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Privacy & Security in IoT

ATTENDANCE SYSTEM USING FACIAL RECOGNITION

Project by:

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ABSTRACT

How to accurately and effectively identify people has always been an interesting topic, both in research and in industry. With the rapid development of artificial intelligence in recent years, facial recognition gains more and more attention. Compared with the traditional card recognition, fingerprint recognition and iris recognition, face recognition has many advantages, but is limited to non-contact, high concurrency, and user friendly. It has high potential to be used in government, public facilities, security, e-commerce, retailing, education and many other fields. Deep learning is one of the new and important branches in machine learning. Deep learning can be classified as a neural network from the general category. For different applications(images, voice, text), you need to use different network models to achieve better results. The aim of this project is to focus on the attendance system which is necessary in an IOT smart classroom by building an easy on the eyes interface for taking attendance of the students using facial recognition with the help of certain algorithms.

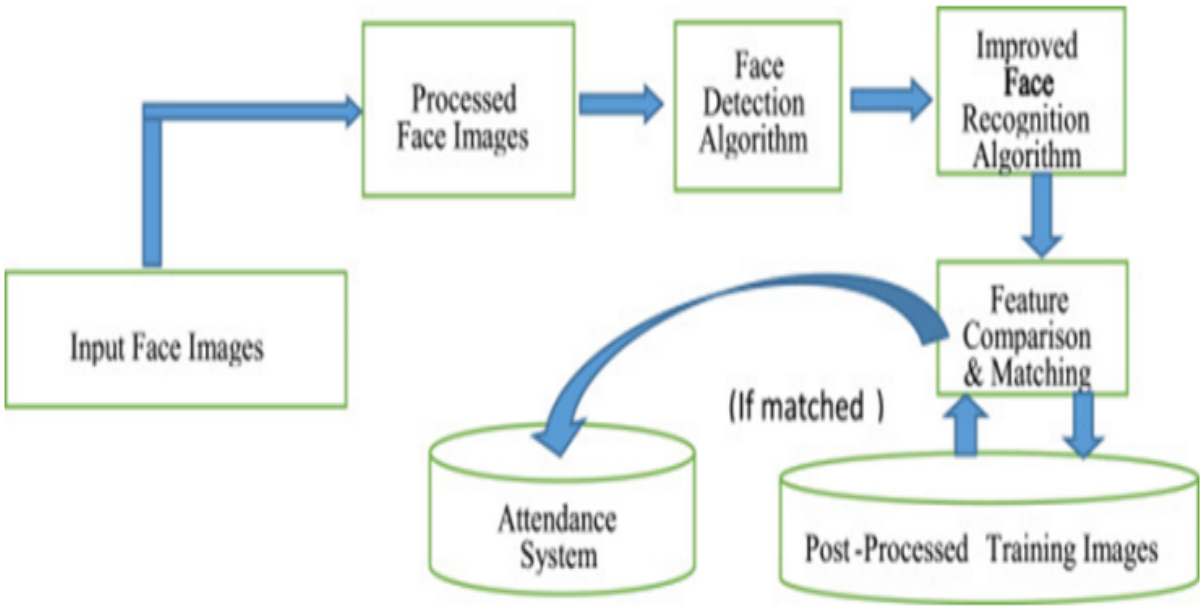
INTRODUCTION

The Internet of Things or IoT is gaining popularity nowadays due to the fact that the devices can connect and interact with one another. We categorize the IoT technologies into five major areas including transport and logistics, infrastructure, smart cities, personal and social, and futuristic. There are many forms of IoT-based research and innovation in various fields, such as the research presented in an IoT-based activity recognition system for smart home environment based on wearable sensors that collect user activity data in real time with the accuracy of 72 percent presented as a framework for smart transport.

PROPOSED WORK

HAAR CASCADE ALGORITHM : Object Detection using Haar feature-based cascade classifiers is an effective object detection method proposed by Paul Viola and Michael Jones in their paper, "Rapid Object Detection using a Boosted Cascade of Simple Features" in 2001. It is a machine learning based approach where a cascade function is trained from a lot of positive and negative images. It is then used to detect objects in other images. Here we will work with face detection. Initially, the algorithm needs a lot of positive images (images of faces) and negative images (images without faces) to train the classifier. Then we need to extract features from it. For this, haar features shown in the image below are used. They are just like our

convolutional kernel. Each feature is a single value obtained by subtracting the sum of pixels under white rectangle from the sum of pixels under black rectangle.



RELATED WORK:

A complete face recognition system includes face detection, face preprocessing and face recognition processes. Therefore, it is necessary to extract the face region from the face detection process and separate the face from the background pattern, which provides the basis for the subsequent extraction of the face difference features. The recent rise of the face based on the depth 8 of learning detection methods, compared to the traditional method not only shortens the time, and the accuracy is effectively improved. Face recognition of the separated faces is a process of feature extraction and contrast identification of the normalized face images in order to obtain the identity of human faces in the images.

Journals:

1. A Counterpart Approach to Attendance and Feedback System using Machine Learning Techniques:

In this paper a methodological approach of a framework is used which combines the two frameworks in one platform that is by identifying the face of the student attendance details along with his marks grades and progress must come together in one form by aligning these two methodologies together.

2. Classroom Attendance Auto-management Based on Deep Learning:

In this paper the author has used deep learning, SeetaFace and Faster R-CNN which have a strong capability for face recognition and face detection. To address the problem of low resolution, they used 4K HD video for face detection and face recognition. This paper applies Faster R-CNN and SeetaFace to class attendance, and achieves satisfactory results.

