When People Vanish: A Study to Investigate How Human Presence Changes the Scenario Speculation

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ABSTRACT

Designers have used everyday photos as stimuli to speculate alternative scenarios about the future. Many studies have developed diverse ways of re-designing roles of an actor to stimulate scenario speculation; however, a lack of understandings of how the presence of an actor influences the scenario speculation process. Therefore, this work conducted a study that investigates how everyday photos with and without human actors affect people to speculate possible scenarios. We recruited 29 crowd workers from Amazon Mechanical Turk to generate 80 scenarios for two groups of photos (i.e., with-actor and non-actor photos). We analysed these scenarios and found that with-actor photos led people to speculate consistent scenarios around human actors and their activities. By contrast, non-actor photos allowed people to speculate the scenarios flexibly and diversely. These insights suggest a new design opportunity of using non-actor photos as potential materials to encourage people to generate diverse scenarios.

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)**.

KEYWORDS

Visual Stimuli; Non-Actor Photo; Scenario Speculation; Human Presence

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1 INTRODUCTION

In designing future applications, designers often face a challenge to envision future scenarios with emerging technologies. As a Japanese writer, kōbō Abe, said, “the future is forever a projection of the present”, design researchers use diverse everyday scenarios as an

inspirational material to envision possible futures and discover new design spaces [17]. However, these everyday scenarios may cause designers to only discuss the existing practice and neglect to think of alternatives ways of being.

To inspire designers to speculate beyond the existing practice, researchers have explored ways to extract scenarios from sci-fi movies [5] and investigated strategies to generate diverse scenarios by re-designing the roles of actors in everyday photos [6]. Actor and background information are two essential components for composing a scenario [17]. By changing the identities and perspectives of the actor, researchers can make everyday scenarios strange and unfamiliar [1]. Such unfamiliar scenarios can inspire designers to gain new understandings of the current practice. For example, Desjardins et al. [6] used everyday photos of participants’ homes as a background context and added novel actors on top of these photos to co-speculate with their participants about IoT future scenarios at home. Brown et al. re-mixed everyday photos with emerging technologies (e.g., drones) to present a future IKEA catalogue [2]. This catalogue presents diverse scenarios and potential users to inspire designers to understand new relationships and lifestyles of the future.

Moreover, Giaccardi et al. attempted to change a viewing perspective from human to things and used photos with different perspectives to engage designers to imagine new relationships in everyday life [8]. Similarly, Vaucelle and Ishii [14] attached a camera to a toy and encourage participants to generate stories through the toy’s eyes. These examples show that ‘actor’ plays a key role to influence people to speculate scenarios. While prior work has identified actors’ roles and perspectives as an effective strategy to defamiliarize the everyday scenarios for generating alternative scenarios [8], a lack of studies investigate whether and how the presence of actors affect the scenario speculation process. We wonder, what if we remove any actors presented in everyday photos? Would these non-actor photos limit people to speculate possible scenarios? Therefore, this work investigates whether and how everyday photos with and without human actors affect the scenarios speculation process.

To do so, we conducted a study by comparing the scenarios generated by two groups of everyday photos with and without actors. We selected a total of 40 photos from the MS-COCO dataset [10], in which 20 photos contain everyday activity/event with humans (with-actor photos) and the other 20 photos contain everyday scenes without humans (non-actor photos). We recruited 29 online workers from Amazon Mechanical Turk to generate 80 scenarios for these photos. Each photo has two scenarios generated by two distinct people. We annotated and analyzed their results by identifying the

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Tell a Story

Use your reasoning skill to **guess or speculate a possible story** in this image. (Please describe **WHO, WHAT, WHERE,** and **WHEN** to construct your story.)

e.g., "Two children" are "playing" toy bear in "the living room" during "the Christmas time".

Figure 1: We designed an interface to assign non-actor and with-actor scenarios to participants to tell what was happening.

narrative styles and the scenarios of the actors and activities. The results showed that participants speculated the consistent scenarios for the same photo by using with-actor photos. In contrast, when human actor vanishes, people speculated scenarios flexibly and generated more diverse scenarios than with-actor photos. This insight suggests ‘non-actor scenario’ as a potential ‘scenario stimuli’ to support people to generate diverse scenarios using everyday photos.

