches to describe and demonstrate, compress and recapitulate, and assess data is known as data analysis. The primary goal of data analytics is to use statistical analysis and technology to data in order to identify trends and solve issues. Data analytics has grown in importance in the company as a tool for assessing and modifying business processes, as well as for enhancing decision-making and business results. There are several kinds of data analytics. Descriptive analytics is the most basic sort of analytics and serves as the foundation for all others. The following logical issue is addressed by diagnostic analytics: "Why did this happen? Predictive and Prescriptive Analytics.

2.2 Literature Review

Research goals are split into two categories in “Cybersecurity awareness, knowledge, and behavior: a comparative study” by moti zwilling, galit klien, duan lesjak, ukasz wiechetek, fatih cetin, and hamdullah nejat basim. Creating a theoretical foundation is the first step in developing cybersecurity training programs. This framework was developed using the following study questions to assess the variables that influence cybersecurity awareness, knowledge, and behavior. The second goal of this study is to offer useful suggestions for raising the standard of cyber training programs in light of the findings from the theoretical framework. The findings of their study indicate that internet users are familiar with the term. “Cybersecurity” and respondents are aware of the numerous risks associated with using the internet, including privacy invasion, loss of money or data, equipment damage, self- or group-organizational surveillance, etc. but we also discovered a mismatch between respondents' attitudes and actions. [1]

The fundamental causes of the increase in cyber violence against women, as well as the many forms of cybercrime committed against women, were explored in “cyberspace and women: research” by mayura u. pawar and archana sakure in the international journal of engineering and advanced technology (ijeat) issn: 2249 - 8958, volume-8, issue-6s3, September 2019. Their advice and case studies were used to create the thesis-related questions. [2]

Astha Srivastava and Shivangi Sinha, "Cyber Delinquency: Issues And Challenges Under Indian Legal System," International Journal of Engineering and Advanced Technology (IJEAT), ISSN: 2249-8958, Volume-8 Issue-5C, May 2019, India. It is strongly argued that the key factor contributing to the country's rising rate of cybercrime is people's ignorance of the consequences of seemingly little actions.
It's also talked about. Globally, the Internet and computer technology have developed rapidly, creating new types of transnational crime that might have an impact on nations throughout the world. Therefore, it is necessary for education and the adoption of essential regulations across national lines to prevent crimes involving computers. [3]

Natasha Kabir's article, "Cyber Crime a New Form of Violence Against Women: From the Case Study of Bangladesh," was published on March 31, 2018, by the Bangladesh Reform Initiative For Development, Governance, and Empowerment Foundation. Its goals include to Revisit the scope and character of online/cyber violence and harassment in Bangladesh; Considering the difficulties in identifying, notifying, and responding to such incidents; Looking for best practices in this area; Considering the shared perspectives and methods being used to address the problem, such as proposed legal reforms. [4]

“CYBER VIOLENCE AGAINST WOMEN: THE CASE OF BANGLADESH" by Farhana Akter, 17th June 2018 highlighted that the victim is discovered to be a woman in 78% of these cases involving digitally altered photographs containing pornographic elements. It should be mentioned that about 77% of youngsters in the nation regularly view porn (MJF, 2014). According to the investigation, the Bangladesh National Woman Lawyers' Association discovered a total of 65 reported suicide attempts by female assault victims between 2010 and 2014. Additionally, it finds that 11 women attempt suicide

annually on average as a result of cyberbullying. In comparison, this figure was 8 in 2008, indicating a substantial uptick in the trend. It goes without saying that the official data just represent the very beginning. There are far more undocumented instances than reported cases (BNWLA, 2014). [5]

Abir, M. (2015, October 10). "Monograph On Cyber Crime Relating To Women Molestation: Conducting the Existing Bangladeshi Laws and Social Values and Views." The honors thesis. Chittagong: International Islamic University Chittagong's faculty of law. This essay highlighted societal ideals and viewpoints in relation to crime and women's in our society, which is why this form of crime affects them most frequently. dominance This is the reason why women are given the major Faeus. [6]

BTRC (2018, April 30). subscribers to the internet. Bangladesh Telecommunication Regulatory Commission explained how the wellness effects of online harassment are thoroughly analyzed by Tactical Tech's study. The results of the study plainly show that women who use social media platforms to advocate for political-related causes turn to Self-censorship as a means of self-defense tactic to deal with internet harassment or to stop abusers from escalating their abuse with physical assaults. Some respondents claimed that the trauma-inducing impacts of online abuse forced them to stop engaging in political activism and human rights advocacy. [7]

S. Zaman, L. Gansheimer, S. B. Rolim, and T. Mridha (2017). Legal Action Against Women's Cyberviolence. Bangladesh Legal Aid Services Trust in Dhaka (BLAST). It briefly analyzes and outlines Bangladesh's present legal framework's shortcomings in sufficiently safeguarding women and girls from online abuse and holding offenders accountable. Additionally, it analyzes pertinent legal frameworks from India and the UK. Finally, it offers suggestions for closing legal loopholes and creating concrete solutions to cyber violence against women and girls. While minority populations encounter hate speech and children are generally at higher risk for cybercrime, we have primarily focused on women and girls in this brief. [8]

"Measuring Saudi Arabia's degree of cyber-security awareness for cybercrime" Alzubaidi Abdulaziz Saudi citizens' Knowledge of Cybercrime: Dataset Data in Brief, Volume 36,

June 2021, Pages 106965 The main contributions are: (1) using theoretical and mathematical analysis to determine the effects of gender and skill level on cybersecurity practices; (2) conducting a survey with 1,230 subjects from all regions of Saudi Arabia of various backgrounds and ages; and (3) offering recommendations based on survey results. [9]

"An Exploratory Study on Cyberbullying With Undergraduate University Students," Carol M. Walker, MA, MEd, Indiana University of Pennsylvania, Beth Rajan Sockman (Ph.D.), East Stroudsburg University, and Steven Koehn (Ph.D.), East Stroudsburg University. The study's findings clearly illustrate that people' capacity to secretly bully others via technology is paired with findings demonstrating that 54% of respondents knew someone who had been cyberbullied and up to 34% had been cyberbullied, demonstrating a need for this research. This study delves at a little-studied aspect of the college experience. Due to a lack of research in this field, the researcher was only able to analyze two identical research. According to preliminary study of 120 participants, the majority (54%) knew someone who had been cyberbullied. One hundred percent of men polled said they knew someone who had been cyberbullied.[16]

"SCHOOLS AND CYBERBULLYING: PROBLEM PERCEPTION, CURRENT ACTIONS AND FUTURE NEEDS" Heidi Vandebosch, Karolien Poels,Gie Deboutte, University of Antwerp. According to the study's findings, while most schools are aware of relatively few instances of cyberbullying, they do consider it a problem. Many schools think it is their job to teach students about cyberbullying and help resolve cyberbullying incidents involving students, even if they occur off campus or after school hours. Despite the fact that most schools organize preventive, investigative, and/or curative initiatives aimed at students, parents, or teachers, they frequently look doubtful of their appropriateness and success. They demonstrate a strong need for more expert support in this area. Evidence-based intervention programs that are interesting to pupils would be welcomed by schools. In light of this apparent need, researchers should perform further research on the most efficient methods of combating cyberbullying. Offer systematic information on school staff members' perspectives and tangible experiences with

cyberbullying, as well as the activities they are presently taking and their remaining requirements. [17]

"Cyberbullying and its impact on young people's emotional health and well-being" Helen Cowie,University of Surrey, UK. The study underlines the need of tackling bullying early on before it escalates into a major problem. This emphasizes the need of having a whole-school plan in place that includes a variety of methods and treatments for dealing with various sorts of bullying and social exclusion. External solutions can help, but we also need to examine the interpersonal aspect of cyberbullying. This indicates that action against cyberbullying should be part of a greater concern within schools about cultivating an environment in which relationships are valued and conflicts are believed to be resolved in a spirit of justice and fairness. [18]

2.3 Scope of the Problem

Bullying is a common occurrence that many students, parents, and teachers from different school communities consider a serious problem. Childhood bullying experiences can leave adults with painful memories that linger well into adulthood. Additionally, the use of electronic media has grown, giving bullies a new platform. The amount of crime online is rising daily. 6,099 cases of various cybercrimes have been reported so far, the majority of which were brought by female victims [15]. According to a study, about 68% of online female users have experienced cybercrime. A whopping 73% of them experienced cyberbullying or harassment [15].

2.4 Summary of Research

We began this research by reviewing reviews of related literature. Our thesis is mainly focused on “Cyber Protection & Awareness For Females.” The approach is an essential element of any research project. Because the method is what makes the outcome

acceptable. Therefore, before we begin the research, we need to be clear on the technique and methods we will use.

