

# Online Child Predator Detection Using ML

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## ABSTRACT

Professionals in the field need a comprehensive understanding of the risks and practices associated with online sex grooming to safeguard young individuals from online sex offenders. While the Internet offers numerous positive aspects, one of the most detrimental issues is its potential for facilitating online sexual exploitation. Originally designed as a communication tool, the Internet inadvertently provides access to promiscuous content for countless children, often in a covert manner. The objective of our task is to identify and flag potential predators through analysis of comments and online media accounts, with the intention of reporting such instances to the appropriate cyber cell administrator. Recent public surveys indicate that approximately one in five young people actively search for sexual content online each year (Finkelhor, Mitchell, & Wolak, 2000; Mitchell, Finkelhor, & Wolak, 2001). This task report outlines our progress in developing a framework to address this issue. Through the implementation of this framework, accounts associated with predatory behaviour are identified, and reports are promptly submitted to the administrator for further action.

**Keywords:** ML, dataset, Training Module, Predator.

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## I. INTRODUCTION

One of the issues in social media that is spreading the fastest is youngsters being exposed to paedophiles online. The National Society for the Prevention of Cruelty to Children (NSPCC) stated that 8% of 11–16-year-olds in the UK had received solicitations to send or react to sexual messages in March 2014, and that 12%

of 11–16-year-olds in the UK had received unwelcome sexual messages [16]. Therefore, it is crucial to solve the problem of identifying young cybercriminals. Social media is now being primarily used by young children for communication [20]. In addition, the recent Study on Awareness, Youth, and Mobile Phones (SCAMP) discovered that by the time they become 14 years old, 90% of UK children

between the ages of 11 and 12 own a mobile phone [28]. Although social media platforms like chat rooms, photo and video sharing sites, and microblogs exist as meeting places for predators like paedophiles who might prey on children (victims), automatic detection of child abuse online is still a mystery. So-called online child care, in which adults interact with youngsters on social media to ultimately trade sexual content, is a tactic used frequently by paedophiles.

Such treatment entails building a rapport of trust with the youngster that eventually results in persuading the child to meet him in person [19]. The First International Sexual Predator identification Competition's (PAN'12)[11] efforts, as well as earlier studies on the subject, concentrated on the automatic identification of predators in chat logs. However, little research has been done to comprehend how predators behave across the several stages of online child enticing, including false trust building, luring, and attempting to gain physical access (Section 2). Being able to describe such actions is important because the majority of sexually exploited children are coerced into freely agreeing to approach a predator physically [36]. This shows that learning the many tactics a predator employs to influence children's behaviour can help them react to such circumstances. Early detection of such behaviours can also help with the early identification of hazardous online chats. We think that a more thorough understanding of predatory behaviour at these developmental stages can aid in the creation of more efficient control mechanisms that may help to lower the incidence of child maltreatment. By suggesting a more precise description of predatory behaviour at each step of online caregiving, this paper enhances the state of the art in predator detection [21]. The following is a summary of this paper's significant contributions: (1) Based on lexical, syntactic, emotional, content, psycholinguistic, and discourse model aspects, we offer a method to automatically identify treatment stages in online conversation.(2) We develop classification models with both single and

multiple features for each stage. Our findings demonstrate that, in comparison to lexical characteristics, utilising simply tag-discourse patterns can produce an average accuracy (P) of 4.63%. Across all rounds of therapy, using combined features in classifiers consistently raises P's performance by 7.6%. (3) To determine the most distinguishing characteristics of each online treatment phase, we present an analysis. The remainder of the essay is organised as follows: Olson's idea of appealing communication, which outlines the phases of carnivorous childcare, is introduced in Section 2. The research on recognising predator-victim online discussions and earlier work in online child care are presented in Part 3. Section 4 lists some traits that have been used to describe the language of predators. Our approach to classifying and identifying therapy phases is presented in Section 5. Chapters 6 and 7 contain the results and debate, Chapter 8 presents conclusions.

