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Visuals Triumph in a Curious Case of Privacy Policy

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Abstract. A privacy policy statement discloses the practices carried out by an organization to gather, use, and share users' data. Previous studies have shown concern of users about understanding the content of privacy policies due to its textual format that has remained an open challenge because of complexity, verbosity, and legal jargon. Video format is proven to have higher impact on engagement and comprehensibility compared to other formats in domains such as education and entertainment. This study focuses on using video as a tool to represent online text-based privacy policies. We created modular animated video-based policies of two different organizations and compared them with their textual counterparts. The results were evaluated in terms of duration and accuracy to comprehend the content of both formats. Our findings suggest that animated video privacy policies have a significant effect on user engagement, delivery of content, and comprehensibility of information.

Keywords: privacy policy, cyber security, videos, security, communication.

1 Introduction

Effective communication of online privacy policies has remained an open challenge, primarily due to the fact that they do not convey information in a way understandable to most Internet users. The language used does not communicate information which is easy to understand by most of the end users [29]. Further, the need (or greed) to consume (sometimes apparently free) online services by the end users have resulted in turning a blind eye to the privacy notices. A study conducted by Pew Research in 2014 found that half of the internet users did not know what a privacy policy was [1]. Another experiment using a fictional website with 543 participants was conducted by Michigan State University [22], which showed that over 74% skipped or ignored the privacy policy notices while joining a social network for the first time.

Even those who read privacy policies still struggle to grasp them. Online privacy policies often contain ambiguous language that undermines the purpose and value of the privacy policies for end users [26]. According to a study [22], in America, if users were to go through all the privacy policies of every site they visit annually, then around 201 hours would be spent for reading all the policies. In monetary terms, it would result in a loss of US \$3,534 in revenue per capita for the time spent. It has been noted that the text-based online privacy policy content is much more in compari-

son to what a user would be willing to read and spend time on [13]. There are more struggles for the end users on the cards as privacy policies are laborious to look at due to text heavy content, time consumption for reading, and difficult to comprehend due to the complex language.

This has now become a more critical issue with the advent of the European Union's much touted General Data Protection Regulation (GDPR) that emphasizes on "privacy by default". While this has forced organizations to reconsider and rewrite their privacy policies, it has been observed that these updated policies contain even more incomplete and ambiguous information flow statements. A recent survey [30] has found that 45% of all pre-GDPR policies and 63% of the post-GDPR policies suffer from this flaw. In addition, the content in both previous and updated versions of privacy policies continue to suffer from "parameter bloating", leading to more verbose text [15]. Studies have shown that post GDPR implementation, there was an average increase in word count of privacy policies of 25.88%. Also, the average change in reading level to comprehend the content increased from 13.6 to 14.1 by 3.68% [27].

Besides that, the language and terms used in the privacy policies obviate the end users from reading large textual content for understanding in context of their requirement. Most policies are written in English at a level suited for college level educated end users, with frequent use of unfamiliar terminologies [10, 3]. For upcoming regions such as India and African countries (for example, Benin, Sierra Leone, Niger, and Mozambique), the rate of Internet penetration has been increasing by more than 20% annually [18, 12]. This includes a vast number of people with only school level education or less. In rural areas, smart phones are becoming the primary means of internet consumption for online services. More and more people are connecting to the internet, but the effectiveness of online privacy documents remains a challenge. Privacy policies often ignore the need for effective design, layout, and visual presentation, leading to decision paralysis [29]. Many studies have stated that reading privacy policies is related to economic proposition and concluded that asymmetric information makes the task of reading them not worthy [2, 28].

Research has been done to convert privacy policy in terms of data visualizations. However, translating a whole privacy statement into a grid that conveyed information using icons did not improve its efficacy [25]. Attempts for creating effective policy through visualizations are still going on using the modeled icons [6] for Privacy, under Creative Commons [8, 5]. CommonTerms tried to resolve this with a standardized view based on review of a large number of available privacy policies and other standardization and iconography work [24]. Iconography and visualizations are not able to convey full information to users. They still require additional access tools such as hover tip for clarifications which further explains what the icon attempts to convey. Kelley et al. [23] were inspired by nutrition labels to design the summary of privacy policies. These privacy labels showed the usage of the users' data on a website in a tabular form. Nutrition labels and privacy icons offered a good starting point, but some questions still remained about their effectiveness. This includes how people would use labels in practice, loss of details while combining multiple categories of policy to make it shorter and prerequisite knowledge of users to interpret icons [21].