2.5 Conclusion

After doing all the background studies we have gathered myriad information which is going to describe the main focus of our work and how these all studies going to cover our flows and how it's going to focus all the works on our research pipeline. To obtain our accomplishment in our work there has been many drawbacks and issues will pop up. All the way through we have identified all those difficulties as our main goal to implement them appropriately.

CHAPTER 3

Research Methodology

3.1 Introduction

Before starting research, it is mandatory to have a solid knowledge about what kind of methodology id needed for that research. Because it is the way that makes the result valid. The methodology is an exceptionally huge piece of a research. In this section, we will discuss each subject of the model we used in our research. We used different types of machine learning (ML) algorithms and libraries for analysis like Decision tree, KNN (k-nearest neighbors), Naive Bayes, and Random Forest. Before analysis, we need a proper dataset that's why we have created our dataset based on our research topic by questionnaire. To get an appropriate result, the dataset needs to go through some preprocessing, and cleaning.

Day by day use of machine learning is growing rapidly because it is capable of performing any kind of tasks that are too hard to do for a human directly. As a human, we have some limitations because we cannot get a lot of information manually, so we want some computer framework for that, and here machine learning makes things easier for us. Machine learning is a growing technology that enables computers to learn automatically from past data. Machine learning uses various algorithms for building mathematical models and making predictions using historical data or information. Machine learning has changed our way of thinking about problems. Machine learning consists of a set of algorithms that operate on large amounts of data. Data is fed to these algorithms to train them, and on the basis of training, they build the model & perform a specific task.

3.2 Research Subject and Instrumentation

The proposed thesis title is “Cyber Protection & Awareness for Females”. Machine learning is extremely interesting because we can learn programs from examples. From our collected data, a machine learning algorithm can analyze and generate a suitable model to

solve the problem. For accomplished our research, we used Python 3.7, Jupyter Notebook, NumPy, Pandas, and so on.

3.3 Data Collection

To perform machine learning (ML) system, we need a huge amount of data. To get a unique dataset, we created a survey questionnaire based on our research title. we are collected 896 data from our friends, relatives, and others. For Corona pandemic, we used google form as a survey paper to reach people and ask their opinion about cyberbullying. We asked 12 different questions including gender, age, occupation their idea about cyberbullying and etc.

B	C	D	E
What is your gender? (আপনার লিঙ্গ কি?)	What is your age? (আপনার বয়স কত?)	Choose your Occupation? (আপনার পেশা নির্বাচন করুন?)	Do you have any idea about Cyberbullying? (সাইবার বুলিং সম্পর্কে আপনার কি কোন ধারণা আছে?)
Female	13-23	Student	Yes
Male	13-23	Student	No
Male	13-23	Other	Yes
Male	24-33	Other	Yes
Female	13-23	Student	Yes
Female	13-23	Student	No
Female	24-33	Student	Yes
Female	13-23	Student	Yes
Female	13-23	Student	No
Male	13-23	Student	No

Figure 3.3.1 Sample of our dataset

F	G	H
Have you ever faced Cyberbullying or cyber harassment, or blackmailing? (আপনি কি কখনো সাইবার বুলিং, সাইবার হয়রানি, ব্ল্যাকমেইলিং এর সম্মুখীন হয়েছেন?)	Have you ever mistakenly shared your personal information on any Phishing site or any other suspicious sites? (আপনি কি কখনো ভুল করে কোনো ফিশিং সাইট বা অন্য কোনো সন্দেহজনক সাইটে আপনার ব্যক্তিগত তথ্য শেয়ার করেছেন?)	Do you think females have enough knowledge about protecting their personal privacy? (আপনি কি মনে করেন নারীদের তাদের ব্যক্তিগত গোপনীয়তা রক্ষার বিষয়ে যথেষ্ট জ্ঞান আছে?)
No	No	No
No	No	No
Yes	No	No
No	No	Yes
No	No	No
No	No	No
No	No	No
No	No	Yes

Figure 3.3.2 Sample of our dataset

I	J	K
Do you think females need to be more aware of cyberbullying? (আপনি কি মনে করেন নারীদের তাদের ব্যক্তিগত গোপনীয়তা রক্ষার বিষয়ে যথেষ্ট জ্ঞান আছে?)	Is our Bangladeshi law sufficient to prevent cyberbullying? (আমাদের বাংলাদেশের আইন কি সাইবার বুলিং প্রতিরোধে যথেষ্ট?)	Do you think that cyberbullying is a personal problem so reporting that problem and making them public can harm the dignity of females? (আপনি কি মনে করেন যে সাইবার বুলিং একটি ব্যক্তিগত সমস্যা তাই সেই সমস্যাটি রিপোর্ট করা এবং সেগুলিকে প্রকাশ করা নারীদের মর্যাদার ক্ষতি করতে পারে?)
Yes	No	Yes
Yes	No	Yes
Yes	No	No
Yes	No	Yes
Yes	No	Yes
Yes	No	No
Yes	No	No
Yes	No	Yes

Figure 3.3.3 Sample of our dataset

To whom will you ask for help to protect yourself if you face cyberbullying? (সাইবার বুলিং এর সম্মুখীন হলে নিজেকে রক্ষা করার জন্য আপনি কার কাছে সাহায্য চাইবেন?)	How do you think we can protect females from cyberbullying? (কিভাবে আমরা সাইবার বুলিং থেকে নারীদের রক্ষা করতে পারি বলে মনে করেন?)
Family, Friends, Institute Authorities	Train females to protect their passwords and personal details online., Limit the use of computers, phones, and social media accounts., By providing counseling and hotline support to discuss cyberbullying with Create awareness through adds and text book, increase consciousness among parents about cyberbullying, By improving the use of the law against cyberbullying
Police	By improving the use of the law against cyberbullying
	Train females to protect their passwords and personal details online., Limit the use of computers, phones, and social media accounts., By providing counseling and hotline support to discuss cyberbullying with Create awareness through adds and text book,

Figure 3.3.4 Sample of our dataset

3.4 Data Partition

In machine learning data preprocessing, we divide our dataset into a training set and test set. This is an important step in data preprocessing because by doing this we can increase the performance of our machine learning model. We always try to make a machine learning model which performs well with the training set and also with the test dataset. Here, we can define these datasets as

Training Set: A subset of the dataset to train the machine learning model, and we already know the output.

Test set: A subset of the dataset to test the machine learning model, and by using the test set, model predicts the output.

In our dataset, we collected 897 data in total and divided them into two parts: Train and Test. we used 70% of the data as Train data and 30% of data as Test data.

3.5 Data Preprocessing

Data preprocessing ensures that is there have any incorrect or missing values. So, Data preprocessing is an essential step in Machine Learning (ML). It is the first step before applying any machine learning algorithms. Because an algorithm can give an exact value from perfect data. Problem-solving heavily depends on accurate data to make suitable features. So preprocessing data, we make it easier to interpret and use. When preprocessing data it's important to understand what kind of dataset we have because depending on what our goals are you have to choose which one to focus on. Let's go over the two different types of features that are used to describe data: categorical and numerical. Categorical Data: Data whose explanations or values are taken from a defined set of possible explanations or values. Categorical values can be colors of a house; types of animals; months of the year; True/False; positive, negative, neutral, etc. Numerical Data: Data with values that are continuous on a scale, statistical, or integer-related. Numerical values are represented by whole numbers, fractions, or percentages. Numerical features can be house prices, word counts in a document, time it takes to travel somewhere, etc.

Data preprocessing is required task for cleaning the data and making it suitable for a machine learning model which also increases the accuracy and efficiency of a machine learning model. To perform data preprocessing using Python, we need to import some predefined Python libraries. These libraries are used to perform certain tasks. There are three specific libraries that we will use for data preprocessing, They are:

Numpy: Numpy Python library is used for including any type of mathematical operation in the code. It is the fundamental package for scientific calculation in Python. It also supports adding large, multi-dimensional arrays and matrices.

Matplotlib: The second library is matplotlib, which is a Python 2D plotting library, and with this library, we need to import a sub-library pyplot. This library is used to plot any type of chart in Python for the code.

Pandas: The last library is the Pandas library, which is one of the most famous Python libraries and used for importing and managing datasets. It is an open-source data manipulation and analysis library.

