

An Adult Site Access Verification System for Non-Adults

A MODEL TO PROHIBIT CHILDREN FROM ACCESSING THE ADULT SITES

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ABSTRACT

Internet is a huge information center and is used in everyday life essentially. Concerns and issues from parents regarding their children below the age of 18; i.e., unauthentic user surfing adult sites on the Internet, has been regularly reported. As just a careful self-watch by the parents does not get the solution to their concerns, so the proposed idea is to provide an automated system that help parents to stop their children from doing such activities. Therefore, an Adult Site Access Verification System (ASAVS) for non-adults is proposed, in which surfing of such objectionable sites by the users below the minimum legal age bounds can be highly reduced. This proposed system works in the service of the people of the nation to have a healthy and mature grown up of their kids. The possible embodiment of the proposal is to use a server program that includes the entrusted third party as a verifier of the user surfing on the Internet. This third party represents the national/government authority. The proposed system verifies the user authenticity who wants to access adult sites and contents by cross verification of the user credentials; a special password, called *user key password*. If user is an adult, then he/she can access such sites after successful authentication, otherwise the request will be denied as a non-adult will not have voter id number, driving license etc. or a special user key password. With this, an immediate SMS and a mail will be sent to the authenticated user's mobile and email id to intimate him about such access. Therefore, if any user hits such URLs unintentionally, he/she gets a warning message and system asks the user to share the credentials for authentication of his/her legal age eligibility. As any unauthentic user will not be having third party registered credentials, thus if he/she uses parent's or other's information for authentication, the credentials owner will be immediately informed via SMS or email services.

General Terms

Software Engineering, Computer Networks and Security.

Keywords

Access Control, Adult Site Access, Child Users, Credentials Control System, Rating System, Site Validation Processing System, Site Verification System Knowledge Repository, Client and Server Processes.

1. INTRODUCTION

As the use of Internet and its related applications are booming up in the today's world, they are pulling us back and creating a big loophole in our society when children or non-adults of below the age of 18 years; try to access the adult sites. These sites are useful for adults to provide them an exposure about different adult issues, like murders, crimes, violence, terrorism, horror, drugs, nudity, brutal language usage, intercourse, pornography, pictures, images and movies on sex,

and many other objectionable concerns. That's why; these sites generally help them by providing knowledge, awareness and education.

According to our Indian Government Laws and legal policies of society, the non-adults of below 18 years should not be allowed to be a part of such non-ethical issues. But our government does not have any section or preventive law against these issues which can prohibit or prevent child users from accessing such objectionable sites. Various surveys have been conducted and evaluated to check that how many users access such sites per day, per hour or per minute. But these surveys don't provide us any data or results about the monotonically increasing access of such sites by the children.

Therefore, our effort is to develop a new system, called *An Adult Site Access Verification System (ASAVS)* which verifies the user authenticity who wants to access these sites. This verification is performed by first matching the credentials of the user by the third party called Site Verification System Server (SVSS), and then after authenticity confirmation, he/she is able to access the adult web sites and contents. Meanwhile, he/she will be communicated by the web server via some media that such access is being done by him/her. The communication messaging of the proposed system works like an ATM machine in which as we do some transactions in our bank account, an instant message is sent to us to prevent us from forgery.

Section 2 provides a survey tour of the existing research work done on the adult verification system, site access control issues at parental, web server, organizational and government levels which lead us on the way to find valid reasons to develop such system. Section 3 provides a comparative analysis of existing systems is also given. In section 4, the proposed ASAVS system and its methodology are discussed in detail along with three impressive handshaking case scenarios. Finally, Conclusion and future scope are discussed in the section 5 of the paper.

2. A SURVEY TOUR OF THE EXISTING SYSTEMS

The advancement in technology has provided individuals with unparalleled opportunities to communicate efficiently and effectively in real time. At the same time, the community has been exposed to a wide range of adult web sites, which involves the online exploitation of children. This represents a very real threat to the mental and psychological safety of children in the technological age. There are so many existing systems and firewalls that work on the concept to restrict the access of such adult sites, so that our PC or computer system cannot access that site. But to prevent the child or a kid from accessing these objectionable sites, some type of tight control mechanism is desperately required [1] [2] [3].

