

Design of Modeling Recommendation System Based on Customer Facial Features

Zihang Fei, Chuansheng Wu

Liaoning University of Science and Technology, Liaoning, China

Abstract: The modeling recommendation system based on customer facial features includes: acquiring the user's image information, which includes the user's facial image; receiving the input scene information that the user is to attend; determining the user's recommended makeup based on the scene information and facial image; The scene information and the recommended makeup look determine the recommended clothing, and this method can save the user's precious time in choosing makeup and matching clothing before going out, and avoid the embarrassing situation of the user choosing the wrong one.

Keywords: Facial features, Modeling, Recommendation.

1. Introduction

With the increasing improvement of people's living standards, air conditioners have almost become one of the necessary household appliances for modern families, but the functions of air conditioners are single. With the advent of the intelligent era, how to make the application of air conditioners more intelligent and multifunctional? It has become a major problem that needs to be solved in the field of air conditioning.

At the same time, modern women pay more and more attention to their own image, and they need to make up and match clothes carefully before going out. Beauty makeup and clothes matching have almost become what modern women must do every day. However, many women can only learn beauty makeup and clothing matching skills from the Internet or participating in training courses. Affected by time, money and transportation locations, the above learning methods have certain limitations. Then, how to use air conditioners to allow women to It is particularly important to be able to find the perfect makeup and clothing matching methods, show a delicate self, and improve the user's intelligent experience.

2. Project Content

In order to solve the above-mentioned problems of the single air conditioner function and the difficulty for women to learn the matching skills of beauty makeup and clothing, the embodiments of this project provide a modeling recommendation method, a device, an embedded system and a storage medium.

2.1. The modeling recommendation method provided by this project embodiment includes

Get the user's image information, the image information contains the user's face image;

Receive the input scene information to be attended by the user;

Determine the user's recommended makeup based on scene information and facial images;

The recommended clothing is determined based on the scene information and the recommended makeup.

Methods also include:

The voice recognition module of the embedded system

receives the first voice of opening the image acquisition module;

The voice recognition module determines the first instruction based on the first voice, and controls the image acquisition module to collect image information of the user based on the first instruction, and the image information includes: a body image, a back image and a face image.

Methods also include:

One or more target scene information is selected from a plurality of candidate scene information.

Methods also include:

Get facial features of facial images;

Match the face features with the model face features stored in the face data set, and use the multiple makeup looks in the makeup data set corresponding to the model face features whose similarity between the face features and the model face features exceeds the first threshold as the first 1. Recommended makeup;

A makeup look with a probability that the first recommended makeup look appears in the scene information is greater than the second threshold is determined as the user's second recommended makeup look.

Methods also include:

determine one or more clothing categories that match the scene information;

Recommended apparel that matches the recommended look is determined from one or more apparel categories.

Methods also include:

The speech recognition module of the embedded system receives the second speech;

The voice recognition module determines a second instruction based on the second voice, and controls the display screen to display a three-dimensional effect of recommended makeup and a matching scheme of recommended clothing based on the second instruction.

2.2. The embodiment of this project provides a modeling recommendation device, including

The acquisition module is used to acquire the user's image information, and the image information includes the user's face image;

a receiving module, used for receiving the input scene information to be attended by the user;

A determination module for determining the user's recommended makeup based on scene information and facial images;

The determining module is also used to determine the recommended clothing based on the scene information and the recommended makeup.

An acquisition module, configured to control the voice recognition module to receive the first voice for turning on the image acquisition module; the voice recognition module determines a first instruction based on the first voice, and controls the image acquisition module to collect image information of the user based on the first instruction, and the image information includes: Image, back image and face image.

2.3. This project embodiment provides an embedded system

It includes: a processor and a memory, where the processor is configured to execute the modeling recommendation program stored in the memory, so as to realize the modeling recommendation method of any one of the above-mentioned first aspect.

2.4. This project embodiment provides a storage medium

It includes: the storage medium stores one or more programs, and the one or more programs can be executed by one or more processors, so as to implement the modeling recommendation method in any one of the above-mentioned first aspect.

