Online Sexual Abuse of Children, Role of Technology, Kinds and Measures for Elimination

*Nadia Zafar
**Ansar Ahmad Randhawa

Abstract

Child sexual abuse has, unfortunately, become a negative component of human societies, in all developed, developing and under-developed countries. With the advent of information and communication technology, accessibility to, media-recording devices, the child sexual abuse and exploitation material has become more prevalent globally. The effects of child sexual abuse (CSA) are extensive, having long-term negative impacts to the victim child, his family, and the community, yet this has been labeled a universal health catastrophe which is avertible. Online solicitation and grooming are most destructive forms of online sexual abuse. The Internet Service Providers (ISPs) such as Google, Microsoft, Twitter and Facebook are required to be regulated through legislation to create server monitoring protocols for battling against child sexual abuse material (CSAM) and this mechanism will facilitate to diminish ever-increasing challenges in investigation and prosecution. For conducting the investigation and prosecution of online sexual abuse; Multi-disciplinary Team (MDT) technique is considered the most appropriate, by involving the experts of every relevant filed with access to foreign jurisdictions for collection of available evidence. This research has included the reasons, causes, forms, prevalent scenario, situation of Pakistan and the measures to eliminate online child sexual abuse.

Introduction:

With the rapid enhancements in technology, the advantages and disadvantages are swiftly increasing. The sexual abuse of children through technology is also snowballing which is a serious concern for any society. Under a research it has been studied that out of 1000 children 127 (18% girls & 7.8% boys) complained the experience of contact sexual abuse by the age of 18[1] [2]. The prevalence rate(s) of child sexual abuse (CSA) depends upon the sex of child, reporting source, and the region. The effects of CSA are extensive, having long-term negative impacts to the victim child, his

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family, and the community[3], yet this has been labeled a universal health catastrophe which is avertible[4]. In recent years, particularly after COVID-19 pandemic, there has been increase in online CSA, for instance in April 2020, the National Center for Missing and Exploited Children (NCMEC) received four times more cybertips for online CSA as compare to April 2019 (4.1 million vs. 10 million)[5]. That the patterns which constitute behaviors online sexual abuse is ranging from in-appropriate sexual discussion or comment, sharing sexual images, online platforms to engage a child in-person and creation of online sexual abuse material[6]. It has also been seen that significant online CSA is committed by a person who knew the child offline[7]. The objective of this study to identify and investigate the role of technology in the commission of online CSA and the measures to curtail and abolish this type of abuse.

Online Sexual Solicitation and Online Sexual Grooming:

Finkelhor and his colleagues have defined solicitation as "Unwanted solicitations (unwanted sexual talk, unwanted sexual questions, and unwanted sexual act requests) by adults or other youth (known or unknown)"[8]. However, universally, there is no singly accepted definition of solicitation, commonly in literature it is referred to non-consensual sexual conversation, request by an adult for sexual acts and questioning by an adult to perform sexual activity[9]. The online sexual solicitation is increasing by the passage of time due to more access of child to internet and devices enabled with internet[10]. Some of the jurists also include online child sexual abuse and online grooming

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[10] Ibid.

in the sub-category of online solicitation[11]. The other jurists have differentiated solicitation and online sexual grooming with the view that in solicitation only occurs once by minimum interaction with the minor and online sexual grooming is a mechanism which contributes development of an intimate relationship with the minor[12]. There is still not a broadly accepted definition of online sexual grooming, it suggests a process comprising of selection of victim, establishing rapport and trust with minor, and desensitizing minor for sex content before intimating online CSA[13]. The technology may also be used for accessing and meeting the children offline as part of sexual grooming process for abuse. "Deceptive mechanism applied by sexual offenders to facilitate sexual contact with minor while simultaneously avoiding detection" is referred as in-person child sexual grooming and for this purpose numerous strategies and behaviors can be used such as video chatting, social media, emails, the same may isolate the minor with psychological good impressions of offender[14].

Prevalence Statistics of Sexual Solicitation:

Study has divulged that there are varying ratio of online sexual solicitation between 17 and 32% of minors who are under the age of 18[15]. Another recent meta-analysis demonstrated that about 20% of minors had undergone unwanted online sexual exposure by means of explicit pictures, videos, web-links and spam email[16], out of this 20% complained sexual solicitation by requests of sexual activities or to facilitate sex information[17]. The research has also exhibited that a significant number of victim children were known to the offender offline, ranging between 23.5% of those who experienced online sexual abuse to 79.5% who complained online grooming[18]. Greene-Colozzi and others via a study found that out of 1113 college undergraduate 23% were affianced in long conversation of intimation with stranger

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adults, further 38% of these individual children had met those strangers in person, and 68% complained that they had physical sexual intercourse with those adults, which is an alarming number of minors[19]. The INTERPOL in its database has registered approximately three million videos and images comprising of child sexual abuse contents to July 2020, this database is very useful to recognize 23100 child victims and to chase 10579 accused, worldwide[20].

