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Attendance and Performance Monitoring Using ML

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Abstract: ***Attendance Management is very important for every organizations. Marking and maintaining attendance is a very time consuming task. It takes lots of time to mark attendance manually. It is difficult to analyse attendance of students how frequently one is skipping classes. There will be some problems regarding proxy attendance of some students. The possible solution to this problem is to use an automatic attendance system which uses face recognition techniques. This system will mark attendance electronically and recorded attendance will be stored in a database.***
The preparation of a question paper for the Internal Assessment Exam can be automatically generated with the help of teachers according to RBT levels. The Internal Assessment is very important for students. This system will give individual student reports based on the RBT levels of students' performance in the internal assessment exam and can be analysed, exactly in which type of RBT level the student is lagging behind.
Keywords: Attenndance Monitoring; deep learning; convolutional neural networks (CNN), Machine Learning, paper setter, Internal Assesment Analysis, RBT(Revised Blooms Taxonomy) can be used;

I. INTRODUCTION

In an educational institute it is a very difficult task to maintain attendance and progress of each student. Each institute has its own methods of taking attendance but most of them used manual attendance sheets. This method required a significant amount of time from the faculty. And there will also be some problems regarding proxy attendance of some students. Face recognition could be an efficient way to replace traditional attendance marking systems. It utilises the facial features of students for identification. This system will use face recognition techniques to mark attendance without any intervention of students. There will be some limitations in terms of accuracy.
The setting question paper for internal assessment is a hepatic task for the teachers. They need to select questions from the question bank and make a question paper according to the RBT level. This process needs to be repeated for every internal assessment. This process can be automated with the help of a teacher. This system will generate a question paper for internal assessment from a question bank given by the teacher according to RBT levels.
RBT stands for Revised Bloom's taxonomy. According to it, cognitive objectives are grouped in six levels which are: Remembering, Understanding, Applying, Evaluating and Creating. The first level cover basics concepts that can be deals with small degree of reasoning, then the concepts raise the level of knowledge to complex levels.
The Internal Assessment is very important for students. Sometimes, students are unable to analyse their Internal Assessment report. This System will give individual student reports where they are lagging.
Due to the advancement of computational frameworks, particularly Graphical Processing Units (GPU) embedded processors, machine learning implementations have grown exponentially in the last few years, resulting in the advancement of novel methodologies and designs, which has now spawned a new classification, Deep Learning. Deep learning involves the use of artificial neural network structures with many functional layers, as opposed to the "swallower" topologies utilised in more traditional neural network methodologies.

II. RELATED WORKS.

A. *Attendance Management System[1]*

In this paper they found the solution for an automatic attendance system by using facial recognition. This paper mainly focuses on the methods and techniques required to mark the attendance.[1] This system uses a deeply supervised neural network for recognizing the faces. They have developed a web application interface which is easy for users to understand.

B. Student Attendance Monitoring System Using Image Processing[2]

In this research paper a group of students is captured and also recognized on an individual bias[2]. Once the face recognition is done a model is built to train based on the information collected. If the faces in the images or video don't match with the student images present in the class then the status of that particular student is marked as absent. They have captured the images through the web camera and they have used the Haar cascade algorithm.

C. Prediction Model on Student Performance based on InternalAssessment using Deep Learning. [3]

This paper compares the classification methods such as artificial immune recognition system and AdaBoost, to analyze the results of the students. The maximum accuracy achieved in this study was 95.34% which is produced by using the deep learning techniques. [3]This project uses the dataset which consists of 10140 student records.

D. Class Attendance Management System Using Face Recognition[4]

This paper proposes a method of developing the attendance management system by using face recognition with controlling the door access. This system uses raspberry pi that runs on a linux operating system installed in a micro SD card. They have used a raspberry pi camera and a screen which are connected to the raspberry pi. The algorithm used in this project is Local Binary Patterns(LBPs).[4] If the input image matches with the trained dataset then the door will open with the help of a servo motor, then the results are stored in the mysql database. This system gives an accuracy of 95% with the dataset consisting of 11 images. Each picture is centered on a single face. These images are encoded in RGB. The original size of the image is 250x250. And also we are going to take image of students and upload it to the dataset.

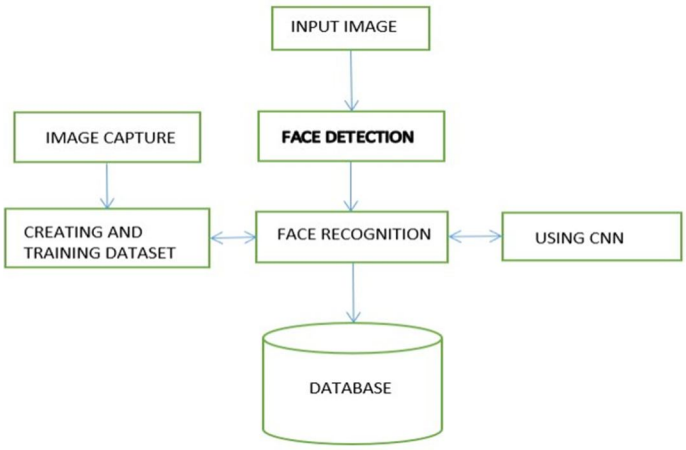
E. Methods

The system not only recognizes student's faces but also generates questions paper for internal assessment and gives an analysed report of individual students about their internal assessment performance. Moreover, the system will be built as a web App. So the attendance and internal assessment marks will be accessible to any authenticated web client. Here, the face recognition will be done by implementation of Convolutional neural network algorithm.

