Management of Privacy When Photos and Videos are Stored or Shared

Srinivas Madhisetty
School of Software
University of Technology
Sydney, Australia
Srinivas.madhisetty@uts.edu.au

Prof Mary-Anne Williams
School of Software
University of Technology
Sydney, Australia
Mary-Anne.Williams@uts.edu.au

***Abstract*—Extensive research has been conducted in the technical side by managing privacy using mechanisms such as encryption, passwords, etc. However, the core issues of privacy are not addressed. This is particularly evident when photos and videos are shared via social media. The main problem is that the actual meaning of privacy is difficult to define. Though there are definitions of privacy and acts defined to protect it but there is no clear consensus as to what 'privacy' actually means. It is quite often challenging to manage as it is an ill-defined concept. This research is motivated by the question of what privacy means with in relation to photos and videos and methods have been used to obtain a crowd truth and arrive at a general consensus. The outcome of this research is to develop a conceptual framework of privacy, particularly for sharing photos and video content when using social media.**

Keywords—Privacy; photos and videos conceptual framework

I. INTRODUCTION

The use of social media technologies and social media applications such as Facebook, Twitter are becoming more popular and, combined with the integration of camera and virtual reality technology will allow the free flow of tacit information through photos and videos which could be published un-intentionally or sometimes without thinking about all of the consequences. As most social media applications rely on user generated content, i.e. the content not regulated by any authority. Users can publish whatever they like, unless it is reported by others as inappropriate. The social media users have limited option but to trust that the content they publish will not be misused. They also can't keep up with the technical changes or content changes that happen in the social media environment. The law in relation to determining breaches of privacy relies on the proportionality test. This proportionality test has ambiguities, for example, law requires that the extent of the interference in respect of the privacy right is not excessive in relation to the legitimate needs and interests that necessitate the interference Goemans & Dumortier (2003) [3]. Social networks provide unprecedented opportunity for individuals and organizations to share information. At the same time they present significant challenges to privacy Chen & Williams (2009) [1]. This research is about how to store and retrieve photos by identifying key sensitive information embedded in a photos and videos. The three rights of information privacy that are required for information privacy according to Chen & Williams (2010a) [1] are choice, consent and control.

Prior research has explained the notions privacy and how to effectively manage privacy to a certain extent. However due to the explosion of social media content most of it is user regulated the problems of privacy become more critical and dynamic. Photos and videos contain tacit information (i.e information embedded in the photo or a video along with the metadata of that photo) there is no agreement on exact values on how and what is it to determine privacy in a meaningful way or in practical contexts and their selection is considered a social question Dwork (2011) [2]. When data is shared in the form of text, it has a structure to it and has a contextualised meaning associated to it. However this structure does not exist in a photo, hence managing risk or controlling information in the photo becomes difficult. Data in the form of photos and videos could be stored for an infinite amount of time in the context of social media; hence allowing others to download the photo and video or share it to republish such data about self could have negative consequences (also called harm). Harm is the damage that could be done to an individual's reputation. In other words, content that could be published by anyone may have serious implications or harm on oneself and other person's reputation. Govani & Pashley (2005) [4] show indifferent user behaviour concerning the adjustment of privacy settings on Facebook. This is important because the user is not aware of the privacy settings or wilfully ignoring the settings, it is important to make it simple for the user to afford privacy. For example, if the individual chooses to publish a photo with public settings and has friends list as private. People who liked the photo or commented could give away who the friends are of the individual. This study uses Grounded Theory. GT (Grounded Theory) originated in the 1960s. Markus & Robey (1998) state that qualitative approaches have the potential to yield data from that process theories and gives richer explanation of how and why processes and outcomes occurred can be developed. The specific research question this research answers is how to manage privacy which depends on how photos and videos are shared and stored when using social media. There is not much literature available to develop an overarching view of the phenomenological implications of privacy in the particular context of sharing a photo or video. There are not many theories which explain the contextualized information about photos or how to identify the context of a photo. An objective view after collection of many subjective opinions is not there to understand for contextualized privacy this is the gap. Considering the scope of this research, an exploratory

approach using GT (Grounded Theory) was used. From the analysis of our findings a framework emerged describing the process of managing features embedded in a photo which could compromise privacy. We found that social media allows an individual to generate positive privacy (privacy which benefits the individual who choose to share content). The Section 2 of this paper is about theory behind privacy. Section 3 elaborates on research approach and data collection methods. We provide our data analysis procedures and discuss our findings, we also provide a summarized view of the conceptual framework developed to manage privacy.