As we all know that web is very high dimensional and provides highly dynamic information network service which gives us every type of information and data of extreme low level to extreme high level. In the case of adult site access, same exceptions are raised when children try to access them just for their fun [1] [2]. Following are some topics related to the research work which require our attention before proceeding for the proposed system.

2.1 Adult Verification System

Originally, *Adult Verification System* or *Age Verification system (AVS)* or *Age Gate* was a computing system used by a website to confirm that the user attempting to access their website is of the age required (usually by law) to view the those website contents, which typically includes sex, nudity, violence, profanity, entertainment software rating etc. These systems set up a password protected entry for the web sites which do not want their web sites to be "publicly accessible" by people under the age of 18. These systems contain hundreds or even thousands of mini adult sites that all can be accessed with the purchase of just one password. In more recent years, AVS services have been forced to stop using the terms "Adult Verification" and "Age Verification" because the system was not able to guarantee that the user is an adult only. Now, the term AVS remains to describe a site that offers access to many sites.

2.2 Site Access Controls: A Step to Protect Child Users from Adult Sites Access

There are many traditional so called protection mechanisms and techniques to protect a child from accessing adult sites and its contents on web at the client and server sides both. All the methods have their pros and cons with this provision.

2.2.1 Parental Controls

As the Internet hosts billions of web pages and information of every type, but a large chunk of adult and objectionable material out of them is inappropriate and harmful for children [4]. Parents always try to protect their children from accessing these objectionable sites. Therefore, there are some easy ways that can possibly help parents to prevent kids from viewing the dark side of the WWW. These methods are given as Block Adult Sites Automatically, Prevent Clicks on Malicious Sites, Block Selected Websites (like IMs or Social sites), Turn Safe Search On forever, Track Kids Activity on the Computer, and Use of FamilyShield. Some software are also there for the preventive activities, given as *Windows Parental Control Software*, *Apple Parental Control Software*, *Ins@fe*, *ConnectSafely*, *GetNetWise*, *StaySafe.org*, *SurfSafely.com*, *Parental Control Bar* and many more [1] [2] [4].

2.2.2 Site Controls at Web Server

Filtering and site control are usually used to ban the undesired websites and related contents at Web Server or ISPs. They determine which type of web sites people should not be permitted to access, so they make the arrangements for those web sites to be locked [1] [2].

2.2.3 Organization Level Controls

Most organizations in the private sectors conduct Internet filtering on their local area networks, Intranets, and Internet access [1], so that no objectionable material can enter into the

organization systems. These organizations include different companies, banks, hospitals, schools, colleges and universities.

2.2.4 Government Level Controls

Web site and content filtering at this level is usually conducted by the *Ministry of Information and Communication* which decides the type of web sites accessible by the people, so that they can block the unwanted sites. Different governments have different reasons for filtering the Internet [1] [2] [3]. In India, there is a law on Pornography Section 292 of the IPC (Indian Penal Code, 1860) and Section 67 of the IT Act (Information Technology Act, 2000). As "Watching pornography is not illegal in India", the new Indian Laws called Information Technology (Guidelines for Cyber Cafe) have been made by our Indian Government announced on 11th April, 2011, which require cyber cafe owners to "tell users" not to surf websites that contain "pornographic or obscene material". The new rules suggest cafe owners to install filtering software and keep a log of all websites accessed by customers for at least one year. Cafe owners have also been asked not to build a cabin/cubicle with a height of more than four and half feet. The move is aimed at reducing privacy a cyber cafe user can get. The new rules make it mandatory for users to carry an identity card [5].

According to W3C Working Draft [6], the Eurostat 2005 community survey on ICT usage in households and by individuals found declining access to the Internet with age, and only 10% of people over 65 years having Internet access as shown in Figure 1 and Table 1 [6].

