

Blocking Mechanism of Porn Website in India: Claim and Truth

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Abstract- In last few years, the addiction of internet is apparently recognized as the serious threat to the health of society. This internet addiction gives an impetus to pornographic addiction because most of the pornographic content is accessible through internet. There have been ethical concerns on blocking the contents over internet. In India Uttarakhand High court has taken initiative for the blocking of pornographic content over internet. Technocrats are coming up with various innovative mechanisms to block the content over internet with various techniques. All though long ago in 2015, the Supreme Court of India has already asked to block some of the websites but it could not be materialized. The focus of this research paper is to review the effectiveness of existing web content blocking mechanism of pornographic websites in Indian context.

Keywords: Pornographic Content, Website Blocking, Blocking Mechanism, Filtering, Error code, Status code

I. INTRODUCTION

The study on the effectiveness of the blocking mechanism is crucial in knowing the current practices used for the blocking the websites in India. The report released by Kantar IMRB ICUBE 2018 reveals, that internet user base in India has crossed 500 million watermarks and is about to reach 627 million by the end of 2019. The number of internet users is suppose to be 566 million as of December 2018, registering annual growth of 18% (Pti., 2019).

The rapid growth of internet users in India has made it a country prone to abuses of internet too. Kids as well as adults are gradually becoming more addictive to internet in general and unsolicited content available over internet in particular, creating a worry to the nation to block unsolicited content available over the internet to save Indian socio-cultural structure and innocence of kids. Stride efforts has been being made by Government of India (GOI) to block or restrict open access of such unsolicited content. The following diagram presents the comparative growth of internet users since last three decades in India and China.

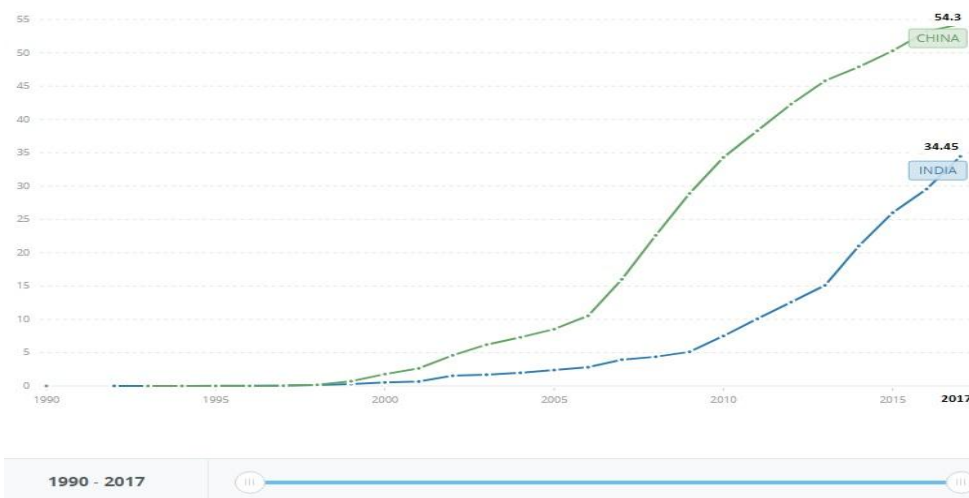


Figure – 1 Internet users in India 34.4% of the population (2017)

Sources: <https://data.worldbank.org/indicator/IT.NET.USER.ZS?contextual=default&end=2017&locations=IN-CN&start=1990&view=chart>

In one of its decision, Uttarakhand High Court states “Unlimited access to these pornographic sites is required to be blocked / curbed to avoid adverse influence on the impressionable mind of the children”. The court also directed the GOI to suspend the licences of internet service providers, under Section 25 of the Information Technology Act, 2000, if they don’t comply with the notification of July 31, 2015. The notification listed over more than 800 websites and directed internet service providers to block access to them as the contents posted on these websites “infringed morality and decency” (Santoshi, 2018).

The minutes of the Cyber Regulation Advisory Committee meeting held on 5th September, 2014 in DietY. Secretary, Department of Information and Technology (DOIT) informed that blocking of websites has been implemented through ISPs immediately when orders were received for blocking. The infrastructures at ISPs need to be upgraded to deal with such large number of web sites for blocking.

II. REVIEW OF RELATED LITERATURE

At present, the government delegates the censorship of internet traffic through ISPs. As per the present data & facts of blocking mechanism of websites is not much encouraging then how the government might enforce a unified censorship policy for the whole county in future (Gosain *et al.*, 2018).

