Novateur Publication's
International Journal of Innovation in Engineering, Research and Technology [IJIERT]
ICITDCEME'15 Conference Proceedings
ISSN No - 2394-3696

ISOLATED PATIENT RECOGNITION AND MONITORING USING 2 WAY MIRROR

Prajakta S. Joshi
Department of Electronics and Telecommunication, Dr. B.A.M.University,
Aurangabad, Maharashtra, India

Shubham S. Joshi
Department of Electronics and Telecommunication, Savitribai Phule University,
MIT Engineering College, Pune, India

ABSTRACT
In this prototype work, the mirror is used to detect face as well as to measures heart rate of user by using the high definition camera placed behind the mirror which is invisible to user. We can make the use of detected face for recognition and store it as database for further reference at doctor's lab. The mirror tracks and displays user's heart rate in real time without using external sensors and sticky electrodes which generally discourages the patient who is already suffering a lot. Advantage of the system is ,Any ordinary person who is not ill also can take care of own health anywhere like home, offices, etc. as it take few minutes to stand and record heart rate in front of mirror. In this system, we propose an isolated detection and recognition of patient by using only mirror and camera behind it. User can detect their heart rates simply by looking into 2 way mirror.
KEYWORDS: Real time system, Digital camera, 2 way mirror.

INTRODUCTION

Digital medical devices promise to transform the future of medicine because of their ability to produce perfect detailed individual physiological data. The Medical Mirror is a novel interactive interface that tracks and displays a user's heart rate in real time without the need for external sensors. Currently, collection of physiological information requires users to strap on bulky sensors, chest straps, or sticky electrodes. The Medical Mirror allows contact-free measurements of physiological information using a basic imaging device. When a user looks into the mirror, an image sensor detects and tracks the location of his or her face over time. By combining techniques in computer vision and advanced signal processing, the user's heart rate is then computed from the optical signal reflected off the face. The user's heart rate is displayed on the mirror, allowing visualization of both the user's physical appearance and physiological state. Digital medical devices promise to transform the future of medicine because of their ability to produce exquisitely detailed individual physiological data. As ordinary people start to have access and control over their own physiological data, they can play a more active role in the management of their health. This revolution must take place in our everyday lives, not just in the doctor's office or research lab. Users can have the experience of remote health monitoring by simply looking into the Medical mirror. Also the recognition held in our work in which database of regular patient will be stored in doctors lab and no need to patient that measures heart rate every time of come in lab for regular check up. Recognition is the computer application capable of identifying or verifying a person from digital image or video frame. To do this is by comparing selected facial features from image and facial database. [1]

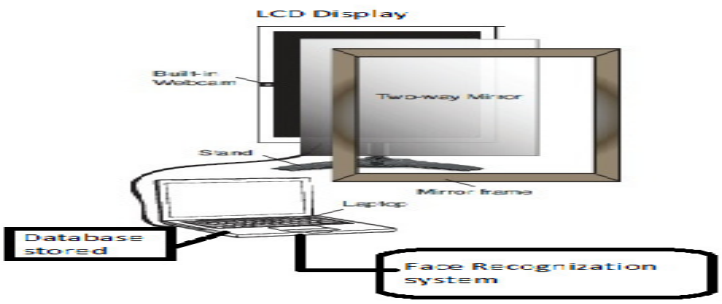


Fig . Proposed working

From the above diagram we can say that the medical mirror is to provide a natural user interface. And LCD monitor with built in webcam to provide an interactive display. Also the 2 way mirror was fitted on to frame to present a reflective surface for users in normal lightning conditions. The user is visible to the webcam and LCD monitor can be used to project information onto the reflective surface of the mirror. The monitor and webcam are connected to laptop running the analysis software in real time.

WORKING

In this prototype the heart beat of user can be calculated by using face detection but the exact procedure is: firstly we uses light to measure information from your body then every time your heart beats, the blood in your vessels increases very slightly. And the blood absorbs light and so this increase absorbs more mono light, decreasing the amount of light being transmitted or reflected by your body. In this case we were just using the ambient light around you, sunlight, room light or anything that's illuminating your environment. The camera then measures the mono light being reflected off you; in this case your face can be measured.

