Abhinandan Veer

Instructor’s Name : Dr. Anil Gavade.

Course Title : Image Processing and Computer Vision

1. **Tittle: Face Recognition Using Fisherface Method**

Due to its capacity to maximise class separation during training, the Fisherface algorithm is a well-liked face recognition method. Through the use of GUI apps and databases of Papuan facial picture data, this research creates a face recognition programme that employs the Fisherface approach. Using Fisher's Linear Discriminant technique, PCA is used to reduce the face space dimension, and Fisherfaces is used for picture identification. In tests using identical photographs, the programme was 100% successful, and in tests using 73 facial test images with different expressions and orientations, it was 93% successful. To standardise the image size and format, preprocessing was done with Adobe Photoshop CS4. A literature review and the Matlab7.10 programming language were employed in the investigation.

1. **Tittle: Face Recognition in Mobile Phones**

An analysis of face recognition algorithms for mobile phones . Face detection was accomplished in the first step utilising colour segmentation, template matching, etc. For face recognition, Eigen and Fisher face algorithms were employed. Due to the hardware limitations of the mobile phone, a compromise between accuracy and computing complexity was made when implementing the algorithms on a DROID phone after being profiled in MATLAB.

1. **Tittle: A Comparative Study of Eigenface and Fisherface Algorithms Based on OpenCV and Sci-kit Libraries Implementations**

In specifically, the Fisherface and Eigenface algorithms are examined in this article as traditional machine learning methods for facial identification. These algorithms, which were included in both the Scikit-learn and OpenCV image processing libraries, were integrated with K-Nearest Neighbours (KNN) and Support Vector Machines (SVM) classifiers and tested using the LFW dataset. The goal of the study was to identify the top performing algorithm and library. According to the results, OpenCV's version of Eigenface with SVM had the lowest F-score (14.53%), while Scikit-learn's implementation of Fisherface with KNN had the greatest F-score (67.23%). No matter the classifier employed, Fisherface fared better than Eigenface in terms of accuracy. Both techniques were implemented better by Scikit-learn than by OpenCV.

**4. Tittle: A Novel Face Recognition System based on Combining Eigenfaces with Fisher Faces using Wavelets**

In the study, a face identification approach based on 2FNN appearance is proposed as a facial biometric system. The system extracts facial features using PCA and LDA methods, combines them using wavelet fusion, and then classifies them using neural networks. The main modules of the system are wavelet fusion, classification, feature extraction, picture extraction, and preprocessing. The suggested system performs better than the systems now in use, with a high rate of correct recognition and a low rate of error. There is a 1.50% equal error rate and a 98.50% right identification rate, according to preliminary testing findings.

**5. Tittle: Face Recognition using SIFT Features**

The research suggests a unique method for facial identification that integrates features from the discrete wavelet transform (DWT) and local binary pattern (LBP). The suggested method uses a Support Vector Machine (SVM) classifier to recognise faces by extracting LBP and DWT characteristics from the facial images. On three well-known benchmark datasets, the technique is assessed and contrasted with other cutting-edge algorithms. The experimental findings demonstrate that, in terms of accuracy, robustness, and computational efficiency, the suggested method performs better than previous methods.

**6. Tittle: Performance Analysis of PCA-based and LDAbased Algorithms for Face Recognition**

The performance of Principal Component Analysis (PCA) and Linear Discriminant Analysis (LDA) for face identification utilising common public databases is examined in this research. The best face recognition rates were obtained by Manual face localisation with 100 components (100 percent recognition rate) and Illumination Adaptive Linear Discriminant Analysis (IALDA), which had a 98.9% recognition rate. The outcomes demonstrate how well these facial recognition systems work.

**7. Tittle: An Introduction to Face Recognition Technology**

The expanding significance of face recognition technology in fields including network security, content indexing and retrieval, and video compression is discussed in this study. It discusses a face recognition system's general architecture, the variants that face recognizers frequently encounter, and various well-known face recognition methods like eigenfaces and neural networks. The advantages of applying facial recognition technology to a variety of applications, including network access control, video indexing and retrieval, and teleconferencing, are also highlighted in the article.

**8. Tittle: FACE DETECTION & FACE RECOGNITION USING OPEN COMPUTER VISION CLASSIFIRES**

The study details a side project on face detection and recognition that was done at Plymouth University for the visual perception and autonomy module. The study explains the technologies included in the OpenCV library as well as the process for putting them into practise with Python. Face identification was accomplished using Eigenfaces, Fisherfaces, and Local Binary Pattern Histograms, while face detection was accomplished using Haar-Cascades. Each stage of the system is broken down into flowcharts in the report, which is then followed by results, plots, screenshots, and a description of any difficulties that were encountered. The authors offer their thoughts on the endeavour and its applications

**9. Tittle: Automatic Face Recognition and Detection Using OpenCV, Haar Cascade and Recognizer for Frontal Face**

The objective of the study was to create a real-time automatic frontal face recognition and detection system using OpenCV, Haar Cascade, and recognizers including Eigenface, Fisherface, and LBPH. In order to test the algorithms, real-time photographs were taken using a camera after the algorithms had been trained on images that had been saved in a database. The findings suggested that when a person's distance from the camera increased, Eigenface had trouble detecting and identifying them. On the other hand, LBPH and Fisherface functioned admirably and had the ability to detect and recognise authorised people with a 5% tilt angle and a range of expressions in both bright and dim lighting.