II. Theoretical Background

Privacy is what enables us to see one's self as a social object and to negotiate appropriate levels of openness and closeness. Goffman (1959) [6] argues that an individual's social actions when removed from the inter-subjectivity that grounds the identity and enables him/her to enter into social relationships. There are number of invasive states of loss of privacy when one experiences as an individual is unable to negotiate a desired state of privacy with other social actors. As the content uploaded via social media is not regulated before sharing, there could be a number of invasive states which could be experienced by the people who are depicted in a photograph or a video that has been shared. Westin (1967) [7] says that privacy states focus on the quality of interactions between social actors. Therefore privacy is not an independent physical separation but negotiated interactions between social actors. Introduction of the notion of identity back to Erikson (1968) [8] was the two cohorts Ego Identity and Group Identity Verkuyten (2004) [9]. The identity concept is not about the individual neither as such nor about the society as such, but the relations of the two. The most valuable privacy theory for understanding interpersonal computer mediated communication, such as blogging and social networking, was stimulated by Altman's dialectical conception of privacy as a tension between opening and closing a personal boundary to others. That theory is Petronio & Durham (2008) [10] is called the Communication privacy management theory.

The concept of what is privacy has been explored in the literature but still lacks a clear scoping of problems which arise due to sharing of personal information. In this study we look at why people like to share their personal information through social media with others as the term as privacy is not clearly defined. By understanding the motivations of the social media user a conceptual framework using grounded theory was developed to manage privacy when photos and videos are shared. Privacy is closely linked to the notion of social identity. This is an aspect of the person that reflects membership into different groups. Social identity and the cognitive process which switch from one identity to another, e.g. become apparent: cognitive needs, affective needs, social integrative needs, and personal integrative needs Leung (2009) [11]. Individuals act within the societies in which we find ourselves so in a way society is created out of our actions, but the other way it is our actions that determine society Giddens (1991) [12]. This transition of self to different membership groups is not dynamically reflected after photos and videos are shared by the individual. Goffman views that he or she constructs meaning from his/her experience, perhaps conditioned by the symbolic world in which he or she lives and whose actions are guided by the repository of cultural beliefs and understandings which are codified as language that is contained within the mind of that thinking being. Self is a minimum state of core entity, capable of self-reflection. Simon (2004) [14] identities as social interactions and some arise out of these social interactions. Identities are mediation between the input we receive from the social world and subsequent interactions with the world. The core purpose for this study is to find ways to manage privacy of an individual during pre or post publication of social media content via photos and videos. Managing privacy is primarily done through various control mechanisms such as usernames, encryption etc. Another enabler of confidence for the publisher of the content that his content will not be misused is their trust that all the people who view the content will not misuse it, this research sheds light on the most vulnerable part that is forced trust. Forced trust is when the publisher does not trust that their content will not be misused via network of friends they have shared. This research asks questions to participants how much of it forced trust was.

III. Goffmans Theory of Privacy

Goffman's theory of privacy was adopted because Goffman's concern with the face or a mask is the idea that there is a binding concern in presenting a positive image of self to others. Goffman's work on social roles is very relevant in determining perceptions that a photo or a video will create after sharing it via social media. Goffman (1959) [13] says forced exposure is so devastating to the individual. Self-presentation is an attempt to control or guide the impression that others might make of a person by using verbal and nonverbal signals. If the mask is torn from the individual, then the real self is bared to the world in which everyone will wear his mask and believe in masked performances. Hence this revelation is quite devastating. Westin (1967) describes a second privacy function as emotional release because individuals can sustain roles only for reasonable periods of time. No individual can play indefinitely without relief, the variety of roles life expects us to play. Privacy provides moments when an individual can lay off their masks and relieve themselves of masked performances. As the content uploaded or shared via social media is sometimes permanent, it becomes difficult to manage individual's privacy once the content loses its relevance.

This research is motivated by Goffmans view about privacy as it is particularly important to diagnose the is the exact motivation behind why people are freely willing to share personal information about themselves to others, sometimes fully aware that the content could be misused by others whom they have shared the content. This research builds on Goffmans views about roles on how an individual take on different roles and via publication of such roles depicted in photos or videos enhances that particular role (i.e. fatherly role, good brother, etc.) he or she plays there by creating a positive reputation for self. The aim of this study is to how manage privacy while sharing occurs about the roles individual plays in the society. There is not much written in the literature about managing information embedded in a photograph or a video. This research asks questions regarding

why people share content via photos and videos using social media and their expectations of privacy. The impact of presenting their roles in a positive light gains the individual social capital. Social media applications such as Facebook, enables individual to gain social capital by allowing them to share personal information through publication of individual content via its application.

