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# Identification and Reduction of Criminal Activities using ML and AI

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**ABSTRACT:** In today's world, Crime isn't just about taking, stealing things physically. Crime rate has expanded up too many levels based on several unknown smart plays and advances by the Criminals. It isn't more than an amazement to hear Hoodlums with great information and advances make their plans cum actions into work. CCTV footage is one of the most significant proofs against any Criminal for now and ever. Crime doesn't only mean stealing even murders, crimes against a person, property money financial crimes etc. comes under different categories of crime and all the above listed can be proven easily if recorded in a CCTV. Cause now a days as previously told CCTV footage can be the wall of defence for crime rate identification and reduction if used through AI and OPENCV. This project is based on creating a real time prototype which can be used to do numerous tasks like detecting any kind of Suspicious behaviours, Criminal detection if present or being recorded in a CCTV. It is expected to pre-recognize hasten circumstance from CCTV surveillance at real time for fast and prompt caretaking or management before any losses and causalities' here the system uses OpenCV library to classify different kinds of suspicious or unusual activities at real time. Apart from this Open CV if used can be able to identify a particular criminal using Face detection, Face recognition methodologies adding to few algos from the OPEN CV library.

**KEYWORDS:** OpenCV, AI, Criminal identification, Face-recognition, Face Identification, YOLO, Haar, Linear Binary Pattern (LBP), Criminal Recognition and Identification

## I. INTRODUCTION

As the world has seen a never before progression throughout the past 10 years, there is an unusual expansion in the crime percentage and furthermore the quantity of crimes is expanding at a disturbing rate. Different reasons for robbery, taking wrongdoings, thievery, hijacking, illegal exploitation and so forth are left perplexing in light of the fact that the accessibility of security personals is less and sometimes restricted for a particular act. Ordinarily there is no distinguishing proof of the individual who was engaged with crimes. According to a survey of report, the crime dept. takes numerous different individuals from the branch to sit Infront of the workstations and PCs in a real sense to look through the CCTV film to find and follow the liable, as they don't have the mechanized framework with them for doing this assignment. This interaction is both labour intensive and time taking too. The Crime division tracks down it extreme to investigate all open camera video information at the point when a significant/minor crime happens. Tracking down the previous history and developments of the crook becomes significant anyway manual strategy is time overpowering. Present existing solutions need factors like light, weather, and orientation to be perfect for a particular crime act to be caught in a CCTV. Face or Facial expressions is a base to human demeanour, feelings also, contemplations going on in mind. Here we will be tending towards fostering associations with applications which might understand human appearances in a video explicitly CCTV footage and surveillance, this could be utilized to acknowledge criminals also hoodlums/crooks or missing people [1,2].

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overpowering. Present existing solutions need factors like light, weather and orientation to be perfect for a particular crime act to be caught in a CCTV. Face or Facial expressions is a base to human demeanour, feelings also, contemplations going on in mind [3-5]. Here we will be tending towards fostering Associations with applications which might understand human appearances in a video explicitly CCTV footage and surveillance, this could be utilized to acknowledge criminals also hoodlums/crooks or missing people.



Fig-1:Group Activity detection

## II. LITERATURE STUDY

ThereUnusual suspicious activities o open zones and person security are a real threat. In open domains, a colossal number of video observation systems are used, for instance, roads, confinement offices, favoured regions, air terminals and supermarkets. Video observation cameras are not sufficiently canny to see unpredictable activities even at progressing. It is critical to screen the acknowledgment of dubious activities and to really look at the authenticity of a recorded video. It is expected to apparent in quick situation at consistent from video perception for quick and speedy decision making. Apart from this coming into the context of Face recognition and identification there are several methodologies open for the occasion of face recognition strategies [6-8]. As we all know a coin has two sides, taking into account this, each method has its endowments and disadvantages. The face recognition methods square measure essentially arranged into six totally various procedures especially, information-based ways, appearance based for the most part ways, highlight invariant ways, math based generally ways, layout based for the most part ways, and model-based for the different tasks and ways.