Prevalent Statistics of Online Sexual Grooming:

Research has demonstrated the rates of the online sexual grooming between 9.6% to 29.8%, depending upon the gender and age of the child[21]. In Spain; a study has resulted that 1704 minors (12-15 years old) reported different online grooming strategies with 7% to 18% ratio by a multidimensional online grooming questionnaire[22]. As per a study; 75% cases of exploitation of\children are related to distribution and possession of contents of child abuse, some 18% are related to child sex trafficking, and 10% to produce itself[23]. The most usually implied strategies for online grooming are manipulation through deception, intense contact, sexualization, flattery, conversation, nastiness, and erratic temperament[24]. The element of active deception has been considered as the most prevalent factor for online grooming and this is also recognized as similar to offline sexual grooming[25]. A study has also provided that grooming attitudes

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remain same and constant, regardless of situations and the child sexual offenders utilize technology to access the child and facilitate abuse[26].

The Role of Technology in Offline Sexual Abuse:

Presently there is no much studies regarding online and offline sexual solicitation. In a study over 1501 youth (between 10-17 years) the researchers have found that 19% complained online sexual solicitation and only 3% had offline sexual contact with telephone, in person or by email[27]. In this context another term "Technology Assisted Child Sexual Abuse" is used which means the use of technology in abuse[28]. Another research has found that few examples of offline sexual solicitation have been observed[29]. It has also been noted that online recruitment has been made for offline child trafficking for sexual abuse and this research has also shown that in 2015 or later 55% child had been recruited through websites, other apps, or via texts[30]. The investigation and prosecution is adversely affected by the rapid changes and advancements in technology. With this swift changing nature of technology, it is almost impracticable to train or prepare the investigators for these changes in technology[31]. The plethora of virtual podiums accessible for criminals to access and data of CSA that makes it more difficult for investigators and it is observed that P2P networks are blamable for the bulky progression in accessibility of CSA on the internet[32]. P2P systems are free and comparatively modest to engage a number of offenders are thought to be distributing CSA on these platforms[33]. The cyberspace allows the perpetrators of online child sexual

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abuse to maintain high level of anonymity and secrecy to continue commit such crimes for a longer time.

Recommended Solutions of Online Sexual Abuse:

The Internet Service Providers (ISPs) may be made responsible through strict laws to establish server monitoring protocols for combating against child sexual abuse material (CSAM) and this will help to address ever-increasing challenges in investigation and prosecution. Worldwide companies such as Google, Microsoft, Twitter and Facebook have already implementing some mechanisms for detecting and reporting CSAM but still these companies are being criticized for not doing enough to curtail child sexual abuse material[34]. The International Centre for Missing and Exploited Children[35] has suggested that there must be strict policy and legislative measures for ISPs' itself detect, delete and take action against person(s) spreading CSAM; further recommended that these companies ought to be proactive and responsible for eliminating CSAM. For example, in USA, ISPs are obligated to report cases of child pornography on their platforms[36]. By applying these technologies and their timely up gradation can more efficiently help to reduce online child sexual abuse material, shared with children[37]. Digital fingerprints and image hash database are primary technological tools which scrutinize user-generated contents on different podiums for identified abuse pictures[38]. The Canadian Centre for Child Protection (CCCP) has created project Arachnid is a quotable example of a successful web-crawler which can identify the dark-web and open web-pages[39].

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Laws regarding Online Sexual Abuse:

A study has divulged that "current laws and enforcement strategies are insufficient to suppress child pornography production and distribution"[40]. The foremost challenge in investigation and prosecution of online child sexual abuse and such online material is surfacing globally due to latest technology, with change of borders and jurisdictions; the trafficking of CSAM under local jurisdictions is as difficult as to deal with internationally[41]. This issue becomes more complicated when an accused is out of jurisdiction, to collect evidence against him in another jurisdiction, to hold him accountable, and to be assisted by the law enforcement agencies of that jurisdiction[42]. Lack of inconsistent laws in different jurisdictions will definitely impact upon the prosecution procedures[43]. For example, in United States of America there are laws on online child sexual abuse and material thereof but if the perpetrator starts searching in Russian jurisdiction, to avoid US laws[44]. The Multidisciplinary Team (MDT) investigation is considered as best helpful mechanism for the professional dealing with CSAM and at the same times, it is supportive for victim children and their families[45]. MDT leads a better decision-making and result-oriented with proper use of resources, less burnout with fewer traumas for the affected children[46]. Through MDT coordination and results may be improved[47]. By applying the MDT mechanism coordination among investigators, social welfare services, prosecutors, other professionals and institution may be increased[48]. Specialized Training of professionals is necessary relating to forensic interviewing, knowledge and understanding of latest technology usage, and how to collect and draft the prosecution case[49].

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Youth, Technology, and Online Sexual Abuse:

It has also been seen that there is a number of cases where the perpetrator has been another minor, it has been assessed that the children below the age of 18 are responsible for 30% to 50% of all cases of child sexual abuse[50], and 95% of these young ones had the direct access to internet-enabled devices[51]. The teenagers prefer to communicate with their class fellow, friends and even teacher via internet mechanism[52]. The tendency of youth is converting to use internet devices for messages and chatting, as they grow towards adolescence[53]. In another study it has been demonstrated that in all cases of online sexual abuse, 16% or less of collected samples were 12 years of age or under at the time of online sexual abuse[54].

Investigation into Online Sexual Abuse:

In online child sexual abuse, with the technological advancements and frequent access to internet, the investigation has become more complex and difficult on the basis of present infrastructure[55]. In the United States, the manufacturing and transferring of child sexual abuse substances (CSAM) online is midst the fastest increasing prohibited online productions[56]. Before the present digital era, this material had typically been shared by the perpetrators by means of physical involvement of in-hand-hard copy or by face-to-face[57]. The offenders of online child sexual abuse are mostly on the cutting edge of technology by applying 'virtual private network' (VPNs), peer-to-peer sharing network (P2P), dark-web (Tor), and encrypted techniques to hide their identity, activity,

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and location[58]. A study has provided that on dark-web, 80% of total requests were for abuse, predominately the child sexual abuse[59]. The investigators face numerous hitches because it has been assessed that 60-80% of the victims of child sexual abuse do not reveal the names of the offenders until they attain adulthood[60]. There is another but the most stressing eventuality for the investigators that due to continuous and regular exposure to sexual abuse material, they may face cognitive, social, behavioral, and silent emotional traumas, for short as well as long term[61].

Situation in Pakistan:

At present, there is no qualified definition of online child sexual abuse due to a fundamental reason that with the passage of every single day technological advancements are increasing which every time open a new window for the offenders. Generally, the main forms may be the production, possession, dissemination of child sexual abuse material (CSAM), commonly known as child pornography, active sexual solicitation, sexting, online child prostitution, online grooming, and revenge pornography.[62] There is a distinction between cyber-enabled and cyber-dependent crimes such as CSAM which falls in first category while online streaming of child sexual abuse is second category that is only possible through internet technology.[63] Easy access to sexting television, music, games, magazines, pornography material, and sexually animated cartoons through social media/internet modes are prevalent in Pakistan[64]. These sources can easily be accessed from anywhere in Pakistan that incites the people to commit child sexual abuse, being

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less capable of shielding themselves[65]. In Pakistani prevailing laws, there is no safe channels for the minors/their guardians to report the cases of online child sexual abuse, local policing system is not efficient even to entertain such complaints, and the FIA has no specific desk or forum for complaints.[66] To curtail and eliminate the cybercrimes against the children, the FIA has established a special wing namely "Cyber Crime Wing" (CCW)[67] under the Prevention of Electric Crimes Act, (PECA) 2016 which has criminalized online violence against the children. The offence entails punishment up-o 7-years and a fine up to five0-million. The children facing online child abuse can directly approach CCW via phone or email to lodge their complaints to address their grievances.[68] This CCW has no permanent technological source[69] to directly take-down and detect the contents and materials showing CSAM; this deficiency is weakening the system and efforts to curtail or eliminate online child abuse. In most of the times, the minors indulge themselves in negative activities including online sexual abuse, because in most of the cases a minor is online sexually abused by another minor, but school systems are not coping with the situation.[70] There is another trauma with Pakistan that the ISPs do not cooperate or not give in-time response to the complaints of online sexual abuse and most of the time; the Pakistan has no Mutual Cooperation Treaty with the other countries where accused may be residing[71].