(Eurostat, Community survey on ICT usage in households and by individuals, 2005)

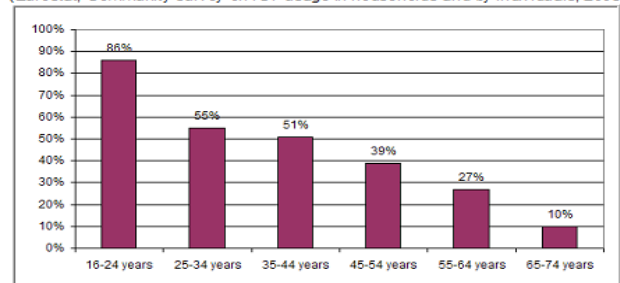


Fig 1: EU Internet Use by Age in 2005

Table 1: EU Internet Use at least One / Week by Age in 2005

(Eurostat, Community survey on ICT usage in households and by individuals, 2005)						
Age Group	16-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65-74 years
Weekly Internet access	86%	55%	51%	39%	27%	10%

3. A COMPARATIVE ANALYSIS OF VARIOUS PROPOSED TECHNIQUES

The following Table 2 shows a comparative analysis of different existing surveys, techniques and methods to identify the adult images, scenes, movies, and contents, so that it can be evaluated that the existing systems provide which type of access control on the web contents.

Table 2: A Comparative Analysis of Various Proposed Techniques and Methods

Ref No.	Author(s)	Problem Area	Solution Proposed	Concepts Used	Experimental Results	Conclusion and Limitations
[1]	Hamade, S. N.	Problem of Internet filtering by identifying the technology used to block information.	Provides a survey of various issues: whether filtering is protection or censorship, how preventing users from accessing specific materials- websites, web pages, blogs etc. online for adult data.	<ul style="list-style-type: none"> • Internet Blocking • Censorship • Blocking Software • Internet Filtering Levels 	-	Worrisome outcome as which filtering creeps into the system in an ad hoc way, without formal evaluation of the standards.
[2]	Crystal Roberts, J.D.	How to protect children from accessing the adult sites and data?	A survey of protecting children from pornography at school level and libraries.	<ul style="list-style-type: none"> • Filters • Protection • Blocking sites 	-	Preventive mechanisms required.
[3]	Sun, H. M.	Recognizing adult image groups performance tuning.	Used optimal parameter settings to achieve the best recognition accuracy for image groups.	Adult Image Recognition , Image Group classification, Web Site Classification & Neural N/W.	Can attain higher recognition accuracy than the earlier methods.	Produces time consuming lookup table to apply the adult image recognizer to scan the testing database many times with various T and m.
[7]	Shahreza, S. S. and Shahrez, M. S.	Identifying child users: is it possible?	A survey of CAPTCHA and HIP systems working at client side.	OCR - based and Non-OCR-Based programs	-	<ul style="list-style-type: none"> • Unable to find information type boundary accessed by adults & children. • Unable to discriminate psychologically between an adult and a child. • Multiple choice question set failure when asked from a child user. • Requires a complex algorithm generation and implementation. • Requires server side solution.
[8]	Kim, Y. and Nam, T.	Highly impractical and unsatisfiable traditional manual classification and filtering systems based on the IP filtering.	Dividing (filtering) the English and Korean languages web documents for adult and non-adult information using a 4 grade system working at server side.	<ul style="list-style-type: none"> • Web-Documents Collection • Preprocessing or Morphological Analysis • Rule-based and Learn – based Text Classifications • Contents Rating Services • Contents Filtering 	<ul style="list-style-type: none"> • Used IG and log TF Algorithms. • Used 12000 Harmful web documents, 16000 web documents for testing. • TF-IDF and SVM used for Learning. 	<ul style="list-style-type: none"> • IG algorithm performance better than log-TF. • Can use other learning algorithms other than SVM, IG and log-TF. • Achieved good performance for rule based text filtering. • Low accuracy for Learning based classifier.
[9]	Kim, S. H. and Jin, S. H.	<ul style="list-style-type: none"> • Traditionally, static URL used for each resource of WWW. • No pass of user authentication process. 	Used a virtual route scheme to keep up a resource location as dynamic URL and to prevent a resource from the illegal usage of a resource.	<ul style="list-style-type: none"> • Authentication Bypass • Virtual Route • Authentication Verification 	<ul style="list-style-type: none"> • Solves authentication bypass. • Prevents a resource from the illegal usage. • No requirement of the traditional Overheads. • Solves the network bandwidth problem. 	Requires Performance rate comparison with other security mechanisms.
[10]	Fong, A. C. M. Hui, S. C. and Hong, G. Y.	Traditional method of manual search, gathering and classification to block the undesirable web site access URLs based on filter content by many web sites.	Involves automated web page crawling for web page collection the Offline Filtering Agent and Web Parser to analyze the textual content of a web page and to perform web page parsing.	<ul style="list-style-type: none"> • Web Crawling • Content Filtering • Web Parser 	<ul style="list-style-type: none"> • Used 1250 web pages (for training) & 1250 web pages (for testing). • Achieved correct acceptance rate of 99.1%, and a correct reject rate of 92.7% on the training set. • Achieved correct acceptance rate of 97%, and a correct reject rate of 92.6% on the testing set. 	<ul style="list-style-type: none"> • Compared against WebChaperone and found less time consuming than WebChaperone. • Both have same accuracy criteria.
[11]	Wang, J. Li, B. Hu, W. and Wu, O.	Threatened Horror videos seen neglected by existing Web filtering tools.	A horror video scene recognition algorithm to prevent children from accessing horror content.	<ul style="list-style-type: none"> • Horror Movie Recognition • Affective Understanding • Color Emotion &Harmony • Video Segmentation • Feature Extraction 	<ul style="list-style-type: none"> • Used 90 horror movies & 90 non-horror movies from 5 different countries. • To evaluate the recognition performances of horror movie scenes identification used Precision, Recall and F-measure. 	<ul style="list-style-type: none"> • Improved the horror movie scene recognition effectively using color emotion • can improve horror film scene recognition algorithm.
[12]	Wang, J. Li, B. Hu, W. and Wu O.	Threatened Horror videos seen neglected by existing Web filtering tools.	An improved horror film scene recognition algorithm by better modeling of features fusion.	<ul style="list-style-type: none"> • Color Emotion &Harmony • Horror Movie Recognition • Affective Understanding • Multiple-Instance Learning 	<ul style="list-style-type: none"> • Collected Film data of 100 horror movies and 100 non-horror movies from many countries. • Improved horror movie scene recognition effectively using color emotional features. 	Good performance by improving the horror film scene recognition algorithm by better modeling of features fusion.

