National College of Ireland

Robust Class Attendance System Using Deep Learning Neural Networks

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Sai Chethan Singu
Student ID: x18181937

School of Computing
National College of Ireland

Lecturer: Dr.Catherine Mulwa
Lab Assistant: Dr. Hicham Rifai

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Sai Chethan Singu
x18181937

Abstract

It is one of the necessary job to carry out the attendance at any academic institution as it can ensure the quality of the classroom teaching. Normal class attendance for students is an integral aspect of the modern education system in order to assess and monitor the students. The typical methods that are in use were by calling out their names or paper signing which is time consuming and results in malpractises. This research study examines the advance Deep Learning algorithms which can detect and recognize the faces for attendance. Algorithms implementing artificial neural networks can be trained with thousands of images which can helps in recognizing faces instantly and with relative ease. Principle Component Analysis (PCA) is used for the extraction of features and also for the reduction of dimensionality. Visual Geometry Group (VGG) algorithm which is a type of Convolutional Neural Network (CNN) is used to process the webcam image for face detection to mark the attendance of students in the class. And also the system will update the attendance to the database in AWS cloud. This face recognition based attendance system will eventually reduce time and manpower and also provide secure storage of data in the cloud. This model is a user friendly and robust face recognition system. The proposed method obtains good real-time accuracy which is better than that of the existing end-to-end face attendance systems.

Keywords— Attendance, Deep Learning Algorithms, Principle Component Analysis, Visual Geometry Group, AWS Cloud.

1 Introduction

In this era, technology plays a very major role in people's lives and even at work places. With the advance in technology, face recognition based automatic attendance systems gained much popularity in the institutions. Attendance in the educational institutions is one of the important aspect of learning process. The major drawbacks with manual system is time consuming and it is a repetitive work. The main intent of attendance in classrooms is to make sure that students attend the classes on a regular basis and to improve teaching quality. By attending classes regularly, students can have significant changes in their performance Dobkin et al. (2010). Nowadays colleges have started introducing attendance systems based on face recognition in order to save time. It will become a tedious task when there are more number of students in the class.

Over the past few decades, many research works have been conducted to bridge the gap between social class and cognitive abilities among children. Perhaps the commonly accepted conclusion from the research works is that children who are more likely to skip school were more disadvantaged in terms of socio-economic conditions. This shows that the formal schooling strongly influences academic behavior. It is also stated that children who miss the classes for three or more days in a month results in getting basic level of grades when compared to other students who attend the classes on a daily basis Ready (2010). Almost all the academic institutions adopt the habit of taking attendance on daily basis. There are many problems in taking out attendance which can cause distraction while passing the attendance paper from one to other, consumes lot of time which might affect the intensity of teaching staff and students and reduces the quality of classroom. When there is large volume of students in the classroom it will be even more difficult for teachers to take attendance by roll-call and there are chances to mark attendance for the students who are not present in the class. All these problems and challenges were addressed by using the technology. After electronic attendance came into picture, manual attendance was completely replaced. In the beginning, students use to swipe their identity cards in the card readers for marking their attendance. It was then the attendance system was replaced with automated face recognition using Deep learning techniques which resulted in accurate detection of faces. As the facial identity for every student is unique, it cannot be faked by any means. With this system, time is saved and teaching efficiency can be increased. Doing the same manual work everyday to take attendance is completely eradicated with the automatic attendance system. The duration of lecture hours can be maintained without comprising time and impersonations of students can be avoided completely with this attendance system.

In this research, the objective is to detect and recognize the faces of students in the class for marking the attendance and automatically storing it in the AWS Cloud services server for the retrieval of data. The webcam is used to capture the image of class and then processed by comparing with the face images in the AWS database. The algorithm used is VGG (Visual Geometry Group) neural network which is one of convolutional neural network for recognizing patterns and features from the input image. It contains uniform architecture with 16 layers for extracting the features from the image. After the face recognition is done by the model by identifying the person, attendance report can be generated from the AWS sever instance. With this the problems in traditional attend-

ance system can overcome. Deep learning algorithms gives accurate and fast results and human work is completely eliminated. In the section 2, it consists of literature review and overview of similar research works that are done on this research topic. Section 3 gives the information about how the input data is collected and processed for this model and also methodology used in order to achieve research objective. In section 4, it consists of detailed implementation of proposed solution and evaluation methods that are used. Section 6 includes the Gantt Chart for project plan.