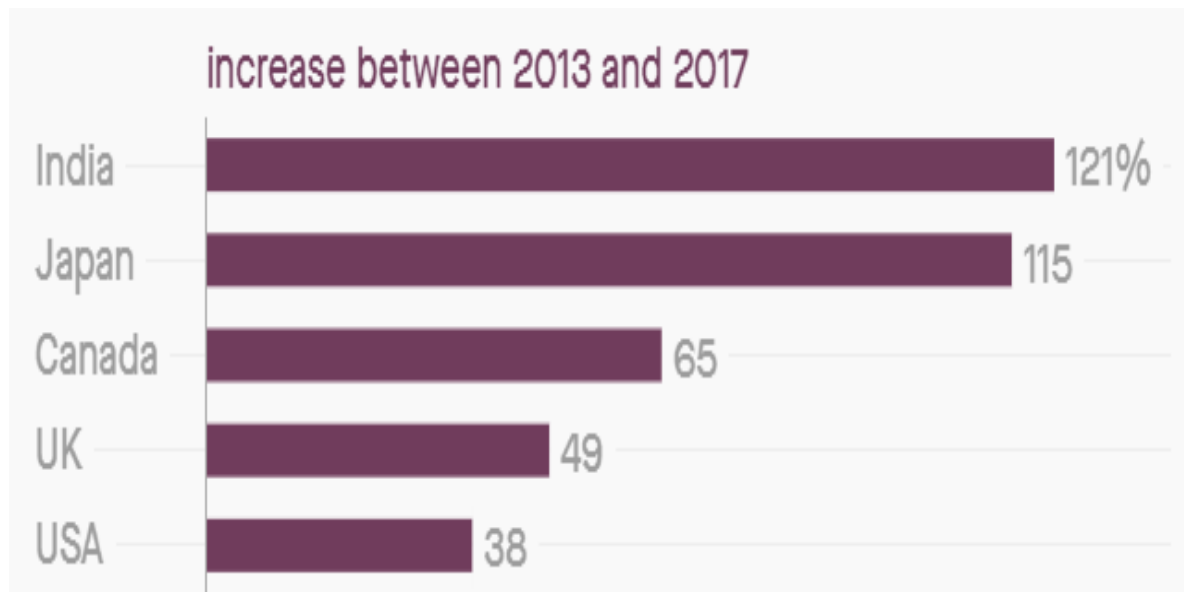


Figure – 2 Growth of mobile traffic share in Pornhub’s top five markets

Source: Pornhub (<https://www.theatlas.com/charts/HkJBO-PHG>)

The viewing of adult content soared 75% since data rates came crashing down in the second half of last fiscal 2016 under severe competitive pressure, according to video viewership tracker Vidooly’s findings, available exclusively with ET Telecom.com from the Economic Times. The new entrant Reliance Jio’s aggressive pricing forced incumbents Bharti Airtel, Vodafone, and Idea Cellular to slash down data rates, even as porn viewing surged - primarily in the tier 2 and tier 3 towns. It is more interesting to note that about 80% of the web content is in short form, and tier 2 and 3 towns contribute 60% of total viewership

At one side research findings support the positive correlation between video consumption and its impact on brain to learn and remember things very quickly while the other side there is open internet for all age groups with the factious visuals. At present scenario, it would be the matter of big importance to differentiate between the reality of visual content against the fake and fictions ones.

Studies related to trends in pornography preferences, Pornhub reports on the device types used by its customers. Its 2018 report has shown that customers are increasingly enjoying their porn material on the go using their mobile phones. In 2013, only 40% of Pornhub’s traffic was on a phone; which increased to 67% in 2017 (Kopf & Kopf 2018).