IV. Grounded Theory

Grounded Theory for the analysis of the interview data was collected after twenty one semi-structured interviews of participants. Grounded theory was chosen because it is suitable for questions which ask why not how things work. GT offers a powerful tool to understand individuals' perceptions as it focuses on everyday life experiences, participants' perspectives, and inquiry into the process between the researcher and the respondent Marshal & Rossman (1999) [15]. By asking relevant and more diverse questions the answers to those questions will reveal a semantically rich oversight about the perceptions of the participant. Although there will be a lot of information it will not make sense initially, as we have no control over what the participant says. The key is to ask questions relevant to the research. Numerous methods such as line-by-line coding, sampling, etc., were used to derive a pattern. Advocates create new theory consisting of interrelated concepts rather than testing existing theories. A process of coding and sorting the information gave rise to the categories used to identify the key themes after the process of coding. As this research is based on the tacit knowledge embedded in photos and videos which relates to privacy, a significant amount time was spent in order to understand the shortfalls in contextualizing privacy. The theory developed and conjunctures need to be new and interesting, or explain something that was poorly or imperfectly understood beforehand Gregor (2002). Further, Charmaz (2006) states that the GT approach is a set of principles and practices for researchers to use the method of flexibility.

V. Research Approach

The research design adopted was to code twenty one open ended interviews using Grounded Theory. The Straussian approach to develop descriptive accounts in the place of theory development is the approach taken to conduct this study. Strauss and Corbin guidelines in the process of data collection, coding and analysis were used to conduct this research. This approach encourages flexibility to use techniques or steps; it characterizes the situation objectively to obtain a general view from different perspectives as opposed to that of a quantitative study. Grey (2009) [5] argued that deductive reasoning moves towards testing a hypothesis, based on empirical evidence. However inductive reasoning seeks to discover binding principles to construct generalizations, relationships, and theories after analysis of data. It does not negate existing theories but outlines and stabilizes them by collecting data [5].

Some of the questions were framed in such a way that they repeat themselves. This was done intentionally to get a clearer picture of what the participant is describing to get contextually rich descriptions. Any participant who had a vested interest in technology such as suppliers or producers of web cameras and other electronic devices were omitted as their opinion could be biased, although it is unintentional, but will have a certain impact on the research, i.e. any participant who has a commercial interest in the growth of privacy-inhibiting technologies were also omitted. Open-ended questions are the best approach as they allow the interviewer to obtain tacit information, which was later, contextualized the meaning of the response. The questions were well-developed. According to Morse (2000) [16] the sample size is dependent upon the scope of the research question. A review of over 50 GT studies has found that the average sample size was 30 Thompson (2006) [17]. The sample size for my study will depend on the saturation of data for that category; for this research after 21 interviews it reached sample saturation. All participants must be social media users. They should have uploaded and viewed photos and videos of themselves and others through social media. Some of the participants should be well-versed in photography. Facebook and Google+, Twitter were used to find potential participants, Different social media accounts using Twitter, etc. to include all users of all social media. I posted on my public profile using Facebook and also posted on other social media accounts about this research. Individuals chose to participate by responding to a separate Facebook page (without direct invitation) meaning that their choice to participate was without pressure. They participated of their own accord and were able to choose to share the invitation to participate with their friends or re-post the invitation on their page. Twelve questions were asked were about why participants shared photos using social media. Any questions which were leading my participants to the answer were deleted. The wording of the research questions was amended in several attempts to obtain ethics approval for conducting this research. Once the Ethics Committee was satisfied that the questions were not in any way infringing on my participants' wellbeing this research was conducted. Questions were semi-structured, the interviews were conducted in a way that will benefit from the diverse views of my participants.

VI. Data Collection

The data collection and analysis were done simultaneously. Existing findings of the analysed data were compared with the latest analysis to reduce or update information. Theory got richer and clearer after every new iteration, iteration means after every new interview was coded. Continuous sampling method was used to code data. This iteration was done until no new patterns emerged: what is seen is a whole and complete picture at that time. Once this phenomenon was explained through this analysis, several codes were then developed to group distinctive patterns to the code. This process is also known as codifying. Several codes can be grouped together to form much higher abstract categories. Data collection and analysis did occur simultaneously. Both process and product were shaped from the data. Conceptual categories were organized using theoretical sampling. Glaser & Stratus (1967) [18] suggest that a constant comparison of one piece of data with another helps to identify the relationship between the two pieces of data. The similarities and differences can be studied. This information was then used to classify and code data to a

category. Similar data was grouped together. Although the grouped version had diversity in its properties, this added to bringing different aspects of the same data. Theoretical sampling allowed data to be collected from multiple sources to add to the diversity of the data and therefore will maximize the ability to collect or generate appropriate concepts from a rich source of properties and dimensions to uncover variations in the relationships and those between concepts. The key differences in using GTM are that it is not the intention of the researcher to measure variables or trends based on scales or ratings. Corbin and Stratus (2008) states, "The basis for sampling is concepts, not persons". The limitations of this research are that the validity of the concepts which are generated is likely to be propositions and not findings. As privacy and states of privacy are dynamic and contextualized, a one-size-fits-all approach cannot be used to mitigate harm caused when these privacy states are exploited in the social media. However by generating propositions from the thematic analysis of photos and videos, this research could generate certain guidelines useful to retaining privacy in photos. This is the limitation of this approach.