2 Literature Review

This section describes the overview of different research works done earlier on this topic. Few research works for automatic class attendance system were done by using hardware components like Rasberry Pi 3, Raspberry Pi camera, Bluetooth Device and biometric sensors. In earlier days, facial recognition in large scale has been difficult due to nonavailability of labeled data set. Earlier conventional method of taking attendance has physiological negative impact on students and also reduces the teaching quality.As the satisfactory results were not produced by using those techniques it was then slowly shifted towards the usage of Deep learning techniques for the recognition of faces to mark class attendance.Deep learning is based on the working of human brain and neurons interaction.One of the main advantage of using deep learning is its ability to implement automatic extraction of features from the raw data which is otherwise known as feature learning.By influx of Graphical processing devices such as Nvidia,the state of art solutions in the domain have been uprooted by new innovations. These technologies allow for extremely fast matrix operations.Historically, Vision and Image Computing has been the forte of non-deep learning-based methods, but noise in the data, such as Occlusion, Luminosity variance severity hampered its effectiveness. Before Deep Learning, Face Recognition required Feature Engineering, Data Preprocessing, Output Parsing and KDD Tree Structures to enable decent performance. The compute power also means that state of art Deep Learning based Image Detection algorithms such as RCNN , Faster RCNN, Fast RCNN, Overfeat and YOLO can execute in nearby real time on a commercially available workstation.The arrival of Convolutional Neural Networks directed to an explosion in the usage of Deep Learning techniques for Image and Vision Computing. Thus real time face recognition based attendance system was developed and used for the student's inspection which replaces the conventional way of taking attendance. The automatic system has been developed by taking all the aspects into consideration like skin tone, hair and background light then identifying the person Yang and Han (2020).

2.1 Different Approaches of Automatic Class Attendance Systems

There has been many approaches used for building automatic attendance system. One such approach is that based on single image of the student used for detection. It was done by using one-shot learning technique on the pre-trained images. Contemporary face recognition systems were built by using one shot learning approach where it requires large amount of labelled data. In this model, face recognition was done by extracting and representing features of low dimensions known as face embedding. With this technique comparing and identification of faces will become easier for the model. In order

to address the vast number of false negatives that occur often in unstable environments, in this model face detection is also done by using max margin object detection. As the number of desirable sub-windows in the datasets is typically large, classifier learn from a subset of windows rather than from all the windows which will eventually reduce the computational time of processing Menezes et al. (2020).

Other research work proposes the attendance capturing system by using Histogram of oriented gradients (HOG). It is one of the techniques widely used for object detection where the model count the number of occurrences in terms of gradient orientations in small portions of image. Initially, face image was branched into small cells or spatial regions where each cell acquires 1-D histogram of gradient orientations over the cell pixels. These histogram bins were evenly spreaded to make up the representation. HOG was performed well when images are subjected to change in terms of illuminations and rotations Khunthi et al. (n.d.). Attendance is considered to be essential thing to check the physical presence of both students and teaching staff. In order the address the problems in traditional system of marking attendance, a model has been proposed by using Convolutional neural networks. This model overcomes the problems of using statistical techniques like Principle component analysis (PCA) and Linear discriminant analysis (LDA). In this model, Non-linearity was introduced by using activation function ReLU and it is 22 layered deep neural network. Dlib algorithm was used for processing of images. The processed images were checked with the existing student face images for recognition Sridhar et al. (n.d.). Other similar approach is that the camera was installed in the classroom which obtains the portrait videos of students and transmits the collected videos to the server for storing and processing it to put attendance for the students. The server obtain various segments of human images obtained by the camera and converts it into a frame image. The frame image is then compared with the original multi frame images given as input for better accuracy. The server will send the feedback to the terminal based on the results obtained, and helps the terminal take a second image to improve accuracy. The movement range of the camera is controlled from 0 to 250 degrees horizontally and from -10 degrees to 55 degrees vertically. The terminal is fitted in such a way that all the seats in the classroom can be photographed and sent in real time to the server. Since the input image needs to be in image format, pre-processing the data collected by the terminal, convert the video into picture frame, and use deep learning algorithm to recognize the face of the acquired frame pictures Lin and Li (2019).

