March 2023

App Personalization with Images Generated Using Artificial Intelligence

Nithyanand Kota

Jatin Chhugani

Ganesh Mallya

Maneesh Dewan

Phillip Campion

See next page for additional authors

Inventor(s)
Nithyanand Kota, Jatin Chhugani, Ganesh Mallya, Maneesh Dewan, Phillip Campion, Tilman Sporkert, and Timir Shah

App Personalization with Images Generated Using Artificial Intelligence

ABSTRACT

Personalized content such as app backgrounds, profile pictures, etc. help in creating a rich and interactive user experience for an app, potentially driving an increase in the active usage. Recent advancements in generative imagery can be used to generate images that are personalized to the user. However, current image generation techniques require a user to explicitly provide prompts to the generation model. This disclosure describes techniques that use generative artificial intelligence to automatically generate customized images for use as an app background or in other contexts. Prompts for image creation are generated based on user-permitted contextual information by using a large language model or other technique. The generated images are filtered by an image recommendation model and provided for user selection to customize the app experience.

KEYWORDS

- App personalization
- Wallpaper
- Generative Artificial Intelligence (AI)
- Image generation
- Generative imagery
- User context
- User embedding
- Transaction history

BACKGROUND

Personalization of a smartphone, tablet, laptop, or other device, and of apps on such devices via the use of backgrounds, profile pictures, etc. creates a rich interactive user experience. Personalization can help drive an increase in the active usage of applications. It can also lead to an increase in the social effect of an app, via sharing of the customization with friends and family. Recent advancements in image generation techniques, e.g., Imagen [1], can help make this process easier whereby a user can use generative imagery to personalize their app experience. However, current image generation techniques require the user to explicitly provide prompts (e.g., “a bear riding a cycle down Main St.”); they do not automatically generate imagery based on available information that is user-specific.

DESCRIPTION

This disclosure describes an automated technique to generate customized images, e.g., for use as an app background or in other parts of the app user interface, e.g., for a personal finance application, a shopping application, or any other application. In the context of a personal finance or shopping application, recent transaction history of the user may be obtained with user permission and text prompts may be automatically generated based on the transaction history.

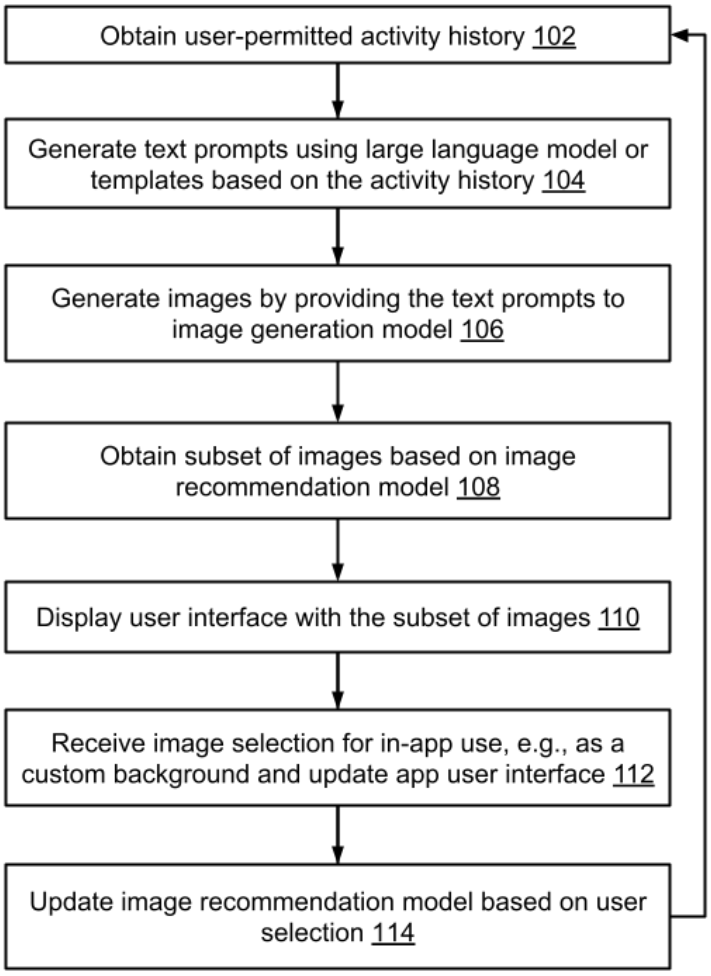

Fig. 1: Automatically generating personalized background based on transaction history

Fig. 1 illustrates an example method to automatically generate a personalized background based on transaction history or other contextual user information, obtained with user permission. User-permitted transaction history is obtained (102). The transaction history is used to automatically generate (104) text prompts, e.g., using a large language model (LLM), using templates, or other techniques. For example, if a user eats often at a noodle place by a lake, the prompt can be something like "a happy robot eating noodles by the lake." The prompt templates as well as the prompts generated by the LLM are generated such that user context such as transactions from sensitive categories in a personal finance application or other

sensitive information is not utilized during the prompt generation process. The user is provided with controls to choose information that may be utilized for prompt generation, to exclude specific types of information, and to disable automated prompt and image generation.