Some bias was noted from the participant when open-ended questions were asked for data collection. So the questions were tapered around what participants responded such that it reduces bias. Sometimes this bias was not known until all the responses were collected, and where those responses were leading those responses were edited in a way that bias was eliminated for this research. All participants were aged between 18 and 60 and had at least one social media account, and should have published at least one or two pictures or videos in the last two years. This was done to contextualize the responses received from my participants and ground them to the epistemic level of the phenomena in question. Denzin & Lincoln (1994) [19] state that the internal coherence of the data in relation to the findings, interpretations and recommendations is referred to as conformability. In accordance with Miles & Huberman (1994) [20], the key for conformability is the extent to which the researcher admits to his or her own predisposition. Liamputtong (2009) [21] suggests that it is a state of comparable objectivity or neutrality. Axial coding was applied to understand the commonalities between the two coding structures.

VII. Data Analysis

The objective of the survey was to find out what kinds of photos were being published by participants and what their intention behind such publication was. It was to understand under what specific conditions my participant would not have any concern about privacy. For example, a profile picture which is always public. To understand what my participants thought was appropriate for publication about a profile picture via social media. The objective was to understand the overarching of what was deemed private and what was not.

Data analysis was done by analysing what participants considered as sensitive information and the reason they choose to publish information in form of photos and videos for others to see. Data analysis was done by aggregating repeating words, Open Coding method was used to compile each code and attach a coded word to generate themes. Selective coding was used based on independent weight of each code. Axial Coding was used to develop low level categories and their relationships to other themes. The proposed conceptual schema shows how one category from one theme is linked to another category from another team (Axial Coding data analysis). To get an objective view of privacy, consistency was maintained in the questions asked such that it the data analysis to be done in order to get an objective views. The sub-questions addressed the intention behind such a publication; these were used to generate themes for the grounding or contextualization of the photos. When ideas or themes repeated they were deleted because it will give rise to a redundant data to cluster with no new information captured. Though some answers were a repeat, during post-processing the information eliminated repeat responses. The interview style was open-ended, which meant questions were relevant to the participants. Some modifications were made in the way the questions were framed for better suitability for the participants.

A. Procedure Used to Analyse Data Using Grounded Theory

Interviews were transcribed; Data analysis tool was used to aggregate repeating words. Open coding was used by compiling each code to attach to the relevant coded word from the data analysis to generate themes. Selective Coding was used by writing memos and regrouping categories based on the independent weight of each code. This supported the earlier open coding process to solidify themes. Axial coding was used to develop low-level categories; this method links low- and high level categories using thematic analysis. Axial coding demonstrated how one core category interacts with the other categories to understand conditions, actions, interactions and consequences. Selective coding was used in sorting through memos and story lines to support the key category or the centrepiece of the theory this research is aiming to refine. The aim of the open coding process was to label code and categories the data according to its properties and inferences that link it to the research question. This was the first stage of data analysis. The open coding method was useful to generate the four themes. Selective coding was used to generate categories which are distinctive enough to hold their weight as key categories. Most of the linkages which were used in axial coding were used to develop a conceptual framework as discussed in the Data Analysis chapter, although the significant overlap in the construction of the core categories was removed using the selective coding process. The output generated through the axial coding method was used to build measures which can make a determination about levels privacy, and how to manage privacy specifically using photos and videos.

After transcription of the interviews, phrases were clunked together and each piece of clunked data was coded with a label. Sometimes one phrase could be placed in more than one category, meaning that the interpretation of those words or phrases had dual meaning. As in this initial phase such categorization was loosely based on the first order of processing of the transcript. However after several phrases were introduced later on, an effective way to manage was collating the phrases by using more direct code names. Thus open coded phrases fell or collapsed even further. Constant