Online Child Sexual Abuse Cases in Pakistan:

FIA has reported that in Pakistan daily about 266 cybercrimes against the children occur, particularly including child pornography and harassment, attaining 94,500 complaints at the end of 2020.[72] That, still, most of the cases remained un-reported because of lack of understanding of children and their parents.[73] 4% increase has been recorded in the year 2020 as compare to 2019, in 2020; total 2960 incidents were reported only in province of Punjab. The cases involved sexual violence, physical

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abuse, and the life threatening eventualities for the victim child; in these cases 51% were females and 49% were male children.[74] From 2020 to 2021, 11 million internet users increased, perhaps due to COVID-19 outbreak, and these users consist of 27% of total population showing significant number of young people under the age of 16-years.[75] As a result thereof, the children face a number of cybercrimes including online harassment and online violence against the children.[76] In 2019; Dr. Shireen Mizari, Minister of Human Rights, has mentioned that Pakistan is one of the most prominent countries to face online child sexual abuse.[77] The young Pakistani internet users have experienced sextortion, revenge porn, and cyber-bullying.[78] Pakistani authorities in 2015 have tracked a wing regulating online child pornography for commercial aims in a village of Kasur, Punjab, Pakistan.[79] In these cases, more than 285 incidents of child sexual abuse i.e. pornography were reported and subsequently silenced through threats.[80] In the same cases, the local police recovered 400-pornographic videos of young/teen-age boys engaged in on-camera sexual acts with the adults.[81] The materialistic ratio of cyber-violence against the children suggests numerous crimes causing psychological injury and physical abuse to the children.[82]

Requisite Reforms for Online Child Abuse in Pakistan:

Pakistan's criminal justice administration authorities must consider the use of artificial intelligence technologies to eliminate the incidents of online child abuse.[83] The concerned authorities should also assign requisite funds for training and application of

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[81] Zehra Abid. In Pakistan's Kasur, child rapes and killings continue unabated. *Child rights Al Jazeera,* (2019). https:// www. aljaz eera.com/ features/ 2019/ 10/ 28/ in- pakistans- kasur- child- rapes- and- killi ngs-continue- unabated

[82] Kasim Abbasi. (2021). Cybercrime increases by 83pc in three years. https:// www. thene ws. com. pk/ print/884453- cyber crime- incre ases- by- 83pc- in- three- years

[83] Velasco, C. Cybercrime and artificial intelligence. An overview of the work of international organizations on criminal justice and the international applicable instruments. *ERA Forum*, (2022)23(1), 109–126. https:// doi.org/ 10. 1007/ s12027- 022- 00702-z

artificial intelligence technologies by CCW. That a detail online cybercrimes policy must be enshrined to specify the crimes against the children via online modes. For example, the government may promulgate National Artificial Intelligence Strategy with a primary framework to enforce laws upon all ISPs and all other organizations with a fundamental application on online child abuse.[84] The most up-dated and advanced technology based soft-wares must be deployed for the purposes of identifying suspicious activities and child sexual abuse materials.[85] To operate the said soft-wares, the government must engage professionally trained and experienced personnel.[86] Establishment of Additional Task Force in collaboration with Artificial Intelligence to combat the cybercrimes against the children may prove vital for identifying suspicious activities and content regarding child abuse and exploitation.[87] For the application of above referred tools like Prey-BOT, DAPHNE and i-COP, teams of professional skilled personnel would be required.[88] Pakistani government while combatting with the online child abuse may take an example and guidance from the Australian Police Department which has introduced "AiLecs" that is fully accomplished to recognize the doubtful happenings of online child abuse.[89]

Efforts of Pakistan regarding Online Sexual Abuse:

Pakistan's Digital Rights Foundation in collaboration with Internet Watch Foundation has established a portal for creating a forum for safeguarding the children from online child sexual abuse and exploitation. On this portal the parents and other people can report the incident of online child sexual abuse and the trained analysts will examine the said reports[90]. Under section 2 (1) (t) of the Balochistan Child Protection Act, 2016 has enshrined a definition of mental violence against the children and sub-section (vii) has also included a psychological harassment by an adult by means of information technology, internet, cyber podium like mobile phones. By adding the harassment through internet and all other modes, the Balochistan legislature has recognized the online child sexual abuse. The Prevention of Electronic Crimes Act, 2016

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[84] Global Information Security. (2019). Global information society watch 2019 artificial intelligence.