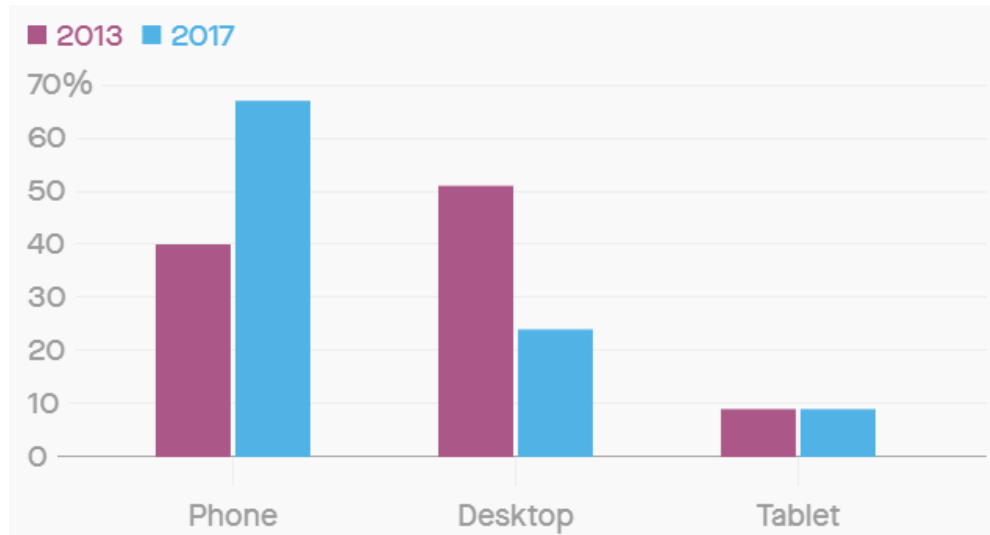


Figure – 3 the trend of porn users moving to mobile devices
Source: Pornhub (https://www.theatlas.com/charts/BJBi_GNBM)

In recent years, internet addiction has become more prevalent worldwide and its adverse impact on the health of the society is also not invisible. Hou *et al.*, (2012) has conducted his study titled “Reduced Striate Dopamine Transporters in People with Internet Addiction Disorder”. The study revealed that internet addiction may induce significant Dopamine transporter losses in the brain and findings suggested that internet addiction is associated with dysfunctions in the dopaminergic brain systems. The findings also supported the claim that internet addiction may share similar neurobiological abnormalities with other addictive disorders.

Alarcón *et al.*, (2019) have conducted a review on “Online Porn Addiction: What We Know and What We Don’t”. Authors concluded that pornography addiction is a type of hypersexual disorder and may be composed of several sexual behaviors, such as problematic use of online pornography (POPU). They further identified that online pornography use is on the rise, with a potential for addiction and this problematic use has adverse effects in sexual development and sexual functioning, particularly among the young population.

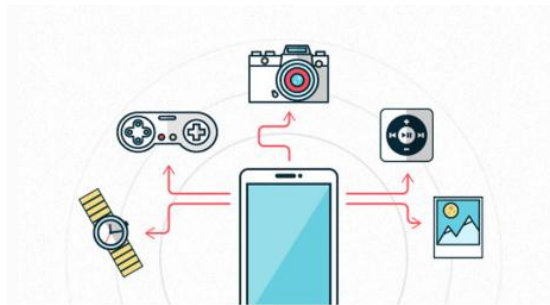


Figure – 4 How the Internet of things is changing the World around us

Source: <https://www.netsolutions.com/insights/how-the-internet-of-things-is-changing-the-world-around-us/>

In Oct. 2018, the Indian government’s telecom department communicated internet service providers (ISPs) to ban 827 websites for hosting pornographic content. (Singh & Singh 2018) reported that this is the second attempt in recent times by India, among the most prolific consumers of porn watching, to shut it out. In August 2015, following a Supreme Court verdict, the government had unsuccessfully tried to block about 857 websites on the grounds that such content promotes sexual assault. Further the Uttarakhand high court has reinstated the Supreme Court’s ban after a rape accused in the state’s capital Dehradun said third person the culprit was nudged into committing the crime after watching a porn movie (Singh & Singh 2018). A few years back, various websites were blocked in totality by service providers when they were only directed to block a particular webpage. The logic and rationale given by these providers was that since they lacked the intrinsic mechanism to block a webpage, they blocked the entire website.

As of now whatever are discussed were focused on abuses of internet but can be very effective if used properly for example as far as teaching and learning process is concerned watching the educational videos may be the best way to improve learning, especially when it comes to remembering key facts and figures. In fact, according to Dr. James McQuivey of Forrester Research, one minute of online video equates to approximately 1.8 million written words. In addition to this, 90% of information transmitted to the brain is visual, and visuals are processed 60,000 times faster in the brain than text. This indicates visual education aids like video can improve learning and increase the rate at which one retains the information.

There are sufficient proofs that teaching online educational videos available on *YouTube* or any other platform is facilitating the teaching and learning process. The teachers and the student both get benefited from this. The study conducted by Elyas & Kabooaha, entitled “The Impacts of Using *YouTube* Videos on Learning Vocabulary in Saudi EFL classrooms” indicates that videos on you tube is making teaching and learning process attractive, interesting and enjoyable. These videos plays crucial role in motivating students intrinsically and as well as extrinsically. Alwehaibi (2015) concluded in his research that the use of *YouTube* platform resulted in reading, writing, analyzing, interacting seeking part in different activities throughout the learning cycle.