3. Specific Implementation Plan

In order to facilitate the understanding of the embodiments of this project, the following will further explain and illustrate with specific embodiments in conjunction with the accompanying drawings, and the embodiments do not constitute limitations to the embodiments of this project.

3.1. The second option

S11. Acquire image information of the user, where the image information includes a facial image of the user.

The embedded system includes a speech recognition module and an image acquisition module. The user sends a voice command to start, the voice recognition module of the embedded system receives the voice command to turn on the image acquisition module, and the image acquisition device on the embedded system collects the user's image, and the image must contain the user's face image.

Turning on the voice command may include: taking a photo, starting to take a photo, or taking a photo, etc.

S12. Receive the input scene information to be attended by the user.

The embedded system is provided with a display screen, the display screen presents the scene information to be attended for the user to select, the user can select one or more scene information to be attended, and the system receives the scene information input by the user.

The user's to-be-attended scene information may include: an occasion to attend and/or a person to meet.

Occasions of attendance may include: banquets, receptions, shopping, travel and/or negotiations.

People to meet can include: friends, leaders, clients and/or foreign guests.

S13. Determine the user's recommended makeup based on the scene information and the facial image.

After the image acquisition module of the embedded system collects the user's face picture, the face recognition module extracts the face feature of the user's face picture, and then compares the user's face feature with the model face feature stored in the system. If the similarity exceeds the first threshold (for example, 80%), the makeup in the makeup database corresponding to the model face feature whose similarity exceeds the first threshold is selected as the first recommended makeup.

According to the scene information selected by the user, in the first recommended makeup look, a makeup look with a probability of occurrence in the one or more scene information is selected as the second recommended makeup look.

S14. Determine the recommended clothing based on the scene information and the recommended makeup.

Users need to take photos of all the costumes in their wardrobe in advance and upload them to the embedded system. The system will automatically classify all the costumes. If the system classification is inaccurate, users can manually change the category of a certain costume.

After the system receives the scene information input by the user, the system can select one or more corresponding categories of clothing for recommendation according to the scene information, and then according to the second recommended makeup, the matching clothing such as color and style can be used as the final recommended clothing.

According to the modeling recommendation method provided by this embodiment of the project, the embedded system obtains the whole body image information and facial image information of the user, first recommends the first recommended makeup suitable for the user according to the facial features of the user, then selects the second recommended makeup that matches the scene information from the first recommended makeup according to the scene information selected by the user, then selects the matching clothing recommendation scheme according to the scene information and the second recommended makeup, and finally presents a complete modeling matching scheme to the user, which not only saves the user's precious time, but also improves the user's intelligent use.

3.2. The second plan

S21: the voice recognition module of the embedded system receives the first voice that starts the image acquisition module.

The user sends out the first voice, and the voice recognition module of the embedded system receives the first voice.

For example, the voice recognition module of the embedded system immediately receives the "take a picture" voice sent by the user.

S22: The voice recognition module determines the first instruction based on the first voice, and controls the image acquisition module to acquire the image information of the user based on the first instruction, wherein the image information includes a front image, a back image and a face image.

The voice recognition module of the embedded system receives the first voice from the user, confirms the first instruction corresponding to the first voice according to the first voice, and controls the image acquisition module of the embedded system according to the first instruction, so as to

control the image acquisition module to acquire the front image, back image and face image of the user.

For example, after receiving the first voice of "taking a picture" issued by the user, the voice recognition module of the embedded system recognizes that the first instruction is "taking a picture", and immediately controls the image acquisition module of the embedded system to start the photographing function, so that the front image, the back image and the face image of the user are taken and stored in the local memory.

S23. Select one or more target scene information from a plurality of candidate scene information.

The embedded system is provided with a display screen, which presents selectable scene information options for users to choose, and users can select one or more scene information from multiple scene information options.

For example, scene information includes attendance occasions and meeting people. Attendance occasions include banquets, receptions, shopping, travel and/or negotiations. Meeting people include friends, leaders, customers and/or foreign guests. Users can choose attendance occasions as shopping and meeting people as friends.