2 RELATED WORK

Photos have been recognised as an effective visual material for stimulating ideas among people because photos containing real-world events can “connect an individual to experiences or eras even if the [photos] do not reflect the research subject’s actual lives. [9]” Researchers have developed various tools using photos as stimuli for idea generations [13, 15, 16] and identified that changing roles of actors can inspire people to speculate different stories [3, 14]. However, a lack of studies investigate how with-actor scenery and non-actor scenery affect people to generate the story using photos. On the other hand, photos with a non-actor scenario are widely found in photography and cinema. For example, ‘scenery shot’ as a filming style often presents a scene with the landscape without human presence. Eugène Atget, a pioneer of documentary photography, uses his landscape photographs, which contain “doorways, balconies, ruins, and streetscapes devoid of people [11]” to engage viewers to imagine a new form of urban experiences aesthetically. In the field of cinema, people apply a scenery shot to shape the ambience of the story at the beginning of the film [11]. Lukinbeal has further identified scenery shots as alternative narrative perspectives to engage viewers to imagine any possibilities in photos [11]. Researchers have also explored different perspectives to conduct their studies depending on different interests [4, 7]. Cheng et al. proposed a tool to capture photos without human presence [4] at home. While their motivation is to protect participants’ privacy, their non-human photos encourage their participants to share more diverse contexts beyond what photos can capture. Inspired by these studies, we see a potential opportunity of a non-actor photos to open a space for rich interpretation. Thus, this work focuses on investigating whether and how with-actor and non-actor photos change ways of people’s scenario generation process.

3 METHOD

To prepare non-actor and with-actor scenario photos, we found an open-source library called MS COCO dataset [10], which has 80 categories of object types (see Fig. 2-A). Using these 80 categories, we filtered the types to select different photos representing the with-actor and non-actor scenarios. Meanwhile, our primary research domains focus on future smart home design. Therefore, we aim at collecting diverse home and indoor related scenarios.

Our filtering processes are: first, we used the category of ‘human’ as a major filter for capturing with-actor and non-actor scenarios (see Fig. 2-B-1). Second, we used ‘indoor’ (e.g., kitchen appliances) and ‘outdoor’ object types (e.g., transportation) as sub-filter and only focused on the categories of indoor object types (see Fig. 2-B-2). Third, we used ‘size’ and ‘mobility’ to capture both large (were rarely moved) and small (easy portable) object types in the indoor object types (see Fig. 2-B-3). Our rationale is that people may use a long-distance camera shot to capture large objects. Thus, we can capture a zooming-out perspective of the location where multiple activities might happen. In contrast, people may use a close-distance camera shot to capture one or a few small objects with zooming-in perspectives. People may also easily take the small object to different locations and capture diverse activities in distinct contexts. Fourth, we used electronic and non-electronic object types as the final filter because we were interested in capturing diverse contexts with different technology for smart home design (see Fig. 2-B-4). Finally, we got four different indoor object types and randomly picked four categories from the types: bottle, hairdryer, couch and fridge. We collected the top five photos from the four categories. We used the filter, human, to capture 20 non-actor scenarios and 20 with-actor scenarios with the four objects (see Fig. 2-C).

To investigate what possible scenarios can be stimulated by these 40 with-actor and non-actor photos, we created an interface (see Fig. 1) to randomly assign 40 photos to different participants. Each photo was assigned to two different participants to write a story about the same photo. We recruited our participants from Amazon Mechanical Turk and finally received 80 scenarios from 29 participants. We analysed their scenarios by annotating the scenarios about who (i.e., the main actor) and what (i.e., activities the actor perform). These annotations allow us to identify different narrative styles between actor and non-actor and the diversity of scenarios stimulated from the same photo.

Figure 2: A) 80 categories in the MS-COCO dataset. B) Our filtering process of selecting home indoor non-actor and with-actor scenarios. C) The final selected categories for with-actor and non-actor scenarios.

4 PRELIMINARY FINDINGS

Our results showed that with-actor and non-actor scenarios affect the scenario speculation process differently. For example, non-actor photos allow participants to project their interested actors and speculate possible scenarios flexibly. When the human actor vanishes in the photos, participants can imagine any actor (e.g., different genders, ages, personalities) and speculate where they are and what they are doing. In Fig. 3-B, the non-actor photos made participants speculate two different contexts: one was about the pregnancy in the hospital; the other was about a discussion regarding the time and space between two men (see B3 in Fig. 3). In addition, one participant projected a scenario of kids having breakfast (see B2[a] in Fig. 3); another participant interpreted the personalities of a family (see B2[b] in Fig. 3). Furthermore, non-actor photos enabled participants to use diverse narrative styles to describe their scenarios. For example, the narrative styles can be a dialogue between two persons (e.g., B3[a]), a description of a family type (e.g., B2[b]), an intention (e.g., B1[a], B3[b]), or an activity (e.g., B1[b], B2[a]). In contrast, with-actor photos only stimulated a consistent description of the activities of the similar actor (e.g., A1, A2 and A3 in Fig. 3).