A research work proposes the student's attendance system by using Convolution neural networks to generate low dimensional representations of the images for classification. Based on the estimation of face landmarks in images and according to those marks, images are scaled and rotated to make centered. By using Support Vector Machine a classifier has been created for recognising faces and by increasing the training images number, false predictions were reduced Ara et al. (2017). To overcome the challenges of manual attendance in institutions, an automated system has been built by using RFID (Radio frequency identification). The RFID readers and the host system comprises the hardware part and VB.NET incorporated with Microsoft access database forms the software part. ID, time and date of every student that enters the lecture room can be used by the administrator. Tag ID of each student can be used for registering each student. UART is inconporated through RS-232 for connecting the RFID reader to the PC. The system is placed in entrance of the classroom where each students are scanned by the

reader. The RFID logs the name, matriculation number of the student, the course to be taken and the date which are then displayed on the user interface if the tag number matches that which is stored in the database Olanipekun and Boyinbode (2015).

2.2 Comparison of Deep Learning and Machine Learning models for Class Attendance Systems

Nowadays AI calculations joins audience interests with the individuals who have a melodic preference for request to decide the tunes/craftsmen ought to suggest an audience. In numerous administrations giving robotized proposals this procedure, which is likewise essentially spoken to as AI, is utilized. Correlation of different strategies for profound learning utilized on Twitter information for assessment investigation. All over this region, profound learning (Deep Learning) methods have picked up notoriety among specialists, which all the while help to take care of a wide range of issues. Specifically, two sorts of neural systems (CNN) are utilized, which are particularly viable in picture handling applications and monotonous neural systems (RNNs) in characteristic language (NLP) preparing applications Goularas and Kamis (2019).

The traditional method of marking attendance has came to an end with the use of new technology. A model has been proposed by using HOG (Histogram of oriented gradient) and SVM (Support vector machine) which is one of binary classifiers. Initially the image was divided into cells and measure the orientations with respect to each cell. Then the features extracted from the test images were compared with the features in database faces. The faces which have the maximum correlation are recognized and corresponding names were also extracted with the help of SVM classifier Rathod et al. (2017). The below table displays the comparison of different models.

Table 1: Performance Evaluation of different classifiers

Classifier	Accuracy of Model (%)
SVM	57
$MultilayerPerceptron$	55
CNN	89

The Database with Faces, showed good light on smart phone images than on Raspberry Pi, these images were proposed for the acquisition procedure. In the Smart Event Faces database with ResNet 34 for feature extraction and the mentioned classifiers: Random Forest ,KNN, Decision Tree, Adaboost, Naive Bayes and SVM. The findings results that KNN and SVM has achieved more than 96% of accuracy in the Event Faces. SVM and KNN did less by 1.5 sec in related to execution time Fung-Lung et al. (2019).

To address the problems with the earlier systems of class attendance, an automated attendance system has been proposed. The system detects and recognizes the faces of the students who enters classroom and mark the attendance. As a step of pre-processing, histogram normalization was used. To extract the features from the images, Principle componenet analysis algorithm which is one of the widely used technique was used. To classify the students with their corresponding names for identification, Support vector classifier was used. The model performance was evaluated by using parameters like false positive rate, recognition rate and distance. Once the face recognition was done, the

names were automatically updated in excel sheet. It was proved that by using support vector machine algorithm, the model was able to achieve low false positive rate Chintalapati and Raghunadh (2013).

Due to their significant performance and improvements, deep learning based face recognition techniques have been predominent. Deep learning based methods have been proposed on two different datasets. It was proved that, image preprocessing played a major role in recognizing the faces. In this model, two convolutional neural networks namely Lightened CNN and VGG-face are pre trained on large number of face representations. It was seen that deep learning models are powerful and can tolerate errors of feature localizations. In order to make the model efficient, usage of preprocessing methods like illumination and pose normalization have been proposed. The model achieved overall significant results by using deep learning approaches. Mehdipour Ghazi and Kemal Ekenel (2016).

