
A Picture for a Thousand Words: Understanding a Slide-capturing Behavior at a Conference

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Abstract

Photos are being increasingly used as a handy information-capturing tool yet little is understood about information-capturing behavior. Our work focuses on the slide photos taken at a conference as a typical example of informative photos and explore why do they capture, what do they capture and how do they manage the slide photos. Findings from a survey and an interview show that people do take slide photos to record information and archive, share or use them temporarily at the moment. The management lifecycle analysis show that people depends on automatic cloud backups to keep photos. Important slide photos were transferred to PIM and remaining photos were deleted or forgotten. The findings suggest supports are needed on the capture, manage and transfer stage.

Author Keywords

Authors' choice; of terms; separated; by semicolons; include commas, within terms only; required.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous; See <http://acm.org/about/class/1998> for the full list of ACM classifiers. This section is required.



Figure 1. Example of Slide capturing behavior.

Introduction

We see people raising their smartphones towards slides at the moment of an announcement. There's no need to rush writing down all the points on the slide. In the era of smartphone, photo is being increasingly used as a handy information capturing tool. However, the use of photos as an information capturing tool is not yet studied a lot.

Here we try to understand photo as an information-capturing tool. With continued research on the personal information management (PIM), we have abundant understanding on how people manage their information as well as personal photos[3]. But yet, using smartphone camera to record information is newly arising behavior and we have a lack of understanding on why people capture, what people capture, and how they manage captured content. Furthermore, with ground-breaking advancement of vision technology, there is plenty of room to intelligently support the users.

We choose conferences would be the best event to observe the information-capturing behavior as most of people have experience of taking a picture of slides at conferences. To deeply understand slide-capturing behavior, we gathered slide-captured photos from graduate researchers, took a survey and interviewed them about their slide photos. Our research questions are:

1. Why people capture the slides?
2. What kinds of contents are captured?
3. How people manage slide captured contents?
4. What is the typical lifecycle of slide photos?

The research contributes to understand the themes for purpose/contents/usage/management of slide-photos and to identify the lifecycle of the slide-photos. Also, we present the design implications to support the slide capturing behavior at a conference.

Related Work

Due to limited scholarship on information-purpose photos, we surveyed literature on personal photos and information management. In this sections, we first visit purpose and properties of photo, and then discuss usage and management of information, especially how information is transferred into personal information management(PIM) tools. We conclude with a discussion of existing research on informative photos.

Information property of photos

The initial attempt to understand purpose of photo-taking behavior was done by Van House[4]. Van House identified three main purposes: memory, creating and maintaining relationships, and self-expression. In the paper he said the photos do have informational components, but is strongly emotional.

The idea that the image is highly emotional medium is repeated from multiple literature. Whittaker described three types of information properties: 1) informative, 2) action-oriented and 3) affective which a photo falls into. He mentioned personal photos are rarely actionable and informative, therefore unique among many types of information. Here we explores whether slide photos have similar affective properties as personal photos[6].

Management of photos

Management of information have received extensive attention in academia. Understanding lifecycle of information of certain type was one of the main focus of the research.

A lifecycle of personal information, suggested by Whittaker[6], claimed that information goes through three distinct curation processes: 1) Keeping, which involves deciding what information is worth keeping, 2) Management, related to how the kept information is managed and 3) Exploitation, how the information is retrieved in the future. Lifecycle of Information scraps are also researched: Capture, Transfer, Organize and Reuse[1]. Information scraps is defined as a piece of information that fail to be managed by PIM, which slide photo falls into.

Slide photo as a memory cue

Information recalled from a photo is researched extensively to understand semantics embedded in the photo. While most research asks users to explain about their photo, we found some research that focuses on ability of photo as a memory cue. One research reported that the participants could describe the design and content of several slides from a presentation five weeks prior[2]. We believe slide photos are very good memory cues for retrieving the speech done in past conferences.

Case study on whiteboard photos

While little research has been done on information-capturing photos, Varona-Marin conducted initial case study on whiteboard photos[5]. He focused on finding out how whiteboard photos are managed, rather than finding out what are taken and why are they taken. He

reported most of whiteboard photos are taken to create superseding documents. We will investigate whether slide photo shows similar behavior.

