WEAPON DETECTION USING ARTIFICIAL INTELLIGENCE AND DEEP LEARNING FOR SECURITY APPLICATIONS

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ABSTRACT - Security is often a main concern in each domain, thanks to an increase in rate during a crowded event or suspicious lonely areas. Abnormal detection and watching have major applications of pc vision to tackle numerous issues. thanks to growing demand within the protection of safety, security and private properties, desires and readying of video police investigation systems will acknowledge and interpret the scene and anomaly events play an important role in intelligence watching. This project implements automatic gun (or) weapon detection employing a convolution neural network (CNN) based mostly SSD and quicker RCNN algorithms. projected implementation uses 2 sorts of datasets. One dataset, that had pre-labelled pictures and also the alternative one could be a set of pictures, that were tagged manually. Results area unit tabulated, each algorithms come throughs} good accuracy, however their application in real things is supported the trade-off between speed and accuracy.

Key Words: Computer vision, weapon detection, Convolution Neural Network (CNN), Faster Region based Convolution Neural Network (RCNN), Single Shot Detection (SSD)

1.INTRODUCTION Weapon or Anomaly detection is that the identification of irregular, unexpected, unpredictable, uncommon events or things, that isn't thought-about as a usually occurring event or a daily item in a very pattern or things gift in a very dataset and so totally different from existing patterns. Associate in Nursing anomaly could be a pattern that happens otherwise from a collection of ordinary patterns. Therefore, anomalies rely on the development of interest . Object detection uses feature extraction and learning algorithms or models to acknowledge instances of assorted class of objects. planned implementation focuses on correct gun detection and classification. additionally involved with accuracy, since a warning may end in adverse responses . selecting the

proper approach needed to create a correct trade-off between accuracy and speed. within the methodology of weapons detection exploitation deep learning. Frames ar extracted from the input video. Frame differencing algorithmic program is applied and bounding box created before the detection of object. The flow of object detection and trailing is finished as, Dataset is formed, trained and fed to object detection algorithmic program. supported application appropriate detection algorithmic program (SSD or quick RCNN) chosen for gun detection. The approach addresses a haul of detection exploitation numerous machine learning models like Region Convolutional Neural Network (RCNN), Single Shot Detection (SSD).

2. SYSTEM DESCRIPTION SSD and quicker RCNN algorithms area unit simulated for pre labeled and self-created image dataset for weapon (gun) detection. each the algorithms area unit economical and provides smart results however their application in real time is predicated on a exchange between speed and accuracy. In terms of speed, SSD formula provides higher speed with zero.736 s/frame. Whereas quicker RCNN provides speed one.606s/frame, that is poor compared to SSD. With relation to accuracy, quicker RCNN provides higher accuracy of eighty-four.6%. Whereas SSD provides associate degree accuracy of seventy-three.8%.

2.1SSD: Single Shot Multi Box Detector

Conventionally used cement –a primary binder additionally a necessitate component in manufacturing concrete rates 1st within the housing industry. Production of standard cement needs a larger ability and is energy intensive. The usage of waste materials within the production of concrete and reduction in cement content was solely the attainable different within the past decade. Associated risks with the assembly of normal hydraulic cement square measure acknowledge. A greener power-assisted with a natural friendly claim will be created solely with the usage of the waste materials and reduction in evolving respiration gas to the atmosphere. most works square measure dispensed victimisation supply material ash, with fine mixture and coarse mixture. Concrete plays a significant role within the housing industry and on the opposite hand, stream sand; one in all the essential material has become terribly pricy that may be a scarce material. Depletion of sand may be a agitated issue thanks to redoubled usage of sand in construction. No alternative

replacement materials like quarry rock mud isn't targeted in casting geopolymer specimens. even if in some analysis papers the replacement materials square measure adscititious solely in partial replacement while not aiming on 100% replacement. several researches primarily focus towards take a look at results of GPC specimens victimisation steel fibers, glass fibers. however the study associated with natural fibers and hybrid fibers square measure found scarce. the most a part of this work geared toward characterizing the engineering strength properties of geopolymer concrete by 100% replacement of fine mixture with quarry rock mud. Hence, combination of flyash and quarry rock mud in GPC are thought-about for evaluating the mechanical properties of geopolymer concrete. Also, investigation focuses on incorporation of 3 totally different fibers particularly polypropene fibers(PF), fibre fibers(CF) and hybrid fibers(HF) in numerous share of proportions like zero.5%,1%,and 1.5% to see the most strength properties of GPC.