Step for attendance marking:

1) Taking input images from cameras used in the classroom.
2) From the input image, detect faces present in the image.
3) Next step will be face recognition by using CNN algorithms.
4) Last step will be to upload the attendance record into the database.

III. MATERIALS AND METHODS



A. Convolutional Neural Network Models

Convolutional neural network algorithm is a well known algorithm in machine learning. It is mainly used for the classification of texts, audios and images. Neural networks are "trained" to represent a system using available data that includes specific matchings of the system's inputs and outputs.

CNNs are a branch of traditional artificial neural networks that are primarily used for applications with repeated patterns in various parts of the modelling space, particularly image recognition. The two basic CNN architectures examined in this study's task of identifying plant illnesses from photographs of their leaves were AlexNet and GoogLeNet. These algorithms, as well as their training and testing procedures, were implemented using the Torch71 machine learning computational framework, which makes use of the LuaJIT2 programming language.

B. Training and testing datasets

The dataset is taken from the kaggle website. The dataset contains 1680 directories. Each directory contains 2-50

Next module of our system is the Internal Assessment question paper generator. Initial teacher will upload all possible questions into the database with their RBT levels. Then the system will generate a question paper according to their requirements.

Last Module of our system is the “Student Performance Analyzer in Internal Assessment”. Initially teachers will upload the marks of internal assessment with question number which they have attended. The system will use a random forest algorithm and generate reports. Which tells students where he/she needs to improve themselves.

IV. RESULTS

The accuracy of the model to predict the exact output varies from 85% to 95% based on the given training and testing datasets. The algorithms used were LBP(Local binary Pattern), KNN(K-Nearest Neighbour), CNN(COnvolutional Neural Network), Haar Cascade algorithm and RNN(Recurrent Neural Network). After a substantial comparison and analysis, it was seen that the Attendance Management System put forward with CNN algorithm was most accurate, efficient and fast.

V. ACKNOWLEDGMENT

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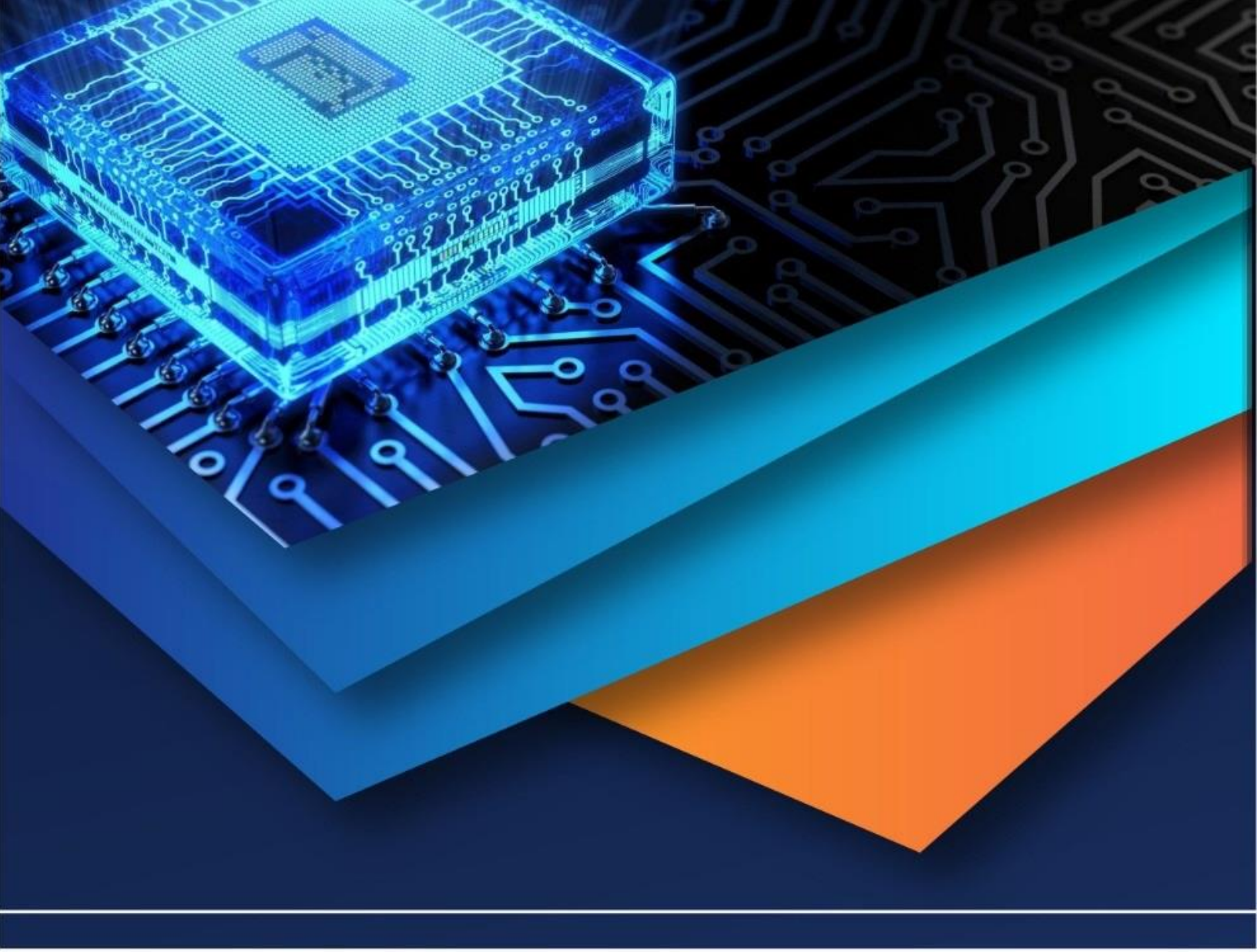

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