The study conducted by FSG organization a statewide pilot of Khan Academy in Idaho with 173 teachers and 10,500 students during the 2013-14 school year shows that students who complete 60% of their grade-level math on Khan Academy experience 1.8 times their expected growth on the Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP) test, which is a popular achievement of mathematics (Phillips *et al.*, 2013-2014)

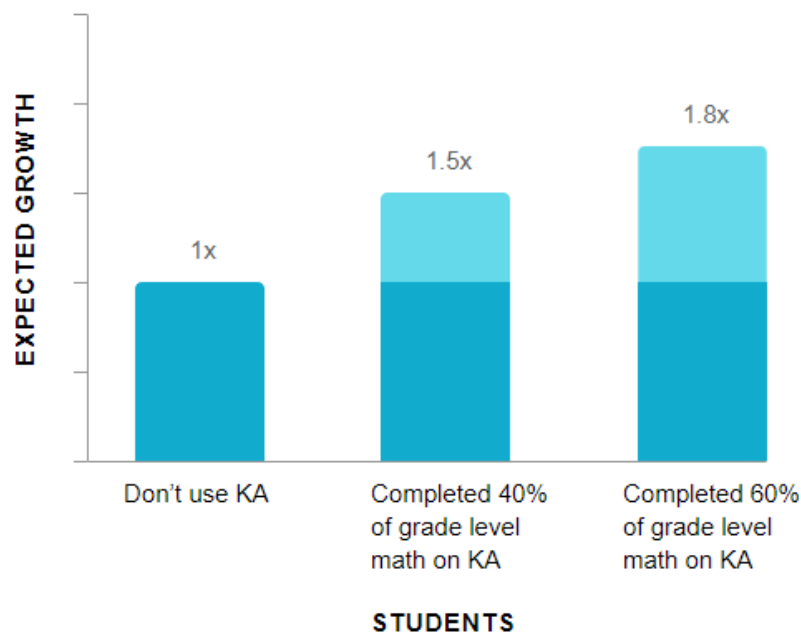


Figure – 5 Impact of Khan Academy on the level of achievement of Mathematics

Source: <https://www.khanacademy.org/about/impact>

III. METHODOLOGY

Source: <https://www.khanacademy.org/about/impact>

In the present study the following objectives were under taken O1: O2:

O1: To review the present blocking mechanism used for blocking the websites in India

O2: To identify and analyze the Architecture of the present blocking mechanism used for blocking websites in India

In order to estimate the status of the blocked websites, the status of all the websites banned by the department of information and technology in respect of the HTTP Error Codes/ Status Codes were investigated. Using HEADMasterSEO tools 849 blocked websites were evaluated. The top four broad categories of the websites on the basis of the further higher number of counts for HTTP error code/ status code responses (200, 301, and 302, blank) were identified. The HTTP status codes indicated

whether a specific HTTP request has been successfully completed or not. Every HTTP request that is received by a server is responded with an HTTP status code. HTTP status codes consist of three digit codes and grouped in different classes. The class of status code identified by its first digit of the status code responses –

1xx: Informational

2xx: Success

Table – 1 Description of Error Code/ Status Code 200

Error Code / Status Code	Message	Description
200	OK	This code indicates that server successfully processed the request and in response provided the requested page.

3xx: Redirection

Table – 2 Description of Error Code/ Status Code 301, 302

Error Code / Status Code	Message	Description
301	Moved Permanently	This code refers that the requested page permanently moved to a different location. It means server forwards the user request to the new associated location.
302	Found / Moved Temporarily	This code refers that presently server is catering the user request from the different location, but in future the user request may be catered from the previous or original location.

4xx: Client Error

5xx: Server Error

Table - 3 An overview of Technical Status of blocked websites in India based on Error Codes

Error Code Description	Error Codes							No of URL
	200	301	302	307	403	404	(blank)	Grand Total
Forbidden					3			3
Found			43					43
Found : Moved Temporarily			1					1
Found, Redirect Loop			3					3
Invalid Server Response							10	10
Moved Permanently		186						186
Moved Temporarily			6					6
Name Not Resolved							137	137
Not Found						4		4
OK	449							449
Redirect			2					2
Temporary Redirect				4				4
Timeout							1	1
Grand Total	449	186	55	4	3	4	148	849