For another example, users can choose to attend banquets and negotiations, and choose to meet people as customers.

S24, obtaining the face features of the face image.

Only the air-conditioning system has a face recognition module, which can recognize the user's face features according to the user's face photos acquired by the image acquisition module, mainly identifying the user's facial organ features and/or facial contour features.

S25, matching the face features with the model face features stored in the face data set, and taking a plurality of makeup in the makeup data set corresponding to the model face features whose similarity with the model face features exceeds the first threshold as the first recommended makeup.

The face recognition module compares the recognized facial organ features and facial contour features of the user with the model face features stored in the face data set. If the similarity exceeds a first threshold (for example, 90%), the makeup in the makeup database corresponding to the model face features whose similarity exceeds the first threshold is selected as the first recommended makeup.

S26: Determine the makeup whose probability of the first recommended makeup appearing in the scene information is greater than the second threshold as the second recommended makeup of the user.

According to the scene information selected by the user, such as attendance and/or meeting people, a makeup with an appearance probability greater than or equal to a second threshold (for example, 80%) in one or more scene information is selected from the first recommended makeup as the second recommended makeup.

For example, the probability of a certain makeup on the Internet being recommended by major bloggers or being used at a gathering of friends exceeds 80%. If the user chooses to attend a party and meet people as friends, this makeup will be recommended to the user by the system.

S27. Determine one or more clothing categories that match the scene information.

The user uploads the clothes in his wardrobe to the embedded system in advance, and the system automatically matches the clothing category according to the clothing photos. If there are any errors, the user can manually change the category. There are clothing data sets in the embedded

system, including online clothing data connected to major websites and private clothing data of users. After the user selects the scene information, the system screens out one or more clothing categories according to the scene information.

For example, if the user chooses to travel, the matching clothing category can be leisure and comfort.

For another example, if the user chooses to negotiate, the matching clothing category can be business, socialite or business leisure.

S28. Determine the recommended clothing that matches the recommended makeup from one or more clothing categories.

The system matches one or more clothing categories according to the scene information selected by the user, and according to factors such as the color of the second recommended makeup look, the system matches multiple recommended clothing suitable for the second recommended makeup look from the matched one or more clothing categories.

S29. The speech recognition module of the embedded system receives the second speech.

The user sends out the second voice, and the voice recognition module of the embedded system receives the second voice.

For example, the user sends out the "appreciation" voice, and the speech recognition module of the embedded system immediately receives the user's "appreciation" voice.

S210. The voice recognition module determines a second instruction based on the second voice, and controls the display screen to display a three-dimensional effect of recommended makeup and a matching scheme of recommended clothing based on the second instruction.

The voice recognition module of the embedded system receives the second voice sent by the user, confirms the second instruction corresponding to the second voice according to the second voice, and controls the display screen of the embedded system according to the second instruction, and the display screen presents A three-dimensional effect image of the user's well-matched clothing and well-matched makeup.

For example, after receiving the second voice of "appreciate" from the user, the voice recognition module of the embedded system recognizes that the second command is "appreciate", and immediately controls the display screen of the embedded system to turn on the display function, and the display screen presents the user's voice. A 3D effect image with a good outfit and a good makeup look.

In the modeling recommendation method provided by the embodiment of this project, the embedded system obtains the user's whole body image information and facial image information, firstly recommends the first recommended makeup look suitable for the user according to the user's facial features, and then according to the scene information selected by the user, from the first recommended makeup In the recommended makeup, the second recommended makeup that matches the scene information is screened, and then the matching clothing recommendation scheme is selected according to the scene information selected by the user and the second recommended makeup, and finally a complete set of styling matching scheme is presented to the user, and displayed on the display screen. The three-dimensional display allows users to see the matching results at a glance, which not only saves the user's precious time, but also improves the user's intelligent use experience, and also solves

the problem of the single air-conditioning function lacking intelligent entertainment functions.