sampling technique allowed me to compare one interview data with the other such that core and sub-categories could be identified. A word analysis tool was used to gather all the phrases into a group, later classified as a category. Categories are groups of concepts that are derived from the data and pertain to exhibiting or representing the same phenomena. The Axial Coding process was when the interconnections between the codes were important to represent the whole picture of the data analysis. The codes were reviewed again and condensed into low level categories. It was necessary for the data analysis portion to be able to use the constant comparison method to merge existing categories into a sub or low-level category. Several iterations were done to remove duplication of the main theme or the characteristic of the data. Such low-level categories were further grouped into broader major categories. This was done to summarize the lower categories into one. These themes of categories emerged from the existing data which revealed the inner workings of the problem in question. In order to establish a core category and establish the links between the other categories a selective coding process was used. The constant comparison analysis along with the open coding method resulted in the emergence of a one main in which participants believed that they have no privacy concerns which also meant that once the content is shared regardless of any privacy settings afforded through social media the participants perceived that there was no privacy. The three sub themes had a varying degree of privacy concerns.

After the extensive usage of transcripts, this research has identified many key motivations behind the sharing of PI (personal Information) of my participants. Nine major categories were found in this research. This research combined the usage of default categories which are already built into most cameras to accommodate various lighting and focus settings. In this research the main categories were called high-level categories, and the default options of the camera were called low-level categories, because each high-level category may have groups of several low-level categories. The linkage between the high-level and low-level categories is important, as they underpin the characteristics of a photo or a video. After several rounds of analysis using GT, this research was able to extrapolate and showcase what were the privacy concerns in the high-level and what were the privacy concerns in the low-level categories. This way, there would be a two-step check to analyse a photo to understand the privacy concerns for the high-level and low-level categories. The lower categories which involved the internal settings of the camera were used to augment the nine categories, as they failed to demonstrate the motivation of the individual for taking the photo or a video just by analysing the camera's inbuilt categories. This research was more about the human element of why people share photos and videos and how they are stored and retrieved. The information about camera technology was embedded into the nine categories as they themselves did not have enough substance to form a sub-category.

VIII. Themes

Main theme was "Had no particular privacy concerns", "Moderate concerns about sharing of PI (Personal Information)". "Serious concerns will do anything to control the flow of information others share", people in this theme likely does not participate in social media at all.

TABLE I. Research Questions Asked to Develop Themes for Privacy Based on How Photos and Videos are Stored and Retrieved

Theme	Tell me what you think about privacy concerns you have in relation to photos and videos. What is your general motivation to share photos and videos, and does that benefit you in any way?
4.2.1	Find out what privacy means from a subjective sense to develop a rational objective. What type of photos would you share using social media? How do you manage the risk of sharing photos and videos? Do you trust the privacy settings in the current social media?
4.2.2.1	Motivation and benefit behind sharing personal and private information. What is the rational of sharing sometimes not obvious? Do you value the right to privacy? Do you obtain explicit consent before uploading photos and videos of others? Do you believe that the consent was implicit when the photo was first taken, before it is published?
4.2.2.2	This theme is to develop a comprehensive understanding of the relationship between implied consent vs explicit consent, and the consequences to mitigate circumstances by managing the delivery of the content pre- and post-publishing. What is the timeframe or how long do you think photos should be made available for others to see, after they are first uploaded on social media? What if your photo was misused by someone else - how would you manage the consequences which arise from this?
4.2.2.3	Timeframe is important to manage privacy effectively. Content management. To create special zones of privacy.

For this paper we have elaborated only on the main theme, Theme one had no particular privacy concerns. The main motivation behind sharing personal information was to keep in touch with family and friends. However a further two themes emerged that were linked to the trust participants had in social media, which further linked to the user's knowledge or lack knowledge upon how their photos could be managed and used. The photos and videos were classified as profile pictures, holiday photos, and personal family photos such as birthdays, etc. The type of photo in each category generated specific responses as to how those photos were stored and retrieved. However, after analysis, the interview data did not provide sufficient evidence to strictly define a category based on information such as holiday photos, etc. Trust in the application is important, regardless of the category of the photos. However there was a difference in the expectations of privacy contained in each category, for example, a profile picture which was usually public and accessed by everyone on the internet or that particular application had certain characteristics, compared with the family pictures which were more private. The first question was deliberately general as it introduces how to manage privacy. There are several nuances

and explanations for publishing photos and videos using social media. At high-level reasoning scoping of the problem was done in such a way that an efficient solution could be delivered. It cannot have a broad scope and certain assumptions were made in developing effective management solutions. This is different from the grounding reasons why content is published. Low-level reasoning an understanding that they are derivatives from the categories which were obtained using GT. GT was used to analyse answers to the research questions to develop low-level categories that deal with understanding the phenomena at a micro level, which is vital to developing a conceptual framework. The GT method of axial coding allowed forming broader categories and the descriptors were condensed or expanded to form higher and lower categories for data representations.