Table - 4 Top Four Broad Categories of Websites based on Error Codes

Description : Error Code	Error Codes				No of URL's
	200	301	302	0 (blank)	Grand Total
Found			43		43
Moved Permanently		186			186
Name Not Resolved				137	137
OK	449				449
Grand Total	449	186	43	137	815

Sample and Sampling

In this study 262 porn websites were selected as sample through proportionate stratified random sampling method. The sample size was determined using formula for determination of sample size for known population (Cochran, 1963, p. 75).

$$\text{Sample size for population} = \frac{n_0 = z^2 * P(1 - P)}{e^2} \quad \text{Equation 1}$$

Where

n_0 = Initial sample size

z = Selected critical values of desired level of confidence or risk from (Z-table) 90% (1.645), 95% (1.96), 99% (2.576)

P = Estimated proportion of an attribute that is present in the population of maximum variability of the population Maximum Variability (50%) that is (0.5)

e = Desired level of precision or margin of error (+- 5%) that is (0.05)

Now putting the values in formula

$$\begin{aligned} n_0 &= \frac{1.96^2 * 0.5(1 - 0.5)}{(0.05)^2} \\ &= 384.16 = 384 \end{aligned}$$

Now calculate population correction factor for sample size for known population –

$$n = \frac{n_0 N}{n_0 + (N - 1)} \quad \text{Equation 2}$$

Where

n = Sample size for known population

n_0 = Initial sample size for population

N = Known population

$$\begin{aligned} n &= \frac{384 * 815}{384 + 814} \\ &= \frac{312960}{1198} \\ &= 261.23 = 261 \end{aligned}$$

$$\text{Sample size of the strata} = \frac{\text{Size of entire sample}}{\text{population size} * \text{layer size}} \quad \text{Equation 3}$$

Now putting the values in formula

Table – 5 Sample Description			
Strata	Known Population	Calculations	Sample
200	449	$\frac{261}{815 * 449} = 143.79 = 144$	144
301	186	$\frac{261}{815 * 186} = 59.56 = 60$	60
0	137	$\frac{261}{815 * 137} = 43.87 = 44$	44
302	43	$\frac{261}{815 * 43} = 13.77 = 14$	14
			262

IV. EXPERIMENTAL RESULTS: ANALYSIS AND DISCUSSION

When attempt were made to access the blocked website / URL's to use of the tools (tor browser and opera browser with virtual private network (VPN) facility) which uses the different ports and protocol of the Open System Interconnection (OSI) model for the communication to serve the user request. The end results were very awaking that more than 95% of the website in each strata were successfully browsed with these tools and technology except the HTTP 0/Blank error codes/ status codes (Name Not Resolved) websites. Name Not Resolved means that the hostname/ website you are trying to connect cannot be resolved to an IP address (Hostname/ website name resolved to IP addresses by a Domain Name Server system).

Table - 6 Tor Browser Success %		
Error Code	Description	Tor Browser Success %
302	Found	96
301	Moved Permanently	98
200	OK	99

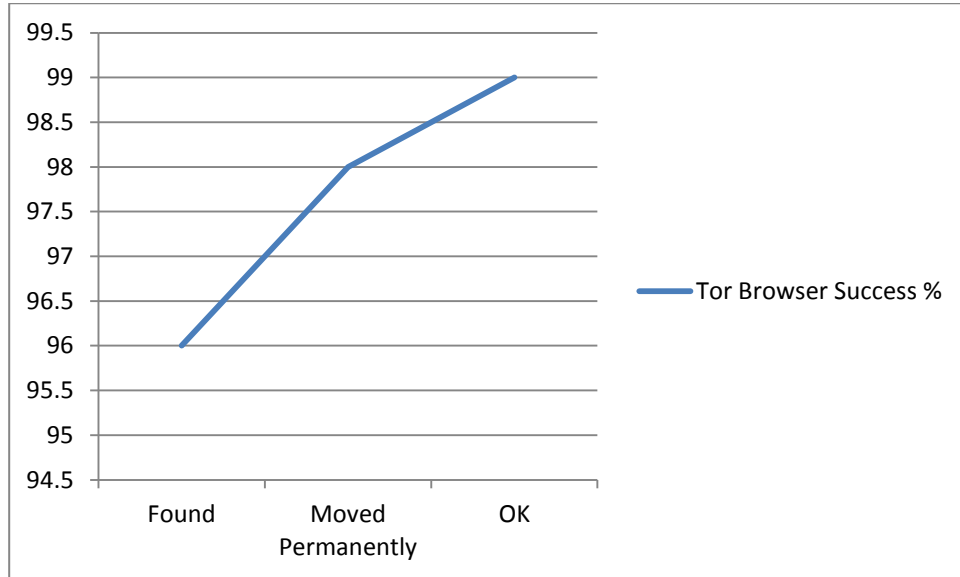


Figure - 6 Tor Browser Success %

Table 6 and Figure 6 represents that porn websites across different category of error codes/ response codes (302, 301 and 200), are brows able with Tor browser at the success rate of more than 96%.