Methods

To understand the slide capturing behaviors, we investigated people who had experience on taking slide photos. We first started by gathering samples of slide photos and asked them about purpose, content and reuse. Based on the findings, we made a survey to understand deeper about slide photos. We interviewed 5 researchers from the survey participants.

Exploratory Study

We had preliminary interview with people around us. We asked them to send us the slide photos they took at conferences and questioned freely about why did they take the pictures, what did they capture and how did they manage. Based on this preliminary interview, we generated the initial codes for purpose, content, usage and management of slide photos.

Survey

Afterwards, we conducted online survey to obtain qualitative data and to mature our potential themes. The researchers who participated in the conferences within the last 1 year were asked about the purpose of slide capturing behavior, contents of slide photos, and usages of the slide photos. We distributed an online link using authors' social network and send email to graduate researchers of the CS department. Total 43 participants finished the survey and 38 of them answered that they have captured slide photos at conferences. The participants differed in profession and conference experience; 13 were in masters (avg. 3 conference experiences), 21 were in Ph. D (avg. 7) and

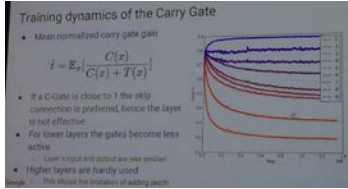


Figure 2. Example of the slide photos captured by interviewee. (a) Slide related to my research. (b) Slide containing impressive statistics. (c) Photo to match the presenter with the slide.

4 were professors/researchers with more than 30 conference experiences. They come from various majors: computer science (11 people), industrial design (5 people), electrical engineering, biology, business and so on. The main questions in the survey were:

- What are the purposes for the slide photos?
- If you took the slide photos for information records, what information did you want to record?
- If you took the slide photos for commemoration, what did you want to commemorate?
- What are the main contents in the slide photos?
- How the slide photos are used?
- How did you manage/transfer the slide photos?

	Age	Occupation	Major	Conference Experience
P1	28	Ph.D Candidate	Civil and Environment	6
P2	28	Ph.D Candidate	Electrical Engineering	5
P3	26	Ph.D Candidate	Chemical and Bimolecular	10
P4	30	Ph.D Candidate	Green Transportation	4
P5	41	Researcher	Aerospace	30

Table 1. Interview participants' demographics.

Interview

To take a closer look based on the survey results, we conducted one-on-one semi-structured interviews with

5 researchers who have experiences of more than 4 conferences. The interviewee is gathered using recruitment flyer posted on online communities in a public research university in South Korea (see Table 1).

Each interview lasted between 20 and 40 minutes and was audio recorded. Participants were asked to bring more than 5 slide photos taken by themselves. We walked through purpose, contents and management of each slide photo. The seed questions were primarily categorized as capture, purpose, usage, transfer, organize, and recall. Each participant was rewarded with a \$10.

Results

In this section we report the survey results on the purpose, contents and reuse of the slide photos taken at the conference. We then report management lifecycle of slide photos. In the following section we discuss the informative use of personal slide photos.

Purpose

From the exploratory study, we coded each of the 26 slide photos for its purpose, and then consolidated similar categories. Survey is conducted based on our 4 major categories. The result can be seen in Table 3.

4 major purpose of slide photos we found were to record information, to share, to use as an official proof of attendance and to commemorate, in order of survey responses. To record information was the most prominent cause having 35 instances.

We also asked which kind information did you want to record. 30 of the 35 responder reported the slide was related to their own research. Figure 2a is the example

Type of Contents	#
Impressive contents	24
Not likely to be in the paper	23
Summary & Conclusion	22
Statistics	19
Emphasized by the presenter	13
Web page links, references	13
Question-incurring contents	7
Etc.(Acknowledgement, Inspiring, ...)	5

Table 3. Survey results of the contents captured in the slide photos.