As such, some research work has been done for identification of adult site access by the user and also which type of adult contents is being accessed. On the other hand, some research studies are oriented towards to block the adult sites and contents from children’s reach by using some software or preventive mechanism either at the user’s PC or at the web

server. But, neither of them actually provides any method to identify the child user and how to prevent them from such access.

Therefore, this is a challenge in front of the society that how can we protect children from accessing the objectionable sites

and contents? Such need gives birth to the adult site access verification system to prohibit the child users from accessing such sites. The involvement of third party as Site Verification System Server (SVSS) is required to securely store the credentials of the original user. When the user is asked to send these details for verification to validate him/her that he/she is the original user (an adult) of that account and wants to access these sites, then SVSS will play the role of verifier.

4. ADULT SITE ACCESS VERIFICATION SYSTEM

The *Adult Site Access Verification System (ASAVS)* is an efficient and effective method of child user identification for adult site access and prohibiting him/her from such access. The ASAVS architecture is shown in Figure 2. ASAVS consists of two processes, client and server processes. In the server process, there are three components *Web Servers*, *Site Verification System Server (SVSS)*, and *Site Verification System Knowledge Repo (SVSKR)*. The SVSS consists of three systems, which are *Site Validation Processing System (SVPS)*, *Rating System (RS)*, and *Access Credential Control System (ACCS)*. This SVSS is connected to the SVSKR via SVPS and ACCS. The SVSKR is a database which stores the

credentials of all the users and uses them for user identification and verification.

As in the simple client server request response model, on the hit of URL, the web server finds the web contents from its repository and responds directly the client with the requested web page, if it exists, so this type of functionality gets the open for all access to the users. Unlike this normal client server process, the proposed idea is to add an extra layer (third layer) or server; i.e., SVSS, to identify the kind of user and non-adult's adult site access prohibition. So, this extra layer of third party with the client and web server verifies whether the user belongs to the adult category or non-adult category. Such process starts when the user hits a URL and sends the request to the web server.