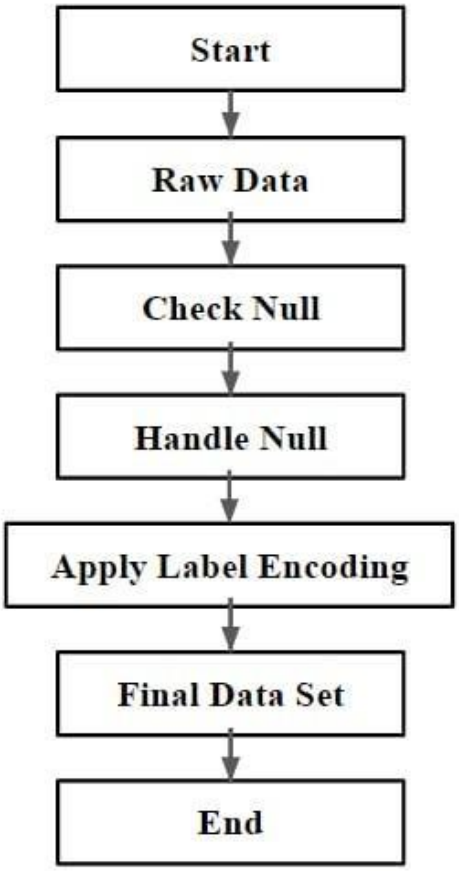

Fig:3.5.1 Data processing Process

In our survey questions, we got some comment-type information. For analysis, we changed them into numbers. They are given below:

Question: To whom will you ask for help to protect yourself if you face cyberbullying?

Family	0
Friend	1
Police	2
Institute Authority	3
Family & Friend	4
Family & Police	5
Friend & Police	6
Family, Friend, Police	7
Family, Institute Authority, Police	8
Family, Friend, Institute Authority, Police	9
Others	10

Question: How do you think we can protect females from cyberbullying?

Create awareness through ads and textbooks.	0
Increase consciousness among parents about cyberbullying.	0
Train females to protect their passwords and personal details online.	1
By providing counseling and hotline support to discuss cyberbullying without hesitation.	1
Limit the use of computers, phones, and social media accounts.	2
By improving the use of the law against cyberbullying	3
All	4

For analysis we changed our dataset header in a small pattern. They are:

What is your gender? (আপনার লিঙ্গ কি?)	gender
What is your age? (আপনার বয়স কত?)	age
Choose your Occupation? (আপনার পেশা নির্বাচন করুন?)	occupation
Do you have any idea about Cyberbullying? (সাইবার বুলিং সম্পর্কে আপনার কি কোন ধারণা আছে?)	idea_about_cb
Have you ever faced Cyberbullying or cyber harassment or blackmailing?(আপনি কি কখনো সাইবার বুলিং, সাইবার হয়রানি, ব্ল্যাকমেইলিং এর সম্মুখীন হয়েছেন?)	face_cb
Have you ever mistakenly shared your personal information on any Phishing site or any other suspicious sites?(আপনি কি কখনো ভুল করে কোনো ফিশিং সাইট বা অন্য কোনো সন্দেহজনক সাইটে আপনার ব্যক্তিগত তথ্য শেয়ার করেছেন?)	shared_personal
Do you think females have enough knowledge about protecting their personal privacy?(আপনি কি মনে করেন নারীদের তাদের ব্যক্তিগত গোপনীয়তা রক্ষার বিষয়ে যথেষ্ট জ্ঞান আছে?)	have_knowledge
Do you think females need to be more aware of cyberbullying? (আপনি কি মনে করেন যে সাইবার বুলিং সম্পর্কে নারীদের আরও সচেতন হওয়া দরকার?)	more_aware
Is our Bangladeshi law sufficient to prevent cyberbullying? (আমাদের বাংলাদেশের আইন কি সাইবার বুলিং প্রতিরোধে যথেষ্ট?)	have_law
Do you think that cyberbullying is a personal problem so reporting that problem and making them public can harm the dignity of females?(আপনি কি মনে করেন যে সাইবার বুলিং একটি ব্যক্তিগত সমস্যা তাই সেই সমস্যাটি রিপোর্ট করা এবং সেগুলিকে প্রকাশ করা নারীদের মর্যাদার ক্ষতি করতে পারে?)	harm_reporting
To whom will you ask for help to protect yourself if you face cyberbullying? (সাইবার বুলিং এর সম্মুখীন হলে	ask_help

নিজেকে রক্ষা করার জন্য আপনি কার কাছে সাহায্য চাইবেন?)	
How do you think we can protect females from cyberbullying? (কিভাবে আমরা সাইবার বুলিং থেকে নারীদের রক্ষা করতে পারি বলে মনে করেন?)	how_protect

Since machine learning model completely works on mathematics and numbers, As our dataset has a categorical variable, then it may create trouble while building the model. So it is necessary to encode these categorical variables into numbers. So, for the rest of the question, we applied label encoding. And got the final data set.

A	B	C	D	E	F	G	H	I	J	K	L
gender	age	occupation	idea_about_cb	face_cb	shared_personal	have_knowledge	more_aware	have_law	harm_reporting	ask_help	how_protect
Female	13-23	Student	Yes	No	No	No	Yes	No	Yes	7	4
Male	13-23	Student	No	No	No	No	Yes	No	Yes	2	3
Male	13-23	Other	Yes	No	No	No	Yes	No	No	10	4
Male	24-33	Other	Yes	Yes	No	No	Yes	No	Yes	6	4
Female	13-23	Student	Yes	No	No	Yes	Yes	No	Yes	6	1
Female	13-23	Student	No	No	No	No	Yes	No	No	2	0
Female	24-33	Student	Yes	No	No	No	Yes	No	No	9	4
Female	13-23	Student	Yes	No	No	No	Yes	No	Yes	2	1
Female	13-23	Student	No	No	No	Yes	Yes	No	Yes	2	1
Male	13-23	Student	No	No	No	Yes	Yes	No	Yes	2	1
Female	24-33	Student	Yes	Yes	No	No	Yes	No	No	7	4
Male	24-33	Student	No	No	No	Yes	Yes	No	No	6	4
Male	13-23	Student	Yes	No	No	Yes	Yes	No	Yes	2	1
Female	13-23	Student	Yes	No	No	Yes	Yes	No	Yes	5	4
Female	24-33	Student	Yes	No	No	No	Yes	No	No	6	4
Male	13-23	Student	Yes	No	Yes	Yes	Yes	No	Yes	2	1
Female	13-23	Student	Yes	No	No	No	Yes	No	No	0	1

Figure 3.5.2 Final dataset

3.6 Statistical Analysis

In this section, we analyzed data graphically. Data are explained based on some questions from our dataset. Firstly, we found from our dataset there have 691 female data and 206

male data in gender. In our dataset, we found that 83.94% of people have idea about cyberbullying. 58.75% of people who faced cyberbullying. 93.31% of people think we need to be aware more of our females. As our research is based on females, we do all analyses based on 691 female data.

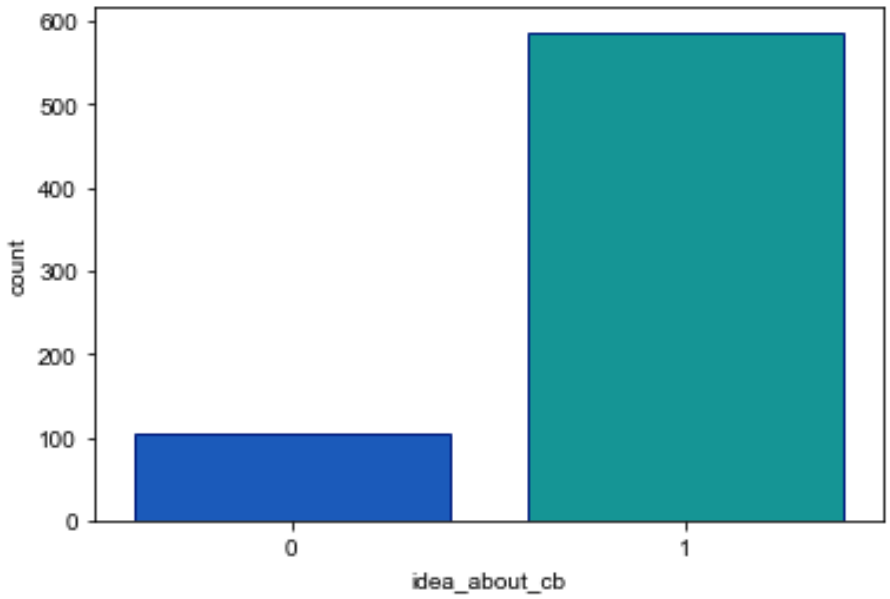

Fig: 3.6.1 Bar Chart comparison between female and have idea about cyberbullying

Fig: 3.6.1 the x-axis indicates that females have idea about cyberbullying and the y-axis indicates the count number.

0= who has no idea about cyberbullying,

1= who has idea about cyberbullying.

It shows that more than 500 females have idea about cyberbullying and almost 100 females have no idea about cyberbullying.