Purpose	#	Detailed Purpose	#
To record information	35	Related to my research	30
		Impressive statistics (Not directly related to my research)	23
		Impressive composition of the slide (Not directly related to my research)	16
		Impressive talk as a whole	15
		To match the presenter to the presentation	11
To share	12		
To use as an official proof of attendance	9		
To commemorate	6		

Table 2. Survey results of the purpose of the slide photos.

of such photo; “I took this picture as a reference for my research. Such formula is hard to find in the paper.” (P1) Impressive statistics, composition and talk as a whole followed the relatedness to the research as a major reason for recording information. P2 said “This kind of evaluation is not common in our field. They were Google engineers and used some interesting metric to show their performance.” (See Figure 2b) To match the presenter to the presentation has been also selected by 11 people. This is closely related to how the slide photo was taken. Both the presenter and the slide were shown in own frame. (See Figure 2c)

Contents

The contents of slide photo were also investigated. We asked our interviewee to point out the exact section in

the slide that incurred you to take this photo. Survey is used to examine the importance of each semantic component. The result can be seen in Table 2.

On the composition, 34 of the 38 people took slide-only photos. Having both the slide and the presenter (11 people) or putting presenter at the focus (5 people) were rare compared to slide-only photos.

Usage

Three usages took the majority: personal archiving, temporary usage and share with colleagues. (see Table 4.) Personal archiving, keeping pictures for possible future reference, topped among three usages. We considered this pattern more as not reusing the photo. P2 said “I took this picture because the figure in this

Usage	#
Personal archive	27
Temporary use	20
Share with colleagues	20
Share at the lecture/seminar	6
Use as an evidence	6
Share with acquaintances	5
Upload to the SNS	3

Table 4. Survey results of the usages of the slide photos.

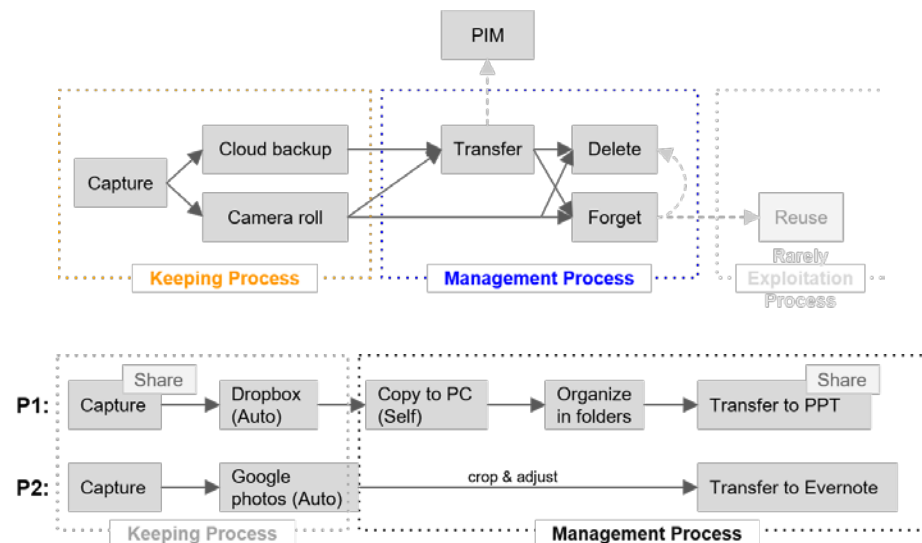


Figure 3. Management lifecycle of the slide photos. (a) Typical lifecycle (b) Example lifecycle reported by P1 and P2.

slide summarized the paper I once have reviewed. (...) I never looked it back."

Temporary use means a slide photo is used right after its capture. P1 and P3 gave example of the usage: "I forgot my glasses, so I took this photo and zoom in to see the letters." (P1), "the slides progressed so quickly so I took this photo to refer and complete the note." (P3).

As mentioned in purpose, sharing with colleagues was common usage of the slide photos. The slide photos were only shared with close colleagues, as "the quality of slide photos are too low to share it with many people." (P1) The way of sharing differs among our

interviewee but they all have shared their slide photo by showing it directly on the smartphone.

