Exploring Barriers to Adoption of AR filters on Social Media

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Abstract

This study examines the barriers to augmented reality (AR) filters' broad adoption on social media platforms. The widespread adoption of AR filters is hindered by significant obstacles despite the rising popularity of AR technology and the potential benefits for users. In order to give social media platforms and the designers of AR filters insights to improve user experiences and encourage better engagement, this study attempts to identify and explore these key barriers from the users' perspective.

Key words: social media, AR filters, technology adoption, user behavior **J.E.L. classification:** M31, M39

1. Introduction

Unique experiences and interactive content formats are now available on social media platforms thanks to augmented reality (AR), a technology that has emerged and gained popularity in the last years. Users now have new ways to express themselves and enhance their appearance and surroundings in fun and interesting ways, all thanks to AR filters. Although these filters, also known as lenses or effects, depending on the platform they're implemented on, are becoming more common and have potential advantages for users (both hedonic and utilitarian), there are still significant barriers standing in the way of their widespread adoption.

This study aims to identify and examine the primary challenges that social media users face in adopting AR filters. By understanding these barriers, we can shed light on the fundamental factors that affect user behaviour and prevent the broad acceptance of the technology. Additionally, the research seeks to offer helpful data for social media platforms and AR filter creators in order for them to overcome these obstacles, improve user experiences, and stimulate higher engagement.

It is essential to examine the development and impact of augmented reality technology within this context in order to fully understand the current level of AR filter adoption on social media. Because of the incorporation of AR technology into social media platforms, users now have more options to interact with digital information and express themselves creatively. The use of AR filters has become a social norm, with users seeking to personalise their online presence and amplify their storytelling capabilities through augmented visuals.

We will review earlier research that analyses the adoption and application of AR filters on social media platforms, drawing on existing literature. That way we can achieve a solid understanding of the elements that influence consumers' acceptance or resistance towards AR filters by analysing empirical studies, theoretical frameworks, and models related to technology adoption and user behaviour. Moreover, the study presents an exploratory research that is targeted at active social media users that aren't yet adopters of the AR feature represented by filters. By concentrating on the difficulties perceived by the users, this analysis will help us fill in knowledge gaps and add to the body of knowledge already available.

2. Theoretical background

Despite numerous statistics that predicted an accelerated growth for AR adoption, the numbers are yet to catch up with the forecasts. Because of this, researchers need to investigate the reasons why AR technologies are still not adopted by some people. While there can be some general threats that can be pointed out for the AR technology, like poor experience or digital fatigue (Busel, 2017), the academic literature keeps identifying issues specific to different use cases. For example, in education the costs of AR systems and lack of collaboration capabilities can influence user acceptance (Iqbal, 2022). In the case of AR systems used in industrial fields, the main barrier of adoption is the technological limitations that AR-based tools currently pose (Lamberti et al., 2014).

Considering that mobile usage was accelerated in the last few years due to the COVID-19 pandemic (Statista, 2021), not owning a device compatible with AR technology is becoming less and less probable to be a real barrier in the adoption of AR filters. There are also other issues that used to be valid in the past, but now their importance is significantly diminished. A good example is the lack of interoperability across mobile platforms, which refers to applications not being compatible with all operating systems. Although it used to be a problem (Kounavis et. al., 2012), nowadays most of the applications, and especially mobile-based applications can be used across multiple types of devices and platforms.

In the past, the requirement for a dependable internet connection was seen as a major obstacle to the uptake of augmented reality (AR) apps. A reliable and fast internet connection was required for AR experiences because they significantly relied on data-intensive processes and real-time content streaming (Kounavis et. al., 2012). This barrier has greatly decreased thanks to the widespread availability and ongoing growth of internet coverage. Improved Wi-Fi infrastructure and the spread of 4G and 5G networks have made it possible to access the internet more quickly and reliably, even in remote locations. Because of this, users may now access AR applications and content without any noticeable difficulties or latency problems.

When it comes specifically to AR filters on social media, the reasons for non-adoption could be more specific. A study conducted specifically for the Snapchat app (Deloitte, 2021) revealed that the limited amount of content and the quality of the AR experience are slowing down the adoption of the technology.