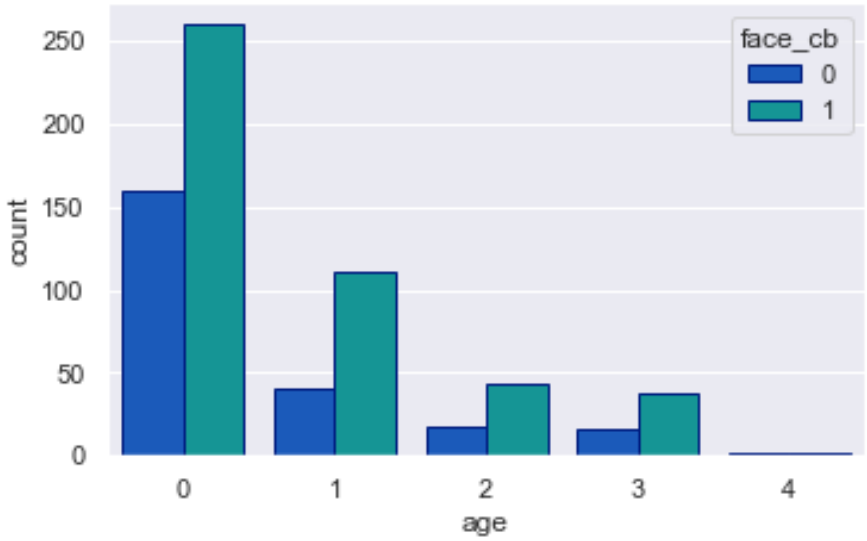

Fig 3.6.2 Bar Chart comparison between age and face cyberbullying

Fig 3.6.2 shows the x-axis indicates the age range of females who have faced cyberbullying and the y-axis indicates the count number. As shown there blue color which is 0 indicates who hasn't faced cyberbullying and the green number which is 1 indicates who has faced cyberbullying.

Also, indicated age range as

0 = 13 - 23,

1= 24 - 33,

2= 34 - 43,

3 = 44 - 53,

4 = 54 - 63.

From the bar chart, we found that 0 means 13-23 age ranges females mainly faced cyberbullying.

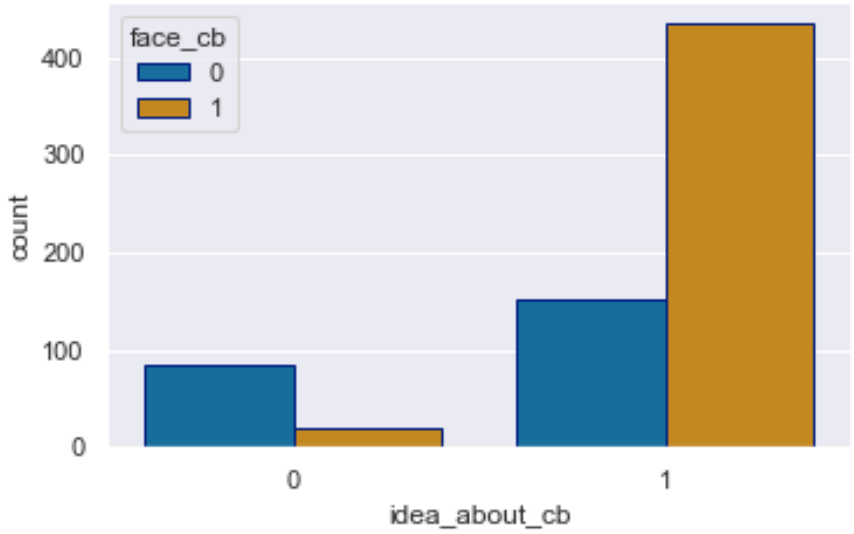

Fig: 3.6.3 Bar Chart comparison between those who have idea about cyberbullying and faced cyberbullying

Fig: 3.6.3 the x-axis indicates that females have idea about cyberbullying and the y-axis indicates the count number.

0= who has no idea about cyberbullying,

1= who has idea about cyberbullying.

As we can see that blue color which is 0 indicates who hasn't faced cyberbullying and the yellow number which is 1 indicates who has faced cyberbullying.

From the bar chart, we realized number 1 means those who have faced cyberbullying in the yellow bar has the highest count number. That means females who have idea about cyberbullying have faced cyberbullying once.

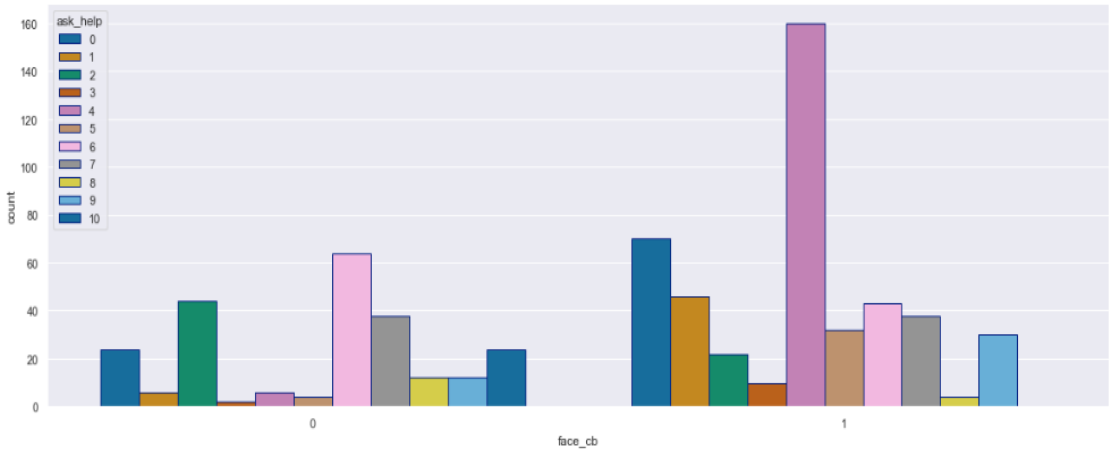

Fig: 3.6.4 Bar Chart comparison between Face cyberbullying and whom they asked help

Fig: 3.6.4 the x-axis indicates that females have faced cyberbullying and the y-axis indicates the count number.

0= who hasn't faced cyberbullying

1= who has faced cyberbullying

Also there have some different colors with different numbers that indicated to whom females asked for help when they faced cyberbullying. Those are

0 = Family

1 = Friend

2 = Police

3 = Institute Authority

4 = Family & Friend

5 = Family & Police

6 = Friend & Police

7 = Family, Friend, Police

8 = Family, Institute Authority, Police

9 = Family, Friend, Institute Authority, Police

10 = Others

So we found those who have faced cyberbullying mostly asked for help in pink color which number 4 is indicates family and friend. When females faced cyberbullying, they asked help mostly from their family and friends.

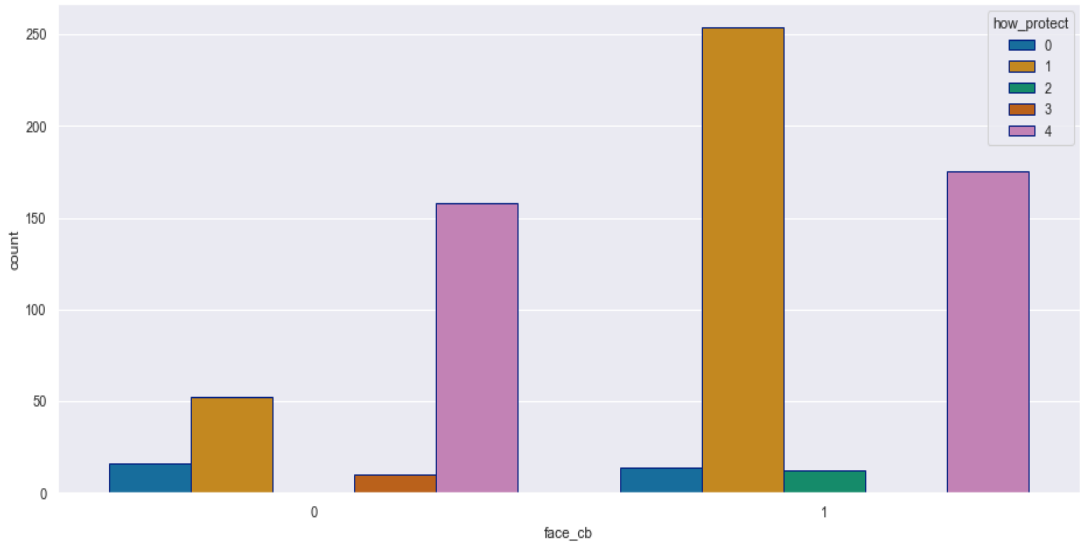

Fig: 3.6.5 Bar Chart comparison between faced cyberbullying and how to build awareness

Fig: 3.6.5 the x-axis indicates that females have faced cyberbullying and the y-axis indicates the count number.

