



## Exploring the public's experience field perception of AR filter media characteristics under CMC

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### Abstract

Sharing selfies has become a popular habit on social media. Traditional beauty filters only complete functions such as whitening and face-lifting on the basis of taking pictures. However, with AR technology entering the realm of mobile photography filters, computer graphics (CG) are superimposed on selfies, allowing senders to manage their impressions more virtually and freely. This paper explores the influence of media attributes of AR selfie filters under Computer-Mediated Communication (CMC) from the perspective of media ecology theory. Explore this phenomenon through a qualitative phenomenological approach. Use in-depth interviews and focus groups to collect data. This paper discusses the impact of AR selfie, a new media, in CMC, and expands the application scope of media ecology theory in CMC emerging media. It also provides a basic understanding for the further communication impact of AR selfie on the sender and receiver in CMC. This can provide basic policies and related references for the government to formulate media policies and social media management regulations, and can also be used as literature for other scholars to refer.

### INTRODUCTION

When simply taking pictures and imaging cannot satisfy people's selfie sharing desires, the technology of beautifying and retouching pictures came into being. That is, filter technology. Filter technology isn't restricted to digital image production. Lens filtering and early types of photo processing can be followed back to the whole history of photography. In 1974, Bryce Bayer developed a light filter that allowed photographs to be colored, and then Steven Sasson and Gareth Lloyd invented the first black-and-white digital camera in 1975 (Lavrence & Cambre, 2020). In the period when digital cameras replaced analog cameras, the complex analog film chemical processing technology in the photographic darkroom was replaced by the PC platform software Photoshop and color printers (Rubinstein & Sluis, 2008). In our digital age, "Photoshopping" stands for "Retouching" (Emme & Kirova, 2005; Spalter & van Dam, 2008), and the function of filters is still used. In the mobile photography era, it was not until 2008 that the iPhone delivered a product advancement pack (SDK) that marketed and promoted photography sifting innovation (Lavrence & Cambre, 2020).

Regarding beautify filters, almost all social media and photo apps have launched beautifying filters (Qin et al., 2021). “Selfie” has taken the world by storm, with numerous cosmetics applications showing up on Google's Android and Apple's iOS application stores (Chiu & Lee, 2018). The most representative is Snapchat. 186 million users share billions of modified and beautified pictures through the Snapchat application (Statista, 2018). It can be seen that the trend of retouching Meitu filters has actively continued the power of fashion beauty ideals (Barker, 2020).

#### CG & AR

In the past of decades, with the fast advancement of CG (Computer Graph) media apparatuses, CG images are widely used in various fields such as film industry, virtual reality, and video games (Meena & Tyagi, 2021). Numerous movies are flooded with digital copies of CG characters, which is exactly the same as those seen by real people (Lucas et al., 2019). If CG images with false information are produced in front of the judicial department, it may cause social chaos (Tyagi, 2018), because it is difficult to distinguish with the naked eye (Meena & Tyagi, 2021). Since CG graphics technology can only be mastered through professional training, it is impossible for ordinary people to personally touch CG technology. Connected with virtual CG and real photographic picture, AR is capable of remote visualization (Javornik, 2016), realistic 3D immersive environment (Kang et al., 2020), participatory interaction (Kim et al., 2016) and entertainment (Hinsch et al., 2020). Since the 1990s, AR has been widely used in art, medicine (Hollerer & Schmalstieg, 2016) and Snapshot AR advertising (Hawker et al., 2020).

In July 2017, Facebook and China Meitu (media Application company) jointly developed AR camera special filter, and AR technology was introduced into smartphone photography applications (Frank, H. 2017). Snapchat described this technology in a 2015 patent as “computer-generated enhancements” that can “add new information to images in real-time” (Jurgenson et al. 2016). The virtual lens enriches the user's communication experience by dynamically integrating CG with real-world entities and environments (David, 2020). Virtual Lens is popular to AR, and mainstream social media (Snapchat, Facebook Messenger, Instagram) which has virtual lens functions (Qin et al., 2021). AR's retouching of selfies is a revolutionary change, as an external cause of stimulus, which in turn leads to varying degrees of participation and behavior changes.



Fig.1 Campus forum AR selfie

The traditional beautify filter is to enlarge the eyes, thin the face and whiten the skin based on the photos taken (Chiu & Lee, 2018). However, the AR filter is different from the traditional beautify filter. It uses AR to combine virtual CG with photography. The application can synthesize a virtual personal impression of the selfie.

New information technology can change the way information is presented to people (De Sá & Churchill, 2012). New York Magazine's Daily News Website Intelligencer describes AR filters as a “widely observed but little-known phenomenon” (Barker, 2020). This focuses on the application of the latest computer and photography technology on mobile phones, influencing the spread of CMC. It provides new insights and new directions to the rapidly changed mass media. Therefore, this paper focuses on the public perception of AR Filter as a new medium and its influence on its propagation in CMC.

This research has a strong reference for the perception of AR technology, providing a pre-observation window for the industry-wide application and popularization of AR technology. Understand the user's perception and intention in the communication of this technology, and provide theoretical support for the application and

popularization of augmented reality technology in the future. Furthermore, from the perspective of popularity and sociality for mobile phones, distinguishing between true and false (Meena & Tyagi, 2021) remains difficult in CG technology. It easily causes social chaos and panic (Tyagi, 2018). This could supply a basic policy and relevant reference for the government to formulate media policies and social media management regulations and it might as well be as literature for other scholars' reference.