Trust in privacy settings afforded by the social media application you use.

Low level categories:

- Trust in privacy settings provided by the software.
- How much of it was forced trust.

The interviewers identified trust and control of information is essential for effective management of privacy. However there was ambiguity in terms of what trust and control actually meant. Control is a simple choice of what information they intend to use to communicate with others, as discussed in Altman (1977) it was about the type of information or the nature of the information which was sensitive or perceived as sensitive, and also the way the flow of such information was managed through various elaborate privacy settings. Had they been given a choice to control the choices of what other people could do with their already published content, they would control it. So the implication of forced trust is the lack of clarity around how the photos and videos would be stored and shared via social media applications. There are some short term software solutions which provide certain amount of control; however how far this was trusted by the user is not clear.

What kind of photo is shared and its appropriateness?

- A profile picture is usually public - what is the general nature or properties of these photos?
- Usage of acceptable material such as a photo or a video which is politically correct.

A profile picture has to be public, which means there is no control over who is able to view it. There are no known measures which enable the appropriateness of a photo deemed to be a profile picture. The contextual representation of a profile picture is to publish to the world about the identity of oneself. The profile picture acts as an identification mechanism for others to find using social media applications. Most social media applications require a photo to identify a profile; however different kinds of photos are used to represent the self when using social media. This diversity in the range of photos that could be used is creating huge privacy concern to the general public, as the photo or video could be downloaded and manipulated in such a way that it could be used by others with unintended consequences. No set rules apply to determine the appropriateness of a profile picture.

Unintended consequences:

- A credit reporting agency looking at personal photos or videos to identify and characterise individuals.
- Job seekers or other employees knowing PI through social media.
- What was appropriate once is no longer appropriate now.
- Being in the wrong place at the wrong time.

A lack of hierarchy in the social media platform allows users to see all the content of every person in their friends list, which could be used by others to benefit from such information. For example, a credit company could search either to find people or to make other unintended determinations which may have significant consequences to the social media user. A photo could be taken at random and published as a profile picture, thereby making it public. By doing so the time and location information of the people in the background is published as tacit knowledge embedded in a photo. Even a simple photo at home could reveal the layout of the house, where security systems are placed, etc. which could have unintended consequences if in the wrong hands.

Perceptions and how they change belief systems:

- Managing expectations of roles (Goffman).
- Managing relationships such as friendships, etc.
- Creating a perception about oneself to others in a way that positive privacy is advocated.
- What we publish could be perceived by others not in its intended form.

Managing expectations using social media becomes tricky as it is not afforded the same amount of privacy we would have in a normal social conversation or a face-to-face meeting. My data has revealed that people are fixed on to how they would like to be perceived. They do not want any deviation in terms of how they will be perceived by others and feel quite insecure about the ability of others to publish photos of them without their consent, because the information that was private is now made public.

"If I called a few people for a private party, by making it public by others, will create a feeling amongst my friends that I was not invited or important".

Managing relationship with others using social media is useful: the key reason why most people want to publish photos and videos is to keep in touch with family and friends. *"The main reason why I choose to publish photos and videos are for my family who live overseas to keep in touch. A photo or a video allows others to experience moments of my private life as personal moments for themselves, this is the most effective way to be able to be a part of each other's life."*

Effective means of communication:

- Belief that a photo communicates much more information about health and state of mind than many other forms of communication.
- It is difficult to ignore a photo or video of others if they want to communicate a message efficiently.

Advertisements, for example:

There is a belief that a photo consists of much more contextually-rich information, hence it is an effective means of communication. Many advertising companies take this advantage to advertise their products. However in the context of social media, the view from the interviews was that a photo or a video is more believable than a statement about what people say about themselves, thereby it creates perceptions among others who view the content.

To be able to relate to a larger audience:

- Social media is an effective tool to communicate a message to a wider audience. It is more effective with photos and videos because it engages the viewer in it.
- A photo or a video has its own life when it is made available through social media, which means that it will tend to live in the virtual space and reveal information or change perceptions as long as it is there (i.e. persistence).

As there is a flattened sense of hierarchy in social media, information which took a long time to trickle through various sources is now done directly via a single photo or a video, thereby able to be consumed by a larger audience. There is a growing concern that consuming published content creates a false sense of knowing: this used to occur with celebrities and people in the public sphere but now the same phenomena are occurring at an individual level.

Information overload:

- When too many photos or videos are uploaded by a person, others feel that they don't want to be part of such a false sense of intimacy that the photos and videos generate.

It is difficult to manage tacit information which is embedded in a photo or video, so when a lot of content is published by a social media user it becomes an overload of content.

