AUTHENTICATION USING FACE RECOGNITION

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ABSTRACT

Face recognition is a kind of biometrics which based on the facial feature information of human. And face recognition has wide application value in computer information security, medical treatment, security monitoring, human-computer interaction. In this process, we going to detect and extract the facial feature from image and then recognize the person. The steps followed for this process is face detection, feature extraction and classification. And it can significantly contribute to the authenticity of the generated face by matching the dataset image with the additional facial attribute feature of the original image.

KEYWORDS

Face mask detection
CNN- Convolutional Neural Network

I.INTRODUCTION

Facial expression recognition has potential applications in different aspects of day-to-day life not yet realized due to absence of effective expression recognition techniques. This paper discusses the application of Gabor filter based feature extraction in combination feed forward neural networks (classifier) for recognition of seven different facial expressions from still pictures of the human face. The study presented here gives simple method in facial expression recognition. Facial expression recognition has potential applications in different aspects of day-to-day life not yet realized due to absence of effective expression recognition techniques. This paper discusses the application of Gabor filter based feature extraction in combination feed forward neural networks (classifier) for recognition of seven different facial expressions from still pictures of the human face. The study presented here gives simple method in facial expression recognition.

II. Existing System

- The face detection system is built based on the template matching, while the face recognition is based on the principle component analysis.
- Even the face detection module has good performance in some conditions, person doesn't use accessories that cover part of face, person doesn't use shirt with color similar to skin color, and background color is difference fromskin color.

Disadvantages:

- Image quality is very low.
- Difficult to create the dataset image.
- It has more complexity in handlingthe unreadable image.
- It is more precise to handle.

III. Proposed System

- As the necessity for higher levels of security rises, technology is bound to swell to fulfill these needs. Any new creation, enterprise , or development should be uncomplicated and acceptable for end users in order to spread worldwide.
- In this process, face feature descriptors are extracted, by means of ***Local Binary Patterns (LBP) and*** classification by means of ***CNN*** classification are two representative methods

Advantages:

- It is easy to implement and can readily be combined with any existing feature descriptor, thus leading to a more compact and expressive feature descriptor.
- Image quality is high.
- It achieves superior performance.

IV. MODULES DESCRIPTION

Image Aquistation

Read an image into the workspace, using the imread command. The example reads one of the sample images included with the toolbox, an image, and stores it in an array named I. imread infers from the file that the graphics file format is Tagged Image File Format (TIFF). Display the image, using the imshow function. You can also view an image in the Image Viewer app. The imtool function opens the Image Viewer app which presents an integrated environment for displaying images and performing some common image processing tasks. The Image Viewer app provides all the image display capabilities of imshow but also provides access to several other tools for navigating and exploring images, such as scroll bars, the Pixel Region

tool, Image Information tool, and the Contrast Adjustment tool.

Preprocessing:

- Noise reduction is the process of removing noise from a signal.
- All recording devices, both analog and digital, have traits that make them susceptible to noise. Noise can be random or white noise with no coherence, or coherent noise introduced by the device's mechanism or processing algorithms.
- In electronic recording devices, a major form of noise is hiss caused by random electrons that, heavily influenced by heat, stray from their designated path. These stray electrons influence the voltage of the output signal and thus create detectable noise.

- In machine learning, pattern recognition, and image processing, feature extraction starts from an initial set of measured data and builds derived values (features) intended to be informative and non-redundant, facilitating the subsequent learning and generalization steps, and in some cases leading to better human interpretations. Feature extraction is related to dimensionality reduction.
- Here We are using three feature extraction methods, such as,
  - LBP
  - HOG
  - CNN

Face Detection:

- Face detection is a computer technology being used in a variety of applications that identifies human faces in digital images.
- Face detection also refers to the psychological process by which humans locate and attend to faces in a visual scene.
- The Viola–Jones object detection framework is the first object detection framework to provide competitive object detection rates in real-time proposed in 2001 by Paul Viola and Michael Jones.
- Although it can be trained to detect a variety of object classes, it was motivated primarily by the problem of face detection.