#### **DISCUSSION OF THE LITERATURE REVIEW**

Due to the relative lack of research literature on AR filters, this paper conceptualizes the characteristic of its media based on McLuhan's theory of media ecology, the principle of messages are media. The core of McLuhan's media ecology theory emphasizes that the true "message" delivered by the media is its own stimulation to the audience, not the content it delivers (McLuhan & McLuhan, 1994). When the media changes, the relationship between the corresponding parties will also change. "Photography—as a fine art, for the purpose of correspondence, as an industry—has always largely depended on technological innovation" (Giannetti & Leach, 1999).

AR filter selfie is a special effect filter for selfies in an important category of mobile photography. It is the ability to edit images with post-production technology that combines CG and AR technology. Selfies are informal self-portraits, usually taken inadvertently and posted on social networking sites. They themselves have become a sub-genre of photography (Trivundža, 2015). Therefore, the media attributes of AR filter selfies will be discussed from the media attributes of mobile photography and AR technology. Among them, selfie is the latest technological expression of the evolution and development of photography. It has experienced analog photography, digital photography and mobile phone photography. The following is a summary of their media attributes.

##### *Analog photography: Index*

In 1839, the Louis-Jacques-Mandé Daguerre silver-plated photography method Daguerreotype applied for a patent in France, which officially marked the birth of photography as a tool for objectively recording reality (Rosenblum, 1997). The term photography originated from the combination of two Greek words, namely painting with light (Bian, 2010). Photos provide people with a certain reference event, a certain means of recording space or time, namely indexability and presence (Cass & Lauer, 2004).

"Index" is the conceptual cornerstone of traditional analog photography theory (Frosh, 2015). Index: In photography theory, "Index" describes the relationship between a photo and its subject, with the former pointing to the latter (Edwards, 2012). Based on Peirce's index concept, that is, a sign that represents an object through physical or causal relationship, it represents the uniqueness of photography because the content it depicts must be in front of the camera when the photo is taken (Goudge, 1965).

Bazin believes that realism and realism are the main qualities of photographic media (Bazin, 2004). Photography "is the use of light to shape the unstable substances of chemical emulsions into analog prints." The objectivity of photography gives it credibility that other media do not have (Pettersson, 2005). From its origins, viewers have been fascinated by the power of photography to document the visual world (Lazard et al., 2020). Photography is usually considered as evidence of reality, in which case it is easy to eliminate the influence of human participation (Bock, 2011; Sontag, 1977). The photograph is described as the "distribution" of the reference (Barthes, 2000) or the "quotation" in reality (Sontag, 1977) because it is produced by the reaction of the photosensitive material to the reflected light exposed to the space-time field before the lens. These insights allow us to re-examine the "indexability" of simulated photos and suggest that there is also some kind of computational work here. For example, when Roland Barthes asserted: "Photos literally refer to the source of the object". From there, a real body emits radiation, which eventually makes me touch the people here (Barthes, 2000). What Barthes has forgotten is that he believes that this is the essence (concept) of photography. That is, its insistence on what it refers to is the result of a very precise algorithm instruction that involves a laboratory technician who processes the image. A series of operations performed.

For the general public, photographic images are natural products. That is, natural self-replication. Although a photo cannot tell us exactly what the object in the photo is like, it can tell us about a particular existence before (and may still exist)—the object being photographed (Villi, 2015). Photos depend on this primitive existence (Sontag, S. 1977; Batchen, 2006). Although we only see two-dimensional images, we can believe that the object did exist in that place (Villi, 2015). Therefore, as a selfie photo of an AR filter, it naturally already possesses the first media attribute: a sense of reality.

*Digital photography: Photo tampering*

The fundamental difference between digital photography and traditional analog photography is that the photosensitive equipment is a digital chip instead of an analog film. Since the photoelectric transmission effect of the digital chip is much higher than the chemical reaction of the analog film, it has greatly changed the economics and operational difficulty of photographic images (Johnson, 1997). Compared with the analog version, digital photos can be stored for a more drawn out time frame, and are more efficient and easier. The utilization of advanced photography hardware can go about as a daily existence recorder and give a chronicle of day by day exercises (Palmer, 2010). When people use digital media, they leave their “social footprint” and show their “life flow” to describe their “digital identity” (Sheth & Solomon, 2014).

The digitization of the photosensitive chip has led to almost free and easy operation of taking pictures, which has greatly promoted the popularization of photography. For digital photos, this kind of origin based on the film itself no longer exists. This also means that the photos used as evidence have caused confusion. Due to digitization and the transfer of algorithms, the indexability of photographic media has been eliminated, and there is no sense of presence brought by photos (Rubinstein & Sluis, 2013).