Various computer vision algorithms can be used to detect the expression given by faces with the help of images videos in frames. In this study the data input was a video of multiple faces in various directions and if the input image matches the images in frames of a database the authentication of a particular person was given. Classification of these faces has been successful achievement by following a process that included ROI cropping, reshaping, creating ID array followed by feature extraction.SVM (Support Vector Machine) and MLP (Multi-Layer Perception) was used to classify faces and comparison between them has been performed in which SVM has higher accuracy than MLP, both the models have performed well in overall have around 80% of accuracy Damale and Pathak (2018)

2.3 A Study on Face Recognition Techniques Using VGG Neural Networks

Face recognition has gained much attention from the people due to its advantages like high precision, stability and fast processing. A model has been proposed to extract the features from the face images and based on VGG-16 for the face recognition. By using PCA, feature vector dimensions was reduced and with SVM algorithm prediction was done. Caleba dataset was used for prediction where it was found that the model has achieved state of the art accuracy when compared to other algorithms Chen and Haoyu (2019).Nowadays face recognition has become one of the hot research areas where it gained much attention from people in short span of time. VGGNet is one of the deep convolutional neural network architectures which was created by Visual Geometry Group. As it contains 16 hidden layers, it was named as VGG-16. In ImageNet, which comprises of more than 14 million pictures in 1,000 evaluations, the model accomplishes 92.7 percent Top-5 test exactness. It was one of ILSVRC-2014's notable models. This improves over AlexNet by supplanting huge piece channels (11 and 5 in the first and second convolutionary layers) with various 3/3-part channels individually. Long stretches of testing and the NVIDIA Titan Black GPUs were completed in VGG16. [1] VGG Neural Network is the creator introduced a superior article location in this paper strategy that permits the system to precisely Object recognition. They have set up this test the conventional VGG organize and the VGG proposed to think about outcomes, ResNet arrange. The improved the methodology exhibits considerable accuracy in multi-scale recognition Objects. The upgraded arrange ResNet utilizes the easy route layer viewpoint and exercise blunder decrease process. Improved design of convolution picked up unmistakable quality exactness in object location. The framework proposed was presented the normal article

recognition exactness of 85.8 map of object detection Haque et al. (2019).

This exploration was done to precisely anticipate scene light by developing an upgraded vgg-16 neural shading steadiness model, which they called VGGC arrange structure. As a passage, VGGC snaps a photo fix 224 to 2224 and works in the picture spatial structure. It is unique in relation to prior methodologies. All through the VGGC arrange, there is no manual capacity extraction process. The VGGC arrange has an information layer of 16 convolutionary layers and two layers. The VGGC arrange upgrades the learning highlights to foresee the scene light more viably. The starter results on spatially explicit enlightenment pictures show that our VGGC Local Lighting Efficiency is steady and the model is more summed up and dependable than the current model with convolutionary neural network expectation Yang et al. (2020).

There has been many approaches by different people in the field of face recognition. In this research work, a CNN based VGG network model was trained on the database for recognition of faces and their ages. It was proved that the proposed model performed well when compared to other neural networks. It comprises of multiple convolutional layers in which each layer process the previous layer's output so that desired accuracy can be achieved. The other advantage of using deep CNN is that they can be easily trained on large databases. Overall the CNN network was proved to be well performed Qawaqneh et al. (2017).

3 Research Methodology

The approach followed in this research work is CRISP-DM (Cross Industry Standard Process for Data Mining). The Objective of this research paper is to ultimately reduce the human efforts and human error in taking the attendance of the students. This help Institutions to take appropriate action and make students attend regularly to the class by either shifting the class hours according to student preferred timing.The It is one of the well-proven and robust methodology. This model process is independent of both technology and industry sector. Data mining requires a general method so that it will help translate enterprise problems into data mining exercises, recommend required data manipulations, and gives medium for the evaluation of effects of results and documenting the understanding. In general, it gives an overall view of the cycle of data mining projectWirth and Hipp (2000).

3.1 Data Understanding

The process of data understanding is getting the knowledge from the discovered data which plays a major role in making the model learn better. The earlier research studies based on automatic class attendance system were done by creating manually their own datasets for face recognition since information can be retrieved from raw data. Some research works have been done by capturing video and some research works were done by feeding the model with the image of classroom for the recognition of faces. The dataset for this study will be created by using labelled facial images of 10 different persons with the help of high definition camera. In order to achieve good accuracy, atleast 15 images of each individual should be taken in different poses and angles. Prior consent will be taken from each person before taking the images so that their privacy is not violated.