[85] Gray, J., Pesevska, D. J., Sethi, D., Gonzalez, M. D. R., & Yon, Y. Handbook on developing national action plans to prevent child maltreatment. *World Health Organization*, (2016) http:// www. euro.who. int/__ data/assets/pdf_ file/ 0019/ 329500/ Child-maltreatment- PAP- handbook. pdf

[86] Podoletz, L. We have to talk about emotional AI and crime. *AI and Society,* (2022) https://doi.org/ 10. 1007/ s00146- 022- 01435-w

[87] Erokhina, E. V, & Letuta, T. V. Juvenile cybersecurity and artificial intelligence system. (2020)156(Iscde), 607–611.

[88] Aiello, L. M., & McFarland, D. Detecting child grooming behavior patterns on social media. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics,* (2014)8851, 16. https:// doi.org/ 10. 1007/ 978-3- 319- 13734-6

[89] Panda Media Center. Australian police develop a new AI tool to combat child abuse, 2022. https://www. pandasecurity. com/ en/ media center/technology / police- ai- abuse/

[90] The News, 'Portal to Combat Child Abuse Content' (2020)
<https://www.thenews.com.pk/print/631591-portal-to-combat-child-abuse-co…

("PECA") under section 21 has also aimed to control and prevent online child abuse because this section protects the modesty of a minor with a punishment up to seven years with fine for online child abuse[91]. Section 22 of PECA has criminalized distribution, transmission, production and procurement of child pornography through technological modes but this provision of law has not properly been implemented. Practically, this provision is hard to enforce because, firstly, people are not much aware regarding the exact procedure to report online abuse and secondly, no mechanism exists at local levels community and even most of the people are hesitant for reporting[92]. After an unfortunate incident of Zainab rape and murder case, the authorities and a team of data analysts from Information Technology University (ITU) started working against the mafia involved in online child pornography and child abuse and they exposed a number of gangs[93]. Since, earlier no such action has been taken against such mafias; therefore, it has been suspected that the same mafia was involved in 2018 indents[94].

Sources of Online Sexual Abuse:

In newspapers and magazines, 52% of women or girls have been sexually objectifying, whereas, in music videos 59% of women appearances observed in enticement manners and it has also been studied that these exposures of young people towards sexual materials may align these young ones to harassment, contradictory sexual beliefs, rape and specially the child sexual abuse[95]. Teen rated videos contain 27 of sexual themes and this tilt of open-display of sexual material shows the acceptability of society; their natural end to sexual harassment and child sexual abuse because the trails of a society may differ from the other societies, particularly the Pakistani society[96].

Sexting Sexual:

In Pakistan, one's rate of sending sexting sexual images is 5% to 7% which is an emerging side of sexual exploitation, experimentation, and adolescent. Sometimes these sext images of a person (both male and female) are forwarded to a third person and same

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[91] Prevention of Electronic Crime Act 2016, section 21 (2)

[92] FIA is the authority empowered to investigate non-cognizable offenses as per Rule 2(n) of Prevention of Electronic Crimes Rule 2018.

[93] BBC News, Investigating the murder of Zainab Ansari - BBC NEWS

(2018). https://www.youtube.com/watch?v=cH-4f_eYsd4 (Accessed 17 September 2023).

[94] Xari Jalil, Is Something Wrong With Kasur? Dawn News

(2018). https://www.dawn.com/news/1384248 (Accessed 17 September 2023).

[95] Huerta, M., Cortina, L. M., Pang, J. S., Torges, C. M., & Magley, V. J. Sex and power in the academy: Modeling sexual harassment in the lives of college women. *Personality and Social Psychology Bulletin*, (2006)32(5), 616-628.

[96] Martellozzo, E. Online Child Sexual Abuse. *Child Abuse and Neglect*, (2019)63–77.

are used for blackmailing, harassing and often for child sexual abuse, if the said images are of a child[97].

Child Pornography:

Uploading child pornography on digital media becomes permanent record of child sexual abuse on the relevant web, while in 2019; the child pornography came in limelight in Pakistan where 70 cases had been recorded. This uploading and broadcasting of child pornography material on internet becomes victimization of child perpetually and according to experts and victims, the victim suffers this victimization and re-victimization for rest of his life knowing that the said material is available on web[98].

Recommendation for Elimination of Online Sexual Abuse:
1.   Image Analysis and Database:

The image analysis technology is the most simple and common instrument applied by various organizations to trace and take-down the contents of online child abuse. It consists of applications such as photo-DNA, which enables to create an exclusive mark for each image with context of its pixels, dimensions, and frames etc.; thereafter, this specific image finds the images of same type's pictures. United Kingdom Child Exploitation Online protection center, Interpol and national Center for Missing and Exploited Children (USA) also use this application, which has helped to detect and remove millions of material having contents of online child sexual abuse[99].

