

Attendance Management System using Deep Learning and Facial Recognition Technique

S.U. Saoji, Naveen kumar, Jayakumar, Vaibhav Gupta, Prakhar Agarwal, Parth Astogi



Abstract: Big data could be a term acclimated converse with the investigation and utilizations of data sets that are unreasonably entangled for conventional information handling application programming framework to sufficiently alter. AI is a use of (AI) that enables frameworks to precisely take in and improve from aptitude while not being explicitly customized. AI centers around the occasion of pc programs which will get to data and use it learn for themselves. The technique for learning starts with perceptions or data, similar to precedents, direct skill, or guidance, in order to appear for examples in data and manufacture higher decisions inside the future bolstered the models that square measure gave. One in everything about applications is programmed face acknowledgment bunch activity framework to a great extent used in Workplaces or gifted workspaces. ID or Verification done by catching an image of client's face through a camera that progressively stamps bunch activity. This propelled face acknowledgment bunch activity biometric framework enlists the particular and changeless facial fine purposes of staff and records them inside the data as stencils. When the enrollment strategy is finished, you just should investigate the camera to confirm your character and furthermore the programmed face acknowledgment bunch activity framework precisely denotes your gathering activity for your sake. Face acknowledgment bunch activity framework is a right innovation for overseeing bunch activity since it scarcely gives mistakes.

Keywords: facial recognition, big data, attendance, biometrics

I. INTRODUCTION

Big data can be a term used to consult with the study and applications of data sets that square measure too advanced for ancient data-processing application code to adequately agitate. Machine learning is associate application of computing (AI) that has systems the ability to automatically learn and improve from experience whereas not being expressly programmed. Machine learning focuses on the Occasion of PC phone which can get to information and use it learn for themselves. The system of learning starts with perceptions or information, similar to precedents, direct involvement, or guidance, in this manner on appear for examples in information and settle on higher choices inside the long run bolstered the models that square measure gave.

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One in every one of the applications is biometric distinguishing proof going to framework generally utilized in workplaces or master workspaces. ID or Verification done by catching a picture of client's face through a camera, that thus checks visiting. This propelled face acknowledgment going to biometric framework selects the unmistakable and changeless facial fine purposes of representatives and records them inside the data as stencils. When the entrance strategy is finished, you only got the chance to safeguard the camera to confirm your character thus the biometric recognizable proof going to framework consequently stamps you're going to for your benefit. Face acknowledgment going to framework is partner right innovation for overseeing going to because of it barely gives mistakes.

II. PROBLEM STATEMENT

Taking and trailing students' attendance physically, losing participation sheets, deceptive nature, sat around idly and high blunder scales are issues confronting the speakers utilize the present attendance framework. It's a dubious technique, require some serious energy and cause stores of paper-based work. The anticipated framework comprises of a camera that catches the photos of the individual and sends it to the picture improvement module. Whenever improvement, the picture goes inside the Face Detection and Recognition modules that the attendance is set apart on the information server. The attendance system is dependent on facial recognition and identification. The framework gauges participation of every understudy by constant perception at the section and leave focuses. The existing system faces problems like recognizing sizable amount of faces and low detection and recognition rate. There is also space for improvement within the system to unravel The prevailing drawbacks of this system. The system can be improved during an approach employing a lot of acceptable and standard approach so the accuracy, detection rate and recognition rate is increased. Some of the drawbacks of the prevailing system is that scanning totally different individuals for variable face sizes is also a processor-intensive task. Most systems permit identification of a face-size vary to eliminate false recognition and speed up image method. However the initial investment in such face following software system package isn't a cheap one, however, it'll pay off in no time.

III. LITERATURE SURVEY

The review helps in structure the system for mechanizing the attendance framework. It is like manner focuses on making month to month attendance of each understudy with the objective that it is basic for instructors to separate it and make a move suitably.