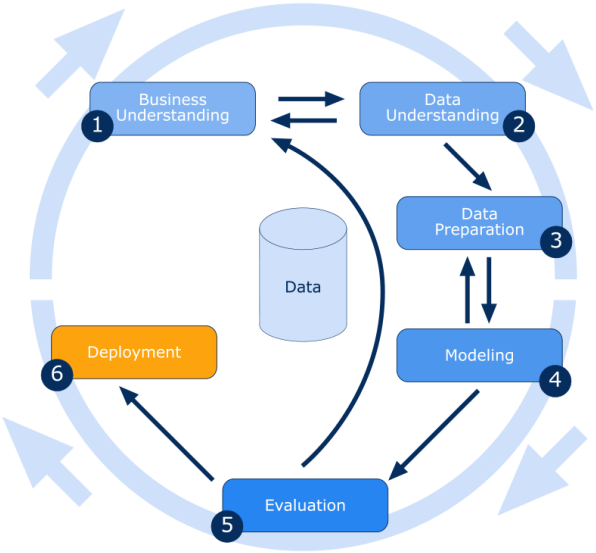

Figure 1: CRISP-DM Methodology

After acquiring the dataset that consists of images, data augmentation can be performed to increase the number of input images.

3.2 Data Preparation

Data preparation is one of the prominent steps in CRISP-DM as the model depends on quality of the dataset. Data augmentation methods like rotation, brightness, image zoom and cropping will be performed on the dataset containing images. It is one of the common method to increase the number of training images with the generation of multiple images virtually from the original images. An example was given in Figure 2. Then Principal component analysis algorithm will be used to lower the dimensionality of images. Geometry based feature extraction technique will be employed for the extraction of features. By using the relative positions and the size of images. In order to store the images Amazon S3 (simple storage service) will be used which is a cloud storage. Data will be stored securely in Amazon S3. Training images that are of high quality can be used for training the deep learning model in Amazon S3. After storing the images, it will be converted to grey scale and resized accordingly.

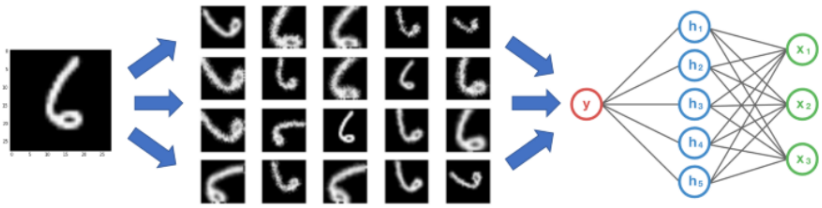

Figure 2: An Example of Data Augmentation

3.3 Data Modelling

Data modelling in CRISP-DM framework involves understanding the domain knowledge of the problem and selecting the appropriate model that can be used to solve the problem. With the advancement of deep learning, CNN based face recognition has turned as main method within the field of recognition.With CNN, number of parameters can be reduced without comprising or losing the quality of the model. To make the model better, VGG-16 based on CNN is used in this research work. It was developed by Simonyan and Zisserman in 2014 and used in ImageNet project in the same year. With their pre-trained convolutional layers, CNN is proved to be one of the effective techniques for face recognition. After publishing of AlexNet, it was proved to be one of the capable model for object detection and detection. While Alexnet focus on small window sizes in the convolutional layer. In VGG-16 neural network the input is RGB image of 224x224 pixels where ReLU activation is applied to the convolutional layers. It comprises of 16 convolutional layers, 3 fully connected layers, 5 max pooling layers and final layer with activation function called Softmax. For the purpose of training, each individual image is rescaled by using random sampling.

The below Figure 3 consists of VGG-16 architecture with five blocks and 3 fully connected layers. Where each block consists of convolutional layers with a max pooling layer at the end. After the fifth block, two fully connected layers are present for the purpose of binary classification. In the process of testing the given input images, it will first rescale