0= who hasn't faced cyberbullying

1= who has faced cyberbullying

Also there have some different colors with different numbers that indicated how to build awareness. Those are

0 = Create awareness through ads and textbooks. Increase consciousness among parents about cyberbullying.

1 = Train females to protect their passwords and personal details online. By providing counseling and hotline support to discuss cyberbullying without hesitation.

2 = Limit the use of computers, phones, and social media accounts.

3 = By improving the use of the law against cyberbullying.

4 = All

So, we found those who have faced cyberbullying mostly thought how to build awareness in yellow color which number 1 shows females need to build awareness by training females to protect their passwords and personal details online and by providing counseling and hotline support to discuss cyberbullying without hesitation.

3.7 Proposed Methodology

In classification techniques, our study applies a number of strategies in the working procedure. We can train machine learning algorithms by providing them with large amounts of data and have them explore the data, build models and automatically predict the required output. The performance of machine learning algorithms depends on the amount of data and can be determined by a cost function. Machine learning helps to save both time and money. Machine learning has three types of algorithms used, Supervised learning, Unsupervised learning, and Reinforcement learning. Supervised machine learning is characterized by labeled datasets to train algorithms that can classify data or accurately predict results. These datasets are used to train or "supervise" algorithms designed to classify data or accurately predict outcomes. Using labeled inputs and outputs, the model can measure its accuracy. Unsupervised learning is utilized to group information without attempting to predict a result where reinforcement learning helps to train the ML to make decisions in a specific way. So, to get perfect outcome it need to utilize what can be used and what not.

Four algorithms were employed in this study. They are

1. Decision tree
2. K-nearest neighbors
3. Naive Bayes
4. Random Forest

1. Decision tree

A decision tree algorithm is a data mining induction technique that continuously divides a dataset of records into classes according to whether they are all members of the same class or not using a depth-first greedy approach or breadth-first approach. We used this algorithm because it uses less memory and can handle noisy input to deliver an accurate result. To choose the appropriate split attribute, it employs a variety of metrics, including entropy, the Gini index, information gain, etc. [11]

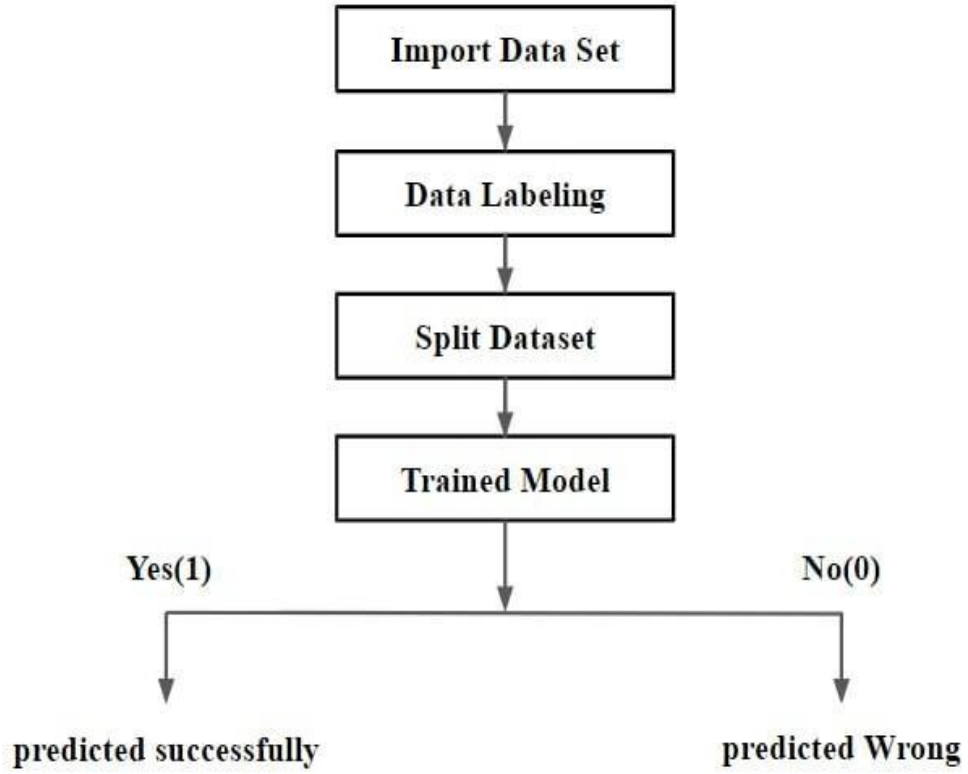

Fig:3.8.1 Proposed Methodology

2. K-nearest neighbors

The K-Nearest Neighbor Algorithm is the simplest of all machine learning algorithms. It is based on the principle that the samples that are similar, generally lie in close vicinity. K-Nearest Neighbor is an instance-based learning method. Instance-based classifiers are also called lazy learners as they store all the training samples and do not build a classifier until a new, unlabeled sample needs to be classified [11]. We used this algorithm to easily understand and implement. As,It is robust to noisy training data. Although It has sensitively to the local structure of the data also has memory limitations.

3. Naive Bayes

Naive Bayes Classifier is the simple Statistical Bayesian Classifier. It is called Naive as it assumes that all variables contribute towards classification and are mutually correlated. This assumption is called class conditional independence [11]. We used this algorithm because it requires a short computational time for training. It improves classification performance by removing irrelevant features. While It has good performance. The Naive Bayes classifier requires a very large number of records to obtain good results. Less accurate as compared to other classifiers on some datasets.

4. Random forest

Random forest is a classifier that contains multiple decision trees and the output category is determined by the mode of the category output by the individual tree. We used this algorithm to solve both classifications and regression problems. As it works well with both categorical and continuous variables. And can automatically handle missing values. But this algorithm requires much more computational power and resources.

3.8 Implementation Necessity

Before implementing algorithms, we need to have a proper idea of what result we want to see, which kind of data we have, and how that algorithm helps us to get our desired result. There are multiple models and types of models for different types of motives in supervised learning. we used four of them to get the appropriate results. Our goal is to enhance machine learning interaction by getting proper accuracy.

3.9 Conclusion

Using the methodology, a coder can find a "performance ceiling" for a data set before settling on a model. In many cases, a range of models will be comparable in terms of performance so that we can weigh the advantages of different approaches. A computer program that we write after learning about the problem and designing the solution, a machine learning model makes all the micro-decisions needed to solve higher-order problems. When we run a machine learning program on our collected data, it creates a program or model for us that knows how to solve the problem. By following them, we can make a good solution.

CHAPTER 4

EXPERIMENTAL RESULTS AND DISCUSSION

4.1 Introduction

The proposed thesis title is “Cyber Protection & Awareness for Females”, we collected myriad data from different types of people and try to generate a suitable model using a Machine learning algorithm. In our research work, we want to use enormous algorithms to solve higher-order problems and get the expected outcome. We tried to cooperate with four machine learning algorithms in this study, they are Decision tree, K-nearest neighbors, Naive Bayes, Fourth, and Random Forest. In this section of “Experimental results and discussion,” we are going to discuss our model.

4.2 Descriptive Analysis

By applying the algorithm, we evaluate which algorithm provides the best accuracy. We are looking for the best model based on statistical performance. We look at the confusion matrix, precision score, recall, precision value, and F-1 score to find the best model to represent our proposed methods.

Confusion matrix: Confusion matrices represent counts from predicted and actual values. It’s an N×N dimensional matrix. The confusion matrix can help us determine whether the classification model is correct and whether it is making any mistakes.
Accuracy: Accuracy is defined as the number of classifications a model correctly predicts divided by the total number of predictions made.

Accuracy = Correct Predictions / Total Predictions

Precision score: The precision is the ratio tp / (tp + fp) where tp is the number of true positives and fp is the number of false positives. It's also known as the PPV (Positive Predicted Value). The best value is 1 and the worst value is 0.

Recall: Recall is a metric that quantifies the number of correct positive predictions made out of all positive predictions that could have been made.

Recall = True Positive / (True Positive + False Positive)

F1-Score: The F-score is a way of combining the precision and recall of the model, and it is defined as the harmonic mean of the model's precision and recall.

F1-Score = (2*Precision*Recall) / (Precision + Recall)

4.3 Experimental Results & Analysis

The whole purpose of machine learning methods is to see how well the model being performed. Classification methods can provide a precise output based on classes and achieve outstanding accuracy. We all know that no machine can produce results that are 100 percent correct. Although the algorithms we used for our research gave us acceptable accuracy, it was not totally valid. In this study, we will show our testing results and visualize their graphical representation.

Machine Learning algorithm applies: To gain acceptable results based on our own dataset, we analyzed four machine learning (ML) algorithms. In this section, the outcomes of our dataset using machine learning algorithms will be defined and explained in detail.