Images are generated (106) by the image generation model on the basis of the generated prompts or template text. The images can be used to personalize the user's device or app experience, e.g., by using the image as an app background, creating a shareable personalized image, etc. The image generation model may be provided additional parameters (beyond the prompt) based on the intended context of use for the generated image. For example, such parameters can be used to put in place safeguards that ensure that the generated image complies with specific filters, e.g., no explicit content or other unsuitable images.

A subset of the generated images is selected by an image recommendation model (108). The image recommendation model can take into account user features (e.g., represented as user embeddings), context features (e.g., the season of the year), and image features (e.g., represented as image embeddings). The subset of generated images is shown to the user in a user interface (110). The user can provide selection (112) for use as a custom background or other purpose. The image recommendation model is updated based on the user selection (114), e.g., if the user views further images beyond the initial set or based on properties of the particular image that the user selects. The process of Fig. 1 can be repeated periodically, e.g., once a week, or can be performed on-demand, e.g., when the user requests a new background image.

Example

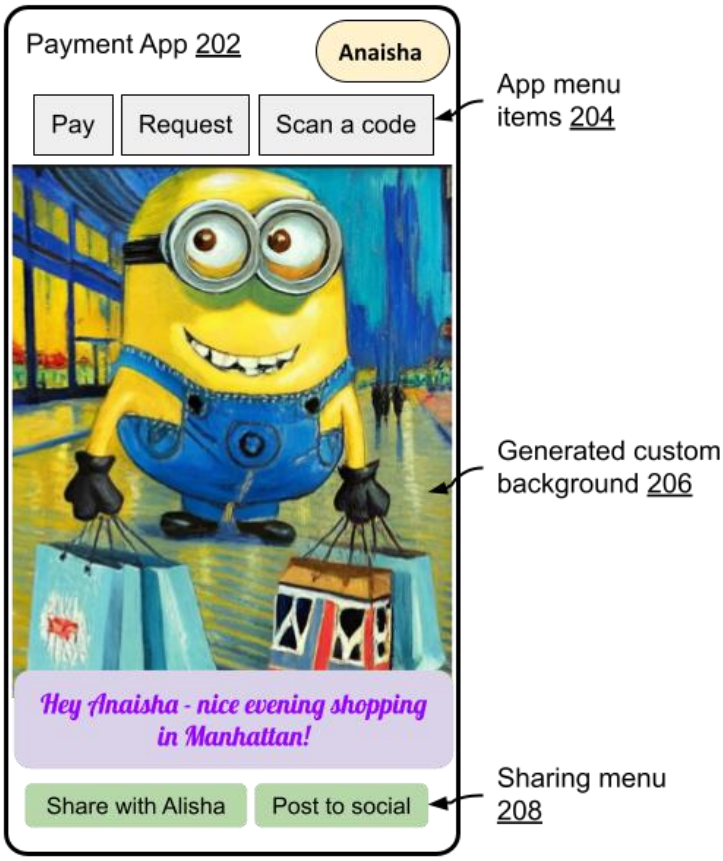

Fig. 2: Example of a personalized background

Fig. 2 illustrates an example of a customized background generated based on a user's ("Anaisha") recent transaction history in a personal finance or payment app (202). In this example, with user permission, the recent payment history is obtained (204) from the app. The history is used to generate prompts for an image generation model. A set of images suitable for use as a custom background for the application are obtained. For example, the image generation model may be provided with a prompt that is indicative of the nature of recent user activity within the app, the location of the user device during the activity, etc. The user can select an image for use as a custom background (206). In the example of Fig. 2, the prompt indicates that the user recently shopped in Manhattan, and that the user is a fan of "The Minions" and of the

painter Vincent Van Gogh, and accordingly, the generated image has attributes that match the prompt. The user can also share (208) one or more of the generated images with their contact. Optionally, a message can be displayed to the user in addition to the image, e.g., “Hey Anaisha, nice evening shopping in Manhattan.”

The user can personalize their app experience with a new image at any time. Option to personalize their profile may be presented periodically, e.g., once a week. For example, new images may be suggested for a payment app based on new transactions. The described techniques can be used to automatically generate custom imagery in any app, e.g., personal finance apps, shopping apps, etc. or by the device operating system.

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 shopping, a user’s financial transactions, social network, social actions or activities, 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 use generative artificial intelligence to automatically generate customized images for use as an app background or in other contexts. Prompts for image creation are generated based on user-permitted contextual information by using a large language model or other technique. The generated images are filtered by an image recommendation model and provided for user selection to customize the app experience.

REFERENCES

1. “Imagen” available online at https://imagen.research.google/