4.1 The Proposed Methodology

The ASAVS process starts when the user hits a request to the web server. The user can request a web page either directly by a hit of URL on the web browser or can also reach a specific web address via search engine's search results. In either case, the request is received by the web server. When user's request reaches the web server, instead of peeping into its web contents, firstly the web server sends that URL request to the SVSS.

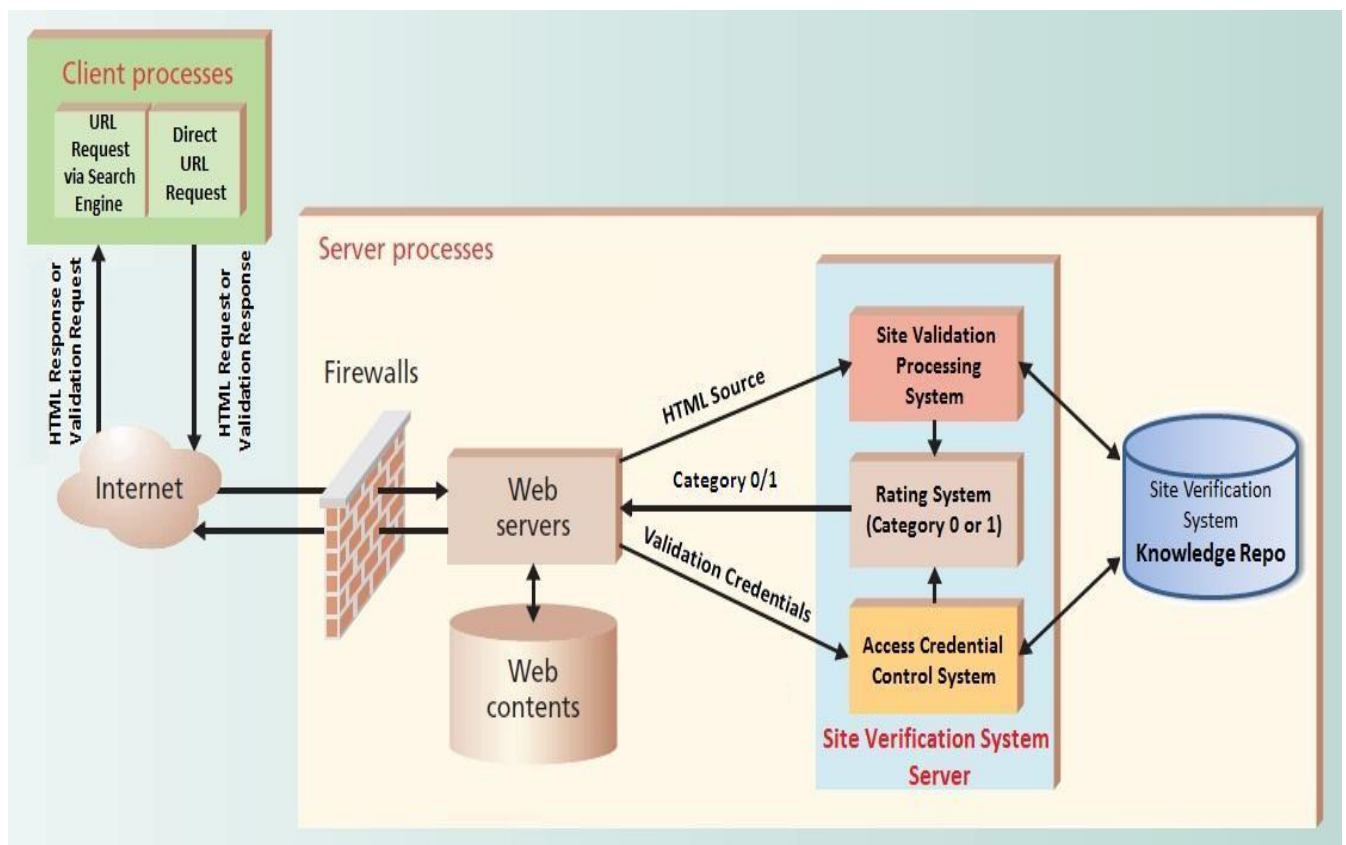


Fig 2: An Adult Site Access Verification System (ASAVS)