Error Code	Description	Opera Browser (VPN) Success %
302	Found	97
301	Moved Permanently	96
200	OK	98

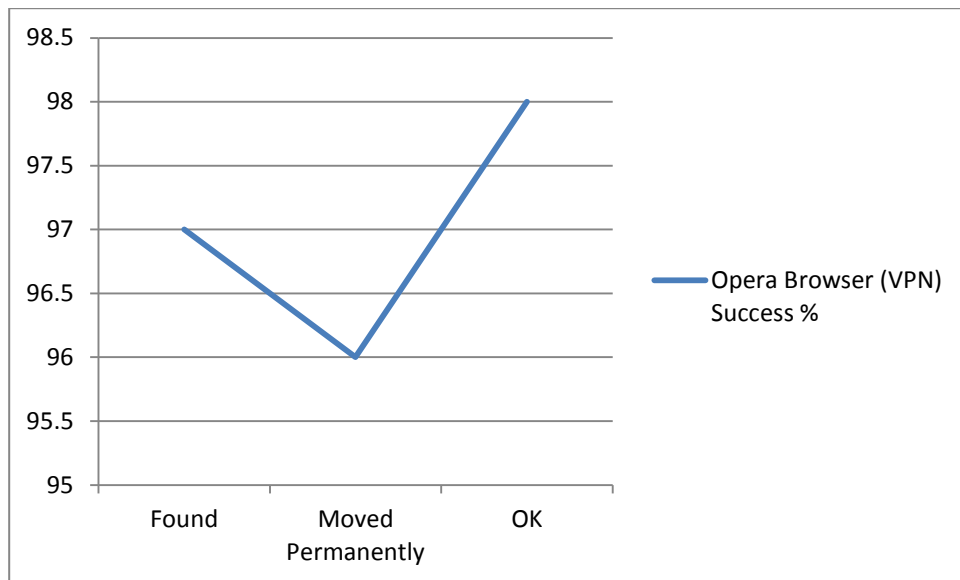


Figure 7 Opera Browser (VPN) Success in percentage

Table 7 and Figure 7 represent that porn websites under the category of error code/ response code (302, 301 and 200) are brows able with Opera browser at the success rate of more than 96%.

Table - 8 Comparison of Tor Browser & Opera Browser (VPN) Success %			
Error Code	Description	Tor Browser Success %	Opera Browser (VPN) Success %
302	Found	96	97
301	Moved Permanently	98	96
200	OK	99	98

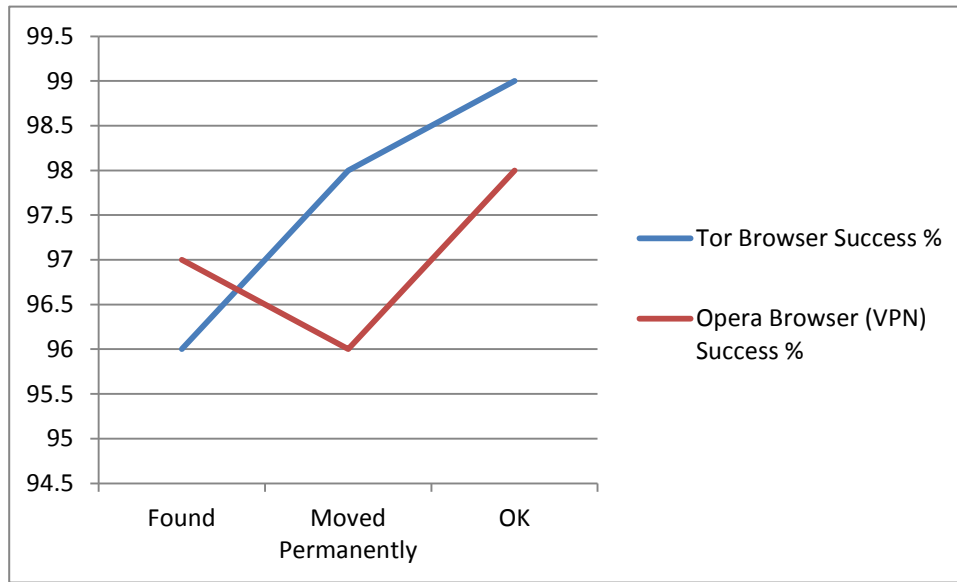


Figure - 8 Comparison of Tor Browser & Opera Browser (VPN) Success in percentage

Table 8 and Figure 8 indicate that more than 95% of the websites were selected as sample is easily accessible with the help of these browsers.