In fact, from another perspective, the history of photo tampering is long. It nearly as rich as the act of making visual pictures (Brugioni, 1999). All photos are manipulated, framing is manipulation, aiming is manipulation, and choosing when to press the shutter is manipulation. Because every part of the camera device is produced by humans, it can be manipulated. No matter how hard we try, we cannot eliminate subjective ambiguity (Aparecida et al., 2018). In the period of analog photography, although the use of tampering operations is not as advanced and efficient as the current digital technology, and it is more difficult to create, but the purpose of retouching is the same (Huynh et al., 2015). The high-threshold darkroom image retouching technique prevents ordinary people from trying, leading most people to believe that the imaging process of photography can exclude human intervention. It is not just an image that is accurately reproduced, but an enlightenment of truth that only nature has. The meaning of a photographic image often depends on the mutual interpretation of various pre-set images, so the core point of it is indeterminate. Photography as a reproducible cognitive means, the meaning of “masking” is even greater than the meaning of “revealing” (Baudrillard, 2006).

Therefore, the selfie of the AR filter has a high degree of graphic editability under the premise that it is disguised as real, which provides the possibility for richer impression management. Photography is a highly subjective medium (Snyder & Allen, 1975) and a flexible medium that is easy to operate (Hancock & Toma, 2009).

*Mobile photography: Sociable*

In 2000, Japan’s J-phone and Sharp Corporation developed and launched the world’s first camera-enabled mobile phone J-SH04. At that time, the camera only had 110,000 pixels (Arth et al., 2015). A camera phone is a device that realizes a new form of mobile interaction by adding visual elements in the communication process (Villi, 2012). For the first time in the history of photography, smartphones represented by Apple iPhone integrated the production, circulation and distribution of images into one device (Cruz & Meyer, 2012). Some scholars have tried to define smartphone photography as a new and important moment in the history of photography, characterized by “complete mobility, ubiquity and contact” (Cruz & Meyer, 2012). This is supported by powerful smart devices, social applications, software interfaces and digital platforms. As photography has transformed from a specialized activity to an ordinary activity, shooting and sharing images has become an indispensable part of experiencing daily life and integrating into the world (Trivundža, 2015).

Generally speaking, the integration of the Internet and mobile phones can achieve seamless and permanent photographic contact with others; users are always in a “visual online” state (Villi, 2015). The online sharing of photos introduces a new dimension of mass communication for personal photography, more appropriately called “posting”. Posting photos to Facebook is similar to placing photos on a pedestal in a crowded room, with features of sharing and exhibition (Villi, 2015). The emergence of photography as a “real-time” medium has enabled digital networks to connect interlocutors in space rather than time. This brings it closer to a dialogue practice, that is, attracting images and their reference objects to the moment of discourse interaction (Frosh, 2015). McLuhan first proposed it in his book “Understanding Media: The Extension of Man” in 1964. It means that with the advent of radio, television, and other electronic media, the space-time distance between people has suddenly shortened, and the entire world has shrunk into a “village” (McLuhan & MCLUHAN, 1994).

Personal photos of this period have become an effective way for people to communicate and interact on social media. People no longer take photos for commemorations and memories, but pay more attention to “instant” interaction and self-worth on social media (Li, 2013). While visual communication is introduced into the field of telephone communication, mobile communication has also changed. That is, mobile phones as communication

devices are no longer limited to transmitting voices. Camera phones have more firmly integrated interpersonal communication into photography, or better photography communication. Medium (Villi, 2012).

Therefore, with such a multi-billion-level community scale, the selfies of AR filters attributes have their special social attributes in the process of dissemination. As a network device with portability and front camera, smartphones have undoubtedly become a common practice for many people, helping to establish selfies and sharing on social media (Lazard & Capdevila, 2020).

#### *Augmented Reality : Interactive and Immersive*

Augmented reality (AR) technology is a collection of technologies that integrate real-world environments with computer-generated calculations and graphics (Azuma, 1997; Azuma, 2011; Fan et al., 2020; Lamantia, 2009). Technology that combines virtual information with the real world. The technical means it uses include multimedia, 3d modeling, real-time tracking and registration, intelligent interaction, and sensing. Virtual content in AR applications may be context-sensitive and take various forms, including three-dimensional (3D) models, animations, annotations, and videos (Dirin & Laine, 2018). The principle is to apply computer-generated virtual information, such as text, images, 3D models, music, video, etc., to the real world after simulation. In this way, the two kinds of information complement each other, thus realizing the enhancement of the real world (Chen et al., 2019).

AR technology is an audiovisual sensory input generated by a computer, such as graphics, videos, models, etc., with the characteristics of information integration, instant interaction, and emotional conception. Therefore, it can be defined as: supplementing and “enhancing” the real environment with virtual content, which can provide users with “imaginary information”. This contains two elements, namely “real” and “virtual”. “Real” represents the real environment, and “virtual” refers to virtual content such as computer-generated text, images, videos, and models (Zhou, 2019).

With the support of mobile technology, AR is a stimulating and beneficial new media for human experience (Qin et al., 2021). With the popularization of smartphones and tablet computers, mobile AR has become a mainstream technology and has become a hot topic for researchers across fields (Dirin & Laine, 2018). A large number of smart applications for children and teenagers are online in mobile stores (Dirin & Laine, 2018). In addition, the increase in the number of toolkits used to create AR applications has also enabled non-technical personnel to create their own AR content (Laine, 2018), Which further expands the use of AR on the mobile phone platform.

