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OBJECT DETECTION IN DISASTER MANAGEMENT

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Abstract: Natural disasters are events that can't be prognosticated both by position and time of circumstance. Natural disasters beget property losses and can indeed take lives. The running of rapid-fire evacuation must be done by the SAR platoon to help victims of natural disasters to reduce the quantum of loss, Bst in reality, there are numerous obstacles in the evacuation process. Starting from facing delicate terrain to necessary outfit limitation. In this exploration, a system designed to descry victims of natural disasters uses image processing where the picture is carried out using a drone that points to help find victims in delicate or vulnerable locales when reached directly by humans. Grounded on this back ground, this exploration proposes the development of a system for the discovery of victims of natural disasters that aims to help the SAR platoon and natural disaster levies in searching for victims who are in hard to reach places. The You Only Look formerly(YOLO) system is enforced using the python programming language related to image processing. From the exploration that has been done, the delicacy result of detecting objects of disaster victims is 89.

I. INTRODUCTION

As Natural disaster causes loss of lives, in order to identify the data, we had introduced an robotic object discovery using deep neural networks for natural disaster recovery. The ideal of this methodology is to identify the objects during natural disasters. To identify the objects manually is a big threat and it's insolvable to be sure about the object which was set up after disaster circumstance. At the time of a disaster, one of the essential effects is the evacuation process of disaster victims. But in reality, there are frequently obstacles in the evacuation process. presently, the evacuation process for disaster victims still lacks unhappy technology, so that it makes it delicate for the SAR platoon in the process. Image processing is a field that's decreasingly growing in the compass of exploration, where the real- time observation system increases the occasion for experimenters to develop new exploration on a variety of problems(2). Processing includes object discovery which is enforced to descry the presence of certain objects(3). Object discovery is related to the identification of objects that live in the real world, similar as people, creatures, and objects. The object discovery algorithm uses colorful image processing operations to prize the asked part of the object(4). Object discovery can be enforced to descry victims of natural disasters similar as mortal body patterns(3). YOLO is a one- stage discovery system. By dividing the input image into regions and prognosticating the boundary box equals and class chances for each region by turning the object discovery problem into a retrogression problem, which can truly achieve end- to- end discovery(5). YOLO is one of the fastest object discovery styles with good performance and high delicacy(6). So in this study, using the YOLO system, a natural disaster victim discovery system will be designed using image processing where the victim's image is taken using a drone that points to help find victims in delicate or vulnerable locales when reached directly by humans.

II. LITERATURE REVIEW

Several references are used as state of the art in the research to be conducted. The first research is about the detection of victims of natural disasters. This research designs a system to detect victims of natural disasters using the Convolutional Neural Network (CNN) method and is implemented on a raspberry pi that can identify victims of natural disasters through streaming cameras placed in the UAV. With the CNN method, 100% accuracy is obtained with an object distance of 1-4 m using the Mobile-net SSD model [3].The second research discusses the detection object using the adaptive background subtraction method. The study explains the reduction in the background used to move humans, such as bending, walking, and jumping. The resulting rate of movement is 97% [2].The third research is about object detection algorithms for video surveillance. Object detection applications designed include skin detection, color detection, and face detection in video surveillance. The parameters are simulated and implemented, such as detection accuracy, Euclidian RGB T Threshold in Target Detection, Y, Cb, and Cr in Skin Detection. The accuracy produced in this application is 95% [4].

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The next research discussed deep learning, and OpenCV methods implemented for detection and tracking the object in real-time. Deep learning combines SSD and Mobile Nets to perform efficient detection and tracking. This experiment has shown a considerable confidence level [7].

Demonstration of the use of the latest YOLOV3 algorithm to detect participant traffic provides in this research. This experiment trained networks for five classes of objects include cars, trucks, pedestrians, traffic signs, and lights, also demonstrated the effectiveness of the approach in a variety of driving conditions including clear and cloudy skies, snow, fog, and night. Because there are too many small objects, the value of precision and recall does not achieve good grades as expected. False detection commonly found in neural network output is further investigated in custom datasets and smaller videos [8].

III. YOLO

You Only Look Once (YOLO) algorithm YOLO is an object recognition method based on Convolutional Neural Network (CNN) [9]. The YOLO algorithm for detecting objects is the first input image that is zoomed. YOLO is a method that divides image input into grids of S x S size. Convolution will be carried out from the input image to get a bounding box. Bounding boxes have x coordinates, y coordinates, width (height), height (height), and confidence score. The bounding box will be nominated from 0 to 1. The x and y coordinates are normalized to adjust the upper left point in question. The height and width will be normalized according to the image size. After the bounding box and confidence have been obtained next, the Convolutional Neural Network operation process on each bounding box.