In a world in which people are more and more concerned about their privacy and usage of personal data, the use of AR technologies can also provoke disquiet in regards to privacy issues (Ruyter, 2020), especially when it comes to face filters (Cowan et al, 2021). When using AR filters, facial features are frequently captured and analysed, which raises concerns about possible data misuse or unauthorised access. The General Data Protection Regulation (GDPR), new international privacy laws, and increased user awareness have forced social media platforms to change how they handle user data by being more transparent and responsible. Therefore, this shift towards enhanced privacy practices can foster an increase in user trust.

In a study that focused on virtual try-on technologies, including AR-based, technological drawbacks were found to be a recurrent motivation for users to reject the use of the system in question (Yim et. al., 2017). These limitations include difficulty of installing the necessary software, a lack of computer literacy and poor media experiences like slow response time of the program and non-satisfactory visuals. While the difficulty of installing a software is not applicable to AR filters, as social media platforms provide built-in AR filter functionalities, the other barriers may be valid to a certain extent. When it comes to computer literacy, for social AR filters we need to shift the concept toward the more general one, which is digital literacy, to include the ability to use mobile-based technologies. In this case, although social media platforms are designed to be user-friendly and accessible to a wide range of users, AR filters may imply actions that are not as intuitive and might appear to some people as too difficult and complicated to use, so it might be a valid barrier in technology adoption. Finally, previous research found that the performance and visual quality of AR filters on social media platforms are crucial for user satisfaction and that slow response times and subpar visuals can negatively impact the user experience (Yim&Park, 2019).

There are also other barriers that are often overlooked by researchers and that is rejection from principle or from social pressures. In a culture that places a greater emphasis on body positivity and self-acceptance, the general association of AR filters with beautifying effects and altering of

appearance might be uncomfortable for some. Individuals can reject the usage of filters out of principle as the trend towards accepting one's true self gains momentum because they believe that doing so perpetuates unrealistic beauty standards or feeds insecurities. People who wish to display their real selves may be discouraged from utilising AR filters due to their fear of being perceived by others to be insecure or lacking self-confidence. Therefore, AR filters on social media may not be widely accepted or adopted due to societal pressure and the desire to adhere to body positivity norms.

In summary, while some barriers identified in AR adoption research may not directly apply to AR filters on social media, there are specific challenges related to content availability, privacy concerns, digital literacy, and user perception that can hinder their widespread acceptance. Understanding these barriers and addressing them effectively is crucial to promoting greater adoption and usage of AR filters on social media platforms. For this purpose, the next section presents an exploratory study that aims to research social media users' perceptions for rejecting the use of AR filters.

3. Research methodology

An exploratory study was carried out utilising an online survey approach to look into the causes of the non-adoption of social media AR filters. The study's main goal was to identify the biggest obstacles to the adoption of augmented reality (AR) technology on social media platforms, which will help guide future work in this area. The survey was directed at social media users who don't use the platforms' built-in photo and video filters. The choice of participants was made using a convenience sampling technique.

At the start of the survey, a filter question was asked to make sure only relevant respondents were included. Only individuals who had previously used social media AR filters, either personally or by observing others use them, were taken into account for the study. Participants were also questioned whether they thought of themselves as active social media users of AR filters.

A comprehensive description of social media AR filters was given in the survey introduction to ensure general understanding among respondents. Participants assured that their answers would be kept anonymous and that their data would only be used for academic research.

The questionnaire was completed by 303 people in total. Participants who reported using social AR filters in the previous month were eliminated, yielding a final sample of 136 valid responses. This allowed the research to focus only on non-active users. The sample's gender distribution was as follows: 46.9% were female, 51.7% were male, and 1.4% were non-binary. 5.5% of participants were under the age of 18, 33.8% were between the ages of 18 and 24, 33.1% were between the ages of 25 and 34, 16.6% were between the ages of 35 and 44, and 11% were beyond the age of 45.

A list of potential barriers against the use of AR filters on social media was included in the survey. Participants had to tick every box that was applicable to them. The options offered were as follows:

- I don't understand how filters work.
- I am concerned about the personal data these filters have access to.
- I don't find the results of using filters interesting enough.
- I don't own a device that supports the use of filters.
- I don't find using filters entertaining.
- The filters' design should drastically improve.
- The technology is not advanced enough for me.
- I am capable of creating quality content without filters.

Participants also had a free-text space to describe any extra motivations that weren't covered by the available choices. After thorough analysis and organisation, several more motivations were discovered in these free-text responses.

4. Findings

This section discusses the results of the study, considering both the options that were presented to respondents, and the motivations that they reported additionally.