Table - 9 Status of Websites with Blank Error Codes	
Status of websites with blank error codes	No. of Domains
Domain Name Available for Purchase	24
A Records Not Found	21
Total No of Websites	45

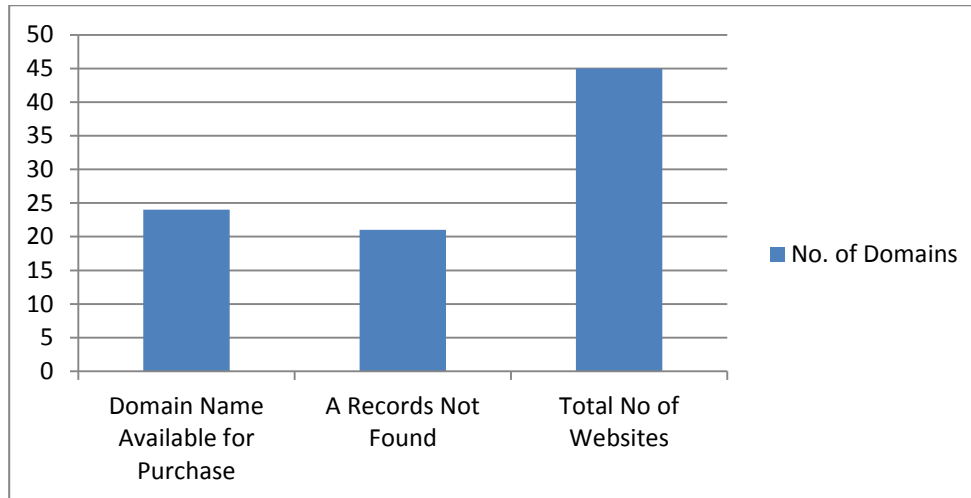


Figure – 9 Status of Website with Blank Error Codes

Table 9 and Figure 9 show the status of the domain name of the websites for the bank error codes. Out of 45 websites in this category 24 domain names available for purchase for this testing, were used the godaddy bulk domain check web utility Register Domains in bulk at GoDaddy. 21 domain names of websites existed but not mapped with any A records for this testing we have used the infobyip.com web utility page ipbulklookup.php (InfoByIP.com.).

Findings - The testing results reveals that the DNS based content blocking mechanisms are being used by the ISP's in India. Website's blocking has been done in continuation to the blocking orders & list released from the department of information and technology (DOIT) in compliance of the order to ban websites by Uttarakhand High Court. This type of filtering mechanism caters the user DNS requests, either by dropping the request or by responding the misleading IP responses by the DNS. Although, in India there are approx 50000 DNS servers, distributed across different networks, reconfiguring all such servers to filter DNS queries for black-listed sites would not be easy (Gosain *et al.*, 2018). DNS based content blocking does not filter and examine all network traffic; instead, it focuses on controlling and routing of DNS queries to bogus IP's.

Discussion on Findings – Checking of the status of the A records for the blocked websites in India and from the US locations through the help of the online utility available at InfoByIP.com, revealed the same A records values from both the locations. Further when it was tried to access the banned website in India, it routes the request and finally got the block page of the website with the text message (Web Page Blocked! The page you have requested has been blocked, because the URL is banned as per the Government Rules) and the meanwhile when accessed the same website with United States hosted server it lead to the final destination of the website without any block page message because there is no any restriction in United States for these websites. As per these testing and comparison of the results for two different geographical locations lookup results for A records have been found same. End result indicated that for the same public IP (A public IP address is the globally unique IP address assigned to any device)

one is getting two different page responses due to the DNS based content blocking in India. In the United States the web request with the same IP lead to the actual destination of the web page while in India it routes to the blocked page hosted / routed by the various ISP's in India.

So on the bases of above experimental results one can easily interpret that the ISP's of India often uses the DNS based content blocking mechanism to block the websites in India.