## II. PROBLEM STATEMENT

Today, professional psychologists should be more holistic Understand the dangers of online childgrooming and ways to protect young people from online child predators. Although the Internet has many positive aspects, one of the most harmful aspects is its potential use for online sexual exploitation. We offer a system to detect child/sexualpredators through comments and messages on social networks.

## III. LITERATURE SURVEY

Grooming is a process used by predators to build trust with children with the ultimate goal of engaging in sexual abuse [1]. In the digital age, this behavior has extended to the online realm, known as cyber grooming, where predators exploit the internet to target and groom potential victims. While the internet offers numerous positive opportunities, it also

presents a significant risk for online sexual exploitation, particularly among vulnerable youth. The widespread availability of the internet allows easy access to countless children, providing an atmosphere of relative secrecy for perpetrators to operate within [1]. The primary objective of experts in this field is to fully comprehend the risks and practices associated with online sex grooming in order to safeguard young individuals from online sex offenders. A recent public survey revealed that approximately one in five young people actively seek sexual encounters on the internet each year [1]. To address this pressing issue, extensive research has been conducted to develop frameworks and methodologies for detecting and mitigating online sexual grooming. One prominent area of research has focused on analyzing chat conversations, as these interactions often serve as the initial point of contact between predators and potential victims. However, analyzing chat data presents unique challenges. The informal nature of chat language, grammatical errors, and the presence of emoticons and irrelevant information complicate the identification process. Several studies have tackled these challenges using various techniques. Pendar [2] employed automatic text categorization techniques, utilizing Support Vector Machines (SVM) and k-Nearest Neighbors (k-NN) as classifiers, to identify sexual predators. McGhee et al. [3] labeled individual messages as either predatory or benign and evaluated their system's performance using 33 conversations from the Perverted Justice (PJ) website. Inches and Crestani [4] provided an overview of the PAN-2012 competition, an international initiative aimed at identifying predators in chat conversations. Villatoro-Tello et al. [5] achieved remarkable results in the competition by employing Neural Networks (NN) and SVM in a two-stage approach. Eriksson and Karlgren [6] achieved the highest recall among submissions, leveraging conversation characteristics such as vocabulary, conversation length, and the number of participants. Ebrahimi et al. [7] were pioneers in applying

Convolutional Neural Networks (CNN) to predator detection, achieving notable precision and recall rates.

In addition to chat analysis, some researchers have focused on examining complete chat conversations between predators and potential victims. Pandey et al. [8] developed a decision tree-based algorithm to detect sexual grooming by analyzing entire conversations. Their system achieved high precision and recall rates on the PJ dataset. These studies, along with others, have contributed to the advancement of techniques for detecting and preventing online sexual grooming. The use of machine learning algorithms, author profiling, and linguistic analysis has proven instrumental in identifying predatory behavior in online chats. Such advancements are vital in the ongoing efforts to protect children from online predators. In summary, the risks associated with online sexual grooming demand a comprehensive understanding of the practices and methodologies employed by predators. The internet's accessibility and relative anonymity provide a breeding ground for potential harm to young individuals. However, through extensive research and the development of innovative frameworks, significant progress has been made in the detection and prevention of online sexual grooming. The utilization of machine learning algorithms and linguistic analysis techniques has demonstrated promise in identifying predatory behavior in chat conversations. These endeavors play a crucial role in safeguarding children from online predators, and continued research in this field is essential to adapt to evolving technologies and protect the well-being of young individuals [1, 2, 3, 4, 5, 6, 7, 8].

#### IV.METHODOLOGY

The dataset for this study consists of hundreds of images. The methodology of this project focuses on creating a SVM model that filters unnecessary

information from the input and detects predator through the output.