These shortcomings motivated us to work on the alternative approach to communicate privacy policy content to end users.

2 Our Approach

We selected animation-based video as an alternative for textual privacy policies because of its high engagement and effectiveness in content delivery. Animated video alternative for delivering text-based content raises user motivation, improves communication, and expands potential for deeper understanding of the subject concepts [7]. Cisco’s forecast report has stated that videos will soon exceed 80% of the global internet traffic in next few years [11]. As per the reports, countries such as India (with major rural population) are not far behind the leading nations of the world to view online content through videos [12] by means of over the top (OTT) platforms such as YouTube, Netflix and Amazon prime. Videos thus, are a great tool to make content more accessible and inviting to a wider audience. For this study, we analyzed online privacy policies of 15 different organizations as shown in Table 1. These organizations are spread across domains such as e-Commerce, retail, technology, entertainment, banking and finance. We found that majority of the content of these privacy policies can be categorized into distinct sections with similar agendas, and it can be used to create short video assets. Two different privacy policies were selected from retail (Amazon) and Entertainment (Netflix) domains that have more end user interaction, overall popularity, and worldwide recognition.

Organization	Domains	Collection of Personal Information	Use of Collected Information	Information Storage and Security	Transparency and Choice	Access Management of Personal Information	Cookies and Other Technologies	Legalities and Disclosure of Information	Third Party Information on Sharing	Protection for Children’s Data	Changes/Updates to Privacy Policies	Miscellaneous Privacy Related Materials	Contact	Global Operation	Opt in/out of Online Marketing
eBay	eCommerce	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓
Netflix	Entertainment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Amazon	e-Retail	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
AmEx	Financial Services	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CitiBank	Financial Services	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		
JP Morgan	Financial Services	✓	✓	✓	✓	✓	✓	✓	✓		✓				✓
Visa	Financial Services	✓	✓	✓	✓	✓	✓	✓	✓						
WhatsApp	Messaging	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	
Walmart	Retail	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Facebook	Social Networking	✓	✓	✓		✓	✓	✓	✓		✓		✓		
Instagram	Social Networking	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓		
Twitter	Social Networking	✓	✓	✓	✓	✓	✓	✓			✓				✓
Apple Inc	Technology	✓	✓	✓		✓	✓	✓	✓	✓		✓		✓	
Google	Technology	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Microsoft	Technology	✓	✓		✓	✓	✓				✓	✓			

Table 1. Comparative Study of Privacy Policies of Different Organizations

Our approach was to convert each section of Amazon and Netflix privacy policies into individual animated video modules. These modules can then be sequenced according to the textual privacy policies under consideration keeping the content layout similar in both formats. Our video creation process followed the proven guidelines provided in well-established studies [14, 9]. The theme of the videos, including colors, logos and fonts, were kept according to Amazon and Netflix websites’ layout to give a familiar impression to the participants while accessing their privacy policies. The flow of the video is similar to that of the text-based privacy policy using animated icons, illustrations, characters, and infographics. For video narration, we selected

two people, one male and one female, to do a mixed voice-over. This would help to remove any bias from participants' mind towards the narration and narrow down their focus towards the content. The video is sub-divided into small sections as shown in Table 1. The overall length of Amazon's privacy policy video is 5 minutes and 14 seconds and for Netflix, it is 5 minutes and 46 seconds. The video covered all the categories of the text-based privacy policy.

Further study involves the comparison of effectiveness of our video-based approach with respect to textual privacy policy. To substantiate the video counterpart, a user study was conducted to compare it with the existing textual privacy policies. The findings are exemplified herein with analysis of correctness and time to answer the survey questions based on the selected privacy policies.