- Template based methodology: This strategy centers primarily around the work of model during this procedure, the total model of face I.e., the entire picture is coordinated with the renowned person's photos related on the inside of open information.
- Feature invariant methodology: This technique attempts to look out invariant choices of a face not withstanding its point or position. It expects to look out the primary choices that exist indeed, even once make or easing up conditions differ then utilize these choices to track down faces which offer decent benefit in various regions.
- Knowledge based methodology: This strategy is believed to be on the extent that the rule-based at any place the most design is to encode the information of human appearances like colouring, shape, and so forth. This basically relies upon the human cerebrum information that is encoded in rules to look out the face demeanour of the exact picture or a same picturized image [9].
- Appearance-based methodology: Related Etraction characteristics from an image is alluded as a feature element. Despite trusting on the human mind information, this procedure offers chiefly centers around the arrangement of instructing pictures. it's basically a model matching method, inside which design information is gain from an assortment of training pictures [10-12].
- Model-based methodology: This technique is generally a blend of, a model of structure the varieties in type of

choices of face pictures and thusly the varieties in face look. This strategy chiefly looks for the aspects and type of pictures of facial.

- Mathematical based method: Geometric {primarily based mostly} strategy is to some degree totally not the same as model based. This basically takes the relative position and size of face into confidence and attempts to determine the face recognition. This technique conjointly deals with rambling pictures and low image or video resolutions [13-15].

## III. PROPOSED ALGORITHM

**1.LBPH (Local Binary Pattern Histogram)**

LBP is an exceptionally powerful texture classification algo. That analyses and compares about each neighbouring pixel's threshold worth to the worth of the middle pixel. It considers results with regards to double numbers. LBP is a typical method in an assortment of implements and apps because of its discriminative strength and effortlessness. LBP was distinguished without precedent for 1994.From that point forward, it appears to have advanced into a more productive texture classification algo. It was subsequently found that joining LBP with histograms of coordinated inclination descriptors expands its exactness on the equivalent dataset. LBP has extra advantages and abilities like monotonic grey-scale upgrades and factual effortlessness, permitting it to decipher pictures progressively.
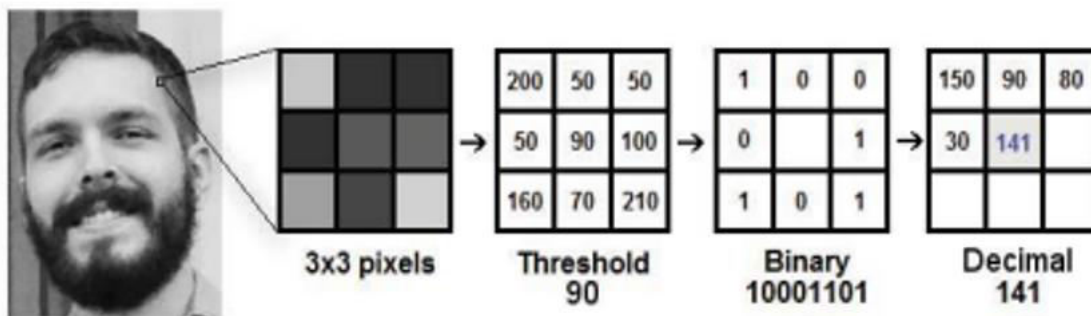


Fig.2: LBPH Algorithm for Face Recognition

**2. YOLO**

YOLO is a shortened form for (you only look once). It is the latest real-time object framework that utilizes a neural network to handle the whole picture. This network parts the image into segments and gauges the at most bounding boxes and possibilities for each. The assessed possibilities are utilized to gauge these bounding boxes. The testing period looks at the entire picture, so the picture's global significance leads to the predictions. This algo can basically distinguish object's structure recordings or picture.
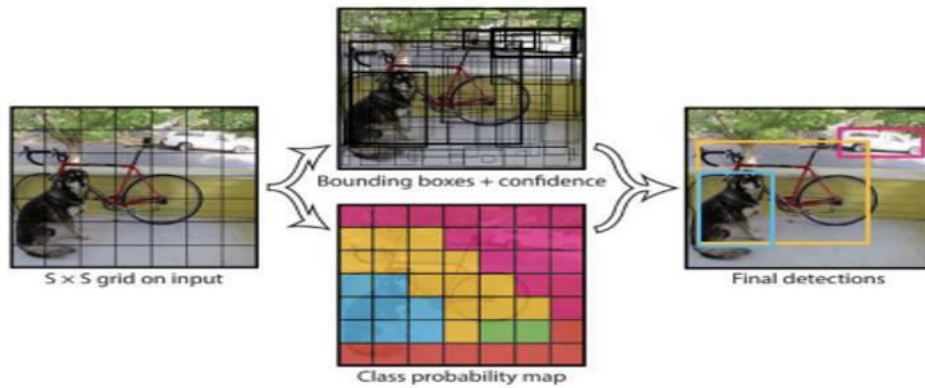
Fig.3: The Yolo Process

