Hotel room design based on face recognition, environment monitoring and AV regulating system

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Abstract

With the improvement of people's living standard, the tourism industry has transformed from the traditional sightseeing tourism to the vacation tourism, In order to improve the quality of the overall experience of resort hotel, the article by using the image acquisition technology, the facial expression recognition technology, the changes of Gabor and the DIB support, VC++ of bitmap provided by Visual Studio, has designed the basic member variables required by bitmap processing packaging DIB and the unrelated CDib of the member function device, and has constructed the facial expression recognition module of the mood regulation system of hotel interior. On the side of audio stream, use PC port as the audio stream scheme of the sound source, in the PC port, separate Av signal, preset the operation and treatment on the end of the playback software, and make self-regulation of sound adjustment in the output end of sound. The highly fidelity of sound has been established.

Keywords: hotel interior, Influence acquisition, feature extraction, frequency

1 Introduction

With the improvement of people's living standard, people's selection of tourism types has shifted from the sightseeing tourism to the vacation tourism. What it has brought about afterwards, is the booming of resort hotels. As people's entertainment venues, the resort hotel needs richer and more colourful and vibrant space than ordinary hotels, as it needs to meet people's growing demand for vacation and to create the life of idyllic beauty for people. People go for holiday from the busy and heavy work, it requires resort hotel also have the ability to adjust the mood, which provides a good opportunity for the designers to give play to the imagination and creativity [1].

The present domestic study shows that the environmental psychology requires the indoor environment design meet people's behaviour mode and psychological characteristics, as well as the personality of users and mutual adjustment of environment [2]. At this point, the paper has made a design proposal for the resort hotel interior designing by regulating the indoor environment to adjust the mood. It saves a lot of renovation costs for the hotel also while allows users to experience a different style of decoration.

2 Technical route for system implementation

Of which, (1) output captured image; (2) comprehensive analysis on weighted environmental mood parameters and weighted facial mood parameters; (3) analysis and calculation for the schemes of living environment suitable to improve mood; (4) process superior orders and invoke the video database, output configuration scheme; (5) implementation of program, projection image and play background music.

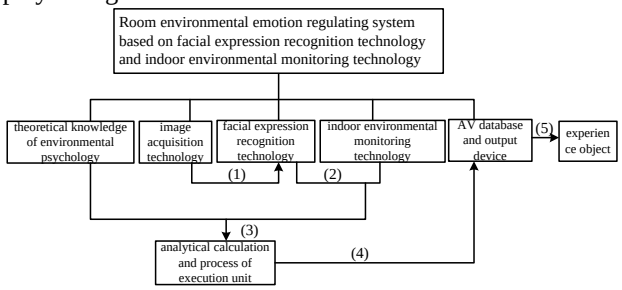

FIGURE 1 System technology route map

The system obtains the facial image of the participators with the scope that the images are able to be captured, with the image acquisition technology and input it into the image processing unit of the next level to conduct facial image analysis, capture the expression details with the facial expression recognition technology, analyse these feature values and give intelligence score Score-1 for the mood state presented by these expressions. Score-1 plus is the weighted facial mood parameters, which comes into being by Score-1 intelligence grades [3]. The system will analyse the image acquisition of the facial expression, while conduct acquisition and analysis of the indoor environment parameters. After the sensor has perceived the environment parameters, it will output these parameters to the weighted arithmetic of the next level. During the computing, these parameters will follow the predetermined algorithm to process the values of the light

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intensity, temperature, humidity and atmospheric pressure, to figure out Score-2 plus, namely the weighted environmental mood parameters. After the weighted facial mood parameters Score-1 plus and weighted environment mood parameter Score-2 plus, the system will conduct comprehensive analysis and computation and figure out the living environment schemes suitable to improve the mood, based on relevant rules of environmental psychology.

3 Key of system technology

3.1 FACIAL EXPRESSION RECOGNITION PROGRAMMING MODULE

The expression features extraction is realized by the use of Gabor transform. The Gabor transform belong to the windowing Fourier transform, which is a special circumstance in the short-time Fourier transform when the window function is evaluated as the Gaussian function. Practically, it is still to request convolution of the two-dimensional image [5] and it can extract the related features in different scales and directions [6]. Gabor function is similar to the biological role of human eye, and is often used for texture recognition, which is the key that it can extract facial expression feature [7]. The facial expression classification algorithm can be realized the use of DIB related to bitmap, which is provided by Visual Studio. The digital image can be realized by the custom class CDib provided by VC++, which is contained in Visual Studio. The design of the device-irrelevant class CDib can package the basic member variables and functions needed by DIB bitmap processing [8].

It can use the VS2008 development environment, MFC to achieve interface. After the initialization of template, run the software and open the diagram to be processed, then the fine recognition of expression can be conducted. Now the accurate expression recognition of happiness, disgust, anger, fear, sadness, neutral and shock in the database has been completed. The system block diagram is as shown in Figure 2.