3 Comparative Study

For the recruitment of participants, we broadcasted an email within our organization for their voluntary participation. We selected 64 participants from the responses indicating willingness to participate in our study. As stated earlier, most policies are written in English at a level suited for college level educated end users [9]. Therefore, we selected participants with a minimum of post-secondary education where 31.25% were identified having Bachelor's Degree, 59.37% with Master's Degree and 9.37% with PhDs in educational qualification. Participants' ages ranged from 21 to 45 years with 64% identifying as male and the rest as female. These participants were asked to visit our lab for conducting the experiments in a controlled condition. They were divided equally ($n=16$ each) into four independent groups, i) Amazon's Text Policy (AT), ii) Amazon's Video Policy (AV), iii) Netflix's Text Policy (NT) and iv) Netflix's Video Policy (NV). We tried to keep the age and gender ratio as similar as possible in each group. All participants were presented with a US \$10 gift as an appreciation for their participation.

3.1 Data Collection

For our experiment, we created surveys consisting of multiple-choice questions (with more than one correct answer) and pre-post feedback forms. Responses of feedback forms collected from participants were based on Likert scale for psychometric analysis [4]. Following the examination of policy statement language [20, 17] and survey design process [16], questionnaires were created to tap into what the users' value in terms of privacy policies. These questionnaires were reviewed by our policy and legal experts to ensure that it covered all the important aspects of the privacy policy document. The objective of our surveys is twofold, 1) to compare the users' understanding of the content in both text and video-based privacy policies and 2) to evaluate their experience with the two different mediums of delivering privacy policy content. The surveys were divided into four fragments as follows:

- **Part I-Participants' data (*common for all groups*)**. It captured the demographic details of the participants concerning their gender, age group and educational background. We refrained from collecting any Personally Identifiable Information (PII) and kept the participants' data anonymous for a group-level analysis.

- **Part II (common for all groups).** It was a pre-questionnaire feedback form, which consisted of questions with responses based on Likert Scale ratings [4]. It explored the participants' experiences with online privacy notices and policies.
- **Part III.** It consisted of the questionnaire related to all the nine categories mentioned in the Section – *Categorisation of the Contents*. The questions were formed so that each category required a thorough exploration from participants thus making them to go through all the content of privacy policy. It evaluated participants' understanding of the content. Since the length of privacy policy varied across nine sections, there was a difference in total number of questions.

Questionnaire 1 (Amazon – Participants' Group AT and AV): 35 questions in total with an average of 3.88 questions per category.

Questionnaire 2 (Netflix – Participants' Group NT and NV): 30 questions with an average of 3 questions per category.

- **Part IV (common for all groups).** A post-feedback form was provided to capture the experience of participants with the experiment. It also gathered participants' thoughts through comments by asking their opinions on what can be improved in privacy policy document to make it more effective.

For data collection, we chose to opt for printed surveys using pen and paper which would be easier for participants while answering. The text-based policy was provided in printed format whereas a digital screen (laptop) was used for video-based policy under a laboratory setting. Printed survey method was used to eliminate the chances of skipping through the content using search and find. This reduced any possible bias and/or any distractions towards the content.

Time duration for giving responses was measured for analogical inference of the effectiveness of content. Participants could refer back and forth to text or video-based policy while answering the questions. This gave us an overall understanding of the effectiveness of finding information in two different mediums of communication.

3.2 Results

Part II of our survey was based on a pre-questionnaire form exploring participants' experiences with online privacy notices and policies. Following were the inferences based on the pre-questionnaire of Part II:

- 62.5% participants have faced the situation at least once where they visited the policy page (directed automatically on the website or clicked by user) but still 87.5% of them skipped reading.
- 73.45% stated that they never read the privacy policy of a website whenever they visited one.
- 81.25% said, they would not read the complete text in case they were presented with a situation to refer to a privacy document.

Comparison in terms of Completion Time. Part III of the survey allowed us to compare the duration and accuracy of the questions answered by the participants with a confidence interval of 95%. The duration of completion of the survey for each participant is measured from the time they receive the questionnaire till they complete

and submit the same. Figure 1(a) depicts the comparative analysis of the average time for completing the survey, with error bars.

The average time for completing the questionnaire for full text-based privacy policy of Amazon was 33 minutes and 8 seconds. This was reduced to an average of 19 minutes and 11 seconds for the video-based survey resulting in around 42.07 % reduction from the full text-based policy. For Netflix, average time for completing the questionnaire for full text-based privacy policy was 26 minutes and 48 seconds with an average reduction of 32.63% for video-based policy resulting in 18 minutes and 4 seconds.

