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Personalized Spatial Advertising in Augmented Reality (AR)

ABSTRACT

Augmented reality technologies can augment physical artifacts with interactive digital capabilities, accessible via various user devices. This disclosure describes techniques that enable personalized advertising based on interactive AR experiences. With user permission, a spatial element is added to personalized advertising by connecting it with the physical spaces or products involved in AR interactions. The content of the advertisement can be personalized to relevant aspects of the user's characteristics and context, determined based on user-permitted data. Personalization can be achieved by associating physical objects and users with spatial anchors that capture relevant parameters of AR interactions. The personalized AR experience of the advertisement can be designed to enable users to purchase the advertised item at an online or physical location of the manufacturer and/or retailer.

KEYWORDS

- Digital try on
- Billboard
- Personalized advertising
- Spatial advertising
- Localized AR
- Augmented reality (AR)
- Virtual Reality (VR)
- Spatial anchor
- Cloud anchor
- Digital object

BACKGROUND

Augmented reality (AR) devices are becoming popular. Augmented reality technologies can enhance physical artifacts in a given physical environment with the addition of interactive digital capabilities. Users can access enhanced interactive functionalities via various devices, such as smartphones, smart glasses, AR headsets, head-mounted displays (HMD/HUD), etc. For instance, a user can point a smartphone camera at a restaurant menu to view the menu on the smartphone screen in a different language and currency. Currently, such interactive AR experiences are limited to immediate localized interactions with objects in the user's vicinity. As a result, each interactive experience is independent of the previous similar AR interactions.

DESCRIPTION

This disclosure describes techniques that enable personalized advertising based on interactive AR experiences. With user permission, a spatial element is added to personalized advertising by connecting it with the physical spaces or products involved in AR interactions. For example, users who encounter a physical advertisement (e.g., for clothing) that is posted at a bus stop can employ AR capabilities to view themselves wearing the advertised clothing. Moreover, the content of the advertisement can be personalized to relevant aspects of the user's characteristics and context, determined based on user-permitted data. For example, such data can include one or more of age, gender, time of day, number of people around, previously visited locations, online search history, etc. For example, a user that recently searched for trips to a tropical island can be shown tropical clothing on an electronic billboard. Additionally, the personalized AR experience of the advertisement can be designed to enable users to purchase the clothing at an online or physical location of the manufacturer and/or retailer.

With permission, individuals that use augmented reality to engage with an advertisement can be informed automatically of updates to the advertised products or services and/or made aware of similar or related products or services. For instance, a user who has tried on an advertised piece of clothing via AR can be informed when the clothing brand releases new clothing later on. Such functionality enables users to use AR to try on the new offerings without requiring that the user visit the location of the original advertisement to receive the advertisements for the newly released clothing.