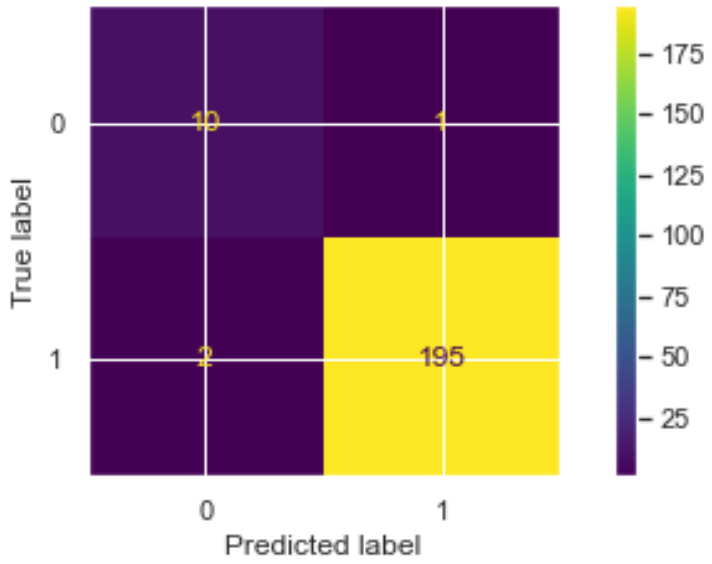

Fig: 4.3.1 Confusion matrix for decision tree

Table 4.3.1 Classification Report for decision tree

	precision	recall	f1-score	support
0	0.83	0.91	0.87	11
1	0.99	0.99	0.99	197
accuracy			0.99	208
macro avg	0.91	0.95	0.93	208
weighted avg	0.99	0.99	0.99	208

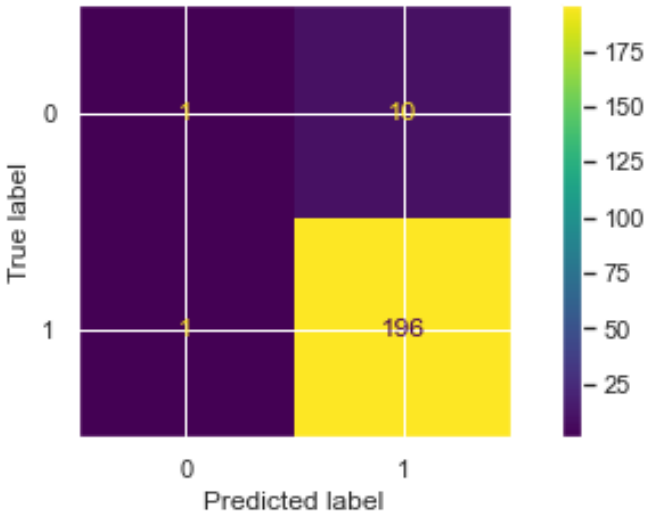

Fig: 4.3.3 Confusion matrix for K- nearest neighbors Algorithm

Table 4.3.2 Classification Report for K- nearest neighbors Algorithm

	precision	recall	f1-score	support
0	0.50	0.09	0.15	11
1	0.95	0.54	0.97	197
accuracy			0.95	208
macro avg	0.73	0.54	0.56	208
weighted avg	0.93	0.95	0.93	208

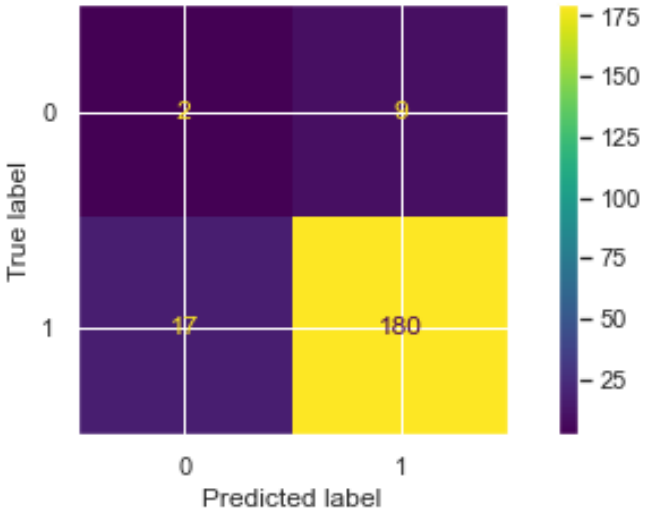

Fig: 4.3.2 Confusion matrix for Naive Bayes

Table 4.3.3 Classification Report for Naive Bayes

	precision	recall	f1-score	support
0	0.11	0.18	0.13	11
1	0.95	0.91	0.93	197
accuracy			0.88	208
macro avg	0.53	0.55	0.53	208
weighted avg	0.91	0.88	0.89	208

Table 4.3.3 Result of all Algorithm

Model	Training Accuracy %	Testing Accuracy %
Decision Tree	99.379	98.558
K-nearest neighbors	93.582	94.712
Naive Bayes	86.749	87.500
Random Forest	88.278	73.562

4.4 Discussion

In our study, we applied four algorithms and obtained results. Our data set contains 897 data. As we are concerned about females, we have only looked at their views. From our questionnaire, we tried to find out how many females know about cyberbullying, have ever faced it, whom they asked for help, and how to protect themselves from cyberbullying. We identify based on Machine Learning (ML) to make females more aware of cyberbullying. From our total data, we used seventy percent of our data as a training set and the remaining thirty percent as a testing set. There were four algorithms and the average accuracy was

91.99%.

From our statistical analysis, around 587 females have idea about cyberbullying among 691. From our statistical analysis, around 587 females have idea about cyberbullying among 691. 455 females faced cyberbullying who participated in this research survey. 645 females among 691 females thought females needed to be more aware of cyberbullying. Approximately 93.34% of females carry the same opinion. Also when females are faced to cyberbully, most of them have gone to their family and friends for help.

4.5 Conclusion

Bangladesh has a high rate of cyberbullying, and 80 percent of victims are women between the ages of 13 and 23 [19].To prevent cyberbullying females need to be more aware of how to protect themselves, and how to asked help from others. Most importantly need to build awareness to protect their passwords and personal details online also increase consciousness among parents about cyberbullying, providing counseling and hotline support to discuss cyberbullying without hesitation. Bangladesh police already formed cyber wing for females to receive complaints about cyberbullying. So, females need to be more aware to protect themselves from cyberbullying.

CHAPTER 5

Impact on Society, Environment, and Sustainability

5.1 Impact of Society

The growth of cyberbullying is a common source of mental distress in young adults. Whatever the usefulness of technological solutions for combating cyberbullying, we cannot deny that this is an interpersonal problem with a societal context. This situation is worsened by the fact that these interpersonal safety concerns are actually caused by the peer group and in surroundings that are difficult for adults to handle.

The fact that cyberbullying affects individuals in real life as well as online implies that it affects how we approach protecting all innocent internet users from cyberbullying. Now, it might be challenging to stop cyberbullying from impacting victims' emotional and physical health. There are several hotlines and online tools available for parents whose children have experienced cyberbullying.

Regarding digital, there are a few tools that consumers can use themselves to set up security measures and protect their family's gadgets from dangerous online activities. The use of technologies like McAfee Web Advisor can aid in preventing children from visiting any websites that have dangerous characters or information.

It takes technology to fight cyberbullying. Only then can the consequences of these ugly online bullies be eradicated from both the digital and physical worlds.

The impact of cyberbullying varies from situation to situation. Victims suffer loneliness and social isolation as a result of a lack of acceptability in their peer groups. As a result, the young individual's overall seclusion is likely to lead as low self-esteem and sadness. Bullies are also in danger. They are much more prone than non-bullies to engaging in a variety of maladaptive behaviors and aggressive behaviors, and they are at risk of becoming addicted to alcohol and drugs; they, like their victims, are at risk of depression and suicidal thoughts.

Victims suffer loneliness and social isolation as a result of a lack of acceptability in their peer groups. As a result, the young individual's overall seclusion is likely to lead to low self-esteem and sadness. Bullies are also in danger. They are much more prone than non-bullies to engaging in a variety of maladaptive behaviors and aggressive behaviors, and they are at risk of becoming addicted to alcohol and drugs; they, like their victims, are at risk of depression and suicidal thoughts.

It can be challenging for parents, teachers, and even law enforcement to understand the problems caused by cyberbullying, let alone have practical solutions. Although accurate prevention is conceivable, there doesn't appear to be enough resources, techniques, or policies in place to get there yet.

As in face-to-face bullying research, online victims report feeling insecure and alienated at school and at home. Similarly, cyberbullies report a variety of social and emotional concerns, including feelings of unsafely at school, a lack of assistance from school personnel, and a high frequency of headaches. They, like typical bullies, engage in a variety of other antisocial behaviors, conduct difficulties, and alcohol and drug abuse. In order to eliminate cyberbullying, we must all take action and look into the appropriate research and technologies. Only then will the consequences of these ugly online bullies be eradicated from both the digital and physical worlds.