2.2 Anomaly Detection in Videos for Video Surveillance Applications Using Neural Networks Deep learning has gained an amazing influence on however the globe is adapting to AI since past few years. a number of the popular object detection algorithms are Region-based Convolutional Neural Networks (RCNN), FasterRCNN, Single Shot Detector (SSD) and you simply Look Once (YOLO). Amongst these, Faster-RCNN and SSD have higher accuracy, whereas YOLO performs higher once speed is given preference over accuracy. Deep learning combines SSD and Mobile Nets to perform economical implementation of detection and following. This rule performs economical object detection whereas not compromising on the performance.

3. IMPLEMENTATION The Implementation is section wherever we have a tendency to endeavor to grant the sensible output of the work worn out planning stage and most of cryptography in Business logic lay coms into action during this stage its main and crucial a part of the project

3.1 Project Modules The modules incorporated in this project are:

1. Dataset upload

2. Pre-processing data

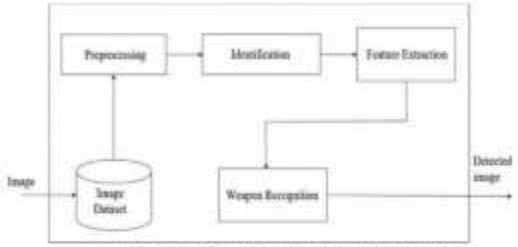
3. Extracting dataset

4. Splitting dataset into training and testing

5. image processing

6. Applying models

3.2 ARCHITECTURE



System architecture of the weapon detection

Flowchart for the module

The flow chart for grouping information is as portrayed within the figure. the information set is collected from a supply and a whole analysis is dispensed. The image is chosen to be used for training/testing functions provided that it matches our necessities and isn't recurrent.

3.3 Technologies Used

- SSD Algorithm A method for police work objects in pictures employing a single deep neural network. Our approach, named SSD, discretizes the output house of bounding boxes into a group of default boxes over completely different facet ratios and scales per feature map location
- Faster R_CNN Faster R-CNN could be a single-stage model that's trained end-to-end. It uses a completely unique region proposal network (RPN) for generating region proposals, that save time compared to ancient algorithms like Selective Search. It uses the ROI Pooling layer to extract a fixed-length feature vector from every region proposal.
- YOLO Algorithm YOLO is Associate in Nursing formula that uses neural networks to offer period object detection. YOLO formula is Associate in Nursing formula supported regression, rather than choosing the attention-grabbing a part of a picture, it predicts categories and bounding boxes for the full image in one run of the formula.

4. CONCLUSIONS SSD and quicker RCNN algorithms ar simulated for pre labeled and self-created image dataset for weapon (gun) detection. each the algorithms

ar economical and provides sensible results however their application in real time is predicated on a exchange between speed and accuracy. In terms of speed, SSD algorithmic program provides higher speed with zero.736 s/frame. Whereas quicker RCNN provides speed one.606s/frame, that is poor compared to SSD. With relevancy accuracy, quicker RCNN provides higher accuracy of eighty-four.6%. Whereas SSD provides AN accuracy of seventy-three. 8%, that is poor compared to quicker RCNN.SSD provided real time detection thanks to quicker speed however quicker RCNN provided superior accuracy.

5. FUTURE SCOPE Further, it is enforced for larger datasets by coaching victimization GPUs and high-end DSP (Digital Signal Processors) and FPGA (Field-programmable gate array) kits. In order that we are able to deliver the goods speed in detection of weapons kind several range of varieties and models.

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