This user request first hits the SVPS which categorizes the website by seeking into the SVSKR. It checks whether the requested site belongs to an adult category or can be open for all. Therefore, it first makes sure whether the site requires

verification of the user or not. For this, SVPS performs some validations on the URL request. These validations will check,

- a. if URL is registered for adult contents. If it returns true, then user needs to be verified, otherwise go for validation b.
- b. if URL's response page's meta data contains any keyword which SVSKR declares as in adult category. If it returns true, then user needs verification, else go for validation c.
- c. if page content contains anything meant only for adults. If it returns true, then user needs verification.
- d. otherwise, user can directly access web page.

The SVPS feeds the validation results to the RS where it categorizes the web request as 0 or 1. Category 0 flags the URL request as a clean web request and feeds the web server with this response, so that web server can send the requested web page to the user. Category 1 flags the URL request as needs to be verified category and feeds web server with this response. Web server then sends the verification pop up to the user before showing the contents of the web page. Now, user has to enter the key password for verification, which was given him at the time of account opening with the SVSS. So, the password is sent back to the web server for verification.

In SVSS, ACCS processes this password and where it tries to map the key credential with SVSKR. If this key search is ok, then ACCS feeds RS for credential verification clearance and then RS feeds web servers with category 0. On acceptance of category 0 at web servers, they allow the user to access the web page. Meanwhile, when the ACCS finds the right match for key credential, it sends an alert message and/or mail to the corresponding user personal details registered at SVSS. This helps the credential owner (or the guardian of the user or user himself) to know the track of access of such sites with his key credential. If key credentials entered by the user are not valid as per SVSKR, then the web server does not allow the user to see the contents of the web page and shows the access block message.

4.2 The Handshaking Process

In this section, the complete handshaking process for three different handshaking scenarios is discussed. Table 3 depicts these scenarios which are categorized in terms of user age, adult or non-adult with category number, and valid key credential.

Table 3: Three Handshaking Case Scenarios

Case	User Age	Adult/Category	Valid Key Credential
I	>= 18	Yes/0	N/A
II	< 18	No/1	Yes
III	< 18	NO/1	Yes

4.2.1 When a User Wants to Access a Non-Adult Site

When a client user puts a web page request to web server, then the server delegates the request URL to SVSS. The SVSS performs its processing and finds that the requested page is in the non-adult category which does not require user type authentication, so it responds with the category 0 as shown in Figure 3. In this case, server gets free to directly forward the response to client irrespective of his/her age.

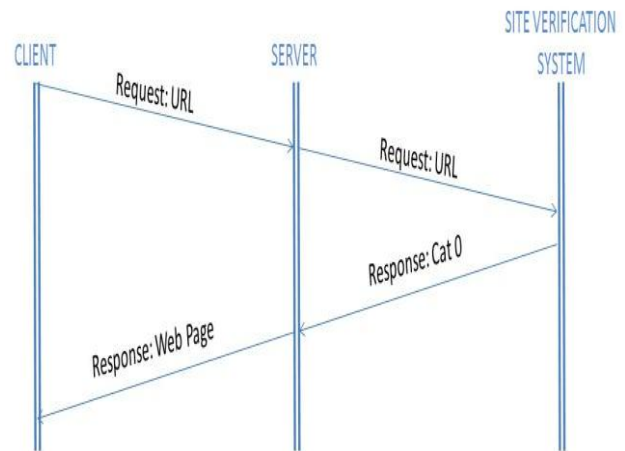


Fig 3: A Case Scenario for Non – Adult Site Access

4.2.2 When an Adult Wants to Access an Adult Site

In this case scenario, when the client puts a request to web server, then it sends this request to the SVSS. The SVSS processes the request and it finds that this request satisfies the adult category; i.e., 1. Therefore, it requires the user authentication to verify the type of user. With this, SVS responds with category 1 to the web server who further sends a verification input form to the client. At this stage, the client needs to enter his/her verification credentials which are sent via web server to SVSS to get them verified. Once SVSS verifies it true, it responds as category 0 to the web server which further responds to the user with the web page. When SVSS sends the permission to web server; i. e., category 0, it also sends the mailer or message alert to the user. The complete procedure of the case scenario is shown in Figure 4.