With the continuous improvement of computer software and hardware performance and the enhancement of the computing power of mobile smart terminal phones, AR interaction has gradually shifted from traditional keyboard and mouse interaction to a human-centered interaction method-a natural interactive experience between man and machine (Narzt et al. al., 2006). In AR smartphone applications, interactivity is the user’s ability to manipulate virtual objects and virtual environments. Interactivity facilitates information processing and enhances customers’ understanding of AR applications and the products/services being demonstrated. Correspondingly, higher interactivity further improves the consumer experience by allowing them to explore the enhanced virtual world (Hudson et al., 2019). As mobile AR users expand their interactivity, control and information acquisition capabilities, they become more motivated to achieve greater satisfaction and ease of use (tom Dieck et al., 2018; Van Noort et al., 2012). Previous research believes that immersive technology control is critical to consumer perceived ease of use (McLean & Wilson, 2019). It will affect the user’s perception and immersion of AR mobile applications. Therefore, the interaction between virtual objects and users is one of the success factors of AR mobile applications (Kim et al., 2016).

#### *Media ecology theory*

Media theorist Marshall McLuhan pointed out in his iconic work “Understanding Media: The Extensions of Man” (1964) that every form of communication simultaneously evolves from the thought itself and affects its essence. Therefore, the media characteristics will affect the user’s thought content, perception and expression. The media is not just a passive channel of information. They provide content, but they also affect our way of thinking (McLuhan & MCLUHAN, 1994). McLuhan believes that the medium is the information, because the user is the content. Viewers and readers must explain the information they have received and process the sensory data they have received. Find meaning in their environment, the artifacts that exist in their bodies, and the events that occur in their bodies. This research focuses on the new media AR filter selfie and its impact on related CMC, which is supported by McLuhan’s media ecology theory. This paper verifies his theory by comparing and analyzing the development of photographic media (cameras and photos) and photographic concepts in the history of photography. The upgrade of camera equipment brings a brand new visual experience that impacts the changes in human thinking and concepts. The continuous lowering of the threshold of photography technology has enabled

more people and even the whole people to engage in photography creation, bringing about a huge change in image thinking.

They point out that computers and the Internet have corrected almost all other existing media. Turn written documents, books, magazines and newspapers, paintings and photos, recordings and telephone conversations, as well as radio, film and television into content for websites and multimedia presentations. Meanwhile, computer monitors and interfaces themselves have also been transformed into content from old-fashioned media such as movies and television. When one medium becomes the content of another medium, it becomes the code and symbolic form of aesthetic style used to create specific information.

McLuhan explained that another reason why the media is a message is because the user is the content. This is consistent with reader response theory, use and gratification research, audience and consumer ethnography research, decoding process research and other communication, media and cultural research methods; this is also consistent with contemporary perceptual biology and cognitive science research (Strate, 2008). The point here is that if the message is mainly built on the receiving end of the communication, then its impact on us is limited. Therefore, it is not the message but the media that has the greatest impact on users and audiences. In other words, it is the context that determines the content.

## **METHOD**

This study adopts a qualitative method. Qualitative research methods provide us with an in-depth understanding of an exploratory study. In the ever-evolving field of new media, qualitative research provides insights into how people (users) engage in virtual communications. Qualitative design is also applicable to determine the influence of cultural factors on the decision-making process and selfie image production.

### *Sample*

This paper chose informants based on research purposes, looking for informants who “have experience related to the phenomenon to be studied” (Kruger & Stones, 1981). These interviewees are the main analysis unit (Bless et al., 2006). Judgmental sampling, also called purposive sampling or authoritative sampling, is a non-probability sampling technique in which the sample members are chosen only on the basis of the researcher’s knowledge and judgment (Merriam, 2002).

The average age of college students in China is 18-24 years old, and they belong to the Z era population born after the millennium. The so-called Z era population (born in 1995-2009) are the aborigines of digital technology. The Internet and digital products are part of their innate application skills and daily life.

The research object of this paper is AR filters, and the informants are college students. It has a good representativeness and explanatory nature to this group in the whole population. Social media has become an indispensable part of people’s daily lives, and sharing selfies has become a global phenomenon on social media (McCain et al., 2016), especially represented by young people (Pew Research Center, 2018; Albury, 2015). Snapchat’s AR filter is one of the most popular applications. According to statistics, users are mainly between 18 and 24 years old (Rios et al., 2018). An interview study with college students does show that most students are aware of selfies and are good at related operations on social media (Katz & Crocker, 2015). Young college students are the main group using social media, have received higher education, and have good expression skills.

This paper adopted focus groups and in-depth interviews to collect data. Communication based on face-to-face, semi-structured and open-ended questions. Informants include campus influencer students and campus audience students. In order to verify the rigor of the interview syllabus for in-depth interviews and group discussions, this study conducted a one-month Pilot Study in June 2021. For reasons of convenience, the university in the Pingdingshan city where the researchers are located, Henan Urban Construction College. The interviewees were students of this college.

