**Real time person detection with face recognition-Activity log.**

For NEF6001

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1. **Literature Review**

Technology has taken us to a new level of understanding in the field of personal security and data security. Detection a person in various situation has become prominence in the field of crime detection as well in the security. Person detection among group of objects was an interesting challenge to separate the articles depending on their shape and size.

In this regard, by using keyword “Person detection” I have done broad scan in IEEE explore for relevant journal and conference papers. Article are focused on person detection in an image, video or from traffic surveillance footage.

**1.1 Person detection (Broad Review Summary, provide a meaningful title)**

Person detection with 25 recent titles.

* Design of Person Flow Counting and Monitoring System Based on Feature Point Extraction of Optical Flow
* Comprehensive Samples Constrain for Person Search
* Person Detection in Video Surveillance
* Euro City Persons: A Novel Benchmark for Person Detection in Traffic Scenes
* Exploiting color cues to improve person re-identification
* Detection of a person in a crowd based on skin colour segmentation
* Probabilistic method of real-time person detection using colour image sequences
* Hostile intent and behaviour detection in elevators
* Traffic Light Detection System for Low Vision or Visually Impaired Person Through Voice
* Robust person head detection based on multi-scale representation fusion of deep convolution neural network
* Multiple static person localization based on respiratory motion detection by UWB radar
* Non-motion blur detection for helping blind persons to see business cards
* Fusion of three techniques for person detection in real time
* A Privacy Protected Fall Detection IoT System for Elderly Persons Using Depth Camera
* Markov random field-based real-time detection of intentionally-captured persons
* Occluded Person Re-Identification
* Machine Learning Based Approach for Person Identification in Group Photos
* Improving person detection using synthetic training data
* Fall detection for elderly persons using a depth camera
* Histogram of confidences for person detection
* Person Detection Using Temporal and Geometric Context with a Pan Tilt Zoom Camera
* Shadowing effect investigation for the purposes of person detection and tracking by UWB radars
* Development of a Person Following Robot with Vision Based Target Detection
* The Design of Person Carrier Robot using SLAM and Robust Salient Detection
* Deep Learning-Based Person Detection and Classification for Far Field Video Surveillance

**Face recognition with 25 articles**

* Face parts importance in face and expression recognition
* MSSVT: Multi-scale feature extraction for single face recognition
* Effect of Super Resolution on High Dimensional Features for Unsupervised Face Recognition in the Wild
* FDAR-Net: Joint Convolutional Neural Networks for Face Detection and Attribute Recognition
* Trunk-Branch Ensemble Convolutional Neural Networks for Video-Based Face Recognition
* Face recognition on surgically altered faces using principal component analysis
* Real time recognition of human faces
* On Face Segmentation, Face Swapping, and Face Perception
* A pose and expression face recognition method using transformation based on single face neutral reference
* A geometrical-model-based face recognition
* A review: Face recognition techniques for differentiate similar faces and twin faces
* Multi-Faces Recognition Process Using Haar Cascades and Eigenface Methods
* How does the transformation of an avatar face giving a favorable impression affect human recognition of the face?
* Anti-cheating presence system based on 3WPCA-dual vision face recognition
* Human face recognition application using pca and eigenface approach
* HW/SW co-design of face detection & recognition on virtual platform
* Wasserstein CNN: Learning Invariant Features for NIR-VIS Face Recognition
* Face recognition rate using different classifier methods based on PCA
* F-DR Net:Face detection and recognition in One Net
* An Advancement towards Efficient Face Recognition Using Live Video Feed: "For the Future"
* Multi-Task Pose-Invariant Face Recognition
* Learning Compact Binary Face Descriptor for Face Recognition
* 3D face recognition from complement component range face images
* A Benchmark and Comparative Study of Video-Based Face Recognition on COX Face Database
* A multi-biometric recognition system based on deep features of face and gesture energy image

In the above article, the first technology used in the face recognition was Face net by Google, which was further developed using many other researchers depending on their requirements and necessity. So I have taken the keyword Face net and performed scan