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[1] With this examination, a gainful Student Attendance System to take and keep up attendance of understudies for each and every educational foundation is proposed. This proposed structure along taking and overview attendance will give additional features for instance impacting sales to educators so plain attendance to can be checked. Moreover, there will be a course of action for giving over delivers to various instructors. Thusly this system will be helpful. Facial Recognition Technology joins both gigantic data and AI. AI: think about that empowers a PC to learn without being unequivocally altered by picking up from data or experience to make estimates on covered data. [5] An AI display creates a yield for a lot of inputs, which is then contrasted and the ideal yield. AI is utilized in applications where there's no observational connection between the information sources and yield. [3] The point is to automatize partner degreed produce a framework that is valuable to the association like an organization. The camera assumes an imperative job inside the working of the framework so the picture quality and execution of the camera in central measure situation should be tried all before real usage. This system is sufficiently secure, solid what's more, on the market to be used. No wish for particular equipment for fixing the framework inside the study hall. It is made utilizing a camera and PC. This paper offers degree outline of distribute models. Additionally some works are studied that are drained of recent years of misuse Hadoop open give structure. Hadoop and its procedure demonstrate are as of late deliberate and like each diverse new innovations may require its own issues, similar to need of recognition of the majority of IT society with it, absence of enough knowledgeable forces and unwanted defects and issues on account of its oddity. Nonetheless, this procedure vogue that employments MapReduce display and circulated grouping framework, are Among the preeminent valuable devices for picture strategy and example acknowledgment among the returning years inferable from its consistency with distributed computing structures. [7] In this paper the philosophy implies that to understand the issues by joining face acknowledgment components. In spite of the established truth that this structure has loads like perceiving monstrous scope of countenances, there's undeniably more region for development. Since abuse the acknowledgment of a chose system the different modules is expanded till a commendable unmistakable confirmation rate is accomplished. Actualizing a standard methodology totally extraordinary modules is improved till partner Acceptable area and conspicuous evidence rate is come to. This paper has sketched out our Hadoop Image process Framework for executing goliath scale picture process applications. The structure is relied upon to extricate the specific nuances of Hadoop's fantastic. MapReduce structure and supply a reasonable framework for customers to system huge picture datasets. [3][9] By giving capacity between shifted picture data types the benefactor is empowered to utilize an expansive differ of ASCII content record picture technique libraries. Procedure libraries. At last, implies that to save picture headers all through picture control approach, retentive helpful and significant data for picture technique and vision applications is given. With these features, the structure offers another element of straightforwardness and simplicity for making serious scale

picture improving applications over Hadoop's MapReduce framework. [3] Catching the pictures from camera and applying procedures face identification and acknowledgment can diminish the manual work from human and increment the assurance wellbeing, taking the choice from this affirmation result. In lightweight of this face identification and acknowledgment can utilized in realize such a huge differ of utilization like programmed attendances framework principally dependent on face acknowledgment, labourer attendances, security, wellbeing, police application like discovering criminal in picture that encourage to getting criminal. In this framework partner bunch activity framework for an address, area or research centre by that speaker or showing colleague a record understudy's gathering activity is implemented. It spares time and vitality, especially if it's an address with huge scope of researchers. The entire framework demonstrates the use of face acknowledgment strategies for the point of understudy bunch activity and for the extra strategy this record of understudy is utilized in conveying associated issues. In order to get the gathering activity of individuals and to record their season of passage and leave, the creators arranged the gathering activity the executives framework bolstered face acknowledgment innovation inside the establishments/

Associations. The framework makes bunch move of each understudy by nonstop perception at the passage and leave focuses. The consequences of our fundamental analysis demonstrates improved execution inside the estimation of the gathering activity contrasted with the ordinary highly contrasting gathering activity frameworks. [6]

The arranged framework has a few phases of movement that are referenced hence. The choice of algorithmic guideline depends on a few components like proficiency and adaptability of the algorithmic principle to more current circumstances and also the very truth that there likely could be numerous photos of an equal article or individual is furthermore contemplated. So as to help the power of the framework there likely could be very one picture from various points of an identical item to shape the acknowledgment simpler and faster. Face acknowledgment might be an each troublesome and vital acknowledgment method. Among all the biometric procedures, face acknowledgment approach has one decent favourable position that is its ease of use (or non-nosiness). The recognizable proof technique is assembled beneath a phenomenal weight of the exploring point that is liable for the objective's face catching. To enrol a face through the fame workstation code, the various points square measure getting utilized – profile, frontal, 45-degree, and so forth anyway to get a reasonable model for the face, one can wish only a frontal read. [10] At that point, there may be assembled with issues with so much things as facial hair or highlights. One will even now trick the FRT with an all of a sudden showed up or expelled facial hair, same goes for darkening face's components with glasses or veils. To dodge such disappointments, the databases ought to be normally refreshed with the premier exceptional photographs. [8] In this paper, initial review for the face acknowledgment innovation is given.

Issues like the conventional system for face acknowledgment, factors which may affect the execution of the recognizer are lined.