After long-term observation of many senders of AR selfies and recipients of messages posted on campus social platforms. The survey informants are determined based on the quality of the AR selfies sent and the professionalism of the responses. Obtain trust and get relevant contact information through visits with the moderators of the campus social platform. And within a week, we conducted semi-structured in-depth interviews with the main four students who sent selfies, and conducted semi-structured group discussions with other responders based on the direct and indirect relationship of the comments. Research tools and materials to record data, including researchers, use pencils, sticky paper (different colors, different groups), Ipad 2 for recording, and Canon camera (EOS 5D MARK4) to record photos. The data collection procedure included the first researcher

being the questioner, the second researcher taking notes on paper, and an assistant taking photos and providing drinks and snacks. The researchers will continue to conduct interviews until and unless data saturation occurred and new data ceased to emerge from interviews (Strauss & Corbin, 1998).

*Specific steps:*

- (1) The 12 informants selected were divided into three groups according to their professional consistency, namely digital media, communication, and computer. Separate focus groups for data collection and analysis. (Through group discussion, let them have a better understanding of AR topics)
- (2) Using photo elicitation (van Manen, 2017). Participants appeared in photos (their own shared photos of augmented reality photography), and the researchers asked them to discuss and comment on the content of the photos, conduct in-depth semi-structured interviews, and collect data for analysis.
- (3) For these informants, they are required to share the specified type of augmented reality beauty photos on their social platforms, and to track the scope of their dissemination (school students) to collect data (views, likes, comments).
- (4) Conduct focus group discussions, collect data and analyze the audiences of campus reviews covered by its dissemination.
- (5) Conduct an in-depth semi-structured interview for about one hour with four experienced students.

## RESULTS AND DISCUSSION

### *(1) Profile of informants*

AR filter selfie survey interview informants. They are all college students from Pingdingshan University in Henan, China. They are between 18 and 21 years old. The two informants have 5 years of experience in taking selfies, while the rest have only 1 to 2 years of experience. Pseudonyms are used to protect the identity of the informant. The data providers come from various disciplines of Pingdingshan university, such as computer major, art major, and broadcast host major. Table 1 summarizes the profiles of the 12 information providers in this study.

TABLE I  
INFORMANT PROFILE

Pseudonym	Identity/Method	Age	Gender	Major	Semester
Chang Ru	Sender / Interview	20	Female	Broadcasting	3
Zi Ren	Sender / Interview	20	Mail	Art	4
Jing	Sender / Interview	21	Female	Computer	5
Xue Qing	Sender / Interview	20	Female	Music	3
Bei Bei	Receiver / Focus Group	19	Female	Broadcasting	2
Bo Hua	Receiver / Focus Group	21	Mail	Literature	5
Ya Ping	Receiver / Focus Group	20	Female	Animation	4
Xiao Jing	Receiver / Focus Group	20	Female	Animation	4
Jia Ying	Receiver / Focus Group	20	Mail	Engineer	3
Meng Chen	Receiver / Focus Group	21	Female	English	5
LU Shan	Receiver / Focus Group	20	Mail	Computer	3
Sun Miao	Receiver / Focus Group	21	Female	English	5

Use a combination of qualitative data collection methods to examine the following four research questions. These research questions are designed to help understand the following questions. The first question focuses on exploring the user's basic view or experience field of the new medium, as well as the understanding of its possible impact. The second question is to explore the impact of the user's Selfie using the AR filter on their own impression management in CMC, which is an exploration of its specific process. Through the collection of data, refer to the

literature research close to the past, and explore the relevant effects of specific AR filters for selfies. The third issue is to explore the technical possibilities provided by the relevant application platforms in the current situation, and to understand the possible scope of the application of this social phenomenon from the function mechanism of the AR filter media in the current situation. The fourth question focuses on exploring the user’s shooting motivation, how to portray their own impressions through the special features of AR filters.

(2) Record of interview and focus group: RQ1

TABLE III  
WHAT IS THE PUBLIC’S INITIAL FIELD OF EXPERIENCE (BASIC PERCEPTION) OF THE NEW MEDIUM OF AR FILTER SELFIES?

Sender / Interview	Receiver / Focus Group
<p>It is a special content filter that can show your own special personality preferences.</p> <p>Realistic performance will be subject to various restrictions, and AR filters can partially meet the desired effect.</p> <p>This is a new tool for self-expression, quick to get started.</p> <p>A very good way, before most people don’t understand it, publish it first and get eyeballs.</p> <p>Very free way of creation, like writing an article, edit and typeset and then publish.</p> <p>With the shell of photography, it is very deceptive. If you can deceive, you will deceive. If you can’t deceive, you will be joke.</p> <p>For the new AR filter, there will be a gap in the use of the public, and the early adopters will be very novel. When everyone realizes that the AR filter makes photography free, it will be boring.</p> <p>It’s a new video game. It’s not photography anymore. It pretends to be photography to confuse the public.</p> <p>The release of a new expression medium with its own enthusiasm will naturally attract attention, like photos and doubt its authenticity</p> <p>It is easy to operate and does not require too high a threshold. It can express emotions like words, and even unspeakable things can be expressed by images.</p> <p>Convenience</p> <p>Editable, controllable, and the effect is like a photo, very inspiring</p> <p>Compared with text, the public is more willing to look at pictures, and more confusing pictures are easier for people to watch.</p>	<p>A new entertainment tool</p> <p>The photo effects are weird and peculiar.</p> <p>At first glance, I thought it was photography, but carefully looked at the renderings made by a computer.</p> <p>Obvious computer elements, knowing that this is a Selfie with additional post-modification, realistic, may shock</p> <p>Very novel</p> <p>More attractive than text and ordinary photos, I will open it for a look</p> <p>Know it is fake, want to see how it can be fake</p> <p>Like photography, but also like computer graphics</p> <p>I will take pictures and play with my friends to see the effect and feel it, but I will not publish it, at most I will keep it myself.</p> <p>New digital photos, even more unreliable</p> <p>Artificial intelligence fake photos</p> <p>Know it’s fake, entertaining</p> <p>Some special ones are difficult to distinguish, so I will pay attention to them for a while</p> <p>I think it’s fun, I can play it, but I won’t publish it on social media</p> <p>It’s quite novel, it feels more exaggerated than traditional photography</p>