3.3. Modeling recommendation device

Specifically include:

The acquisition module is used to acquire the user's image information, and the image information includes the user's face image;

a receiving module, used for receiving the input scene information to be attended by the user;

A determination module for determining the user's recommended makeup based on scene information and facial images;

The determining module 303 is further configured to determine the recommended clothing based on the scene information and the recommended makeup.

an acquisition module, specifically configured to control the voice recognition module to receive the first voice for turning on the image acquisition module; the voice recognition module determines a first instruction based on the first voice, and controls the image acquisition module to collect image information of the user based on the first instruction, and the image information includes: Body image, back image and face image;

The receiving module is specifically used for selecting one or more target scene information from a plurality of candidate scene information;

A determination module, which is specifically used for obtaining the face features of the face image; Matching the face features with the model face features stored in the face data set, and taking a plurality of makeup features in the makeup data set corresponding to the model face features whose similarity with the model face features exceeds a first threshold as first recommended makeup features; Determining the makeup whose probability of the first recommended makeup appearance in the scene information is greater than a second threshold as the second recommended makeup appearance of the user;

A determining module, further configured to determine one or more clothing categories matched with the scene information; The recommended clothes matching the recommended makeup are determined from one or more clothing categories.

The styling recommendation device provided in this embodiment can be the styling recommendation device shown in Figure 3, which can perform all the steps of the styling recommendation method shown in Figure 1-2, and further realize the technical effect of the styling recommendation method shown in Figure 1-2. Please refer to the relevant description in Figure 1-2 for a concise description, so it will not be repeated here.

4. The Structure of Embedded System

The embedded system includes at least one processor, a memory, at least one network interface and other user interfaces. The components in the embedded system are coupled together through the bus system. It can be understood that the bus system is used to realize the connection communication between these components. Besides data bus, the system also includes power bus, control bus and status signal bus. But for the sake of clarity.

The user interface may include a display, a keyboard or a pointing device (for example, a mouse, a trackball, a touch pad or a touch screen, etc.).

It can be understood that the memory in the embodiment of this project can be volatile memory or nonvolatile memory, or can include both volatile and nonvolatile memory. The nonvolatile memory can be Read-OnlyMemory(ROM), ProgrammableROM(PROM), erasable programmable ROM (EPROM), ElectricallyEPROM,EEPROM programmable ROM (EEPROM) or flash memory. The volatile memory may be a random access memory (RAM), which is used as an external cache. By way of illustration but not limitation, many forms of RAM are available, such as StaticRAM,SRAM), DynamicRAM,DRAM), SynchronousDRAM, SDRAM), double data rate synchronous dynamic random access memory (ddrsdram), enhanced synchronous dynamic random access memory (esdram), synchronous connection dynamic random access memory (sldram) and direct memory bus random access memory (drram). The memories described herein are intended to include, but are not limited to, these and any other suitable types of memories.

In some embodiments, the memory stores the following elements, executable units or data structures, or their subsets, or their extended sets: operating system 1 and application programs 2.

Among them, operating system 1 contains various system programs, such as framework layer, core library layer, driver layer, etc., which are used to realize various basic services and handle hardware-based tasks. Application 2, including various application programs, such as MediaPlayer and Browser, is used to realize various application services. The program to realize the method of this project embodiment can be included in application 2.

The program or instruction stored by calling the memory, specifically, the program or instruction stored in the application program 2, is used by the processor to execute the method steps provided by each method embodiment, including, for example:

Acquiring image information of a user, wherein the image information includes a face image of the user; Received scene information to be attended by users; Determining the recommended makeup of the user based on the scene information and the facial image; Determine recommended clothing based on scene information and recommended makeup.

The voice recognition module of the embedded system receives the first voice that starts the image acquisition module; The voice recognition module determines the first instruction based on the first voice, and controls the image acquisition module to acquire the image information of the user based on the first instruction, wherein the image information includes a front image, a back image and a face image.

One or more target scene information is selected from a plurality of candidate scene information.