IV. APPROACH

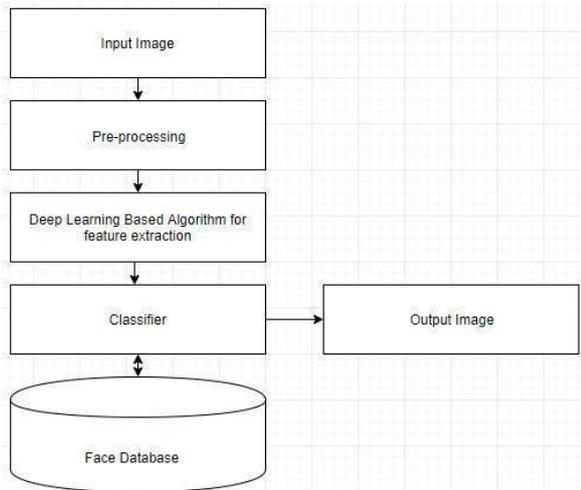


Fig 4.1 – Flowchart of Proposed System

The mathematical algorithms of biometric facial recognition follow many stages of image processing. CaptureThe initial step is for the framework to amass physical or conduct tests in arranged conditions and through an announced measure of some time. A picture of your face is caught from a photo or video. Your face may seem alone or in a group. Your picture may indicate you making an endeavour straight ahead or almost in profile.Extraction At that point, this accumulated data should be extricated from the examples to give layouts bolstered them. . Programmed face acknowledgment bundle peruses the arithmetic of your face. Key components encapsulate the hole between your eyes and in this manner the hole from brow to jawline. The bundle recognizes facial tourist spots — one framework distinguishes sixty eight of them — that unit key to trademark your face. The outcome: your facial signature. Comparison After the extraction, collected information is compared with the present templates. Your facial signature — a mathematical formula — is compared to an information of notable faces. This information is recommended to be updated usually to avoid and eliminate certain demerits like alteration of efficiency attributable to the modification any person’s face experiences like growing beards, ever-changing skin tones et cetera. Nearby Binary Pattern (LBP) might be a basic yet extremely prudent surface administrator that marks the picture segments of a picture by thresholding the area of every constituent and considers the outcome as a parallel change. It was introductory attracted 1994 (LBP) and has since been observed to be an amazing element for surface grouping. It’s more been resolved that when LBP is joined with histograms of orientated angles (HOG) descriptor, it improves the location execution fundamentally on some datasets. Utilizing the LBP joined with histograms the face photographs with a straightforward information vector are portrayed. As LBP might be a visual descriptor it ought to try and be utilized for face acknowledgment assignments, as are frequently observed among the ensuing stepwise legitimization.

1. Parameters: the LBPH uses 4 parameters:

Radius: the radius is used to form the circular native binary pattern and represents the radius from the central component. It’s sometimes set to at least 1.

Neighbours: the number of sample points to form the circular native binary pattern. It’s sometimes set to 8.

Grid X: the quantity of cells inside the flat heading. The more cells, the better the lattice, the higher the Dimensionality of the following component vector. It is usually set to 8.

Grid Y: the quantity of cells inside the vertical course. The more cells, the better the lattice, the higher the dimensionality of the resulting highlight vector. It is usually set to 8.

2. Training the Algorithm:

To start with, the standard should be prepared. To do as such, a dataset is required with the facial film of the general population required to be perceived. Partner ID is should have been set (it might even be choice or the name of the individual) for each picture, subsequently the standard will utilize this data to recognize partner input picture and gives you partner yield. Pictures of indistinguishable individual should have steady ID. With the instructing set previously made, how about we see the LBPH procedure steps.

3. Applying the LBP operation:

The principal method venture of the LBPH is to make partner middle of the road picture that portrays the essential picture terribly} higher implies that, by gentility the facial attributes. To do as such, the standard uses an origination of a window, upheld the parameters range and neighbours. In light of the picture made, it is broken into a few next to no means along these lines on comprehend it effectively: Assume there’s a facial picture in grayscale. Subsequent to getting a large portion of this picture as a window of 3x3 pixels. It will moreover be envisioned as a 3x3 network containing the force of every part (0~255). At that point, it’s required to require the focal worth of the framework to be utilized because of the edge. This esteem is utilized to characterize the new qualities from the eight neighbours. For each neighbour of the focal value (limit), a fresh out of the plastic new paired worth is readied. One is prepared for qualities measure up to or on prime of the verge and nil for qualities not up to the edge. Presently, the framework can contain altogether double qualities (disregarding the focal esteem). At that point link every parallel cost from each situation from the lattice line by line into a shiny new twofold worth (for example 10001101). Note: a few creators utilize elective ways to deal with connect the twofold qualities (for example dextrorotary bearing), anyway a definitive outcome square measure getting the chance to be indistinguishable. At that point, this paired worth is recover to a decimal cost and set it to the focal estimation of the grid, that is extremely an image component from the essential picture At the highest point of this system (LBP method), there’s a substitution picture that speaks to higher the qualities of the essential picture. It is finished by training direct insertion. On the off chance that some learning reason for existing is between the pixels, it utilizes the expenses from the four closest pixels (2x2) to appraise the value of the new information.