2.   Image Hash Database:

Hashing is a digital instrument which permits us to know that a copy of digital information is the same as of original while converting variable-length digital input data into static-length hexadecimal number, the same is used for data confirmation and password encryption.[100] Image hash database is a technology that facilitates to diagnose and remove the data containing child sexual abuse and exploitation images, a well-recognized image hash database is Microsoft's Photo-DNA.[101] It generates a specific signature for every image containing sexual abuse and exploitation. However, this system

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[97] Luthra, R., Abramovitz, R., Greenberg, R., Schoor, A., Newcorn, J., Schmeidler, J. & Chemtob, C. M. Relationship between type of trauma exposure and posttraumatic stress disorder among urban children and adolescents. *Journal of interpersonal violence,* (2009)24(11), 1919-1927.

[98] Fiedler, A. M., & Blanco, R. I. The Challenge of Varying Perceptions of Sexual Harassment: An International Study. *Journal of Behavioral & Applied Management*, (2006)7(3), 274-291.

[99] United Nations Office on Drugs and Crime, 'Study on the Effects of New Information Technologies on the Abuse and Exploitation of Children' (2015), 45-47.
<https://www.unodc.org/documents/Cybercrime/Study_on_the_Effects.pdf> (Accessed 17 September 2023).

[100] Westlake, B.; Bouchard, M.; Frank, R. Comparing methods for detecting child exploitation content online. In Proceedings of the European Intelligence and Security Informatics Conference, Odense, Denmark, 22–24 August (2012) 156–163.

[101] Photo-DNA. Microsoft. https://www.microsoft.com/en-us/photodna (accessed on 25 September 2023).

is unable to detect the new contents of CSAM. Dr. Neal-Krawetz has criticized Photo-DNA with the view that it does not detect the reflections.[102] Web-crawler is also an important product in which the relevant applications crawl the web-pages for adding the contents into database for indexing and verification. Westlake[103] and others trough their research has examined the efficiency of web-crawlers and investigative results concluded that web-crawlers successfully recognize CSAM, if the images and keywords are reasonably obtained and selected.[104] Arachnid[105] is a worth mentioning app which applies the hash lists from different organizations to detect and remove the concerned data, this detection is based on known CSA files and to do this metadata characteristics are extracted from various files segmenting and normalizing the text.[106] These applications mostly work on the parameters of sensitive-detection that incorporates segmentation of color of skin regions to identify nudity[107], and it also takes inputs such as pixels and spatial distributions mentioning the nudity or naked person.[108] Multimodal technique (newly added audio and vision feature) pornography recognition has been enforced to search efficient solutions.[109] Transformers which are initially used in natural language processing (NLP) have also shown better results.[110] The world-known ISPs have

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[102] Krawetz, N. Photo-DNA and Limitations—The Hacker Factor Blog. https://www.hackerfactor.com/blog/ index.php?archives/931-PhotoDNA-and-Limitations.html (accessed on 25 September 2023).

[103] Westlake, B.; Bouchard, M.; Frank, R. Assessing the Validity of Automated Web-crawlers as Data Collection Tools to Investigate Online Child Sexual Exploitation. *Sex Abuse J. Res. Treat*, (2017), 29, 685–708.

[104] Westlake, B.; Bouchard, M.; Frank, R. Comparing methods for detecting child exploitation content online. In Proceedings of the European Intelligence and Security Informatics Conference, Odense, Denmark, (2012)156–163.

[105] Canadian Centre for Children Protection. Project Arachnid. 2022. https://projectarachnid.ca/ (accessed on 25 September 2023).

[106] Media Detective Software to Detect and Remove Adult Material on Your Home Computer. Available online: https://www.mediadetective.com/ (accessed on 5 January 2023).

[107] Choi, B. Han, S. Chung, B. Ryou, J. Human body parts candidate segmentation using laws texture energy measures with skin color. In Proceedings of the International Conference on Advanced Communication Technology, Gangwon-Do, Republic of Korea, (2011)556–560.

[108] Garcia, M.B. Revano, T.F. Habal, B.G.M.; Contreras, J.O. Enriquez, J.B.R. (2018) A Pornographic Image and Video Filtering Application Using Optimized Nudity Recognition and Detection Algorithm. In Proceedings of the 10th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management, Baguio City, Philippines. 1–4, ISBN 978-1-5386-7767-4.