Management

Automatic backup features provided by cloud storage providers, i.e. Google photos, Dropbox auto-upload, have been used by 13 participants among 38 who took slide photos. Few participants organized their slide photos. 9 participants copied their slide photos to the PC, 3 participants summarize them using a PIM such as Evernote. Organizing to folders or deleting useless photos were done by 7 among 38 participants each.

Management lifecycle of the slide photos

To better understand the use and management of the slide photos, we asked interviewee to report how they

used the slide photos they brought with. Figure 3b is an example of the lifecycle, reported by P1 and P2.

We build our management lifecycle on Whittaker's curation lifecycle [6]. We added more details to each process based on the report from our interviewees, with help of Bernstein's information scrap lifecycle. Figure 3a shows the diagram of the lifecycle. Note that we only cover the slide photos that are not in PIM.

KEEPING PROCESS

Keeping process of the slide photos differ from Whittaker's one in a sense that people do not make decision whether to keep or not. Whittaker explained keeping process as a process of deciding what information is worth keeping. This decision is hard since it make people to predict their future usage. However, most of modern smartphone have ability to keep more than a thousand photos, and a few cloud services provide unlimited photo storage. Current technological support removes such decision from keeping process, delaying them to happen at management process.

MANAGEMENT PROCESS

Management process, where people decide how to manage the kept information, comprises transfer, delete and forget stages. Transfer is only major activity that people conduct on slide photos; activities such as tagging, organizing into folders are rarely observed. They select the photos that worth reviewing and transfer them to PIM such as email, PC, and so on. After the transfer stage, the photos are deleted immediately or fall into forget stage. The slide photos are rarely reused.

Discussion and Future Work

In this paper, we investigated the informative use of the slide photos categorizing into major themes through the survey and interview. We found that: 1) The major purpose of slide photos was to record information, showing that slide photos are good example of informative photos. 2) Slide photos contains content that are impressive, not likely to be in the paper and summarizing the talk. When capturing, most participants placed only the slide at the center of photo. 3) Three main usages of the slide photos were personal archiving, temporary usage, and share with colleagues. 4) We found people are actively using automatic cloud backup service, making the decision to keep or not unnecessary. 5) Typical management lifecycle of the slide photos consists of keeping and management process. On keeping stage, automatic backup stage made people do not think deeply about to keep or not to keep. On management process, people transfer important slide photos to other PIM such as email, PC or Evernote. The slide photos left at the camera roll of cloud are then deleted or forgotten. Reuse of the such photos barely happens.

Based on the key findings and pain points gathered from interviews, we present three design implications.

Support silent and clear capture

All P1-5 mention about difficulties in capturing. Difficulties were threefold: the attention from the surrounding audience, low resolution and blurry focus in low-light condition and timing when slide progress quickly. This implies the capturing experience should be sneaky, the image should be clear enough to refer and the camera should understand when a slide progresses.

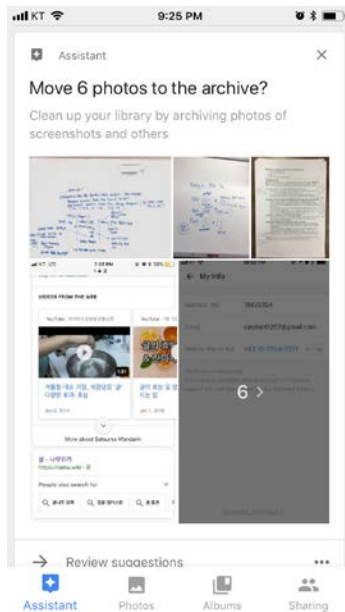


Figure 4. Example of the support on management of informative photos. Photos are intelligently selected based on its content.

Support separate management of the slide photos

As people do not manually manage their camera rolls[6], a lot of technological support focused on display and management of camera roll. As informative photos have different lifecycle compared to other personal photos, we suggest two options: group the slide photos and make the user transfer important content quickly and discard the other unused slide photos. The slide photos can be easily found via vision technology as they have slides as a main focus. Figure 4 shows the example of such support.

Support people to take notes with the slide photo

P2 said capturing slides and taking notes is done on different place and the integrating process is cumbersome. By doing both in a same workflow, i.e. annotate on the slide photo [7], we may help slide photos to contain more contextual information.

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