The option "I don't understand how filters work" was chosen by 6.9% of the total pool of participants in the study. This suggests a lack of understanding or experience with how AR filters work and function. It's possible that people are not yet fully familiar with how the AR technology works, because its use on social media platforms is fairly new. Also, the result could be determined by limited technical knowledge or digital literacy. For some AR filters, activating or modifying the filter effects may require several steps, gestures, or particular actions. Users who find these interactions difficult to grasp or complex may have trouble using the filters successfully. This implies that better user education and more detailed instructions on how to use filters effectively might be required for more users to adopt them.

The item "I am concerned about the personal data these filters have access to" got 17.9% of responses. Therefore, we consider the privacy concerns a big impediment to the deployment of AR filters on social media platforms. Users are concerned about possible data misuse or unauthorised access. To alleviate these worries, platforms should place a high priority on transparency and offer assurances about data protection and privacy practices.

A big percentage of participants (44.1%) considered the statement "I don't find the results of using filters interesting enough" to be relevant for them. The lack of engagement or satisfaction with the results of employing AR filters is evident in this comment. In some cases, the filter effects fail to be visually-pleasant, or in line with the users' preferences. AR filters heavily rely on visual effects to enhance or alter photos and videos. Users may find the overall experience dull and unappealing if the filter results fall short of their expectations in terms of visual quality, aesthetics, or realism. Moreover, a user's interests, hobbies, or preferred content themes may not all be catered to by an AR filter. Some users who have been consistently exposed to AR filters, either through their own use or extensive exposure from others' posts, may experience fatigue or saturation. Overexposure to AR filters can lead to a diminished interest and decreased novelty. On social media, some users could prioritise authenticity and favour posting unedited or unfiltered content. They can believe that applying AR filters contradicts their intention to offer an unaltered or authentic version of themselves. Users' interest and engagement may rise if AR filters' appeal, diversity, and customizability are improved.

The least relevant motivation for the survey respondents was "I don't own a device that supports the use of filters". Only 0.7% claimed that their devices are too old and outdated to be compatible with this innovative technology. Due to a number of factors, the lack of suitable devices with AR filters is no longer a significant barrier to adoption. First off, smartphones and other mobile devices with cutting-edge hardware capabilities are proliferating quickly. More and more contemporary smartphones are equipped with augmented reality features and are compatible with AR filters. Second, due to intense market competition, several smartphone manufacturers now include augmented reality (AR) technology in their products. Major smartphone manufacturers like Apple and Samsung have been making significant investments in augmented reality, making sure that their most recent models have the necessary hardware and software to support AR experiences, like AR filters. Thirdly, the price of smartphones and other mobile devices has dramatically dropped over time, making them more affordable and available to an increasing number of users. The issue of device compatibility for AR filters has diminished as a result of the growing adoption rates of smartphones. Social media platforms have also made their applications compatible with a wide range of devices and operating systems because they recognise how important it is to serve a broad user base. They make an effort to make sure that AR filters are usable on various operating systems, such as iOS and Android, to reduce any restrictions brought on by device compatibility.

"I don't find using filters entertaining" was the choice of 46.2% of participants. The result suggests that for some people, applying AR filters is not enjoyable or amusing. When it comes to the kind of content that they find interesting, people have a variety of interests and preferences and they might not find the degree of entertainment they desire when using AR filters. Users that find videos, memes, or interactive posts to be more interesting and amusing than AR filters may choose these types of material over AR filters. Even while AR filters offer a variety of effects and enhancements, users may not always get the amount of creativity and customisation they are looking for. The range and uniqueness of the various AR filters may not satisfy certain users, who may feel that they lack entertainment value. Users may stop using filters if they believe there aren't enough opportunities for them to express themselves or be creative. The use of filters could be made more interesting and

pleasurable by social media sites experimenting with gamification components and interactive features.

The item "The filters' design should drastically improve" reached a percentage of 15.9% among respondents. Users complain about the poor design of the current filters. This encompasses characteristics including visual appeal, realism, and general aesthetics. AR filters rely on visual components to improve or change the surroundings or look of users. Users may find the filters dull or unsatisfying if the design is unattractive and lacks aesthetic appeal. Users' aesthetic tastes may not be met by poorly designed filters, creating a negative impression of their general quality. Although the purpose of AR filters is to deliver an enhanced or augmented experience, users may also not be happy if the filters yield unrealistic or artificial outcomes. For instance, filters that artificially apply effects or distort face characteristics excessively might be off-putting. The creation of filters that are of a high standard, appealing to the eye, and diversified can boost user acceptance and pleasure.