**Face net with recent 25 articles:**

* SP-Net: A Novel Framework to Identify Composite Sketch
* FaceNet Based Face Sketch Recognition
* FaceLiveNet: End-to-End Networks Combining Face Verification with Interactive Facial Expression-Based Liveness Detection
* Evaluation of a 3D-aided pose invariant 2D face recognition system
* Empirical Study on Web-Based Facial Recognition Services
* Novel Real-time Face Recognition from Video Streams
* Cleaning Adversarial Perturbations via Residual Generative Network for Face Verification
* Design and Implementation of Vehicle Unlocking System Based on Face Recognition
* How to Train Triplet Networks with 100K Identities?
* Machine learning on FPGAs to face the IoT revolution
* Simple Triplet Loss Based on Intra/Inter-Class Metric Learning for Face Verification
* Face Friend-Safe Adversarial Example on Face Recognition System
* IARPA Janus Surveillance Video Benchmark
* Feeding a DNN for face verification in video data acquired by a visually impaired user
* Student Attendance System in Crowded Classrooms Using a Smartphone Camera
* Longitudinal Study of Child Face Recognition
* Machine learning on FPGAs to face the IoT revolution
* Optimizing deep neural network structure for face recognition
* Person Recognition for Access Logging
* Blind Source Separation for Face Image based on Deep Leaming
* A Pipeline to Improve Face Recognition Datasets and Applications
* Face Recognition: Primates in the Wild
* Face Recognition based Surveillance System Using FaceNet and MTCNN on Jetson TX2
* Face Net: A unified embedding for face recognition and clustering
* DemogPairs: Quantifying the Impact of Demographic Imbalance in Deep Face Recognition

**2.Research problem**

Face recognition has been one of the mightiest real-time security tool in the real time digital environment. Face net was the first techniques invented by google for recognising the face. There were various further applications developed using the face recognition techniques and proved successful.

One of them is student’s attendance system based on facial recognitions in “Student Attendance System in Crowded Classrooms Using a Smartphone Camera” where the data base of the students will be stored in order to retrieve them while matching for the purpose of taking session attendance.

A research is being proposed based on the selected articles that if the technique of face recognition is effectively used for classroom attendance system the same system can be used to track the performance of the lecture based on the expression of the students in the classroom as well as the behaviour of the student can be monitored using the facial expression which are tracked using the camera installed in the classroom. This data is effectively charted to monitor the performance of the faculty as well as the student.

3.**Motivation of the research:**

* It has been a practical problem in taking the feedback of a student regarding a particular session or taking the feedback from a faculty on the performance of a student. So this situation motivated me to propose a research to use the technology to understand the real time academic parameters
* What did authors proposed and contribute? What are key outcomes

In the first paper author has proposed Facenet which uses two different convolution networks Zeiler and Fergus method based on multiple interleaved layers and inception model of szegedy. Using these two methods facenets developed a new method to reduce the triplet loss.

In the 2nd paper the author has proposed a algorithm for matching the captured images of the student with already stored images in the data base for the calculatin the attendance session wise

* **key innovation:**

Facenet and attendance system based on face recognition. In the faceNet algorithm various architectures were taken to consider the performance of the model architecture for the given set of data inputs. Among tall those Zeiler and Fergus method Gave best results as stated in the table below.



In the attendance system based on face recognition paper, the author has performed the matching using various algorithms and tabulated the accuracy of the different algorithms, among all those it has been concluded that FaceNet matching algorithm produces highly saccurate results than other.



* **Relating Research proposal** 
  + Work taken from previous papers:
    - Facenet technology and matching algorithm in the attendance system based on face recognition
  + Further development in the current proposal:
    - Extra feature is needed to be attached her to the existing algorithm to capture the expressions such as anger, moody, jovial, sleepy etc..

4.**References:**

Domingo Mery, Ignacio Mackenney, Ignacio Mackenney 2019 IEEE, Student Attendance System in Crowded Classrooms Using a Smartphone Camera.

Florian Schroff,Dmitry Kalenichenko, James Phibin. 2015.CV.Facenet: A unified embedding for face recognition and clustering.