Feature Extraction:

- Pattern recognition is a branch of machine learning that focuses on the recognition of patterns and regularities in data, although it is in some cases considered to be nearly synonymous with machine learning.

Classification:

The performance of the process is measured in terms of performance metrics likeAccuracy, Sensitivity, Specificity and time consumption.

TP - is the total number of correctly classified foreground (true positives).

TN - is the total number of wrongly classified foreground(true negatives).

FN - is the total number of false negatives, which accounts for the incorrect number of foreground pixels classified as background (false negatives).

FP - is the total number of false positives, which means the pixels are incorrectly classified as foreground (false positives). The performance values were calculated for each frames of the input video based on the metrics described above.

Precision:

- In the field of information retrieval, precision is the fraction of retrieved documents that are relevant to the query:

$$\text{precision} = \frac{|\{\text{relevant documents}\} \cap \{\text{retrieved documents}\}|}{|\{\text{retrieved documents}\}|}$$

Precision is used with recall, the percent of all relevant documents that is returned by the search. The two measures are sometimes used together in the F1 Score (or f-measure) to provide a single measurement for a system.

Note that the meaning and usage of "precision" in the field of information retrieval differs from the definition of accuracy and precision within other branches of science andtechnology.

SYSTEM TESTING AND IMPLEMENTATION

Testing of Product:

System testing is the stage of implementation, which aimed at ensuring that system works accurately and efficiently before the live operation commence. Testing is the process of executing a program with the intent of finding an error. A

good test case is one that has a high probability of finding an error. A successful test is one that answers a yet undiscovered error.

UNITTESTING:

Unit testing is the testing of each module and the integration of the overall system is done. Unit testing becomes verification efforts on the smallest unit of software design in the module. This is also known as 'module testing'. The modules of the system are tested separately. This testing is carried out during the programming itself. In this testing step, each model is found to be working satisfactorily as regard to the expected output from the module. There are some validation checks for the fields. For example, the validation check is done for verifying the data given by the user where both format and validity of the data entered is included. It is very easy to find error and debug the system.

INTEGRATION TESTING:

Data can be lost across an interface, one module can have an adverse effect on the other sub function, when combined, may not produce the desired major function. Integrated testing is systematic testing that can be done with sample data. The need for the integrated test is to find the overall system performance. There are two types of integration testing. They are:

i) Top-down integration testing.
ii) Bottom-up integration testing.

WHITE BOX TESTING:

White Box testing is a test case design method that uses the control structure of the procedural design to drive cases. Using the white box testing methods, we derived test cases that guarantee that all independent paths within a module have been exercised at least once.

BLACK BOX TESTING:

- Black box testing is done to find incorrect or missing function
- Interface error

- Errors in external database access
- Performance errors
- Initialization and termination errors

In 'functional testing', is performed to validate an application conforms to its specifications of correctly performs all its required functions. So this testing is also called 'black box testing'. It tests the external behavior of the system. Here the engineered product can be tested knowing the specified function that a product has been designed to perform, tests can be conducted to demonstrate that each function is fully operational.

VALIDATION TESTING:

After the culmination of black box testing, software is completed assembly as a package, interfacing errors have been uncovered and corrected and final series of software validation tests begin validation testing can be defined as many, but a single definition is that validation succeeds when the software functions in a manner that can be reasonably expected by the customer.

USER ACCEPTANCE TESTING:

User acceptance of the system is the key factor for the success of the system. The system under consideration is tested for user acceptance by constantly keeping in touch with prospective system at the time of developing changes whenever required.

OUTPUT TESTING:

After performing the validation testing, the next step is output asking the user about the format required testing of the proposed system, since no system could be useful if it does not produce the required output in the specific format. The output displayed or generated by the system under consideration. Here the output format is considered in two ways. One is screen and the other is printed format. The output format on the screen is found to be correct as the format was designed in the system phase according to the user needs. For the hard copy also output comes out as the specified requirements by the user. Hence the

output testing does not result in any connection in the system.