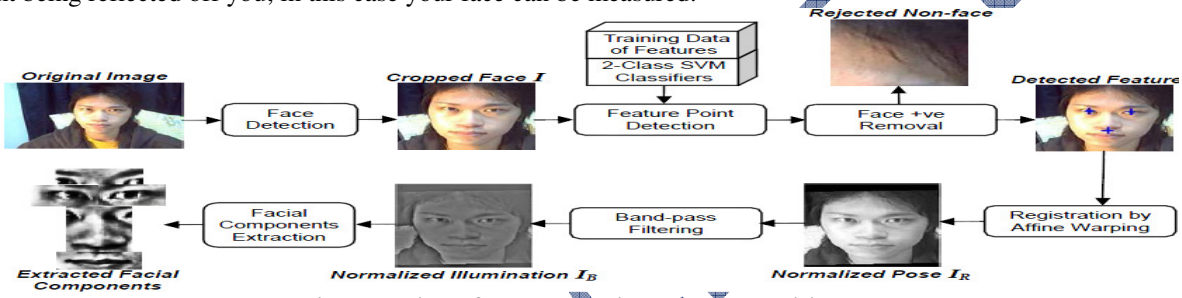


Fig. Working of Face detection and Recognition

FACE DETECTION

Face can be detected by using RGB channels. Red slices of image, Green slices of image, and Blue slices of image that will produce the random waveform depending on the color value of pixels. In color image each pixel contains 24 bits that has 8 bits of Red, 8 bits of Green and 8 bits of Blue. An automated face tracker detects the largest face within the video feed from the webcam and localizes the measurement region of interest (ROI) for each video frame.[2]

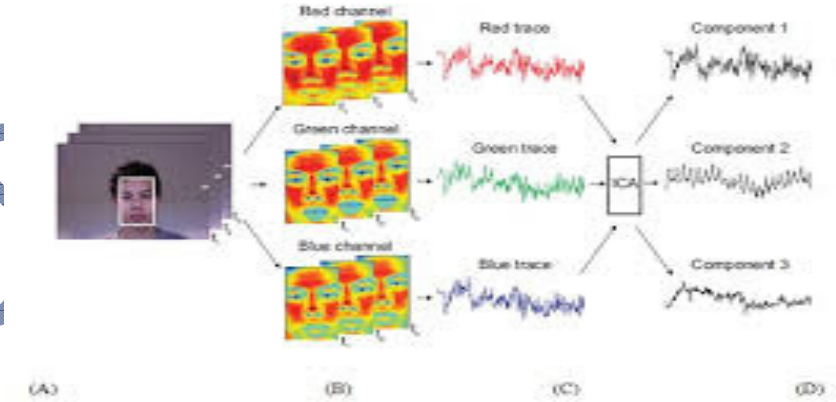
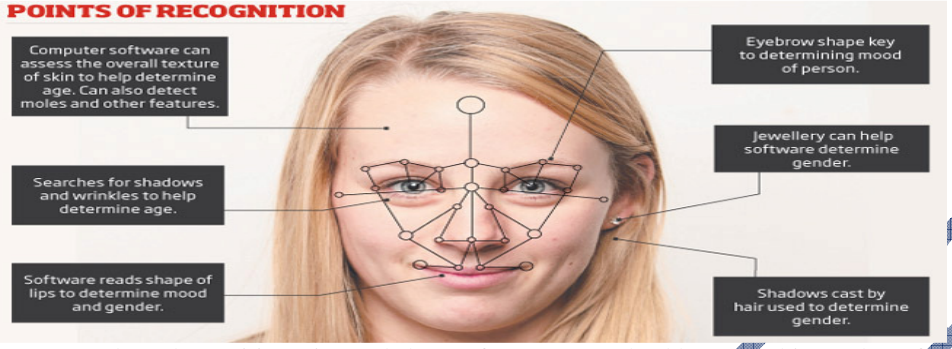


Fig . Showing the pulse measurement results

The raw RGB signals are decomposed into three independent component using ICA. i.e. independent component analysis. The power spectrum of component containing the strongest blood volume pulse signal is then computed. The users heart rate is quantified as the frequency that corresponds to the highest power of the spectrum within an operational frequency band (45-240 bpm) . [1]

FACE RECOGNITION

Recognition is a computer application capable of identifying or verifying a person from digital image or video frame. To do this is by comparing selected facial features from image and facial database.