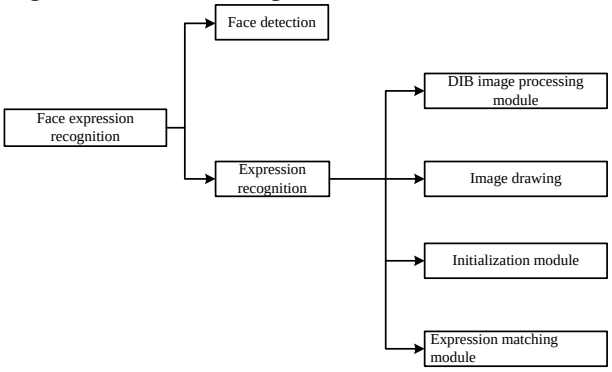

FIGURE 2 System block diagram

(1) Present block diagram of module debugged

The debugged DIB processing module includes the following aspects: save the DIB image, normalization processing of image; constructor and destructor; construct DIB image; obtain CIB image from file; Obtain the subimage class and the both large-sized and small-sized DIB information; By taking pDIB as module, the model pGabor of Gabor as content, create new DIB file, of which both the length and the width is 1/5 of the original image.

(2) Initialization of module

The initialization module comprises constructor, the initialization of function and the release of resources.

3.2 AUDIO STREAMING SOLUTION

The audio stream is the mood and the weather data input by the previous system, and is also the final implementation scheme and the important component of output terminal of data stream in the hardware treatment, so it should be specially produced according to the needs and characteristics of the system. In consideration of the influence on the space shell material and sound system external structure and the blend use of data exchange interfaces of the central processing platform of PC end, decide to carry out two sets of predetermined audio stream solutions. In the stage of the cooperative work of various components in the system, and under the frame of the centre algorithm, integrate the demand of interface and resource and select the preferential audio stream solutions, which will be attached on importance later.

Introduce in detail the two sets of predetermined audio streaming solutions:

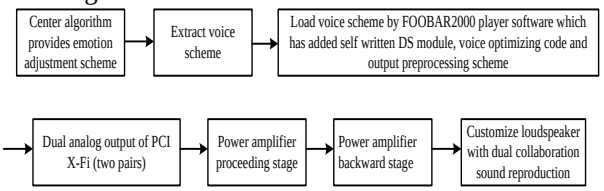

FIGURE 3 Schemes 1

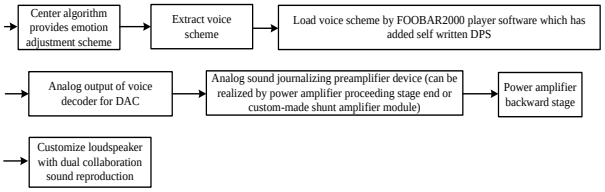

FIGURE 4 Schemes 2

The overall philosophy of the article of using PC end as the sound source is to process the separation of AV signal in the PC end, preset the operation and treatment of the output information on the top of the playback software, and make the self-regulated sound adjustment in the end of sound output. In this way, the audio stream becomes innovated and independent. Unlike the other main stream medias, the internal clocking of PC can synchronize and asynchronize the audio frequency and video frequency, PC can separate the audio stream with video stream and make digital decoding and simulated amplification of the audio stream, which is great emancipation for the audio effects in the audio end, and make the quality of sound effect more excellent. In the

level of audio decoder, the DAC module will be positioned that the external sound card or independent digital analogue converter will replace the inner on board sound card, built-in sound card, merged amplifier, etc. The advantage of it is that there will be inner disturbance and shielding problems, brought about by the built-in card and the on-board card and it solves the puzzle that it is hard to input and output multiple, which is caused by the previous and later levels with independent of merging efficacy. Of course the audio efficacy(device to merge the amplification video and audio streams), originally audio amplification device also has the typical functions of sound effect and fulu, which will conduct self-code-edition on FOOBAR2000 in the PC end, so as to preset sound effect, DSP setting and the operation of optimizing sound effect, so as to better achieve index parameters of sound channel isolation, delayed time range, all kinds of sound field modes, while it can separate the excessive operations and functions of the related part of videos in AV, which will affect the sound quality.

Different from the traditional independent type design of amplifier of PC together with AV power, the scheme will bring about the improvement in high fidelity. It requires the sound equipment to conduct distortionless amplification process of various indicators, during playback [9]. At the same time, use subtle music style for the dyeing of sound.

(1) When AV amplifier plays the sound source of large signal, the dynamic range is poor and the transient is lagged and it lacks of confidence; the audio stream makes the independent decoding he amplified and the process of dynamic state and frequency response more leisurely.

(2) With respect to AV amplifier routing, the amplifier module is the input and output of the same type interface and it does not need routing and fly line. The advantage of routing is reflected in shielding.

(3) The multiply interfaces displayed by traditional multimedia will affect the sound quality.

4 Conclusion

Based on the environmental psychology, with the environmental monitoring technology and the facial expression recognition technology, the article has conducted the acquisition of the related parameters and information on the hotel inner objects, made intelligent process and analysis on the relevant knowledge, worked out the adjustment scheme of hotel room environment suitable to improve the mood of the objects, and finally fulfil the purpose to improve the mood the target objects. From the detection and screening of weather factors by the integrated transducer and the reading of the facial image information by the facial expression recognition, the system will conduct intelligent analysis of the target objects, and then the actuating station piece will make changes to the environment hues, the wall patterns and background music. The system, by changing the tourist hotel indoor "scenery" to arouse the "affection" experiencing joy, and to form different mood themes, gives deep-felt care to the tourists with the recreational purpose and the need to get relaxed.

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