

CNN Based Animals Recognition using Advanced YOLO V5 and Darknet

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Abstract: The most of common method of identifying an animal for a human was based on his knowledge what he had acquired yet still the identification of few animals is still a tremendous task. In order to overcome this problem, we make use of advanced technology like computer vision along with YOLO V5 algorithms for the better performance and analysis of animal recognition. A sample input will be fed which will be analyzed using the YOLO algorithms, animal will be recognized and using the pretrained dataset and provide the right output.

Keywords: YOLO V5, CNN, Open CV, Database image processing, Darknet.

1. Introduction

To perform any computer vision task, we need to make use of certain algorithms in order to perform the operation, here we make use YOLO software [YOLO = you only look once] YOLO was developed by Joseph Redmon which perform @ a very high speed. In order to perform computer vision operation YOLO would make use of CNN architecture YOLO has several layers supported by CNN to perform smart and accurate output. The input image will be fed which would undergo image extraction process which provides a feature map output using Kernel matrix.

The kernel matrix will have a highest feature with regard to performing 3x3 image matrix formation we

Here the image matrix formation is taken for further analysis which is consider to be the input which brings proper perspective view for the software algorithm to the better analysis which plays a vital role in deeper analysis for CNN to perform its operation.

The input will be analyzed and a feature detection box is formed on to input with accuracy rate which completely work on image processing techniques, object detection and recognition. Advanced YOLO V5 with Darknet helps in better performance, earlier YOLO had only few layer for analysis detection and for providing output. The extracts image will be further taken for 3x3 CNN layer for the final output. The YOLO V5 makes detection simple by utilizing anchor boxes each box bounds on the input provided and works on detection. Darknet has 53 layers with a pretrained dataset images which works on backend.

2. Literature Survey

“Efficient Face Recognition System” was developed by Sahana Banu for the identification using face patterns for security purpose.

“YOLO V3” model was developed by Joseph Redmon basically image processing software for better analysis and identification.

Object detection and image classification was done by Michal Maj in 2018.

1. Proposed Methodology

The model consists of three phases:

1) Capturing

First a trained dataset will be prepared, which consist of images in several thousand later using camera an image will be captured the captured image will be undergoing several process at first we would have image segmentation and background subtraction.

2) Filtering

Next the image will be undergoing 3x3 matrix for deeper analysis using CNN architecture YOLO perform image processing operation and recognition.

3) Displaying

As soon as the detection process starts the labeling box will be formed on the recognized image and accuracy rate will be provided.

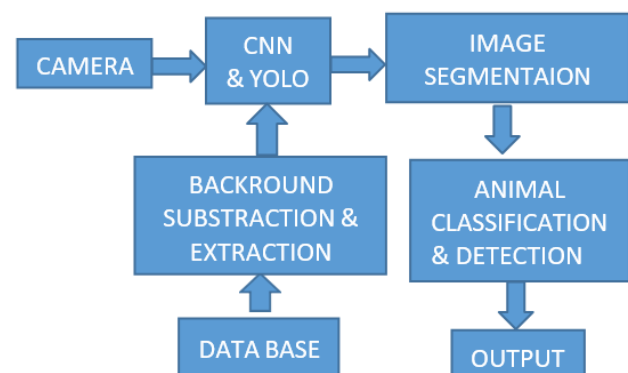


Fig. 1. Block diagram

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The digital camera would capture the image whereas the capture image is also determined to be digital image available at digital format where the capture image which is in digital formats will be further send to analysis section which basically involves YOLO and CNN technology whereas YOLO and CNN is an image processing software built on higher level algorithms which involves image segmentation technology undertaken along with image extraction techniques performing analysis by comparing with trained dataset later after all this process animal classification and detection will be done and output is generated.

3. Implementation Details

The implementation of this project mainly works with the help of python language with deep learning algorithms deep learning has several layers for higher analysis are this layer are installed for identification process training using various API's, the kernel matrix will have a highest feature with regard to performing 3x3 image matrix formation we

Here the image matrix formation is taken for further analysis which is consider to be the input which brings proper perspective view for the software algorithm to the better analysis which plays a vital role in deeper analysis for CNN to perform its operation.

Today internet has lot of open-source API like Open CV to perform image processing operation this will read the input image and generate certain details so we need to import certain lib for perform effective operation and provide the output.

A. Requirement

1) Software Requirements

- Open CV
- YOLO
- Python
- Darknet

2) Hardware Requirement

- Laptop with Windows or Linux OS
- Camera

B. Flowchart

Initialing by the input fed to the software alongside with darknet with OpenCV along with certain GPU which acts like a compiler where the darknet works at backend analyzing information available at dataset where certain level of filtration like image segmentation and subtraction is done using darknet at backend where the image is identified where the output is display.

C. Pseudo-Code

Step 1 = Start.

Step 2 = Analysis of the image using Open CV API's.

Step 3 = Acquired image will be processed for recognition.

Step 4 = Role of Darknet begins.

Step 5 = Animal recognition is done and recognized output provided in trained or preferred language.

Step 6 = Display the output.

Step 7 = Repeat the step from [1]-[6].

Step 8 = End.