5.2 Sustainability Plan

Due to the modernization of communication technology, social media platforms are now a basic thing for human life and also fueling digitally enabled violence against women. In particular, the ICT tools are easily accessible for use for abusive deeds. In Bangladesh, two out of ten women have been victims of cyber harassment, including having received offensive sexually explicit messages or emails, unwanted abusive comments or inappropriate advances, and abusive attitudes from other males on social networking sites.

These chaotic online activities are mostly increasing due to inhibitions, including a silence, and a lack of proper laws from the government. However, cases of revenge pornography, cyberbullying, and cyberstalking are becoming more intense day by day. As a result, many teenagers commit suicide after receiving threats to publish their nudes or any personal items from a male they met through Facebook or any other online platform. That's why our primary goal is to find out all the reasons available behind these and how to increase protection. Raising awareness among women as well as among the whole society Also, encourage the government to take the required action to prevent cyber-bullying or harassment and support women morally, culturally, and with legal action whenever they need it.

5.3 Conclusion

The fact that cyberbullying affects individuals in real life as well as online implies that it affects how we approach protecting all innocent internet users from cyberbullying. Now, it might be difficult to stop cyberbullying from having an impact on victims' emotional and physical health. There are several hotlines and online tools available for parents whose children have experienced cyberbullying.

In order to eliminate cyberbullying, we must all take action and look into the appropriate research and technologies. Only then can the consequences of these ugly online bullies be eradicated from both the digital and physical worlds.

CHAPTER 6
Conclusion and Future Work

6.1 Conclusion

Main focus of the research is particularly finding out how women in Bangladesh are victims of online harassment, cyberbullying, and cybercrime. How to build cyber protection and awareness which can support and ensure their safety against online abuse and violence, which can have serious impacts on women's security and empowerment, and the impact on their livelihood is beyond our imagination and far more distressing and shocking than we indeed imagine.

Through research, we want to find some effective preventive measures for ending the cycle of aggression and ensure friendly circumstances free from gender-based violence. So, the purpose of this paper is to work on this particular problem and find its solution, ensuring a healthy online environment for women. We begin by gathering raw data from different women.

It is obvious that raising the public's understanding of cyber-security is necessary to ward off the continuously rising number of cyber-attacks. With regard to cyber bulling conditioning and taking the development of technology into account, this research presented an in-depth examination of the depth cyber-security understanding of a diapason of people from different Bangladeshi origins, periods, locals, and genders.

6.2 Further Suggested Work

Every single day, every woman especially young girls and mothers, from all around the world is facing different online difficulties, crimes, cyberbullying, and harassment, and struggling their level best to be protected from this danger and secured themselves. But recently incidents like molestation, kidnapping, harassment, and rapes are growing enormously. Not only in Bangladesh but in the whole of south-east Asia, development is increasing rapidly but still, there are a huge number of crimes taking place every day

against women. For example, in the streets, public transport, and public places have become the hunters' dominion.

Especially nowadays women are being harassed and faced different bullying and unexpected incidents on various online platforms. In many situations, they can't take the stress and choose the path of suicide. So, it is visible how much important it this right now to make some initial steps and some policies to help women regarding these issues and the recent situation determined the need. So, in this paper, mainly focuses on finding out the possible solution to this problem. What can we do to stop cybercrime from spreading? The greatest long-term approaches to cybercrime involve educating individuals who are most at risk and more broadly deploying instruments for crime prevention.

Cybercrime is a problem that demands immediate preventative action worldwide. Indeed, as cutting-edge technology becomes more pervasive in everyday life, cybercrime is one of the most urgent issues facing law enforcement now and in the future. Therefore, international cooperation is crucial in the battle against cybercrime. We'll add additional information to this study moving forward.

There are few laws in our country issued by the government against bullying in particular on cyberbullying. But as these laws are relatively new and haven't been introduced everywhere so people don't have any idea about them. So, one of our main focuses is to observe the whole situation and suggest some solutions to the government and inspire them to have specific laws on cybercrime, harassment, and cyberbullying to control online behavior and prevent any serious emotional distress among the victim because of these issues.

Our future goal is to provide circumstances for women so that they can seek any help or protection, spread awareness among them and prohibit communication with any suspicious people who can bring any harm, and also make them change their lifestyle by restricting the use of devices. As punishment is not always the most effective solution to overcome the circumstances and change the behavior and habit of the bullies, another plan is to build a community for women from where they can seek help from nearby people, ask for help,

can share any of their experience thus other women can learn about a lot of things and it will help them to be more conscious and enrich their awareness.

In future, we are planning to build a mobile app from where women can directly seek help from nearby people and also from the police if they face any harassment online as well as offline. For this work, we inspire by Sadat Rahman, he is actually a app developer and also won the international children's peace prize 2020 because he development app for anti-bullying called Cyber Teens. In an interview the developer said, he was inspired working on the project after hearing a suicide of a underaged victim because of cyberbullying. So, his work also inspires us to develop a mobile app and website to build a community.

References

[1] Moti Zwilling, Galit Klien, Dušan Lesjak, Łukasz Wiechetek, Fatih Cetin & Hamdullah Nejat Basim, "Cyber Security Awareness, Knowledge and Behavior: A Comparative Study"14 Feb 2020.

[2] "Cyberspace and Women: A Research" Mayura U. Pawar, Archana Sakure, International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-8, Issue-6S3, September 2019,

[3] Astha Srivastava, Shivangi Sinha"Cyber Delinquency: Issues And Challenges Under Indian Legal System", International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-8 Issue-5C, May 2019 India,

[4] Natasha Kabir"Cyber Crime a New Form of Violence Against Women: From the Case Study of Bangladesh", Bangladesh Reform Initiative For Development, Governance and Empowerment Foundation; Jahangirnagar University, March 31, 2018,

[5] Farhana Akter "CYBER VIOLENCE AGAINST WOMEN: THE CASE OF BANGLADESH", 17th June 2018

[6] Abir, M. (2015, October 10). Monograph On Cyber Crime Relating To Women Molestation: Conducting the Existing Laws of Bangladesh and Social Values and Views. Honors Thesis. Chittagong: Faculty of Law, International Islamic University Chittagong. October 10, 2015.

[7] Karaman, S. (2017, 11 29). Women support each other in the face of harassment online, but policy reform is needed. The LSE Women, Peace and Security blog. London: The London School of Economics and Political Science. November 29th, 2017

[8] Zaman, S., Gansheimer, L., Rolim, S. B., & Mridha, T. (2017). Legal Action on Cyber Violence Against Women. Dhaka: Bangladesh Legal Aid Services Trust(BLAST). 17th June 2018

[9] Xingshe Zhou, Tianben Wang, Jinli Cao, Zhu Wang, Hua Wang, Yanchun Zhang, "An Attention-based Hybrid LSTM-CNN Model for Arrhythmias Classification", 2019 International Joint Conference on Neural Networks (IJCNN). 14-19 July 2019

[10] Abdulaziz Alzubaidi "Measuring the level of cyber-security awareness for cybercrime in Saudi Arabia" Cybercrime Awareness among Saudi Nationals: Dataset Data in Brief, Volume 36, Pages 106965, June 2021.

[11] Arwa A. Al Shamsi"Effectiveness of Cyber Security Awareness Program for young children: A Case Study in UAE" , British University in Dubai, August 2019.

[12] Sayali D. Jadhav, H. P. Channe“Comparative Study of K-NN, Naive Bayes and Decision Tree Classification Techniques”.Department of Computer Engineering, Pune Institute of Computer Technology, Savitribai Phule Pune University, Pune, India.Volume 5 Issue 1, January 2016

[13] Machine Learning is Fascinating. by Jason Brownlee on December 11, 2013, available at <<https://machinelearningmastery.com/machine-learning-is-fascinating/>> last accessed on 06-07-2022 at 10:00 AM.

[14] Machine learning available at <<https://en.wikipedia.org/wiki/Machine_learning/>>, last accessed on 06-07-2022 at 12:00 PM.