OpenCV library OpenCV is a library of programming functions used for computer vision [11]. The goal is to make computers have abilities that resemble humans. This library is made for programming that uses the C/ C++ language. The features contained in the OpenCV library include basic image processing (filtering, edge detection, color conversion, histograms), can detect moving objects, camera calibration, and object recognition [12].

IV. PROPOSED METHODS

Proposed methods The purpose method applied to the system is described at the stages used as a reference as a framework for the analysis of object recognition of disaster victims. The object detection flow diagram that is applied will be explained in Figure 2.

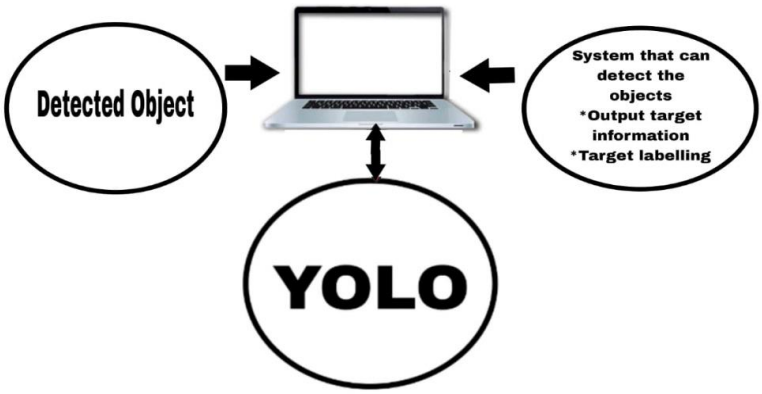

fig2

Based on figure 3, when the image is used as input from the network model, the output of the network model will be calculated according to the parameters and structum of the model. The output of the model contains image category information, coordinates information that corresponds to bounding boxes, and corresponds to outpar information. Value allows the computer to display boxes to detect targets selectively

Them are several stops taken in the process of detecting objects using the YOILO method. The following steps of detection of disaster victims use the YOLO method shown in Figure 3

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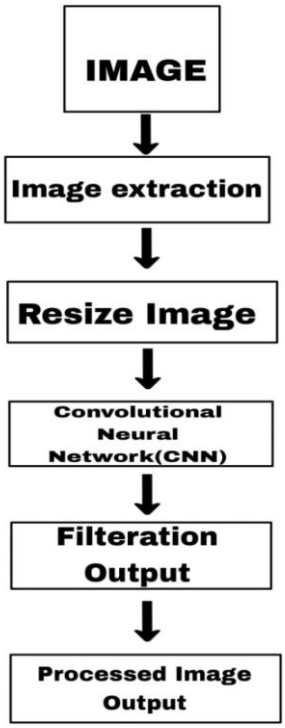

Fig3

Based on Figure 3, the first step of the detection of disaster victims is to start by extracting a single image. Then resize the image where the output image resizes is input, which will be processed using Convolutional Neural Network (CNN). CNN will process the input image. The processes that will be carried out include the prediction of coordinates and the position of the bounding box containing the object, the probability of the bounding box containing the object, and the probability of each purpose in the bounding box included in the class specified. Then the output image from the CNN process is carried out the filtration process to determine more specific objects. So that the output video contains information on the name of each object detected.

V. CONCLUSION

Conclusion In this paper, we present the YOLO algorithm for the detection of victims of natural disasters. Conclusion In this paper, we present the YOLO algorithm for the detection of victims of natural disaster. Detection of victims during disaster is difficult. In this situation we introduce artificial intelligence to assist this operation .Compared with CNNs, YOLO has more advanced application in practice. YOLO is a unified object detection model. It's simple to construct and can be trained directly on full images. Unlike classifier-based approaches, YOLO is trained on a loss function that directly corresponds to detection performance and the entire model is trained jointly. YOLO's better generalizing representation of object than other models making it ideal for applications that rely on fast, robust object detection. These preeminent and precious advantages make it worthy of being strongly recommended and popularized. Except the structure of each algorithm, the most urgent up-coming challenge for machine learning is the scope of the dataset. The availability of suitable training data could be the vital part in the learning process, to achieve an idea results. In futurework, precision of the algorithm could be improved with training on the bigger and more diverse datasets that cover different weather and lighting conditions. Also, this algorithm could be used in fusion with other sensor's readings to reduce the number of false detections.

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