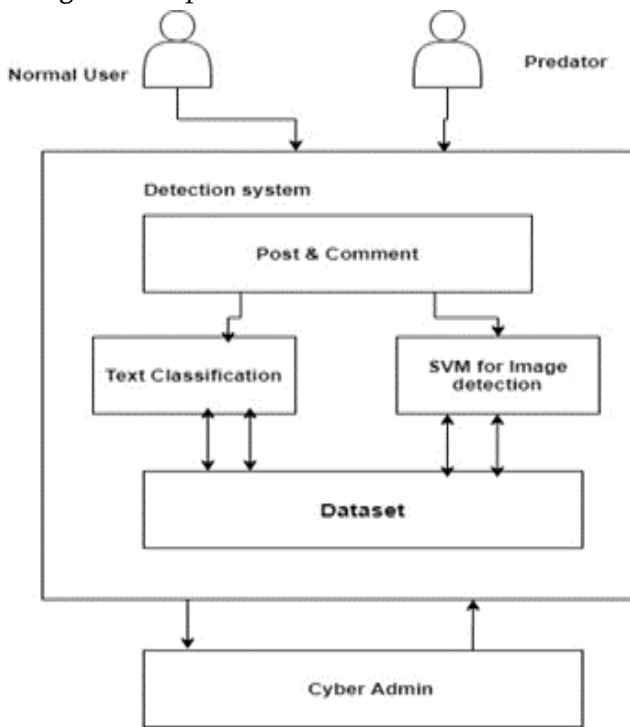


Fig.: System Design

We are implementing 3 Modules for the detection system:

**User:** The project involves two types of users:

**Normal users:** Normal users are regular users who can create posts, comment on social media, and upload images.

**Users displaying predator behaviour:** Users displaying predator behaviour are individuals whose actions or content exhibit predatory tendencies or behaviours.

**Training Module:**

The training module is responsible for training the models used in the system's text classification and image detection processes. For text classification, a dataset is used to train the model. This dataset likely contains labeled examples of text data, distinguishing between normal and predatory content. SVM (Support Vector Machine) algorithm is utilized for image detection. The model is trained on a dataset that includes images labeled as either normal or predatory. After training, the models can classify and detect predatory behaviour in new text or image data.

**Cyber System:**

The cyber system is responsible for monitoring and handling predator reports generated by the system. The system checks all the predator reports received from the training module or user inputs. Actions are taken based on the reported behaviour, which may involve further investigation, user suspension, content removal, or other appropriate measures. The cyber system plays a crucial role in maintaining a safe and secure environment for users and addressing predatory behaviour promptly and effectively.

**V. ALGORITHM**

**SVM:**

It is a supervised machine learning model that divides a dataset into different classes on a hyperplane which is used to find the maximum margin. Finding a hyperplane in a high-dimensional space that best divides the data points into distinct classes is the basic goal of SVM. Data points on one side of this hyperplane serve as a decision boundary, whereas points on the other side belong to a separate class. Finding the hyperplane that maximises margin, or the distance between the decision boundary and the closest data points of each class, is the objective of SVM. SVM strives to increase generalisation and its capacity to accurately classify unseen data by maximising the margin. We'll feed labeled data to train our model, in the prediction phase labeled data will get matched with new data with the help of the SVM algorithm to give the desired output.