3. AUTOMATED ATTENDANCE SYSTEM USING FACE RECOGNITION :

In this Paper, the system which is proposed by the author is used to identify an unknown person. In real time scenarios PCA outperforms other algorithms with better recognition rate and low false positive rate.Their future work is to improve the recognition rate of algorithms when there are unintentional changes in a person like tonsuring head, using scarf, beard. The system developed only recognizes face up to 30 degrees angle variations which has to be improved further.

4. Student attendance system in classroom using face recognition technique:

This paper proposes a method for student attendance system in classroom using face recognition technique by combining Discrete Wavelet Transforms (DWT) and Discrete Cosine Transform (DCT) to extract the features of student's face which is followed by applying Radial Basis Function (RBF) for classifying the facial objects. From the experiments which is conducted by involving 16 students situated in classroom setting, it results in 121 out of 148 successful faces recognition.

5. A smart technique for attendance system to recognize faces through parallelism

In this paper they have presented a spontaneous presence for students in classroom. At first classroom image has been in use and after that image is kept in data record. For the images that are stored in the database they have applied a system algorithm which includes steps such as, histogram classification, noise removal, face detection and face recognition methods. So by using these steps we can detect the faces and then compare it with the database. The attendance gets marked automatically if the system recognizes the faces.

6. STUDENT ATTENDANCE SYSTEM USING IRIS DETECTION:

The Design of student attendance system in this paper is based on biometric system. In which student has to stand in front of the camera to mark the attendance. This system is used to prevent the proxy issues and it helps to keep the student records safe.

7. FACE RECOGNITION BASED ATTENDANCE MARKING SYSTEM:

In this paper Automated Attendance System has been envisioned for the purpose of reducing the errors that occur in the traditional (manual) attendance taking system. Their aim is to automate and make a system that is useful to the organization such as an institute. The efficient and accurate method of attendance in the office environment that can replace the old manual methods. Their method is secure enough, reliable and available for use. There is no need for specialized hardware for installing the system in the office.

8. Face Recognition Based Attendance System :

The aim of this paper is to capture the video of the students, convert it into frames, relate it with the database to ensure their presence or absence, mark attendance to the particular student to maintain the record. The Automated Classroom Attendance System helps in increasing the accuracy and speed ultimately achieve the high-precision real-time attendance to meet the need for automatic classroom evaluation

9. Automated attendance management system based on face recognition algorithms:

In this paper the system, which is based on face detection and recognition algorithms, automatically detects the student when he enters the class room and marks the attendance by recognizing him. The system architecture and algorithms used in each stage are described in this paper. Different real time scenarios are considered to evaluate the performance of various face recognition systems. This paper also proposes the techniques to be used in order to handle the threats like spoofing. When compared to traditional attendance marking this system saves the time and also helps to monitor the students.

10. Fingerprint attendance system for classroom needs:

Fingerprint attendance system aims to automate the attendance procedure of an educational institution using biometric technology. This will save time wasted on calling out names and it gives a fool-proof method of attendance marking. A hand-held device is used to mark the attendance without the intervention of teacher. The device can be passed and students can mark attendance during the lecture time. Students would be made to place their finger over the sensor so as to mark their presence in the class.

References:

1. **N.Sudhakar Reddy, M.V.Sumanth, S.Suresh Babu, "A Counterpart Approach to Attendance and Feedback System using Machine Learning Techniques",Journal of Emerging Technologies and Innovative Research (JETIR), Volume 5, Issue 12, Dec 2018.**

2. **Dan Wang, Rong Fu, Zuying Luo, "Classroom Attendance Auto-management Based on Deep Learning",Advances in Social Science, Education and Humanities Research, volume 123,ICESAME 2017.**

3. **Akshara Jadhav, Akshay Jadhav, Tushar Ladhe, Krishna Yeolekar, "Automated Attendance System Using Face Recognition", International Research Journal of Engineering and Technology (IRJET), Volume 4, Issue 1, Jan 2017.**

4. **Samuel Lukas, Aditya Rama Mitra, Ririn Ikana Desanti, Dion Krisnadi, "Student Attendance System in Classroom Using Face Recognition Technique", Conference Paper DOI: 10.1109/ICTC.2016.7763360, Oct 2016.**

5. **B Prabhavathi, V Tanuja, V Madhu Viswanatham and M Rajashekhara Babu, "A smart technique for attendance system to recognize faces through parallelism", IOP Conf. Series: Materials Science and Engineering 263, 2017.**

6. **Prajakta Lad, Sonali More, Simran Parkhe, Priyanka Nikam, Dipalee Chaudhari, " Student Attendance System Using Iris Detection", IJARIIE-ISSN(O)-2395-4396, Vol-3 Issue-2 2017.**

7. **K.Senthamil Selvi, P.Chitrakala, A.Antony Jenitha, "Face Recognition Based Attendance Marking System", IJCSMC, Vol. 3, Issue. 2, February 2014.**

8. **Yohei KAWAGUCHI, Tetsuo SHOJI, Weijane LIN, Koh KAKUSHO, Michihiko MINOH, "Face Recognition-based Lecture Attendance System", Oct 2014.**

9. **Shireesha Chintalapati, M.V. Raghunadh, "Automated Attendance Management System Based On Face Recognition Algorithms", IEEE International Conference on Computational Intelligence and Computing Research, 2013.**

10. **B. K. Mohamed and C. Raghu, “Fingerprint attendance system for classroom needs,” India Conference (INDICON), Annual IEEE, pp. 433–438, 2012.**