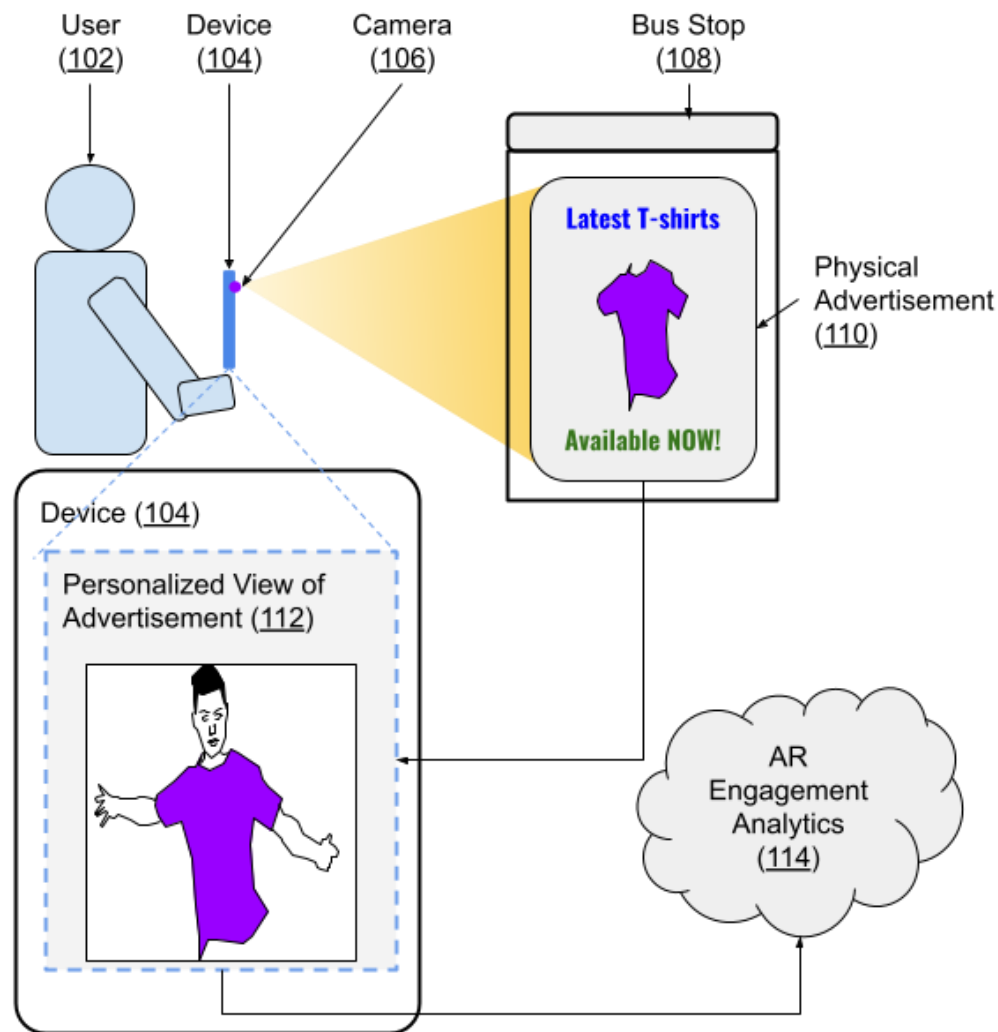


Fig. 1: Personalized viewing experience for a physical advertisement

Fig. 1 shows an example operational implementation of the techniques described in this disclosure. A user (102) encounters an AR-enabled physical advertisement (110) for a t-shirt at a bus stop (108). The user points the camera (106) of an AR-capable device (104) at the advertisement to obtain a personalized view (112) of the advertisement on the device screen. The personalized view enables the user to see how the user would look when wearing the t-shirt shown in the advertisement. With user permission, information relevant to the interactive AR experience of viewing the personalized advertisement may be obtained and stored on a cloud platform (114). The analytics can be employed to make the user aware of new styles for the advertised t-shirt (or brand) released in the future without requiring the user to revisit the bus stop or another location that carries the advertisement.

With appropriate permissions, the localization required for marking the physical locations of the advertisements, users, and interactive AR experiences can be performed via spatial anchors. Such anchors are based on cloud anchors that are used to assign identifiers to digital objects in augmented or virtual digital spaces. The spatial anchors can use appropriate location coordinates (e.g., latitude and longitude) and orientation (e.g., vertical or horizontal angles) to associate persistent location-based identifiers with digital objects, including advertisements delivered via AR. For instance, a spatial anchor for an advertisement placed on a rotating billboard can contain the latitude, longitude, and rotation angle of the billboard.

Each user can be associated with a cloud anchor to position the user in three-dimensional (3D) space. In addition to location, such anchors can be used to take into account the user's orientation to determine the various objects in the user's current field of view via appropriate computer vision techniques. The AR-capable objects in the user's view can be augmented as appropriate using AR technologies that employ 3D meshes for rendering digital objects.

The spatial and cloud anchors used for objects and users can be static, dynamic, or a combination. For example, an anchor for a rotating advertisement at a given location can have static location coordinates but dynamic orientation dependent on movement. When relevant, the anchors can serve as uniform resource locators (URLs) for AR environments, with parameters to personalize the content to different users and/or contexts. For example, the anchor for an advertisement for a shirt can show different types of shirts to different users or different shirts at different times, such as holiday-themed shirts close to an upcoming holiday.

Implementation of the techniques described herein can create a game-like experience for interacting with spatial advertisements experienced via AR technologies, thus incentivizing users to view and interact with such advertisements. Moreover, the instant AR personalization as described above can enable advertisers to offer customized advertising to large numbers of users at no extra cost and to follow up with interested users later on without waiting for them to visit the same physical location in the future. With user permission, the relevant analytics of interactive experiences with personalized AR advertisements can be stored locally on the user device or on a cloud platform.

The techniques described in this disclosure can be implemented to support any AR-capable object and environment accessed via any device capable of delivering AR experiences. The techniques can also support virtual reality (VR) environments with fully digital objects and environments and users represented as avatars. The spatial and cloud anchors described above can be integrated into digital maps. Personalized advertisements within AR, VR, or digital map applications can be made available for purchase via markets for purchasing and customizing the delivery of online advertisements.

Implementation of the techniques described in this disclosure can enhance the user experience (UX) of AR experiences by enabling users to experience advertisements for products and services of interest in a personalized manner. Moreover, users can continue the engagement without needing to visit a specific location in the future. The techniques can additionally benefit manufacturers, retailers, and advertisers by enabling the personalization of physical advertisements at scale with little to no additional costs and facilitating potentially greater user engagement with such advertisements.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs or features described herein may enable collection of user information (e.g., information about a user's activity using augmented reality devices, social network, social actions or activities, profession, a user's preferences, or a user's current location), and if the user is sent content or communications from a server. In addition, certain data may be treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control over what information is collected about the user, how that information is used, and what information is provided to the user.

CONCLUSION

This disclosure describes techniques that enable personalized advertising based on interactive AR experiences. With user permission, a spatial element is added to personalized advertising by connecting it with the physical spaces or products involved in AR interactions.

The content of the advertisement can be personalized to relevant aspects of the user's characteristics and context, determined based on user-permitted data. Personalization can be achieved by associating physical objects and users with spatial anchors that capture relevant parameters of AR interactions. The personalized AR experience of the advertisement can be designed to enable users to purchase the advertised item at an online or physical location of the manufacturer and/or retailer.