"I think something needs to be done, on how many photos or videos one could publish in a day. I don't want to be in that private space with that person. I don't like to always disengage by pressing don't show in news feed."

Too much information about any individual regarding what they do is not a good outcome, but currently social media platforms do not restrict the amount of content an individual wishes to make available. A quota system could limit the amount of content so that the publisher can prioritize. Another suggestion was to select a timeline for each photo or a video, after which it would automatically disappear from the public space and only after the photo or video, is renewed would it be made available to others to see.

"I think a timeline of five to six months is enough for a photo to exist in the public sphere. Managing photos and videos is easier that way."

Currently there is no time limit on how many days the content is made available to the end user.

Effective ways to filter information:

- When a photo or a video that should not be shared is shared in a public space, possessing or watching the video should be a crime. The viewer has limited control on how to stop others watching the videos as they start as soon as they appear on the social media page.
- There are no means to identify all the information which is embedded into the photo to be able to filter the information effectively.

"Though the photos are classified belonging to a category and technology is available to detect the default category from the software in the camera like portraitures, landscapes, etc., there is no provision made similarly to detect privacy concerns, such that they can be filtered." There are no privacy enablers which register portions of a photo as sensitive. For example, when someone tries to upload a photo of a crowded beach as a profile picture, there is no restriction or warning about its suitability to the end user.

1) Targeting by third parties to use the information in ways it was not intended to be used:

- When a photo or a video is uploaded it could be downloaded by others and be uploaded elsewhere, thereby ruining the reputation of the person it belongs to.
- When insurance or credit agencies or prospective employers are trying to access social media, then it may become a nuisance.
- Revealing information without consent is quite possible when people tend to use social media.

If a photo is downloaded or posted by others to cause harm to people's reputation, there is no effective way to stop it and there is a general lack of awareness among social media users as to what the actual consequences are. The photos in their profile that are made public could be used by various insurance agencies and credit reporting agencies and may have a significant impact on social media users.

"Someone took my profile picture, created a false account under my name and started sending friend requests to people I know. Some of them accepted it thinking it was me, but what a nuisance."

IX. Conclusion

A. Discussion

By using Grounded Theory and Goffman's theory on privacy as a theoretical lens to conduct this research, and using the findings from our data analysis, this conceptual model to explain how to manage privacy was created. This framework is used when photos and videos are shared.

Integration of camera typically in a mobile phone and other virtual reality technologies are allowing the free flow of tacit information through photos and videos as the sharing happens instantaneously. Social media are the enablers for this kind of information to flow through freely. Further we have used this model to specifically address our research question on how to manage privacy when photos and videos are shared or stored. In this paper we could only summarize one major theme. As sharing of any information regardless if it is sensitive or not is considered loss of privacy. Hence the main theme was, when people think they have less or no privacy concerns, this is interesting because many users who fall under this category do use the provided settings on social media to maintain their privacy. They don't trust that the settings fully address privacy concerns, so they only choose to publish content which if made public will not compromise their reputation. The primary reason why my participants share content is to keep themselves connected to friends and family. Privacy concerns played a role as a deterrent for sharing information. Most of the participants relied on settings provided on the social media application to enable privacy about the information they shared. However, there was a lack of trust that those mechanisms can deliver required levels of privacy. Technology such as user names passwords, encryption enables privacy through controlling what gets shared. However trusting the system is more intrinsic i.e. very subjective and difficult to develop. Trusting the system meaning relying that the friends they shared information with will not misuse that information. Sometimes trust and control mechanisms are not very clear, as some of the users are forced to trust in the application that their privacy will not be compromised. We call this as forced trust. Goffmans theory about privacy states that we as individuals are actors performing different roles. Information shared across multiple roles may lead to loss of privacy. Grounded theory when used to connect all the repeating words that were said during the interviews, with the help of line by line coding and Axial Coding could see the dual nature of privacy and how it affects an individual's life in multiple ways. An ontological application could be developed from the findings of this research which sits as a standalone software program which can manage privacy of the individual.

B. Contributions

By understanding typical privacy concerns of users of social media, this research illuminates the expectations for publication of content from the user and its outcomes after publishing them. How it is broadly perceived, this builds a paradigm through a deeper understanding about why people share information in the first place. While privacy and its surrounding issues have been around for a long time, little or no research has been done about privacy in photos and videos. This research delivers a framework which can assist an individual to assess his or her privacy.

The major contributions of this research are:

- Illumination of issues and aspects of privacy as they relate to the way photos and videos are stored and shared across the social media platform.
- A deeper understanding behind what motivates people to share photos and videos of themselves and others.
- Identifying what aspects could be managed to retain privacy. Identification of a core concept of privacy which unifies different aspects of it helps us to understand the new challenges which we currently face and what we will face in the future.