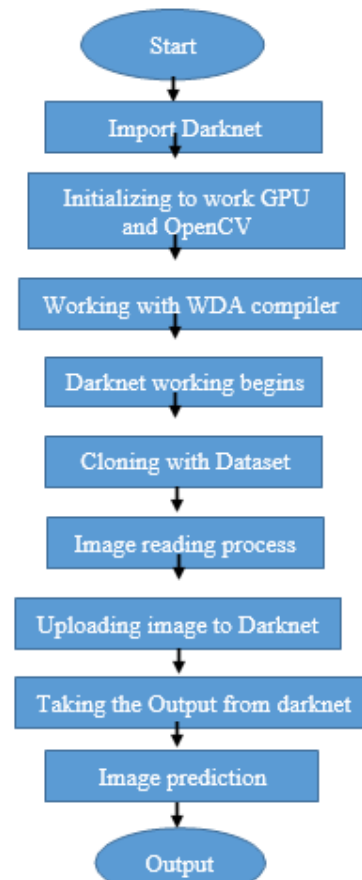


Fig. 2. Flowchart

4. Results and Discussion

After all analysis the output section will display the image a cell wall will be formed on the image recognized with the labelling and accuracy.

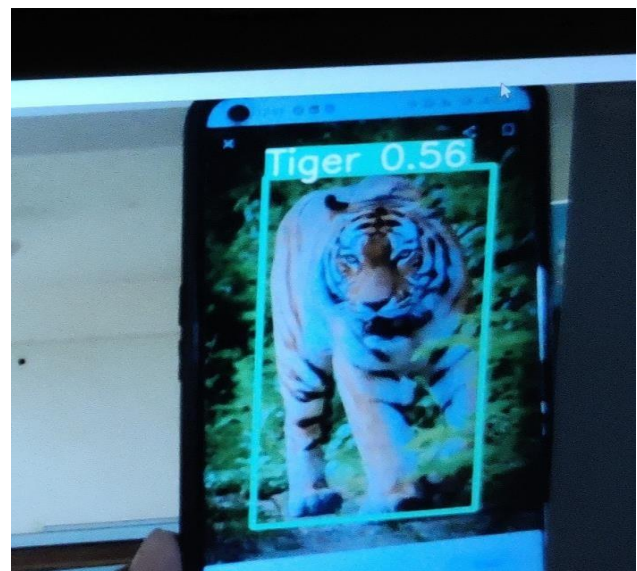


Fig. 3. Obtained result image (Tiger)

6. Future Scope

Training the dataset for highly accurate outcomes and developing advanced YOLO technology for performing better analysis

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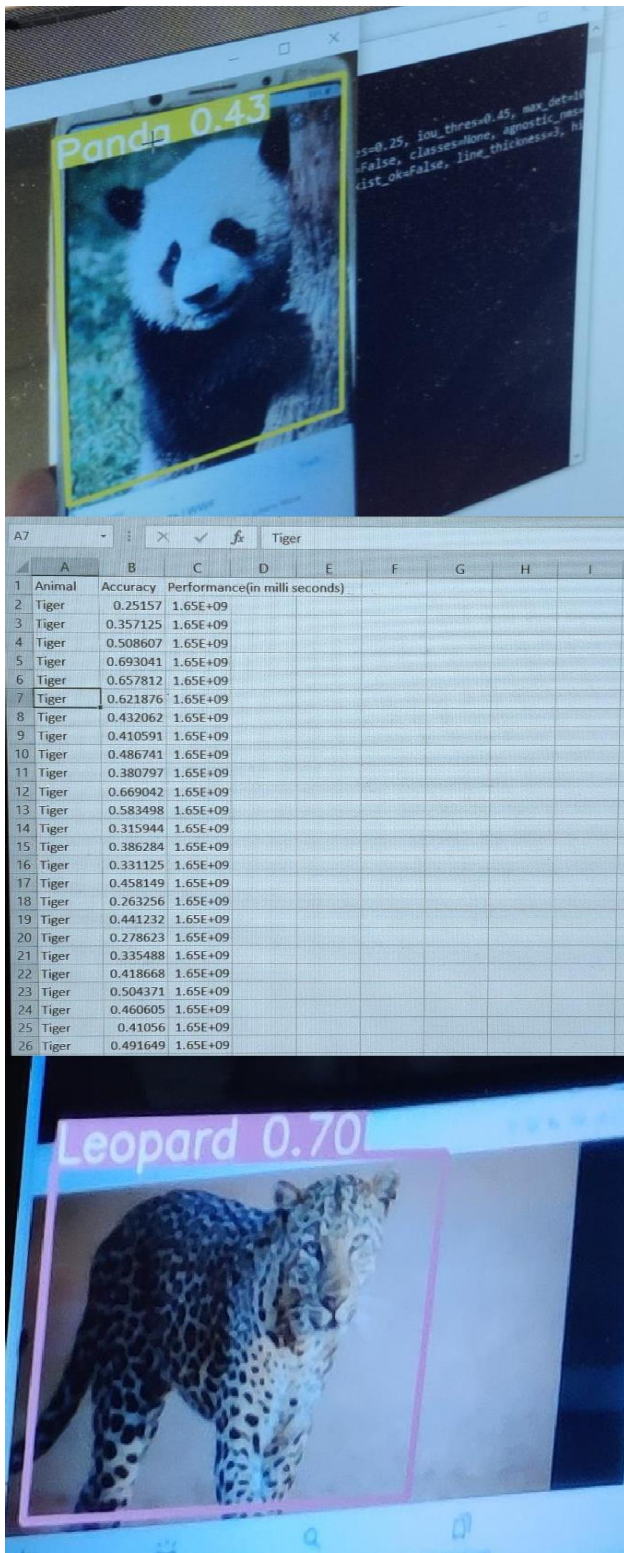


Fig. 4. Obtained result image (Panda and Leopard)

5. Conclusion

We trained this model using advanced YOLO v5 for identification of animals which involves CNN algorithms which performs higher and operation with accurate results.