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RESEARCH ARTICLE

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FACE DESCRY SYSTEM

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ABSTRACT

This paper discusses an expert system called Integrated System for Facial Expression Recognition (ISFER), which performs recognition and gesture classification of human facial expression from a still full-face image. The proposed system helps you to have a two level security for your system. The system consists of two major parts. The first one is the ISFER, which forms a framework for facial feature detection. Multiple feature detection techniques are also applied. The second part of the system is its inference engine which converts low level face geometry into high level facial actions. The importance of utilizing biometrics to establish personal authenticity is growing in the present scenario of global security concern. Development of a biometric system for personal identification, which fulfils the requirements for access control of secured areas and other applications like identity validation for social welfares, crime detection, ATM access, computer security, etc., is felt to be the need of the day. Face gesture recognition approaches for still images can be broadly categorized into holistic methods and feature based methods.

INTRODUCTION

The user interface for the computer systems is evolving into an intelligent multi-modal interface. It is now moving away from keyboard-given instructions to more natural modes of interaction, using visual, audio and sensorial means. This is the first step in achieving a human-like communication between man and machine. Human communication has two main aspects: verbal(auditory) and non-verbal (visual). Phenomena like facial expressions, body movements and physiological reactions are the atomic units of the non-verbal communication. Although it is quite clear that non-verbal gestures are not necessary for successful human interaction, considerable research in social psychology has shown that non-verbal gestures can be used to synchronise dialogue, to signal comprehension or disagreement, to make dialogue smoother and with fewer interruptions. This finding itself suggests that multi-media man-machine communication systems could promote more efficient performance. At the moment there are several systems available for automatic speech recognition.

A. Problems of face detection and facial feature Extraction

In fact, detecting human faces and extracting the facial features in an unconstrained image is a challenging process. It is very difficult to locate the positions of faces in an image accurately. There are several variables that alert the detection performance, including wearing of glasses, different skin coloring, gender, facial hair, and facial expressions. Furthermore, the human face is a three-dimensional (3-D) object, and might be under a distorted perspective and uneven illumination. As a result, a true face may not be detected. Moreover, facial feature extraction is a time-consuming process due to the lack of constraint on the number, location, size, and orientation of faces in an image or a video scene.

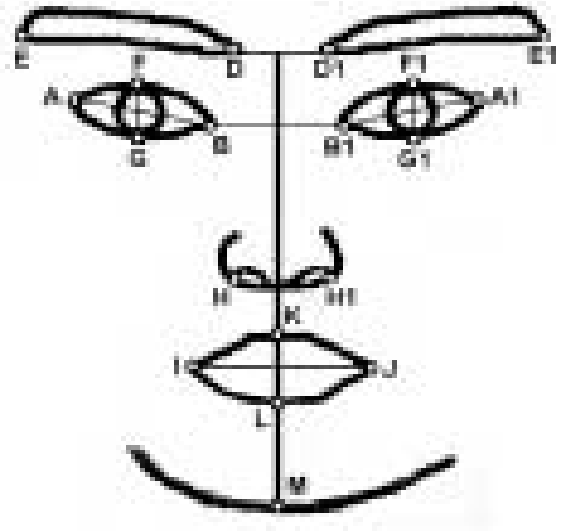


Figure 1. Feature Points

B. Existing work on face detection and facial feature Extraction

Recently, human face detection algorithms based on color information have been reported. Experimental results showthat the skin-like regions can be segmented by considering the chrominance components only. Although skincolors differ from person to person, and race to race, they are distributed over a very small area on the chrominance plane. The major difference between the skin tones is intensity. However, human face detection andfacial feature extraction in grey-level images may be more difficult because the characteristics of skin tonecolor are not available. Extraction of facial features by evaluating the topographic grey-level relief has been introduced. Since the intensity is low for the facial components, the position of the facial features can be determined by checking the mean grey-level in each row and then in each column. The pre-processing step for reducing the lighting effect is very important for the methods. In our previous work, possible face candidates in a grey-level image with a complex background were identified by means of valley features on the human eyes. In this paper, we propose an efficient method for locating the face region and facial features based on the characteristics of eye regions. In order to improve the level of detection reliability, the lighting effect is also considered and alleviated for the possible face regions.

II.DEVICE DESCRIPTION

In hardware the components are camera whose resolution is 640*480 24bit RGB and it can capture 15 frames per second, ATMEG8 Microcontroller, RFID card reader, keypad 8*8, USB A-B converter, LCD 16*2, USB explorer RS232.

A. Circuits

Programmer Circuit for Microcontroller.