1. **Tittle: Analysis of Different Face Recognition Algorithms**

This paper provides an overview of various face recognition algorithms, such as PCA, LDA, ICA, EBGM, and Fisherfaces. The paper also discusses techniques for developing face recognition systems with PCA that use different approaches, such as neural networks and artificial neural networks. The paper compares these algorithms and the combination of PCA with various techniques, as well as their advantages and disadvantages.

**REFERENCE**

1. Anggo, Mustamin, and La Arapu. "Face recognition using fisherface method." In *Journal of Physics: Conference Series*, vol. 1028, no. 1, p. 012119. IOP Publishing, 2018. Anggo, Mustamin, and La Arapu. "Face recognition using fisherface method." *Journal of Physics: Conference Series*. Vol. 1028. No. 1. IOP Publishing, 2018. Anggo, M. and Arapu, L., 2018, June. Face recognition using fisherface method. In *Journal of Physics: Conference Series* (Vol. 1028, No. 1, p. 012119). IOP Publishing.
2. Dave, Guillaume, Xing Chao, and Kishore Sriadibhatla. "Face recognition in mobile phones." *Department of Electrical Engineering Stanford University, USA* (2010): 7-23.
3. Aliyu, Ismail, Muhammad Ali Bomoi, and Maryam Maishanu. "A Comparative Study of Eigenface and Fisherface Algorithms Based on OpenCV and Sci-kit Libraries Implementations." *International Journal of Information Engineering & Electronic Business* 14, no. 3 (2022).
4. Devi, B. Jyostna, Naralasetti Veeranjaneyulu, and K. V. K. Kishore. "A novel face recognition system based on combining eigenfaces with fisher faces using wavelets." *Procedia Computer Science* 2 (2010): 44-51.
5. Aly, Mohamed. "Face recognition using SIFT features." *CNS/Bi/EE report* 186 (2006). Aly, M. (2006). Face recognition using SIFT features. *CNS/Bi/EE report*, *186*. Aly, M., 2006. Face recognition using SIFT features. *CNS/Bi/EE report*, *186*.
6. Fernandes, Steven, and Josemin Bala. "Performance Analysis of PCA-based and LDA-based Algorithms for Face Recognition." *International Journal of Signal Processing Systems* 1, no. 1 (2013): 1-6. Fernandes S, Bala J. Performance Analysis of PCA-based and LDA-based Algorithms for Face Recognition. International Journal of Signal Processing Systems. 2013 Jun;1(1):1-6.
7. Lin, Shang-Hung. "An introduction to face recognition technology." *Informing Sci. Int. J. an Emerg. Transdiscipl.* 3 (2000): 1-7. Lin, Shang-Hung. "An introduction to face recognition technology." *Informing Sci. Int. J. an Emerg. Transdiscipl.* 3 (2000): 1-7. Lin SH. An introduction to face recognition technology. Informing Sci. Int. J. an Emerg. Transdiscipl.. 2000 Jan 1;3:1-7.
8. Dinalankara, Lahiru. "Face detection & face recognition using open computer vision classifies." *ResearchGate* (2017). Dinalankara, Lahiru. "Face detection & face recognition using open computer vision classifies." *ResearchGate* (2017). Dinalankara, L., 2017. Face detection & face recognition using open computer vision classifies. *ResearchGate*.
9. Arya, Zankruti, and Vibha Tiwari. "Automatic face recognition and detection using OpenCV, haar cascade and recognizer for frontal face." *Int. J. Eng. Res. Appl. www. ijera. com* 10, no. 6 (2020): 13-19. Arya, Zankruti, and Vibha Tiwari. "Automatic face recognition and detection using OpenCV, haar cascade and recognizer for frontal face." *Int. J. Eng. Res. Appl. www. ijera. com* 10.6 (2020): 13-19.
10. Saini, Rakesh, Abhishek Saini, and Deepak Agarwal. "Analysis of different face recognition algorithms." *International Journal of Engineering Research & Technology (IJERT)* 3, no. 11 (2014). Saini, Rakesh, Abhishek Saini, and Deepak Agarwal. "Analysis of different face recognition algorithms." *International Journal of Engineering Research & Technology (IJERT)* 3.11 (2014).