## 3.LBP (Local Binary Pattern)

A basic yet powerful texture algo marks pixels in a picture by thresholding the pixels' area what's more, regarding the outcome as a binary number. The LBP surface administrator has turned into a typical methodology in an assortment of applications because of its discriminative power and computational effortlessness. It tends to be seen as a binding together answer for surface examination's generally dissimilar measurable and primary models. The LBP administrator's heartiness to monotonic grayscale changes instigated, for instance, by enlightenment varieties is maybe its most huge property in genuine world applications. Another key component is its computational straightforwardness, which permits it to examine pictures in troublesome real time situations.
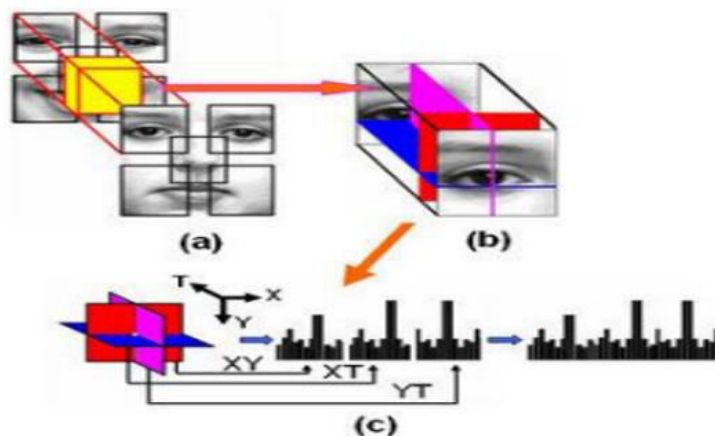


Fig.3: Description of Facial Expression with Local Binary Patterns

## 4.Haar Cascade

Haar Cascade is a viable strategy method for distinguishing objects. It's a Machine learning based strategy in which an outpouring of activities is gained from countless positive and negative pictures. It is best worth for the insight of things in different frames possible.

Fig.4: View of Haar Cascade Classifier

## IV. IDEOLOGY AND WORKING

The ideology of this project is to create a framework which addresses the solution for the reduction as well as identification of criminal activities. According to my knowledge and imagination these can be done by first Facial recognition, Weapon detection, Unusual Human activity detection in public. So, I've taken three cases and tried to combine them into a single framework in a small scale which in future on a large scale can really be a tremendous change in the providence of security to any individual and tracking down criminals.

I've taken a lot of Videos and Sample pictures into context and trained, tested them to identify a person, detect a weapon as well as finding out unusual activity too all by using Open CV and AI included.

*Following are the steps to execute:*
- Collect a sample of pics and videos to train the model.
- Choose an algorithm based on the necessity for recognition or identification.
- Train the model.
- Finally given the output by testing it in Real-time or by using sample videos or pictures.

*Result for weapon detection:*
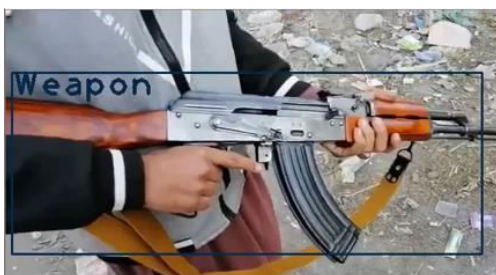
Algorithm used: YOLO V3(You only look once)



Fig.5: Image Detection of Weapons

*Result for face recognition:*

Used: Keras, OpenCV



Fig.6: YOLO image boundary box formation.