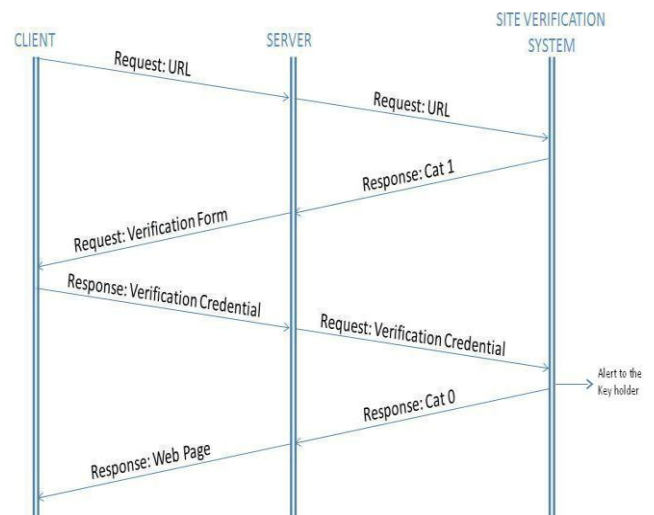


Fig 4: A Case Scenario for Adult Site Access with Valid Verification

4.2.3 When a Non-Adult Wants to Access an Adult Site

This handshaking scenario is same as given in section 4.2.2 with one difference that when the user does not provide valid verification credentials, then SVS does not verify it to be true,

so it sends a category 1 response to the web server which then blocks the user access on the requested web page.

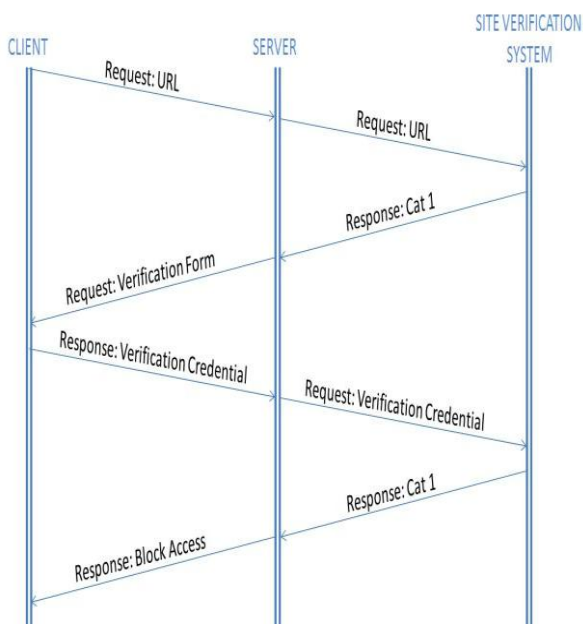


Fig 5: A Case Scenario for Adult Site Access with Invalid Verification

5. CONCLUSION AND FUTURE SCOPE

In this paper, the existing system surveys have been done on the data of US, Australia, and India and it is found that how many countries implement which type of laws and policies to stop such adult access by the non-adult ones.

The Proposed ASAVS model shows high performance when a user (adult or non-adult) tries to access the objectionable sites and related contents. It efficiently verifies the kind of user using the credential details stored at SVSKR and accordingly responds the user with the contents. This is done at the server side with the help of third party inclusion, i.e., SVSS, so it is concluded that the web servers need not to worry about such verifications and validations. It will just behave like an intermediate media between the user and his/her web contents with SVSS involvement.

In the future, the verification details and credentials can be made more informative and complex by including the feature of face recognition system captured by the Web Camera instantly, so that to make it more preventive and protective.

6. ACKNOWLEDGMENTS

We would like to acknowledge and special thank you to Dr. Vikas Saxena, Dept. of Computer Science, Jay Pee University, Noida, India for his stipulating guidance, help and encouragement.

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