[15] Police launch cyber support for women, available at <<https://www.thedailystar.net/city/news/police-launch-cyber-support-women-1996293>>, last accessed on 18-07-2022 at 12:00 PM

[16] An Exploratory Study of Cyberbullying With Undergraduate University Students at <<https://members.aect.org/pdf/Proceedings/proceedings10/2010/10_31.pdf>> last accessed on 16-07-2022 at 12:00 PM

[17] SCHOOLS AND CYBERBULLYING: PROBLEM PERCEPTION, CURRENT ACTIONS AND FUTURE NEEDS at <<https://www.learntechlib.org/p/209181/>> last accessed on 18-07-2022 at 12:00 PM

[18] Cyberbullying and its impact on young people's emotional health and well-being at <<https://www.cambridge.org/core/journals/the-psychiatrist/article/cyberbullying-and-its-impact-on-young-peoples-emotional-health-and-wellbeing/B7DB89A2035CF347E73D21EAF8D91214>> last accessed on 18-07-2022 at 12:00 PM

[19] Cyberbullying in Bangladesh alarming at <<https://www.newagebd.net/article/116007/cyberbullying-in-bangladesh-alarming?fbclid=IwAR1E_oYwlsPOCYsP-aGOKCYFFuArGKB2VYRvtn3FOI2Oel39DrFBvlJx3bs>> Iqbal Mahmud | Published: 23:59, Sep 11,2020 | Updated: 20:26, Sep 12,2020

[20] Smith, PK, Mahdavi, J, Carvalho, M, Fisher, S, Russell, S, Tippett, N. Cyberbullying: its nature and impact in secondary school pupils. J Child Psychol Psychiatry 2008; 49: 376–85.

[21] Schenk, AM, Fremouw, WJ. Prevalence, psychological impact, and coping of cyberbully victims among college students. J School Violence 2012; 11: 21–37.

[22] Hoff, DL, Mitchell, SN. Cyberbullying: causes, effects, and remedies. J Edu Admin 2009; 47: 652–65.

[23] Livingstone, S, Haddon, L, Anke Görzig, A, Ólafsson, K. Risks and Safety on the Internet: The Perspective of European Children: Full Findings and Policy Implications from the EU Kids Online Survey of 9–16 Year Olds and Their Parents in 25 Countries. London School of Economics, EU Kids Online, 2011.

[24] Kumpulainen, K, Rasanen, E, Henttonen, I. Children involved in bullying: psychological disturbance and the persistence of the involvement. Child Abuse Neglect 1999; 23: 1253–62.

[25] Lappalainen, C, Meriläinen, M, Puhakka, H, Sinkkonen, H-M. Bullying among university students – does it exist? Finn J Youth Res 2011; 29: 64–80.

[26] Isaacs, J, Hodges, E, Salmivalli, C. Long-term consequences of victimization: a follow-up from adolescence to young adulthood. Eur J Dev Sci 2008; 2: 387–97.

[27] Dooley, J, Pyzalski, J, Cross, D. Cyberbullying versus face-to-face bullying: a theoretical and conceptual review. Z Psychol/J Psychol 2009; 217: 182–8.

[28] Gradinger, P, Strohmeier, D, Spiel, C. Traditional bullying and cyberbullying: identification of risk groups for adjustment problems. Z Psychol/J Psychol 2009; 217: 205–13.

[29] Riebel, J, Jaeger, RS, Fischer, UC. Cyberbullying in Germany – an exploration of prevalence, overlapping with real life bullying and coping strategies. Psychol Sci Quart 2009; 51: 298–314.

[30] Mitchell, KJ, Ybarra, M, Finkelhor, D. The relative importance of online victimization in understanding depression, delinquency, and substance use. Child Maltreat 2007; 12: 314–24.

[31] Mason, KL. Cyberbullying: a preliminary assessment for school personnel. Psychol School 2008; 45: 323–48.

[32] Kumazaki, A, Kanae, S, Katsura, R, Akira, S, Megumi, K. The effects of netiquette and ICT skills on school-bullying and cyber-bullying: the two-wave panel study of Japanese elementary, secondary, and high school students. Procedia Soc Behav Sci 2011; 29: 735–41.

[33] Aricak, T, Siyahhan, S, Uzunhasanoglu, A, Saribeyoglu, S, Ciplak, S, Yilmaz, N, et al. Cyberbullying among Turkish adolescents. Cyberpsychol Behav 2008; 11: 253–61.

[34] Shariff, S, Strong-Wilson, T. Bullying and new technologies: what can teachers do to foster socially responsible discourse in the physical and virtual school environments? In Classroom Teaching: An Introduction (ed. Kincheloe, J): 219–40. David Lang Publishers, 2005.

[35] Furnell SM, Jusoh A, Katsabas D. The challenges of understanding and using security: a survey of end-users. Comput Secur. 2006;25 (1):27–35.

[36] Machine Learning Tutorial, available at <<https://www.javatpoint.com/machine-learning>>, last accessed on 06-09-2022 at 7:47 pm

[37] What Is Data Preprocessing & What Are The Steps Involved?, available at <<https://monkeylearn.com/blog/data-preprocessing/>>, last accessed on 06-09-2022 at 8:47 pm

[38] Data Preprocessing in Machine learning, available at <<https://www.javatpoint.com/data-preprocessing-machine-learning>>, last accessed on 06-09-2022 at 9:15 pm

APPENDIX

1. Appendix A:

i)Survey Question

Cyber Protection & Awareness For Females

Cyberbullying is a major worldwide problem that has arisen with the increased use of the Internet, smartphones, and social media. This study presents an overview of Cyberbullying and awareness for females. (সাইবার বুলিং হল একটি বড় বিশ্বব্যাপী সমস্যা যা ইন্টারনেট, স্মার্টফোন এবং সোশ্যাল মিডিয়ার বর্ধিত ব্যবহারের ফলে উদ্ভূত হয়েছে। এই সমীক্ষাটি মহিলাদের জন্য সাইবার বুলিং এবং সচেতনতার একটি সংক্ষিপ্ত বিবরণ উপস্থাপন করে।)

All the content and question, we are going to ask here is a part of research activities -Your feedback will help us to study how the females of Bangladesh from various platforms like students, professionals, and housewives are defining Cyber Protection & how much they are aware.

1. What is your gender? (আপনার লিঙ্গ কি?)*

Female

Male

2. What is your age? (আপনার বয়স কত?)*

13-23

24-33

34-43

44-53

54-63

3. Choose your Occupation? (আপনার পেশা নির্বাচন করুন?)*

Student

Housewife

Doctor

Teacher

Other

4. Do you have any idea about Cyberbullying? (সাইবার বুলিং সম্পর্কে আপনার কি কোন ধারণা আছে?)*

Yes

No

5. Have you ever mistakenly shared your personal information on any Phishing site or any other suspicious sites? (আপনি কি কখনো ভুল করে কোনো ফিশিং সাইট বা অন্য কোনো সন্দেহজনক সাইটে আপনার ব্যক্তিগত তথ্য শেয়ার করেছেন?)

Yes

No

6. Have you ever faced Cyberbullying or cyber harassment, or blackmailing? (আপনি কি কখনো সাইবার বুলিং, সাইবার হয়রানি, ব্ল্যাকমেইলিং এর সম্মুখীন হয়েছেন?)*

Yes

No

7. To whom will you ask for help to protect yourself if you face cyberbullying? (সাইবার বুলিং এর সম্মুখীন হলে নিজেকে রক্ষা করার জন্য আপনি কার কাছে সাহায্য চাইবেন?)*

Family

Friends

Institute Authorities

Police

No one

Other

This is a required question

8. Do you think females have enough knowledge about protecting their personal privacy? (আপনি কি মনে করেন নারীদের তাদের ব্যক্তিগত গোপনীয়তা রক্ষার বিষয়ে যথেষ্ট জ্ঞান আছে?)*

Yes

No

9. Do you think females need to be more aware of cyberbullying? (আপনি কি মনে করেন যে সাইবার বুলিং সম্পর্কে নারীদের আরও সচেতন হওয়া দরকার?)*

Yes

No

10. Do you think that cyberbullying is a personal problem so reporting that problem and making them public can harm the dignity of females? (আপনি কি মনে করেন যে সাইবার বুলিং একটি ব্যক্তিগত সমস্যা তাই সেই সমস্যাটি রিপোর্ট করা এবং সেগুলিকে প্রকাশ করা নারীদের মর্যাদার ক্ষতি করতে পারে?)*

Yes

No

11. Is our Bangladeshi law sufficient to prevent cyberbullying? (আমাদের বাংলাদেশের আইন কি সাইবার বুলিং প্রতিরোধে যথেষ্ট?)*

Yes

No

12. How do you think we can protect females from cyberbullying?(কিভাবে আমরা সাইবার বুলিং থেকে নারীদের রক্ষা করতে পারি বলে মনে করেন?)*

Train females to protect their passwords and personal details online.

Limit the use of computers, phones, and social media accounts.

By providing counseling and hotline support to discuss cyberbullying without hesitation

Create awareness through ads and textbook

increase consciousness among parents about cyberbullying

By improving the use of the law against cyberbullying.

2. Appendix B:

Cyber Protection & Awareness For Females

ORIGINALITY REPORT

30%	28%	17%	24%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

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2	www.genderit.org Internet Source	2%
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35	researchr.org Internet Source	<1%
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