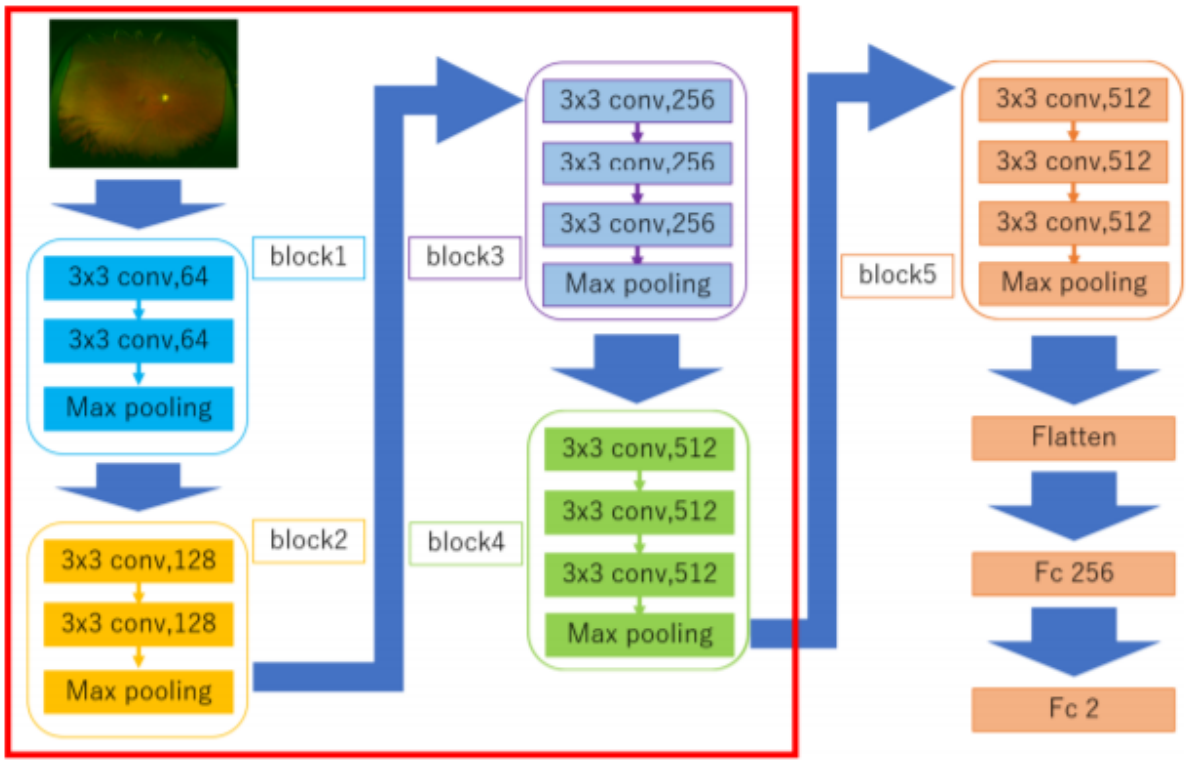

Figure 3: Architecture of VGG-16

the images into pre-defined small images. The Convnet is then applied over the test images which are rescaled. Then fully convolutional network is applied to all the uncropped

test images. This results in class score map with number of channels. Finally to gather fixed vectors of class scores. Followed by flipping of images horizontally for augmenting the test images. Atlast, the averaging of flipped and original images is done to achieve the final scores for images. To add the probabilities to 1, Softmax function is used. And it is also used for multi class classification.

ConvNet Configuration					
A	A-LRN	B	C	D	E
11 weight layers	11 weight layers	13 weight layers	16 weight layers	16 weight layers	19 weight layers
input (224 × 224 RGB image)					
conv3-64	conv3-64 **LRN**	conv3-64 **conv3-64**	conv3-64 conv3-64	conv3-64 conv3-64	conv3-64 conv3-64
maxpool					
conv3-128	conv3-128	conv3-128 **conv3-128**	conv3-128 conv3-128	conv3-128 conv3-128	conv3-128 conv3-128
maxpool					
conv3-256 conv3-256	conv3-256 conv3-256	conv3-256 conv3-256	conv3-256 conv3-256 **conv1-256**	conv3-256 conv3-256 **conv3-256**	conv3-256 conv3-256 conv3-256 **conv3-256**
maxpool					
conv3-512 conv3-512	conv3-512 conv3-512	conv3-512 conv3-512	conv3-512 conv3-512 **conv1-512**	conv3-512 conv3-512 **conv3-512**	conv3-512 conv3-512 conv3-512 **conv3-512**
maxpool					
conv3-512 conv3-512	conv3-512 conv3-512	conv3-512 conv3-512	conv3-512 conv3-512 **conv1-512**	conv3-512 conv3-512 **conv3-512**	conv3-512 conv3-512 conv3-512 **conv3-512**
maxpool					
FC-4096					
FC-4096					
FC-1000					
soft-max					