We also observed that the human actor plays a key role in driving the scenario speculations in the with-actor photos. Participants paid more attention to the human actor's behaviours and expressions and created possible scenarios around the actor. The scenarios driven by the with-actor photos showed more consistent styles and contexts than the non-actor photos. In Fig. 3-A, participants who were in the with-actor photos group speculated similar contexts such as teaching (e.g., A1[a] and [b]), playing Wii (e.g., A2[a] and [b]), and cooking (e.g., A3 [a] and [b]). Our results show consistent evidence from prior research and further explain why re-designing actors' in everyday photos could guide people to speculate alternative scenarios.

5 DISCUSSION AND FUTURE WORK

Our results showed that the non-actor and with-actor photos stimulated people to tell stories differently. For example, with-actor photos encouraged people to speculate a story around a specific role in detail. In contrast, non-actor photos prompted people to generate diverse scenarios with their imagined actors. We envision developing a possible scenario generator system that uses with-actor and non-actor photos as inputs to encourage people with different backgrounds (e.g., online crowd, experts, inhabitants) to generate a variety of scenarios.

In this work, we only investigated how an individual speculates a story by using non-actor and with-actor photos. It would be interesting to extend this work to understand how these two types of photos affect a group of people to generate a scenario in the future. We are also aware that people's speculations could be influenced by some factors [9, 12]). For example, content (e.g., a neat or messy surrounding) and color impressions of the photos (e.g., warmth, contrast and hue) might evoke different feelings, memories, and experiences [9]. People's different cultural backgrounds, personalities and previous experiences could also affect the way of interpreting everyday objects in the photos [12]. Additionally, different ways of capturing photos can make people speculate narratives from different views [6, 8]. Future work is required to explore different factors that affect people's speculations. In this work, we did not control the quality of the photo representation due to the chosen dataset. Thus, future work is needed to consider other datasets containing consistent photo contents, color impressions and photo-taking perspectives. Finally, we noticed that not everyone was well-inspired by the non-actor photos. The instructions we provided (i.e., tell a story) could be too general, causing some participants to only focus on background stuff rather than a whole story containing who did what, when, and why they did. Future work could explore diverse structures in guiding people to generate complete scenarios with

EX	Photo	Scenario	Who	What
A.scenario		[a] Primary school teacher teaching a small group of three Asian children.	Teacher	Teaches in primary school
		[b] A teacher is trying to teach some girls how to write their names on a notebook during a school morning in a kindergarten.	Three children	Are Asian
			Teacher	Teaches girls about how to write their names
			Teacher	Teaches in a kindergarten
	[a] Two guys are playing wii while drinking at night.	Two guys	Play wii
			Two guys	Drink at night
		[b] Two men playing the Wii and having the best time of their lives.	Two men	Play wii
			Two men	Have the best time
B.non-actor scenario		[a] Three women prepare the meal in a very messy kitchen.	Three women	Are cooking
			Three women	Are in a messy kitchen
		[b] Three ladies cooking the most amazing meal ever for the family.	Three ladies	Are cooking for the family
	[a] Family buys many new books for grandma to read at night on her rocking chair.	Family	Buys books for Grandma
			Grandma	Read at night on her rocking chair
		[b] Two adults are talking with the tv off. One of the adults are laying on the couch while the other is sitting in the chair	Adult 1 & Adult 2	Talking to each other
			Adult 1	Lay on the couch
B2		[a] The kids are enjoying bananas for breakfast on their usual chairs.	Kids	Eat bananas for breakfast
			Kids	Sit on their usual chairs
		[b] There was a family who loved going out and living life to the fullest and having plenty of laughs.	Family	Loves outdoor activities
			Family	Has optimistic attitude
	[a] "Okay—I'm just speculating," Dean closed his eyes. ... Fred asked the question like a learned professor, speculating on a universal problem of time, space and the creation of the universe. ... Dean spent much of the trip speculating on the reason for the law man's visit.	Dean	Is listening and thinking
			Fred	Speculate on a universal problem
		[b] Hospital room is prepared for pregnant woman to birth her baby.	Woman	Is pregnant
			Woman	Prepare to birth baby in the hospital room

Figure 3: Six examples of the scenarios stimulated by (A) with-actor and (B) non-actor photos annotated as A1, A2, A3 and B1, B2, B3.

non-actor photos. A possible instruction could be ‘what is going to happen?’ It might encourage people to generate a story about the future contexts with new but related objects and actors not presented in the photos.

6 CONCLUSION

This paper presented a preliminary study to compare different scenarios stimulated by non-actor and with-actor photos. By capturing multiple scenarios from 29 online participants, we found that non-actor photos could be a potential stimulus to encourage people to project their imagined actors to the scenario and generate diverse stories in a flexible way. This insight suggests a design opportunity

of using non-actor everyday photos as a material to facilitate people to generate diverse scenarios for supporting designers to explore possible futures.

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