[109] Wang, H.; Schmid, C. Action recognition with improved trajectories. In Proceedings of the IEEE International Conference on Computer Vision, Sydney, Australia, 2013.

[110] Fu, Z.; Li, J.; Chen, G.; Yu, T.; Deng, T. Porn-Net: A unified deep architecture for pornographic video recognition. *Application Science*, (2021)11, 3066.

launched the productive and efficient applications such as Microsoft's Photo-DNA, (6) Facebook's PDQ,[111] Google contents safety API[112] and Apple's Neural-Hash.[113]

3.   Digital Forensics:

In a number of cases it has been seen that the offenders save their data of child abusive in their mobile phones and computers; Digital Forensic facilitates the investigators to crack and uncover such devices for the recovery of such data. By extracting such data, the investigators will be in a better position to investigate and prosecute the criminals.

4.   Data Mining:

Data mining is a process wherein the companies provide a mechanism to their customers to extract data of their choice. These companies may be, under the rules, asked to join hands with the government authorities as well as NGOs to combat against online child abuse by providing an efficient mechanism as to digital media. This process will also help the police investigating the cases of online child sexual abuse[114].

5.   Undercover Online Investigations:

The underline investigation is a type of investigation where the police investigates the cases secretly in which the identity of victim, his family and witnesses is kept in conceal. In online child sexual abuse, this term is refers to a situation where investigator poses himself as a child, sets up fake websites, digitally accesses chat rooms, view contents of online child sexual abuse and other similar forums to receive data of online child sexual abuse. During this process the investigators may also come to know the soft-wares used to conceal their identity and may get more advance technologies to cater said soft-wares.

6.   Censorships / Watchdog apps and Extensions:

In different jurisdictions, the law enforcement departments may frame mechanisms, in-collaboration with ISPs, to establish a process of warning when any person in that particular jurisdiction tries to access material on online child sexual abuse. The law enforcement agencies may maintain record of that person for future purposes. For example, Child Sexual Abuse Anti-Distribution Filter has been developed by the European Commission to detect and block the online child sexual materials. This application is implemented in Denmark, Italy, Norway, Malta, Sweden, and Finland.

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[111] Facebook. Open-Sourcing Photo- and Video-Matching Technology to Make the Internet Safer | Meta. https://about.fb.com/news/2019/08/open-source-photo-video-matching/ (accessed on 25 September 2023).
[112] Google. Content Safety API. https://protectingchildren.google/tools-for-partners/#learn-about-our-tools (accessed on 25 September 2023).
[113] Apple. CSAM Detection. 2021. Available online: https://www.apple.com/child-safety/pdf/CSAM_Detection_Technical_Summary.pdf (accessed on 25 September 2023).
[114] Ibid. p. 59.

7. Maintaining a Database of Offenders Accessible to other Departments:

The law enforcement agency must establish a comprehensive database of the offenders of child abuse, online child sexual abuse and the said database must be up-dated regularly so that the other relevant departments may get the immediate help and information from that database.

8. Improved Security Software:

The progression of information technologies has provided numerous user-friendly devices and mechanisms. In this regard, the technological companies must make available a mandatory built-in warning system in mobile phones and computers when any offender attempts to contact a child and expose him to online explicit contents.

9. Role of Courts:

In a case where the facts were that an accused allegedly shared child pornographic material and the social media contacted Federal Investigating Agency (FIA) and provided the details of accused. An inquiry has been conducted, mobile of accused took into custody, forensic report showed that mobile was containing child pornographic videos and images, mobile number was registered in the name of the accused, and the Supreme Court of Pakistan dismissed the bail application of the accused[115]. In another case, facts were that a cyber-crime operation was initiated abroad for the diffusion of online child abuse material through social media groups. In this operation 351-mobile numbers were investigated and number of accused was one of those numbers. FIA captured the accused and seized his mobile and other devices, sent them for forensic examination, it was found that cell number of accused has been traced by Interpol, and the ownership of mobile and other devices was not denied by the accused person. The Karachi High Court dismissed the bail of the accused person.[116]

Establishment of Special Desk at FIA Offices
Total FIRs Registered & Total Assets in 2023 on Child Pornography
(01-01-2023 to 01-09-2023)

Regions	CCRCs	Local Complaints	Cyber Tipline reports	Foreign Referral/Interpol	Total FIRs	Total number of accused involved	Total Arrests
Central	Lahore	0	1	0	1	1	1
	Multan	3	2	0	5	5	5

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[115] Umar Khan vs. State, 2022 SCMR 216, Supreme Court.
[116] Adil Nadeem vs. State, 2021 PCr.LJ 1457, Karachi High Court-Sindh.