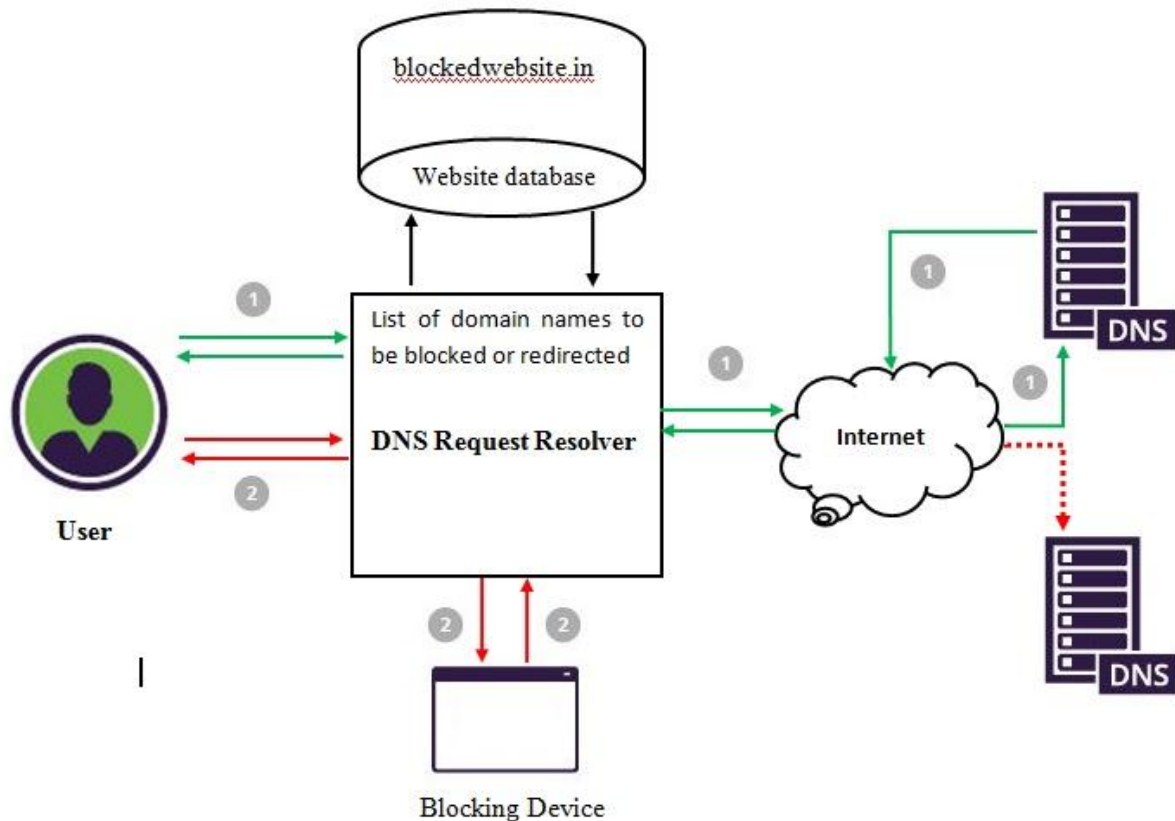


Figure - 10 Architecture of DNS-Based Websites Blocking Mechanism

- ➔ 1 User initiates the request for website i.e. www.allowwebsite.in The allowwebsite.in is not in the list of blocked domain names. User request forwarded to the DNS server for allowwebsite.in with the query what is the IP address of allowwebsite.in
- ← 1 DNS server for allowwebsite.in resolves the request and in response send the IP address of allowwebsite.in=W.X.Y.Z to the user. The DNS query operate normally and returned the correct answer
- ➔ 2 User initiates the request for website i.e. blockedwebsite.in The blockedwebsite.in lies in the database of blocked website list. In this case the user request will not forwarded to the DNS server

2

The DNS query for blockwebsite.in intercepted by the blocking device which returns the IP address of the webserver. Webserver returns the error page “Website Blocked” because the blockwebsite.in on the block list

CONCLUSION

The present website blocking mechanism of Government of India seems in effective. It needs to address the issues with long lasting corrective measures. In fact present blocking mechanism is not sustainable to achieve its goals at grass root level. The blocking mechanism used by the ISP’s is low cost and can be quickly implemented, but the major flaw is that there is no blocking mechanism at different layers and ports of the OSI / TCP/IP model. It is not holistic solution to block the request for the unwanted sites at different levels. It was observed that the blocked websites are easily accessible with the help of the browsers, using the different protocols and ports of communication. There are numerous pornographic websites available on internet so it does not seem practical to block it with the help of ISP’s using DNS based blocking only. India has to think of an integrated holistic model for web content filtering and blocking.

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