B. Software

The software section is completely based on MATLAB. In our interface we have used MATLAB for gesture recognition. Here we will be using a camera for recording the gestures from the user. The camera

connected to the hardware unit is used as input for authentication. The facial gesture will be stored in the database, matched with the stored image and the gesture would be verified on the basis of dynamic characteristics of facial gestures.

C. Key Components

D. Hardware

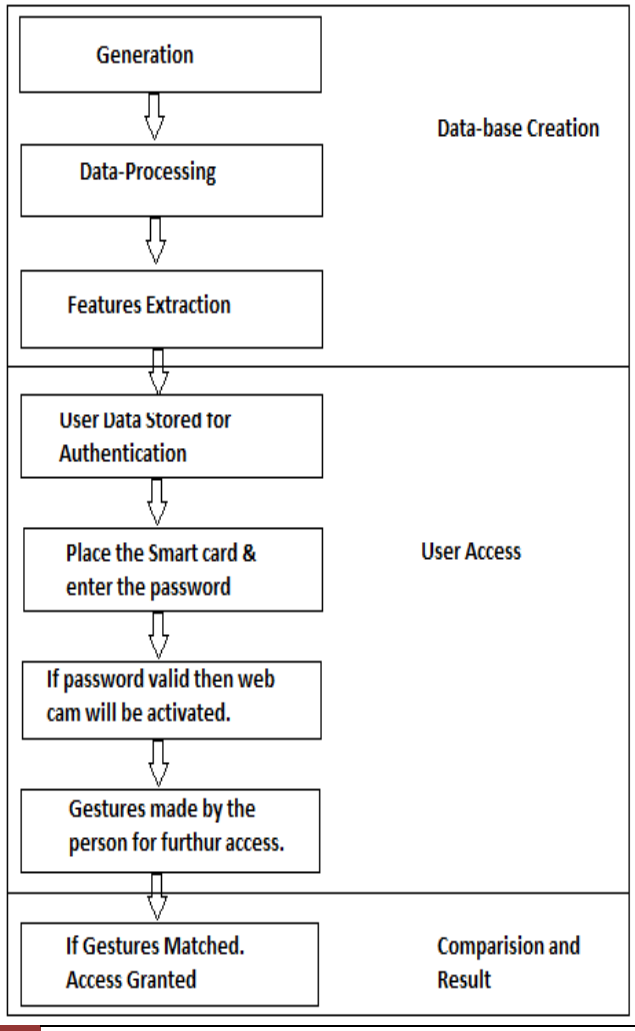
1. PC
2. ATMEG8 Microcontroller
3. RFID card reader
4. USB explorer RS232
5. Keypad 8*8
6. LCD 16*2
7. Camera 640*480 15fps
8. USB A-B converter, 7905 etc.

E. Software

1. Embedded C.
2. MATLAB

III. FLOW DIAGRAM

Overview of the procedure followed.



IV. OPERATION

Initially the Smart card will be used for the basic authentication purpose and then to enter the password. If the password is valid then the web cam will be activated. Then to get into the authentication process the user has to enter the Gestural password which will then be compared with the previously created data base. The gesture will be compared with that stored in the system database. If both the gestures are matched then the user will be authenticated and allowed for further process. There are 22 different facial gestures that can be used which are as follows:

1. To raise inner portion of the eyebrows.
2. To raise outer portion of the eyebrows.
3. To pull eyebrows closer together.
4. To raise upper eyelids.
5. To raise cheeks (smile).
6. To raise lower eyelids.
7. To pull lips towards each other.
8. To pull mouth corners up.
9. To pull mouth corners sharply up.
10. To pull mouth corners down.
11. To push mouth medially forward.
12. To stretch mouth horizontally.
13. To tighten lips.
14. To press lips together.
15. To part lips.
16. To part jaws.
17. To stretch mouth vertically.
18. To suck lips into the mouth.
19. To suck cheeks into the mouth.
20. To widen nostrils.
21. To compress nostrils.
22. To drop upper eyelids.

Using multiple combinations of these gestures the password will be created. The authentication of the same will be done.

V. ADVANTAGES

1. It is very useful in authentication and security.
2. Common man can easy control it.
3. It is very much cost effective.
4. Simple in design.

VI. APPLICATION

The maximum application is in Banking for ATM. It can be used for computer security, voter verification, government security and residential security.

VII. CONCLUSION

We have designed and developed a system for reliable recognition of gesture. This system can be made highly efficient and effective if required conditions are maintained. The setup for maintaining these different conditions will be a onetime investment for any real life application.

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