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4. Extracting the Histograms:

At that point utilize a limit and in this manner the 'certainty' to naturally evaluate if the algorithmic guideline has appropriately perceived the picture. It might be expected that the algorithmic guideline has with progress perceived if the intensity isn't up to the verge delineated.

Presently, utilizing the picture produced inside the last advance, utilize the Grid X and Grid Y parameters to partition the picture into numerous matrices.

In light of the picture created, histogram of every district will be removed as pursues: Once there's a picture in grayscale, each diagram (from every matrix) will contain completely 256 positions (0~255) Representing the events of each part force. At that point, connection of each diagram to make a substitution and greater graph is dispensed. Assuming there's 8x8 lattices, there'll be $8 \times 8 \times 256 = 16.384$ positions inside the last bar outline. A definitive bar diagram speaks to the attributes of the picture unique picture.

5. Performing the face recognition:

In this progression, the standard is as of now prepared. Each outline made is utilized to speak to each picture from the work dataset. Along these lines, given partner input picture, the means square measure played out some other time for this new picture and a diagram is framed that speaks to the picture. So to take note of the picture that coordinates the info picture there is an interest to analyze two structured presentations and are accessible back the picture with the nearest histogram. Various approaches are going to be used to compare the histograms (calculate the area between two histograms), for example: geometrician distance, chi-square, absolute value, etc. during this example, the Euclidean distance is employed (which is) supported the following formula:

$$D = \sqrt{\sum (\text{hist1} - \text{hist2})^2}$$

So the calculation yield is that the ID from the picture with the nearest visual diagram. The algorithmic guideline should also returned the determined separation, which will be utilized as a 'certainty' action. Note: don't be tricked about the 'certainty' name, as lower confidences are higher as a consequences of it implies that the separation between the two histograms is closer.

DEEP LEARNING BASED ALGORITHM

The key here is to get a profound neural system to supply a pack of numbers that depict a face (known as face encodings). when 2 absolutely entirely unexpected photographs of indistinguishable individual zone unit passed, the system need to return comparative yields (for example closer numbers) for each photographs, while once you go in photographs of 2 completely entirely unexpected individuals, the system should return in all respects absolutely very surprising yields for the 2 photographs. This infers the neural system should be prepared to naturally confirm absolutely entirely unexpected selections of appearances and ascertain numbers upheld that. The yield of the neural system might be thought of as a picture for a chose individual's face — on the off chance that you go in a few photographs of indistinguishable individual, the yield of the neural system will be fundamentally the same as/close, while in the event that you go in pictures of a completely entirely unexpected individual, the yield will be all around totally unique.^[12]

Fortunately, the inconvenience of work or building our own neural system is stayed away from. We have access to a prepared model through lib that we tend to will in general will utilize. It will explicitly what we tend to keep an eye on claim a twisted to wish it to do to - yields a cluster of numbers (face encodings) when we tend to will in general go inside the picture of somebody's face; examination face encodings of appearances from totally changed photographs can tell. On the off chance that somebody's face matches with anybody we have photographs of, at that point it is viewed as a match.

1. Detect/identify faces in a picture (using a face detection model) — for simplicity, this tutorial can completely use photos with one face/person in it, not more/less
2. Predict face poses/landmarks (for the faces known in step 1)
3. Exploitation data from step an attempt of and therefore the actual image, calculate face encodings (numbers that describe the face)
4. Compare the face encodings of well-known faces with those from the keep information to truly perform the popularity operation.

V. RESULTS

Based on the algorithm described above the proposed system is used to recognize any objects and register the upward or downward count for the object moment. When an object comes in front of the camera the algorithm first detect the object and then the algorithm computes the length and width of the object that is in the view of the camera. Then the object is classified either for UPWARD count or DOWNWARD count. The blue line is for tracking the downward count and the red line is for tracking the upward count. If the object crosses the blue line then the downward count is incremented and if the object crosses the red line then the upward count is incremented.