During the study, we provided printed copies of online privacy policy to the participants in text-based policy condition for easy reading, instead of showing it on a digital device. This may have resulted in an increase in completion time for the survey. We can confirm this hypothesis in future studies by providing on-screen (laptop/desktop/mobile) privacy policy for reference instead of printed copy.

Comparison in terms of Correctness. The average correctness score for the Amazon video-based policy ($M=26.062$) is increased by 21.57 % as compared to textual privacy policy ($M=21.437$). A similar trend is observed in case of Netflix with an increase of 22.12% correctness score for video-based version ($M=25.187$) to textual policy ($M=20.625$). Average scores of the questionnaire based on the privacy document depicted in Figure 1(b) provided us with positive results for the video-based privacy policy compared to text-based version.

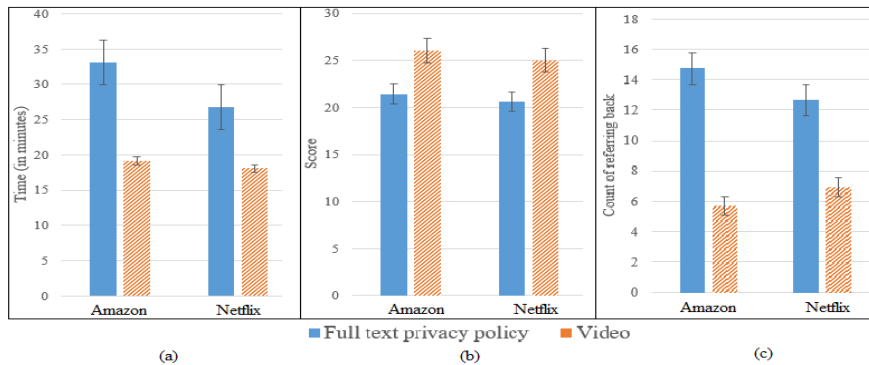


Fig. 1. (a) Average time comparison for completing the survey. (b) Average score comparison of text and video survey. (c) Analysis of the count of referring back to text and video. (All error bars at 95% confidence interval)

Comparison in terms of Count of Referring Back. The count of referring back to full-text and video policies while completing the questionnaire was gathered using selective observation technique in a laboratory setting [19]. Analysis of the count for both Amazon and Netflix is shown in Figure 1(c). For textual version of Amazon's policy document, the count averaged to 14.75 times per participant while for the video it was limited to 6 times per participant resulting in an average reduction of 57.14 %. Similarly, for Netflix's textual policy, the average count was 13 times which reduced to 7 times (reduction by 46.15%) for video-based version. This data shows that visual

representation of privacy policy content improves comprehensibility with less referring back to the given content.

Comparison in terms of Consistency. The scatter plots shown in Figure 2(a, b) using Kernel Density Estimation clearly illustrate the fact that the overall responses of participants in the case of video shifted towards the top left part of the graph. This suggests that the participants consumed lesser time, with higher accuracy rate, for answering the questionnaire in case of video-based policies. The plots also show higher dispersion in scores for full-text versions which signifies lower consistency and predictability for full-text privacy policies. The results show that when participants answered the questionnaire using video-based policy, their score increased as compared to text-based policy indicating improved comprehensibility of the content.

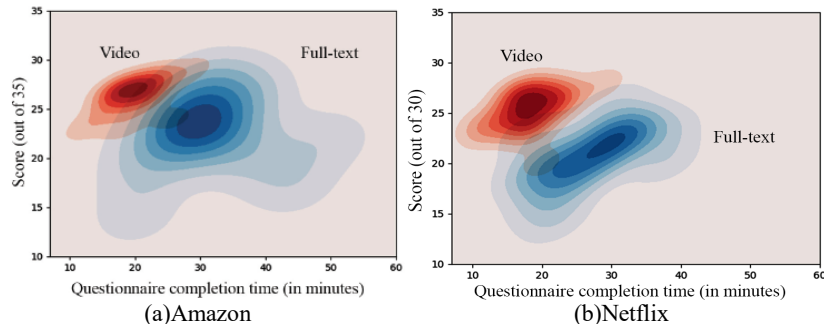


Fig. 2. Scatter plot using Kernel Density Estimation (a) Amazon's Privacy Policy: Score versus time for full-text and video-based questionnaire (b) Netflix's Privacy Policy: Score versus time for full-text and video-based questionnaire

Comparison in terms of Preference. As per the post survey questionnaire more than 81% people agreed that the content of text-based privacy policy can be shortened. About 97% of the participants said that they would prefer an alternative for text-based privacy policy and all the participants surveyed for video-based privacy policy stated that they would prefer video over text.