Acquiring face features of a face image; Matching the face features with the model face features stored in the face data set, and taking a plurality of makeup features in the makeup data set corresponding to the model face features whose similarity with the model face features exceeds a first threshold as first recommended makeup features; Determine the makeup whose probability of the first recommended makeup in the scene information is greater than the second threshold as the second recommended makeup of the user.

Determining one or more clothing categories matched with the scene information; The recommended clothes matching the recommended makeup are determined from one or more

clothing categories.

The voice recognition module of the embedded system receives the second voice; The voice recognition module determines the second instruction based on the second voice, and controls the display screen to display the recommended makeup and recommended matching scheme of the three-dimensional effect based on the second instruction.

The method disclosed in the above project embodiment can be applied to or implemented by a processor. The processor may be an integrated circuit chip with signal processing capability. In the implementation process, each step of the above method can be completed by the hardware integrated logic circuit in the processor or the instructions in the form of software. The above processor can be a general-purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic devices, discrete gate or transistor logic devices, and discrete hardware components. The methods, steps and logic diagrams disclosed in the embodiment of this project can be implemented or executed. The general-purpose processor can be a microprocessor or the processor can be any conventional processor or the like. The steps of the method disclosed in connection with the embodiment of this project can be directly implemented by a hardware decoding processor, or implemented by a combination of hardware and software units in the decoding processor. The software unit can be located in RAM, flash memory, read-only memory, programmable read-only memory or electrically erasable programmable memory, register and other mature storage media in this field. The storage medium is located in the memory, and the processor reads the information in the memory and completes the steps of the above method in combination with its hardware.

5. Concluding Remarks

In the modeling recommendation scheme provided by the project embodiment, the image information of the user is obtained, and the image information includes the face image of the user; Received scene information to be attended by users; Determining the recommended makeup of the user based on the scene information and the facial image; Based on the scene information and recommended makeup, the

recommended clothing is determined. By this method, the precious time of choosing makeup and matching clothing before the user goes out can be saved, and the embarrassing situation that the user makes a wrong choice can be avoided.

References

- [1] Research on the influence of training set on automatic target recognition under super-resolution of remote sensing images [J]. Rebecca, Li Ang, Wang Shengquan. Journal of Chongqing University of Science and Technology (Natural Science) .2021 (02).
- [2] Ship target detection and recognition method based on remote sensing [J]. Li Zongling, Wang Luyuan, Yu Jiyang, Cheng Bowen, Hao Liang. Remote Sensing Information .2020 (01).
- [3] Remote sensing estimation and spatial-temporal distribution of actual evapotranspiration in the Yangtze River Basin [J]. Yin Jian, Qiu Yuanhong, Ou Zhaofan. Journal of Beijing Normal University (Natural Science Edition) .2020 (01).
- [4] UAV monitoring of mangrove species based on deep convolutional neural network [J]. Huang Yiqi, Liu Qi, Zhao Jianye, Huang Wenshan, Sun Zhongyu, Joessi. China Journal of Agricultural Chemistry .2020 (02).
- [5] Overview of the application of recommendation system based on deep learning [J]. Lv Gang, Zhang Wei. Software Engineering .2020 (02).
- [6] Research progress of data processing and application of abbreviated polarization SAR [J]. Xu Lu, Zhang Hong, Wang Chao, Wu Fan, Zhang Bo, Tang Yixian. Journal of Radar .2020 (01).
- [7] Judgment method of speech lip movement consistency based on the analysis of specific vowel pronunciation events [J]. Zhu Zhengyu, Qiu Huayu, Yang Chunling, Wang Yong. Journal of South China University of Technology (Natural Science Edition) .2020 (01).
- [8] Application of machine learning method in clinical decision support in the era of omics [J]. Zhao Xuetong, Yang Yadong, Qu Hongzhu, Direction East. Genetics. 2018(09).
- [9] Review of recommendation system research based on deep learning [J]. Huang Liwei, Jiang Bitao, Lu Shouye, Liu Yanbo, Li Deyi. chinese journal of computers. 2018(07).
- [10] Deep learning research for natural language processing [J]. Xi Xuefeng, Guodong Zhou. acta automatica sinica. 2016(10).