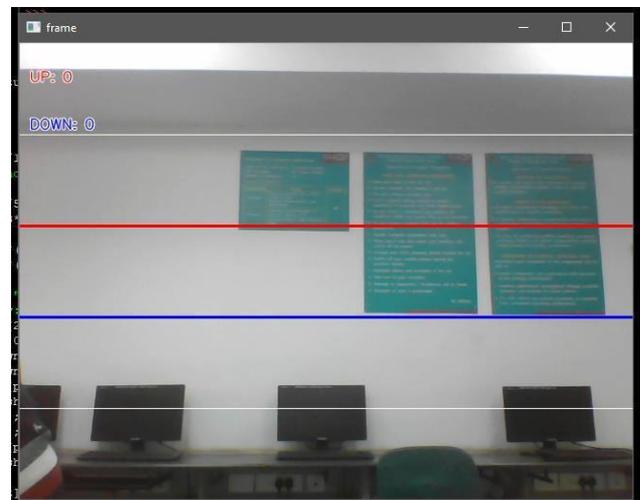


Fig 5.1 Initial phase when there is nothing in the view of camera

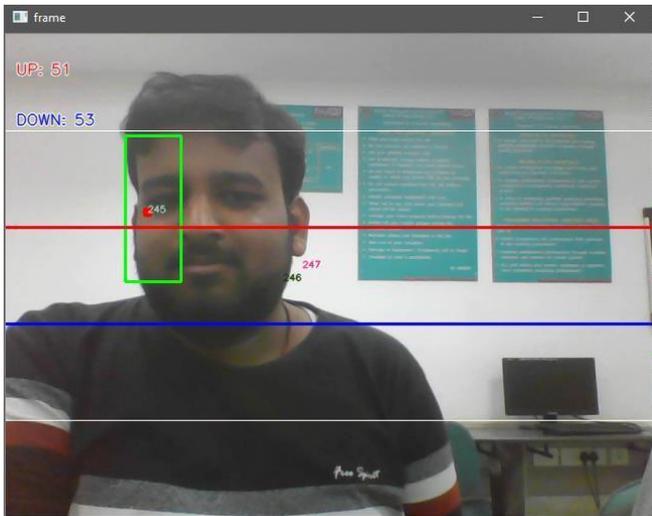


Fig 5.3 Camera detects more than one objects

The camera detects the length and width of the object, face in the above image in fig 5.3 and computes dimensions of the object and updates both UPWARD and DOWNWARD accordingly. If the object crosses the blue line then the downward count is incremented and if the object crosses the red line then the upward count is incremented. This ensures that the number of objects or people moving in or out is kept track of. This ensures that attendance is marked for all the objects that are present.

Table 5.1 Sample Output

Sr. No.	IM001
Dimension	245px*100px
UP	51
DOWN	53

In fig 5.1 shows the blank view of the camera where the camera does not detect any object. The initial count of the upward and downward counter is zero.

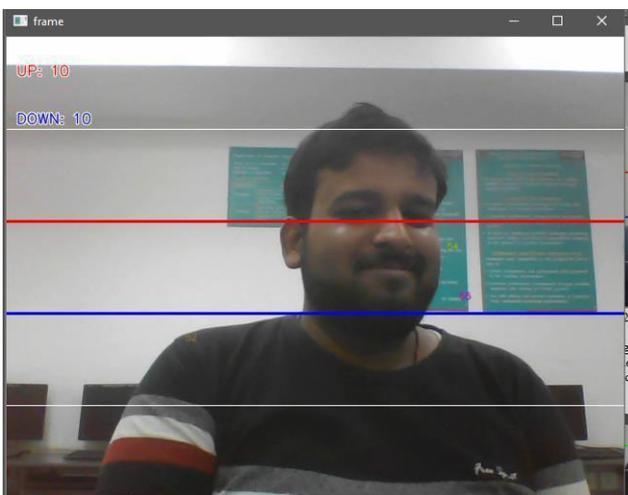


Fig 5.2 Camera detects the object

VI. CONCLUSION

There could be various varieties of lighting conditions, seating Arrangements and environments in numerous lecture rooms. There may additionally exist students portraying various facial expressions, variable hair designs, beard, spectacles etc. All of those cases are thought of and so a high level of accuracy and efficiency is obtained. This system will

be enforced for higher results concerning the management of group action and leaves. The system can save time, reduce the amount of work the administration has to do and can replace the letter paper material with electronic equipment and reduces the amount of human resource needed for this purpose. Summing it up, each new identity verification technology represents large views and guarantees for the long run evolution. It's extremely doable that during a number of years such systems would be ready to method gestures, expressions, gait patterns, palm & ear prints, voice and scent signatures. To not mention that humans can't do what a laptop is capable off – like scrutiny at the same time photos of the many people against an information of thousands.

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