	Faisalabad	0	0	0	0	0	0
	Gujranwala	2	0	0	2	2	2
	Rawalpindi	2	3	0	5	5	5
	Gilgit	0	0	0	0	0	0
South	Karachi	0	0	0	0	0	0
	Sukkur	0	3	0	2	2	2
	Hyderabad	0	0	0	0	0	0
	Quetta	0	1	1	2	2	2
	Gwader	0	0	0	0	0	0
North	Peshawar	1	1	0	2	2	2
	D.I. Khan	2	0	1	3	4	4
	Islamabad	3	0	1	4	5	4
	Abbottabad	2	2	0	4	4	4
	Grand Total	15	13	3	30	32	31

Details of Cases, Names of Accused, and Allegations

Enquiry No. & Date	Complainant	Circle	Gist of allegations	Name of accused
1111/2023	National Center for Missing & Exploited Children	FIA CCRC Multan	Accused involved in possessing and sharing of child pornography content on social media	Anonymous person
1112/2023	National Center for	FIA CCRC	Accused involved in possessing and sharing of	Anonymous person

	Missing & Exploited Children	Multan	child pornography content on social media	
1113/2023	National Center for Missing & Exploited Children	FIA CCRC Multan	Accused involved in possessing and sharing of child pornography content on social media	Anonymous person
1114/2023	National Center for Missing & Exploited Children	FIA CCRC Multan	Accused involved in possessing and sharing of child pornography content on social media	Anonymous person
115/2023	National Center for Missing & Exploited Children	FIA CCRC Multan	Accused involved in possessing and sharing of child pornography content on social media	Anonymous person
1116/2023	National Center for Missing & Exploited Children	FIA CCRC Multan	Accused involved in possessing and sharing of child pornography content on social media	Anonymous person
1117/2023	National Center for Missing & Exploited Children	FIA CCRC Multan	Accused involved in possessing and sharing of child pornography content on social media	Anonymous person
1118/2023	National Center for Missing & Exploited Children	FIA CCRC Multan	Accused involved in possessing and sharing of child pornography content on social media	Anonymous person

1123/2023	National Center for Missing & Exploited Children	FIA CCRC Multan	Accused involved in possessing and sharing of child pornography content on social media	Anonymous person
1124/2023	National Center for Missing & Exploited Children	FIA CCRC Multan	Accused involved in possessing and sharing of child pornography content on social media	Anonymous person
1125/2023	National Center for Missing & Exploited Children	FIA CCRC Multan	Accused involved in possessing and sharing of child pornography content on social media	Anonymous person
1126/2023	National Center for Missing & Exploited Children	FIA CCRC Multan	Accused involved in possessing and sharing of child pornography content on social media	Anonymous person

Details of Pending Cases of Online Child Abuse

Enquiry No.	List of allegations	Complainant Name	Alleged accused	Current status
931/2022 dated 07-07-2022	The accused involved in possessing and sharing of child pornography content on social media	National Center for Missing & Exploited Children	Muhammad Waqas	Pending
982/2022 dated 22-07-2022			Unknown	Pending
983/2022 dated			Unknown	Pending

22-07-2022				
984/2022 dated 22-07-2022			Unknown	Pending Tipline
985/2022			Unknown	Pending
986/2022			Unknown	Pending Tipline
987/2022			Unknown	Pending
988/2022			---	----
989/2022			Suhaib	Pending
994/2022	---	----	Unknown	---- Tipline
995/2022			Converted into FIR No. 98/2023	Pending Tipline

Conclusion:

No doubt, the developments in technology, particularly the information and communication technology in the shape of social media applications, has become an important part of young people's daily life. Numerous social media apps are available online on different platforms, most of which are accessible to young folks, free of cost. The competent authorities must design the safety tools in the electronic devices, the legislatures must immediately enact the most appropriate laws to handle the situation, and the local authorities must frame the rules for the implementation of laws and to curtail online sexual abuse. The relevant experts must identify and remove the abusive date before it travels or comes into access to young people. The adult ones have to play a vital role for the prevention of online sexual abuse, they must proper take care of minors, their access to internet and relevant apps, frequent checks on the use of social media apps and regular counselling to minors. The multifaceted approach is necessitated for the effective counter to online sexual abuse. High level coordination between the law enforcement agencies and service providers is the key to achieve maximum results. The school level framework may too provide better results because at that level the children learn more.