6.9% of respondents considered that they are represented by the statement "*The technology is not advanced enough for me*". Some people believe that there haven't been any advances or advancements in AR technology recently. Users could have high expectations for the seamless and realistic enhancement of their environment or look that AR filters can offer. Users can think the technology isn't advanced if it can't produce effects that are believable and seem natural. Users may believe that the technology is not advanced enough to give the appropriate level of realism if, for instance, filters struggle to precisely track face movements or do not blend in with the environment flawlessly. By superimposing digital features over the real world, augmented reality filters provide a stimulating and participatory experience. Users may have expected more complex interactions and functionality than simple facial tracking or object placement. In order to provide real-time visual augmentation, AR filters primarily rely on computer capacity. Users who experience performance problems like latency, sluggish response times, or frame rate decreases could blame the technology's lack of innovation for these limitations. This obstacle can be overcome through continued technical development and the incorporation of cutting-edge features.

The item "I am capable of creating quality content without filters" was chosen by 42.1%. Users may be less likely to use AR filters if they demonstrate confidence in their ability to create highquality material without them. Some people place a higher value on exhibiting their own creativity and originality than on using pre-made filters. They might favour producing content that showcases their distinctive personalities, worldviews, or aesthetic skills. They feel that by eliminating AR filters and instead focusing on custom effects and overlays, they can offer their information in a more genuine and unique way. Moreover, users that are skilled in photography, videography, or graphic design may have confidence in their capacity to produce visually appealing content without the use of AR filters. They might be familiar with editing processes, software tools, compositional elements, lighting, and editing techniques. These users could think AR filters are pointless or restrict their ability to express themselves creatively. Last but not least, users differ in the preferences they have for the kinds of content they love producing and viewing. While some people might find augmented reality (AR) filters amusing and interesting, others could prefer media that does not primarily rely on AR features. These users might place a higher value on narratives, personal experiences, or certain topics that don't always benefit from the application of augmented reality filters.

Regarding the free-text responses, they can be categorised as follows:

Concerns about self-image and authenticity: A number of participants were concerned that filters might encourage unattainable beauty standards, distort the reality, and lead people to hide their genuine selves. This is consistent with the rising body positivity trend and the desire to embrace authenticity.

Mental health concerns: Concerns about the detrimental consequences of filters on mental health, such as fostering the development of dysmorphia, were raised by some respondents.

Lack of interest, relevance, or usage frequency: Some participants said that they were not interested in utilising filters, that they rarely used social media, or that they preferred to highlight natural beauty as opposed to altered appearances. This is representative of a subset of consumers who value real interactions and content.

Difficulty finding suitable or diverse filters: Some participants express difficulty finding filters that suit their interests, indicating a desire for a greater selection of filter choices that accommodate various tastes.

Practical concerns: The lack of interest in AR filters is attributed to practical considerations including battery consumption, difficulties accessing filters, or digital fatigue due to already existing numerous other features on social media platforms.

5. Conclusions

This study set out to identify and analyse the main barriers that social media users have while implementing augmented reality (AR) filters and to offer solutions to these problems.

Among the key takeaways of this research paper we mention:

- Lack of understanding of how filters function and insufficient technical expertise or digital literacy may make it difficult for users to use AR filters successfully.
- Another key hurdle was privacy issues, with several participants expressing concern about how AR filters might access their personal information.
- One common reason for non-adoption was found to be a feeling of disinterest in the results of employing AR filters.
- Device compatibility was found to be a minimal barrier.
- Having devices that support AR filters was shown to be a minimal barrier, with the majority of participants reporting having such devices.
- Free-text comments from participants were used in the study to elicit additional motives, underscoring the value of taking into account different viewpoints. These reasons included the need for more innovative and interactive filter experiences as well as worries about supporting body positivity ideals and unattainable beauty standards.

In conclusion, this study offers important insights for social media platforms and AR filter producers by highlighting the obstacles to the adoption of AR filters on these platforms. Greater acceptance and usage can be facilitated by improving user education, addressing privacy issues, improving the calibre and variety of AR filters, and appealing to users' interests and preferences. By solving these challenges, social media platforms may realise the full potential of augmented reality filters, providing users with distinctive and interesting experiences while fostering greater user pleasure and engagement.

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