Face recognition can analyze the position, size and shape of eyes, nose, cheekbones and jaw. These features are then used to search for other image has matching features. We use principal component analysis algorithm for recognition. A newly emerging trend is 3D face recognition in which 3 D sensors capture information about shape of face. And it is not affected by changes in lighting like other recognition. We can use different angles to identify face. There are different software used for the face recognition like Digicam, I photo (Apple), Light room(Adobe), etc.[7]

2 WAY MIRROR

It is fitted onto the frame to present a reflective surface for the user in normal lighting. LCD monitors uses with built in web cam to provide interactive display. Which is not visible to user but user is visible to webcam and LCD monitor which is used to project information onto reflective surface.

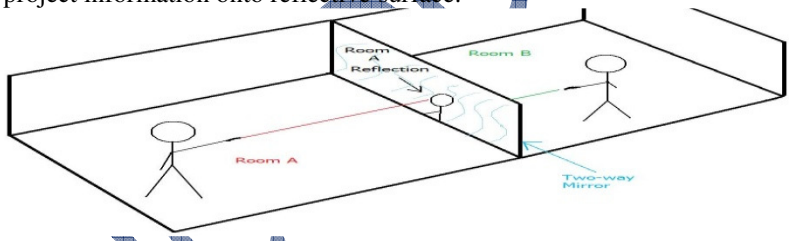


Fig. Methodology of 2 way mirror

From the above figure we can see that user A can not seeing to user B but user B can see the user A.[3]

RESULT ANALYSIS

Fig. Proposed idea

A single user will be able to interact with the mirror at a time. When looking into the mirror, the user will see a box appear around his/her face and a timer will be displayed on the top corner of the box. Users will be asked to stay relatively as the timer counts down. After 15 s, the user's heart rate will be displayed on the mirror, allowing simultaneous visualization of his/her physical appearance and physiological state. The heart rate measurement will be updated continuously until the user looks away.

As well as this mirror can be placed at reception hall that will register the patient along with their heart rate measured. So there is no need to patient for suffering from the sticky electrodes and heavy sensors. This is by using the face recognition with the camera built behind the mirror and regular patient database has already stored in lab.

CONCLUSION

This project gives a novel methodology for medicinal real time application whose interface is intended to provide a convenient mean for people to track their daily health having minimum efforts, using simply a mirror which assist to record and monitor a cardiac pulse rate of a person along with face recognition at just a glance in mirror at the time of like brushing teeth, shaving, combing etc. The system makes use of mirror along with webcam, LCD which has the widespread availability and economical. This system is user friendly for the patient who is undergoing through number of health issues by using automated and motion tolerant system. Therefore the patient needs not to check their heart rate every time because regular patient database has already store in doctors' lab, by seeing in the mirror that data will be update only. So this technology is promising for extending and improving access to medical care.

REFERENCES

1] Miss Bhagyashree J. Bhoyar , Mrs. Smita R. Londhe submitted "Methodology for Medical Mirror" in IJSRT publication in jan.2014 vol.4, ISSN 2250- 3153.
2] Ming-Zher Poh, Daniel J. McDuffie and Rosalind W. Picard,´ Non-contact, automatedcardiac pulse measurements using video imaging and blind source separation.´ Optical Society of America, 2010
3] I. Pavli is, J. Dowd all, N. Sun, C. Puri, J. Fei, and M. Garbey, ³Interacting withhuman physiology,´ Comput. V is. Image Underst.108 150±170 (2007)
4] S. Cook, M. Togni, M. C. Schaub, P. Wenaweser, and O. M. Hess, ³High heart rate: acardiovascular risk factor? ´ Eur. Heart J.27 (20), 2387±2393 (2006) International Journal of Scientific and Research Publications, Volume 4, Issue 1, January 2014 4 ISSN 2250-3153 www.ijsrp.org
5] K. Humphreys, T. Ward, and C. Markham, ³Noncontact simultaneous dualwavelength photoplethysmography: a further step toward noncontact pulse oximetry,´ Rev. SciInstrum78 (4), 044304 (2007)
6] C. Takano, and Y. Ohta, ³Heart rate measurement based on a time-lapse image,´ M ed.E ng. Phy s29 (8), 853± 857(2007).
7] S. Hu, J. Zheng, V. Chouliaras, and R. Summers, ³Feasibility of imaging photo plethysmography,´ in Proceedings of IEEE
8] https://en.wikipedia.org/wiki/Facial_recognition_system.