From Table 2, it can be seen that it is generally recognized that taking selfies with AR filters is no longer a simple photographic photo. It contains both the authenticity of photography and the effect of subjective editing. Especially the confusing nature of the combination of the two makes more people willing to pay attention to watching. This is consistent with Baudrillard’s simulacrum (Baudrillard, 1998) and Benjamin’s extinction of ontology (Benjamin, 1999). From the comparison of the data, it can be seen that the sender is better at understanding the attributes of this new medium. Some senders stated that they deliberately want to use the time difference that the public has not yet understood to gain attention. A sender stated in an interview that today’s discourse has changed, and it has shifted from text to images, especially the real images that can be edited and manipulated are more valuable for publicity. Therefore, the AR filter itself has the possibility of agitating publicity, and the content superimposed on it will magnify its publicity effect exponentially. This is consistent with Michelle’s picture turn theory (Mitchell, 2018). Because AR is capable of tracking real scenes and using computer graphics to provide assistance (Azuma, 2011). In short, AR filter selfies give the public a sense of novelty, realism and maneuverability, and it can be used to promote better results.

(3) Record of interview and focus group: RQ2



TABLE IIIII  
 HOW DOES THE SENDER MANAGE THE IMPRESSION (DISCLOSE OR HIDE THE INFORMATION) THROUGH THE AR FILTER TO AFFECT THE PERCEPTION OF THE AUDIENCE?

Sender / Interview	Receiver / Focus Group
<p>You can modify itself. Either retouch the unsightly parts, or directly cover the foreign material with the AR filter, so that the imperfect parts are not seen.</p> <p>If I take a selfie in a place with a cluttered background, I can add many accessories around the character, such as small stars, to cover up the shortcomings.</p> <p>What is difficult to express in reality can be realized on the other side in AR filters.</p> <p>If you have acne on your face, you can directly use the AR filter to change your face, or add glasses or masks, or directly become an animal cartoon avatar.</p> <p>I'm not very confident. I don't have the guts to post the original self-portrait directly. You can use the AR filter to block part of the image.</p> <p>Very free, I can change whatever I want</p> <p>Diablo style, another exploratory exposure that hides oneself, specific identities, attempts, special alternative gameplay.</p> <p>The AR filter can conceal one's true identity, and at the same time show a specific personality. When it is announced on a social platform, especially when facing a group of strangers, it is a powerful layer of protection. If you post the original photos to the public without modification, you are afraid of personal information leakage.</p> <p>AR filters, simple accessories are acceptable, add atmosphere, avoid the awkward simplicity of the pure background (stars, flowers, etc.).</p> <p>The advantage of posting AR selfies online is that you can precisely control the image, and you don't want to expose many impressions inadvertently in the case of FtF.</p> <p>AR filters have many special identities and effects to choose from, which can convey the mood and emotions at the time.</p> <p>AR filters have models that are updated every day to choose from, and can create topic announcements when there is nothing to publish.</p> <p>Sometimes posting a selfie is not for what it is, it's just a sense of accomplishment and satisfaction.</p> <p>I will compare the AR filter functions of different apps, and even a photo needs to be modified by several apps before being released, and choose the best function of each.</p>	<p>They can cover the unsightly places with computer pictures and expose the nice places</p> <p>Extremely, almost completely covered by computer graphics, leaving only one hand or the other to convey what he wants to convey in a targeted manner.</p> <p>Definitely only publish the good ones, not the bad ones.</p> <p>Some AR filters are very funny, for example, they can turn the photographer into an ugly image such as a vampire or a monster, but this is exactly what the sender wants to send. It is like letting you see the other side of him.</p> <p>Girls like stinky beauty, and they will definitely make fine modifications and use various methods.</p> <p>AR filters are too templated, all the same</p> <p>It feels aloof and perfect, but in real life, you can't see it.</p> <p>I like the more realistic AR filter. This kind of look is strange but easy to accept.</p> <p>I admire the courage of the sender, and dare to publish all weird things</p> <p>It feels very good. After the AR filter is covered, it is very subtle, not too direct, and has a certain sense of mystery, which provides further topics for communication.</p> <p>The sender is very smart and will use small tricks to deceive and induce the recipient</p> <p>Using a filter to take a selfie is to control emotions, it is a deliberate performance. It is difficult to judge the true face of the sender.</p>