Figure 4: Different VGG Configurations

$$P(y=j \mid \Theta^{(i)}) = \frac{e^{\Theta^{(i)}}}{\sum_{j=0}^{k} e^{\Theta_k^{(i)}}}$$

where $\Theta = w_0 x_0 + w_1 x_1 + .$

Figure 5: Formula for Soft-max Function

Different architectures of VGG is represented in Figure 4. There are two different versions of VGG-16(C & D), is because of different filter size convolutions and parameters. Vgg-16 is one of the best performed architecture in Imagenet challenge with very less test error. All the configurations in VGG architecture follows universal pattern and are different from each other in terms of weight layers that ranges from 11 to 19. Vgg-16 outperformed the other algorithms by performing complex recognitions and image representations.The loss function for one training example for VGG-16 is given in Figure 6.
.

$$\mathcal{L}(\hat{\mathbf{y}}, \mathbf{y}) = -\sum_{i=1}^{1000} y_i log(\hat{y}_i)$$

Figure 6: Loss Function for VGG-16

3.4 Proposed Flow Diagram And Model Deployement

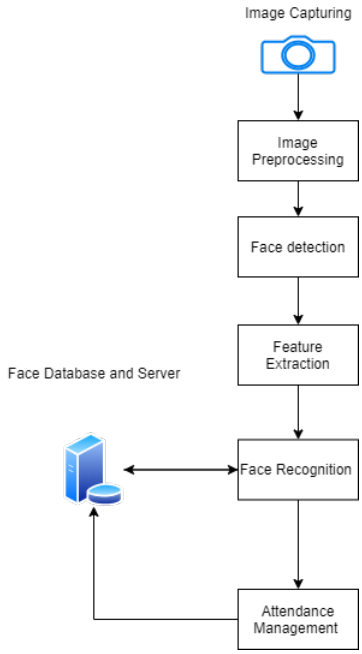

Figure 7: Flow Diagram

In the proposed work, the process starts with image capturing of a group of people to feed the CNN based VGG neural network. By using different image pre-processing techniques such as data augmentation and dimensionality reduction, pre-processing will be done. After the process of face recognition, feature extraction will be done by using PCA algorithm. Then by using VGG Neural network, face recognition will be done for the identification of person in the image. This deep learning model will be implemented in AWS Cloud. Information will be retrived from the Cloud server to mark the attendance.

3.4.1 Model Deployement

AWS Lambda is used with custom trained model to leverage a simplified serverless computing in a large scale.Initially, the necessary Deep learning and AI bundle are copied inside the Amazon S3 bucket called "dl-model-bucket".CloudFormation script is ran to create all necessary resources in AWS, including the deeplearning test bucket. Images are then seperated using the process of Convolutional Neural Networks and it is uploaded in the test bucket.Amazon cloud watch logs are used for lambda inference function and to validate the inference result. New stack is created in the AWS cloud formation console

where we give details of the bucket which contains the training model and code.The script builds the entire solution which contains AWS Identity and Access Management (IAM) role, DeepLearning Inference Lambda function, and permissions for the S3 bucket to trigger our Lambda function when the object is PUT into the test bucket.Inference results can be obtained by uploading input images and Cloudwatch can be used for monitoring and viewing logs. Amazon DynamoDB is used for working with the obtained inference images where images can be indexed with associated labels. Python libraries relying on legacy C are used for maximizing the performance while running on AWS Lambda and should be built and installed on Amazon Elastic Compute Cloud (EC2) using an Amazon Linux Amazon Machine Image (AMI).

4 Evaluation Metrics for Class Attendance System

The performance of the model is generally evaluated by using multiple methods. In this proposed research work, 5 important parameters were considered:

1.**False Acceptance Rate**: It is a measure of possibility that model incorrectly recognizes the unregistered students. The attained value of FAR should be low.

$$FAR = \frac{False\ \ Acceptances}{Total\ \ Number\ \ of\ \ attempts}$$

2.**False Rejection Rate**: The failure of a system to recognize an registered student is called False rejection. And the ratio of false rejections to the total number of attempts is called false rejection rate.

$$FRR = \frac{False\ \ Rejection's}{Total\ \ Number\ \ of\ \ attempts}$$

3.**Equal Error Rate**: Ideally both the FAR and FRR should be zero. But practically it is difficult to achieve. So we choose a point at which FAR and FRR are low. This point is called Equal error rate.