Statistical Analysis. An independent-samples t-test was conducted to compare time consumed in answering the questionnaire for full-text and video-based policies. Participants who watched the video-based policy (for Amazon $M=19.19$, $SD=4.34$, for Netflix $M=18.06$, $SD=3.37$) compared to the participants who read text-based policy (for Amazon $M=33.12$, $SD=7.94$, for Netflix $M=26.81$, $SD=6.51$) consumed significantly lesser time for completing the questionnaire (for Amazon $t(23)=6.15$, $p=0.0000014$ and for Netflix $t(23)=4.77$, $p=0.000041$).

Similarly, an independent-samples t-test was conducted to compare score of participants for correctly answering the questionnaire of full-text and video-based policies. Participants who watched the video-based policy (for Amazon $M=26.06$, $SD=1.91$, for Netflix $M=25$, $SD=1.96$) compared to the participants who read text-based policy (for Amazon $M=21.44$, $SD=4.11$, for Netflix $M=20.62$, $SD=3.03$) demonstrated significantly better scores in the questionnaire (for Amazon $t(21)=4.08$, $p=0.00027$ and for Netflix $t(26)=4.77$, $p=0.000025$).

Comparison in terms of Accuracy Rate. In the comparison of video-based policy to text-based policy, we found that greater number of participants scored over 80% in the questionnaire for video policies. Figure 3 depicts distribution of participants' scoring at different levels for both video and text-based policies. For both Amazon and Netflix, the participants' mean percentage scores were higher for video-based policy as compared to textual policy. 87.5% of the participants who were surveyed for video-based policies scored above 70% in the questionnaire. While 66% participants scored below 70% for textual policies. Thus, video policies out-performed text-based policies in terms of percentage scores in the questionnaires.

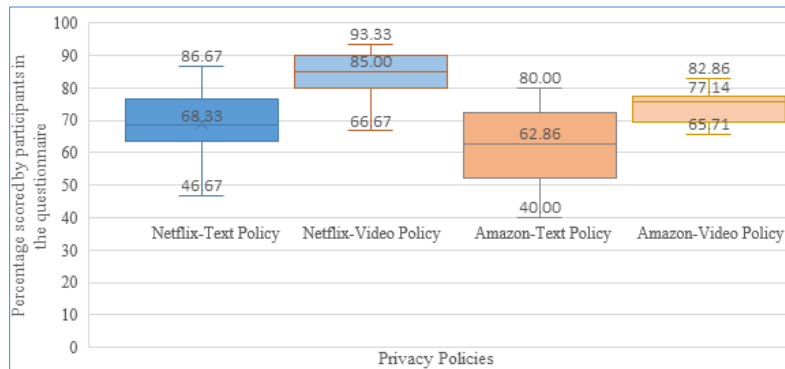


Fig. 3. Distribution of participants by percentages scored in different privacy policy formats. Note: Percentage scores of participants calculated for Amazon's policy (out of 35 questions) and for Netflix (out of 30 questions)

4 Conclusion and Discussion

We studied current textual privacy policies and came up with an alternative way of communicating the privacy policies. Our animated video approach is a step towards visualizing the content of the privacy policy in terms of its comprehensibility, engagement, and reduced time consumption. The data clearly indicates that animated video-based privacy policy influence time consumption and correctness score achieved by participants for answering the questionnaire. This implies higher accuracy and content understanding for video-based policies as compared to textual versions. Animated video privacy policy is not a replacement for the text-based version. Visual representation of the privacy policy acts as an alternative mode of communication to improve the readability of current policies and reduce users' cognitive burden and time for understanding them. Enforcement of GDPR will increase awareness about data rights and privacy education among the internet users. Hence, we need to enhance the efficacy of privacy policy statements and more innovative solutions should be sought to help end users. In future, our aim is to target broader modular design of the video content, which can act as a template for most of the content across multiple privacy statements of different organizations. With reusable assets available from animated video-modules, we can reduce time and efforts for creating new privacy policy videos for different organizations.

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