From Table 3, it can be seen that AR filters have a wealth of means to process photos, and can precisely control various effects through APP operations. First of all, deficiencies on the physical level can be concealed, such as skin, facial features, etc. The clothing part can also be replaced, the background can also be erased, and virtual accessories can be added for embellishment. Secondly, at the psychological level, it is possible to create images that are not available in reality out of thin air and incorporate them into selfies, many of which cannot be achieved in reality. This method greatly provides the sender with the impulse to create virtual images. Third, the operation is simple and the threshold is low. Unlike Hollywood movies that require a high-tech professional team, this AR filter can allow ordinary people to reach professional standards and is a product of technological decline. Compared with the sender, the recipients have basically similar views on this, but they can also understand the sender's mental state when watching a selfie. They have brainstormed the corresponding strategies in advance, and are willing to interact with them for specific situations. The above is in line with the sip theory, and the sender said that they are satisfied when publishing photos, which is consistent with the related articles published in the literature review on self-portraits. In short, the public understands the information management routines of self-portraits released under CMC. AR filters provide a very free operation method, simple, and can create virtual images that cannot be photographed in the physical world.

(4) Record of interview and focus group: RQ3

TABLE IVV

To what extent does the recipient ideally shape the sender's impression under the influence of the AR filter selfie?

Sender / Interview	Receiver / Focus Group
<p>There are good reviews and bad reviews, sometimes like a tide The degree of idealization is like a lock, only for people with keys. I must know that it's not all true. Few people who dare to publish the original photos are like not wearing clothes. The sincerity of communication between people needs to be gradually established bit by bit, so as a breakthrough in communication, when you publish the photos for the first time, they must be modified. This is a trial before the communication. If there is progress, then slowly Expose your own shortcomings. Developing a relationship is like peeling an onion, layer by layer. The same is true for post selfies. Modifications need to be removed slowly. AR filters can be used as the first layer of armor to protect your privacy and give a little clue. Can make up for the defects of one's own body or face The responding audience is generally positive and most of them are silent It's like asking everyone a question. Provide a little hint of clues to see who can truly understand themselves. Unlocking this lock is a good test tool. Sometimes when I can read the message of the publisher, I feel that I have found a common language at once, and I can get closer to the sender. Like an exam, if you answer it correctly, it means that you can have a relationship progress, know the extent of his exposure to information and the expected relationship progress, AR can manage the impression more freely, and it will be more free to shape the ideal image.</p>	<p>The taste of digitization is too strong to see real people A show has nothing to do with real people No matter how fake it is, at least one can feel the sender's expression tendency and his own personality Can see his personal impression of the goal, but also guess the gap between him and the goal By using what APP function, you can determine what the sender wants to cover up Can understand what the sender cares about and what it expresses, which is very helpful for further communication Communication definitely requires multiple interactions to understand the sender's efforts in impression control. I can feel the courage of the sender, I only dare to play secretly, share in a small area Can feel the other side of the sender No one is perfect, all have defects, and the impression of proper management is normal behavior The more beautified, the more I feel it is a defect and cover-up. It is better to confess, or even excessive use of APP will cause disgust. Will leave a message privately, comment on his selfies, guess his intentions, and see the response.</p>

From table4, similar to table3, the public is familiar with the rules of CMC communication and has a certain skepticism about the information transmitted by the sender. However, an interesting phenomenon was discovered from it, that is, when you take a selfie of the sender when you are interested, its AR filter technology reflects the special information delivered by the sender. When interpreting his digital impression, special decoding is required, that is, a special idealized component. When this level is reached, one will naturally be eliminated. For batch recipients, only a few recipients who really understand this specific push point can form a common discourse with the sender in a specific code word, thereby promoting future relationship building. This is consistent with the SIP theory and at the same time conforms to the Uncertainty Reduction Theory of Communication (West & Turner, 2019). In short, AR filter can accurately manage physical and virtual digital images due to its advanced technology, so it can guide the recipient to accurately accept a specific ideal image.

(5) Record of interview and focus group: RQ4

TABLE V

How will the audience's feedback on AR filter selfies affect the sender's further impression management and the continued development of the entire communication cycle?

Sender / Interview	Receiver / Focus Group
<p>More typified, too few options In order to avoid the aesthetic fatigue of the recipients, I only post the latest selfies with AR filters to keep them fresh. Different APP AR filters use different methods and effects. Some are simple to operate, but the effect is single; some have good effects, but the operation is too complicated, and a balance needs to be found. I feel that the audience will slowly enter the two extremes, one is the pursuit of the ultimate truth, so that the modification cannot be seen, and the modification is disguised as photography; the other is hoping to see enough peculiarities and abnormalities. AR technology is still in development, and more and more dynamic AR filters will gradually increase, which are more interesting than photos, and can show the entire process from ordinary people to special effects. The material of the AR filter is too few, single, and after playing twice, change to another APP. Sometimes I will chat with my friends online in real time, and turn on the AR filter, disguise each other as cartoon characters such as small animals for entertainment. It is hoped that similar AR functions will be popularized to avoid delays. Many apps have AR functions, and many platforms also provide and support them, and they will become more popular in the future. After the public is paralyzed by the AR filter, it is not easy to attract attention. It is necessary to innovate and design in technology and content. Fewer choices, too typified, intelligent and passive choices, unable to actively create, too complicated, and troublesome to operate</p>	<p>After seeing the habit, it returns to calm, so AR filters must be constantly updated. I only look at the more peculiar ones now, and I will open them occasionally I think the AR filter is very good. It gives people a way for the electronics to play their ideal impression. Whether it is realistic or not, it at least understands the sender's intentions. It would be great if the AR filter can increase interaction, especially to provide a special interface to allow more people to participate. It should be more and more lively, more and more fancy Now you can hardly see the original image to share. Even if it looks like the original image, the result of more detailed processing has covered the traces of the retouching, so the future development will move towards a more realistic direction. AR filters will definitely become more and more popular and more mainstream AR filters should have more choices and more realistic effects Now the AR effect is still average, it can be seen at a glance that it was made by a computer.</p>