C. Limitations for Future Work

The conceptual schema is the contribution. This research provides a conceptual framework where the data was collected via interviews and analysis of data about people's views about privacy. We believe our contribution to this area can be concluded as postulates that were inferred through a paradigm. Many such paradigms developed iteratively may yield a completely objective picture. This research was done to obtain a high-level abstraction of privacy that can be managed and applied more broadly to assess and manage privacy in photos and videos people share using social media. Many of the issues in this study are about intentions versus expectations of the user who uses social media to share photos and videos to others. Since there are many views about privacy and advances in social media technology, there is huge scope to misuse of information. I believe that this research will provide a basic conceptual framework to implement and evaluate privacy of an individual via development of an application using the key performance indicators provided in the conceptual schema. Furthermore, research into requirements to develop a holistic framework is necessary to implement a reasonable expectation that privacy. For future work, I need to investigate the link between default categories embedded in the camera such as portrait, landscape, low light and the categories found by asking questions about why people share photos and videos. This task requires the help of Big Data, and tools like Hadoop, Hive, Pig, etc. The use of linking the above are to address privacy related issues when capturing a photo or a video. For example, a typical portrait requires the foreground to be in focus, while the background blurred on the contrary under landscape settings there is no foreground or background everything will be in focus. Identifiable information and tacit information embedded in a photograph may not be very obvious in all photographs and videos when they are first taken.

REFERENCES

[1] Chen, S. & Williams, M.A. 2010a, ' Towards a comprehensive requirements architecture for privacy-aware social recommender systems ', *Australian Computer Society Inc*, pp. 33-41.

[2] Dwork, C. 2012, 'A firm foundation for private data analysis', *Communications of ACM 2011 Review*, vol. 54, no. 1, pp. 86-95.

[3] Goemans, C. & Dumortier, J. 2003,'"Mandatory retention of traffic data in the EU: possible impact on privacy and on-line anonymity*′′*, T.M.C. Asser Press, Hague, Netherlands, pp. 161-183.

[4] Govani, T. & Pashley, H. 2005, *Student awareness of the privacy implications when using Facebook*, viewed 11January 2015, http://lorrie.cranor.org/courses/fa05/tubzhlp.pdf.

[5] Grey, D.E. 2009, '*Doing Research in the Real World*', 2nd edn, Sage Publication, London.

[6] Goffman, E. 1959, *The presentation of self in everyday life*, Double Day Anchor Books, Garden City, New York.

[7] Westin, A ., 1967, *'Privacy and Freedom'*, Atheneum, Newyork

[8] Erikson, E.H. 1968, *Identity, youth, and crisis*, 1st edn, Norton, New York.

[9] Verkuyten, M. 2004, 'Ethnic group identification and group evaluation among minority and majority groups: testing the multiculturalism

hypothesis', *journal of personality and social psychology*, vol. 88, no. 1, pp. 121-138.

[10] Petronio, S. & Durham, W. 2008, 'Understanding and applying Communication privacy management theory', *Engaging theories in interpersonal communication*, Sage Publication, Thousand Oaks, pp. 309-322.

[11] Leung,L.2009, A dynamic longitudinal examination of social media use, needs, and gratifications among college students , *journal of Computers in Human Behavior*, vol. 28, pp. 1829–1839

[12] Giddens, A. 1991, *Modernity and Self- Identity: Self and society in the Late Modern Age*, Polity Press, Cambridge.

[13] Goffman, E. 1959, *The presentation of self in everyday life*, Double Day Anchor Books, Garden City, New York.

[14] Simon, B. 2004. "Identity in Modern Society. A Social Psychological Perspective.Blackwell", Oxford.

[15] Marshall, Catherine & Rossman, G.B. 1999, *Designing Qualitative Research*, 3rd edn, Sage Publication, London.

[16] Morse, J. 2000, 'determining sample size', *Qualitative Health Research*, vol. 10, no. 1, pp. 3-5.

[17] Thompson, B. 2006, Foundations of behavioral statistics: *An insight-based approach.* New York: Guilford

[18] Glaser, B.G. & Stratuss A.L. 1967, *The discovery of grounded theory: Strategies for qualitative research*, Aldine Publishing Company, Chicago.

[19] Denzin, N.K. 1978, Sociological Methods: A Sourcebook, McGraw-Hill, New York.

[20] Miles, M. B. & Huberman, A. M. 1984, *Qualitative data analysis: A sourcebook of new methods*, Sage Publication, Newbury Park, California.

[21] Liamputtong, P.(2009).Qualitative ResearchMethodology(3rd ed.). Melbourne : Oxford University Press.