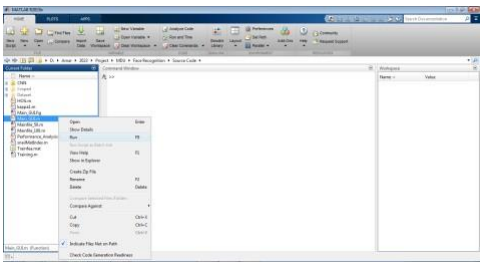
Conclusion

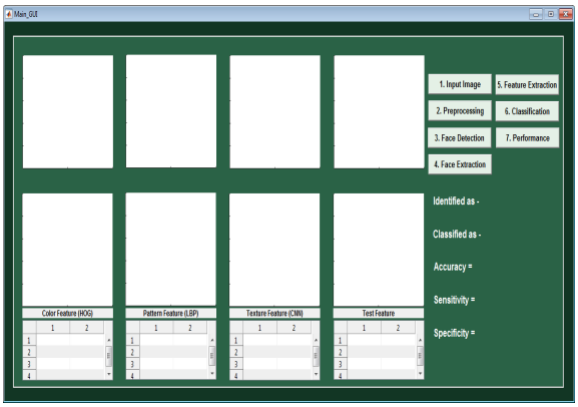
The computational models, which were implemented in this project, were chosen after extensive research, and the successful testing results confirm that the choices made by the researcher were reliable. The system with manual face detection and automatic face recognition did not have a recognition accuracy over 90%, due to the limited number of eigenfaces that were used for the PCA transform. This system was tested under very robust conditions in this experimental study and it is envisaged that real-world performance will be far more accurate. The fully automated frontal view face detection system displayed virtually perfect accuracy and in the researcher's opinion further work need not be conducted in this area. The fully automated face detection and recognition system was not robust enough to achieve a high recognition accuracy.

FUTURE ENHANCEMENT:

In this section we present the proposed approach for the task of texture classification. First, we intro- duce RLBP operator obtained by circularly shifting the weights of LBP operator. Further, the intrinsic structure of the patterns is utilized by incorporating the principle of uniform patterns to generate uniform RLBP (uRLBP). The dominant direction is defined as the index in the circular neighborhood for which the difference is maximum. As an image undergoes a rotation the dominant direction in a neighborhood also undergoes the rotation by the same angle.

WORKING





REFERENCES

[1] M. H. Siddiqi, F. Farooq, and S. Lee, "A robust feature extraction method for human facial expressions recognition systems," in Proc. 27th Conf. Image Vis. Comput. New Zealand , 2012, pp. 464–468.

[2] M. H. Siddiqi, A. M. Khan, T. C. Chung, and S. Lee, "A precise recognition model for human facial expression recognition system," in Proc. 26th IEEE Can. Conf. Elect. Comput. Eng., 2013.

[3] M. S. Bartlett, J. C. Hager, P. Ekman, and T. J. Sejnowski, "Measuring facial expressions by computer image analysis," Psychophysiology, vol. 36, no. 2, pp. 253–263, 1999.

[4] A. Mehrabian, "Communication without words," Psychol. Today,vol.2, no. 9, pp. 52–55, 1968.

[5] V. Bettadapura. (2012). "Face expression recognition and analysis: The state of the art." [Online]. Available: http://arxiv.org/abs/1203.6722

[6] C. Lisetti and C. LeRouge, "Affective computing in tele-home health: Design science possibilities in recognition of adoption and diffusion issues," in Proc. 37th IEEE Hawaii Int. Conf. Syst. Sci., Hawaii, USA, Jan. 2004, pp. 348–363.

[7] X. Wu and J. Zhao, "Curvelet feature extraction for face recognition and facial expression recognition," in Proc. 6th Int. Conf. Natural Comput. (ICNC) , vol. 3. Aug. 2010, pp. 1212–1216.

[8] S. Moore and R. Bowden, "The effects of pose on facial expression recognition," in Proc. Brit. Mach. Vis. Conf., 2009, pp. 1–11.

[9] Z. Zhu and Q. Ji, "Robust real-time face pose and facial expression recovery," in Proc. Comput. Soc. Conf. Comput. Vis. Pattern Recognit., vol. 1. Jun. 2006, pp. 681–688.