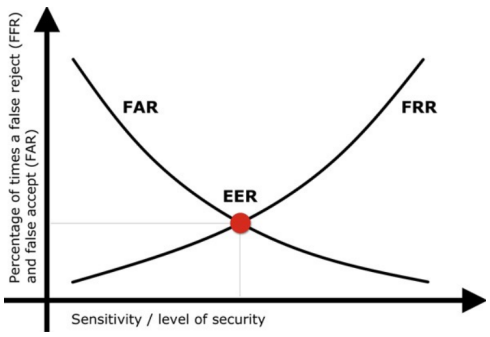

Figure 8: Equal Error Rate

4.**Genuine Acceptance rate**: It is the percentage of registered students recognized by the system.

$$GAR = \{^{\{100-FRR\}}$$

5.**Receiver Operating Charecteristics**: It is the plot between GAR and FAR.

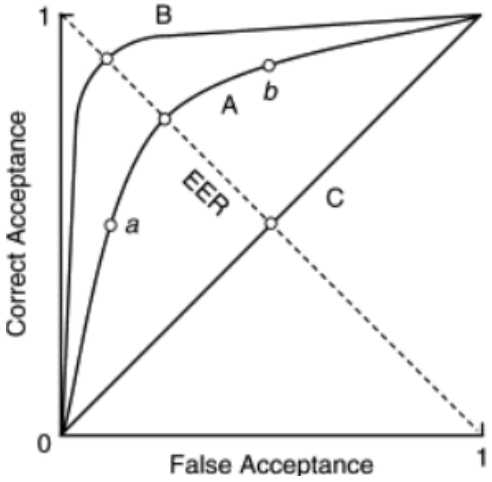

Figure 9: Receiver Operating Charecteristics Curve

5 Ethics and Project Management

Project plan always plays a major role in attaining the desired target. GANTT chart is one of the project management tool that enables us to set up or plan work over certain period of time. It is used to break down the work into sequence of tasks in a chronological order.
The dataset for this research work will be prepared manually by taking 10 different persons images after having their prior consent. By this their privacy will not be disclosed. The work presented in this research study is original and its my idea. It does not include any duplicate work in terms of research methodology and implementation. The project plan was divided into two sections. Main idea & scope and thesis work. Each section has individual sub tasks. In order to complete the proposed research work with all the tasks, it is crucial to finish all the tasks from Oct'2020 to Dec 16th 2020.

6 Conclusion

In this paper,a VGGNet model algorithm combined with PCA is proposed for superior attendance system.Initially, convolution neural network based on VGGNet model is used to extracted the required face images. Then, principal component analysis is used for extracting the feature's dimensions and also used for face recognition. Dataset is deployed on AWS and is used for testing the proposed method. When effects of different dimensions on accuracy are compared, highest accuracy is reached when feature dimension is reduced to 400.Thus 400 is selected as the featured dimension to be used on the dataset

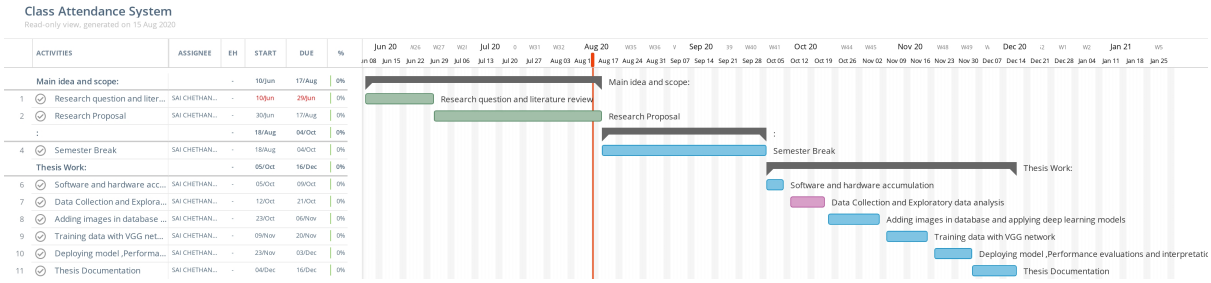

Figure 10: Project Plan using Gantt Chart

which gives the best operational efficiency compared to other algorithms.The greatest success of this product will be its simplicity and removing the reliance on paper based framework.Information security and information accessibility will be better than the existing methodology. Past attendance can be effectively looked and transferred to other format in a composed way.

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