Accuracy score:

| SYSTEM | ALGORITHMS | ACCURACY SCORE |
|---|---|---|
| Existing | HAAR | 65-72 |
| Proposed | YOLO | 83-90 |

*Results for unusual activity detection:*
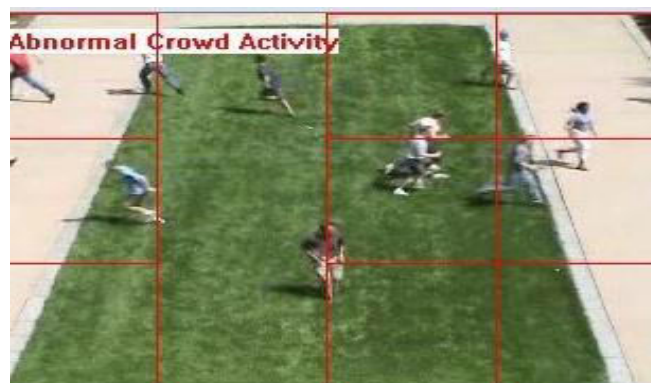*Unusual activity:*

Gray scale image:



Fig.7: Gridline Formation using Keras, OpenCV

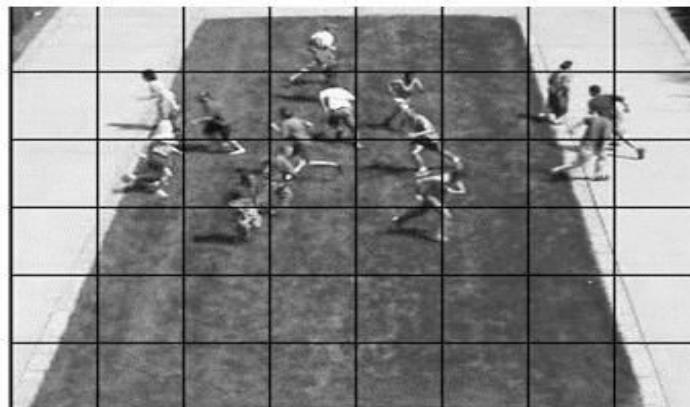Fig.8: Gray Scale Application on the Scenario

Image divided into blocks:



Fig.9: Grey Scale Grid Line Block Formation

## V. CONCLUSION

Computer Vision can be considered as a branch or a subpart of Artificial Intelligence, where computers are prepared to deal with the picture and separate the significant featured elements from the pictures or recordings. Open Computer Vision (OpenCV), a python library written in C++, gives different functionalities to computer vision applications. Uses of Computer vision are object location, face acknowledgment, clinical analysis, and so forth. In this paper, we underscore the significant job of OpenCV in face location and face identification. We represent the well-known calculations in OpenCV that are utilized for face location and face identification. Then express the OpenCV modules and make sense of OpenCV in light of Python and notice the applications for OpenCV. The frameworks which have been proposed till presently are expected to perceive straightforward human activity, for example, strolling, running and a lot more however not reasonable for swarmed region. Framework which has been proposed is capable to perceive strange human activity from swarm and activity as needs be utilizing movement impact map and OpenCV. The accuracy rate somewhat higher than other and less explores have been made over this idea. Proposed framework can work for Prior Appraisal against Crime. The Unusual Crowd Movement Detection can be executed in different public spots. Be that as it may, precision is frequently significant which requires improving for fostering an ideal system that can be executed or implemented for all intents and purposes. The legitimate preparation of the data sets upgrades the picture, and the exactness of the system tech. Single-face recognition is conceivable. Single-side face recognition, that can be either left side or the right half of the face can be perceived through the proposed system tech. Numerous faces

acknowledgment is a development benefit of this framework. Higher precision permits keeping away from misleading distinguishing proof. The framework plans to track down answers for a vigorous strategy for face acknowledgment from recordings, diminishing the time prerequisites for face recognition with presentation of four unique algos. The proposed approach when carried out effectively could be of extraordinary assistance to our Criminal agencies in distinguishing and finding of hoodlums, likewise, search for missing individuals. So as a result, I would like to propose a system which if made into work using the above three ideologies put together into single framework can surely become the base of security to every individual in this planet.

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