<p>AR technology can provide more changes, such as changing backgrounds, changing props, etc., not just face changes.</p>	<p>Because the effect is not real enough, the contrast is a bit bigger.</p>
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From Table 5, it can be seen that the current AR technology is still in the development stage, and senders generally hope to make AR filters richer, provide more models and modify details to match the various psychology of the sender Impression type. Recipients believe that AR filters will become more popular and become mainstream; they will polarize the effects of AR images. On the one hand, they hope to imitate photography more realistically, which is consistent with Baudrillard’s simulacrum theory (Baudrillard, 1998). On the other hand, they want complete freedom. Opening up the shackles of photography is consistent with Benjamin’s perception of the disappearance of ontology in the age of mechanical reproduction (Benjamin, 1999). It can be seen that the target of the interview is the general public who are interested in AR filters. They are those who accept the impact of AR filters on photography. There are many people who do not accept the interview. Some of them must adhere to photographic fundamentalism, Resist all acts of tampering with photos. The American scholar Toffler put forward the term “three kinds of illiteracy” in his famous “The third wave”, pointing out that human beings will produce “literal cultural illiteracy, computer cultural illiteracy, and image cultural illiteracy” (Toffler & Alvin, 1980). Various phenomena are in line with the so-called “four effects” (the laws of media) stipulated by McLuhan. He believes that the development of any kind of technology will inevitably present four different applications (Sandstrom, 2012), namely Retrieval, Reversal, Obsolescence, and Amplification or Enhancement. Correspondingly, AR filter selfies have become mainstream and popular (Amplification or Enhancement). On the one hand, it will deliberately hide through AR technology to show unmodified photos (Retrieval). On the other hand, it will Special emphasis be placed on the various bold attempts of computer graphics to make its reversal, and a small group of people will resist and insist on using the unmodified original image (Obsolescence).

**CONCLUSION**

The findings of this study show that the photographic medium characteristics of AR selfies, use the public’s habitual cognition of photography, use the sense of reality as a guide, and are enhanced by AR technology, making image manipulation freer. This makes AR selfies give the public a sense of novelty and temptation. As a carrier, AR selfies have strong dissemination and attention. For the sender, it can be very precise and targeted to manage a specific impression for dissemination, creating a delicate and ideal virtual impression to the receiver. Its convenient operation, the current popularity of mobile photography, and the visual turn proposed by Michelle will inevitably bring AR digital photography retouching to become a new way of social media communication.

Based on the above characteristics, AR filter selfies, due to the index attribute of photography and the simulated real effect of AR technology, can first give people a sense of reality and perceive the presence of the sender. Secondly, the CG features of AR technology and the maneuverability of digital photography enable AR filters to be able to carry out purposeful modification and impression management of selfies. Third, with the help of the mobile phone’s social attributes and the image expression characteristics of the image, AR filter selfies are spread on the mobile phone’s social network, with social attributes and a good interactive interface, which promotes a deeper interactive feature.



## Fig.2 Chinese New Year's Eve Dinner

In 2018, during the Chinese New Year's Eve, the publisher posted false photos retouched by photoshop on social media (using nationally protected cherished wild animals as food ingredients), causing public panic (Si, 2018). In the end, the publisher was sentenced to administrative detention for 5 days.

These findings have implications: For informants, the skills of AR selfies should be improved to improve the control of small clues on the impression of the release, so as to efficiently screen the recipients. For AR-related companies, provide more models and more settings to meet the different ideal impressions of the senders, and improve the degree of realism. To avoid a public panic similar to the 2018 New Year's Eve incident (Fig. 2), the government should enact relevant legislation to address the use of AR filters on social media. Because, compared to using Photoshop, the operator needs software technology and a personal computer, and AR selfie filters can allow ordinary people to use mobile phones to spread quickly and widely on social media anytime, anywhere. This suggests that when the public posts selfies with AR filters, they should flag whether those photos have been computer-edited.

**LIMITATIONS OF THE STUDY:**

(1) Informants are too concentrated, regardless of age, status or geographic location. (2) The follow-up time for AR self-portrait social activities is relatively short, and after the sender publishes the photos, further interactions with suitable recipients are not conducted, and follow-up investigation is continued. (3) The interview outline is not popular enough, and in many cases, the researcher needs to explain it on the spot.

Follow-up researchers should expand key information providers and increase sample types in qualitative research or surveys to ensure that qualitative data are supported by mutual corroboration. Researchers need to consider other geographic areas, rather than just study the interior of a campus.

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