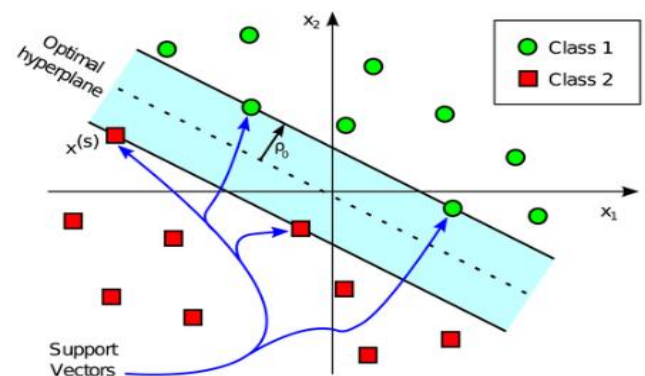
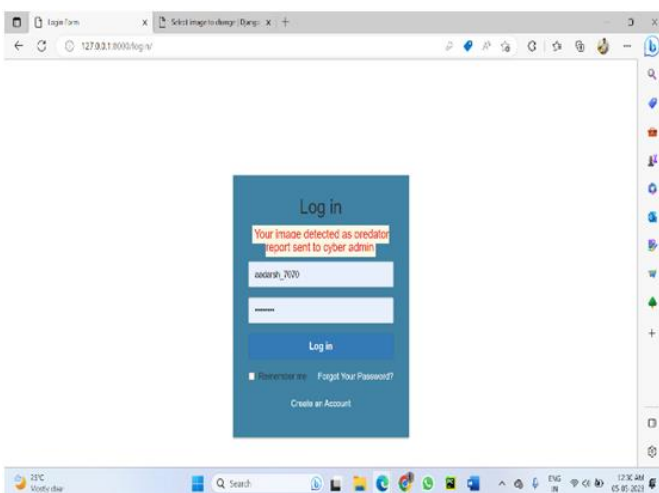
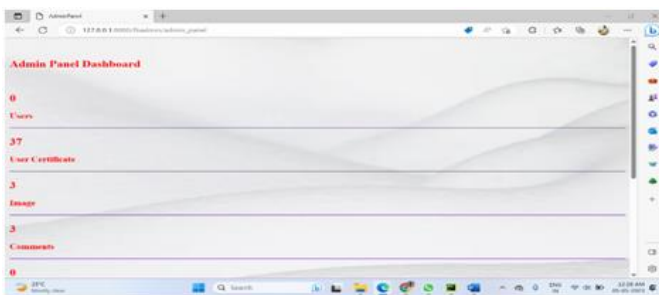
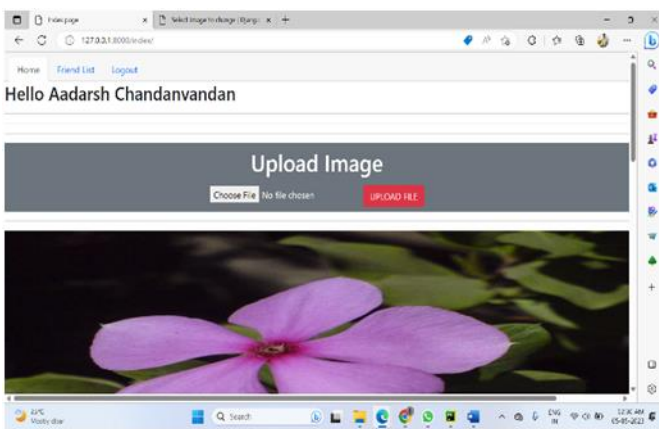
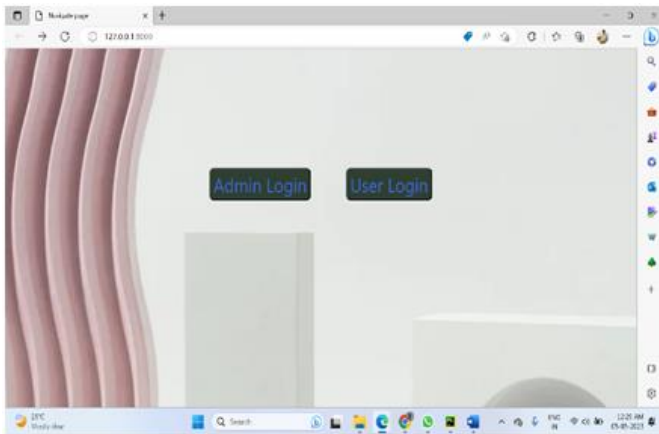


Fig.: SVM Algorithm

## VI.RESULT



## VII. CONCLUSION

The effect of sexual assault on children and society are too high to neglect the risks associated with internet solicitation. In order to get access to a youngster, the groomer tries to establish a connection with them. When grooming is performed, it's typical for an adult groomer to adopt a child's hobbies or interests in order to establish a connection with the youngster that includes trust. For the safety of children, we identify child predators in this project, then forward a report to the cyber admin for consideration.

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