

Object Recognition System

High Level Design of the System:

On the high level view of the system,

The system takes the following parameters and outputs the recognized object.

INPUT :

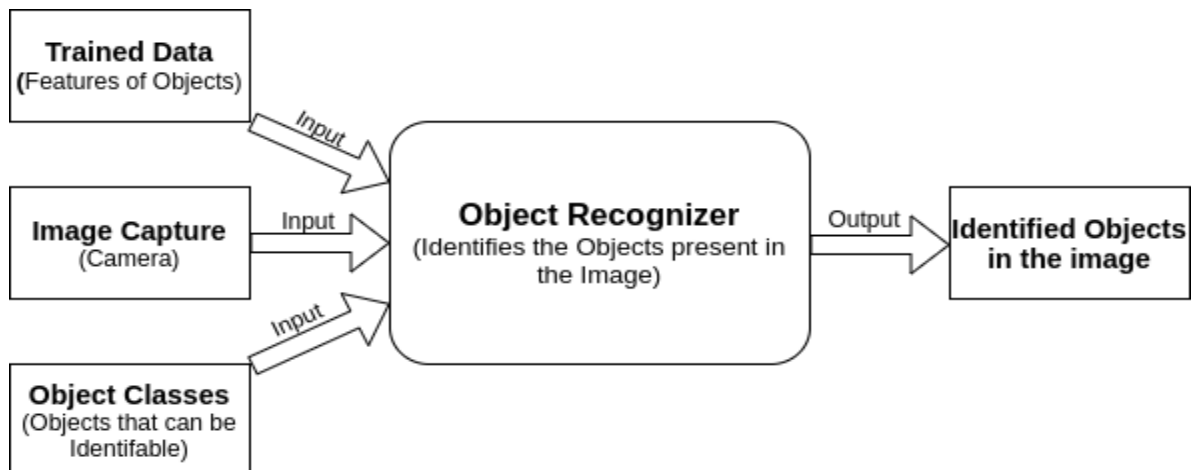
- **Image Capture** : Image Containing various Objects
- **Trained Data** : Contains the features of the Objects.
- **Object Classes** : Contains the list of Objects that Can be identifiable.

OBJECT RECOGNIZER:

- Identifies the Objects Present in the Image.

OUTPUT :

- List of Identified Objects as Image.



Proposed System:

The Proposes Object Recognition System will perform the following operations briefly

- When the user runs the program, the webcam will be on and starts working.
- Whenever the user enters a waitkey, the webcam will take the image.
- The input image undergoes processing by applying yolo v3 algorithm. In this, a single neural network will be applied.
- This network divides the image into regions and predicts bounding boxes and probabilities for each region and these bounding boxes are weighted by the predicted probabilities.
- The detected object will be displayed as an identified object in the image.

Object Recognition System

Modules of the system:

The Modules of Object Recognition System are listed below

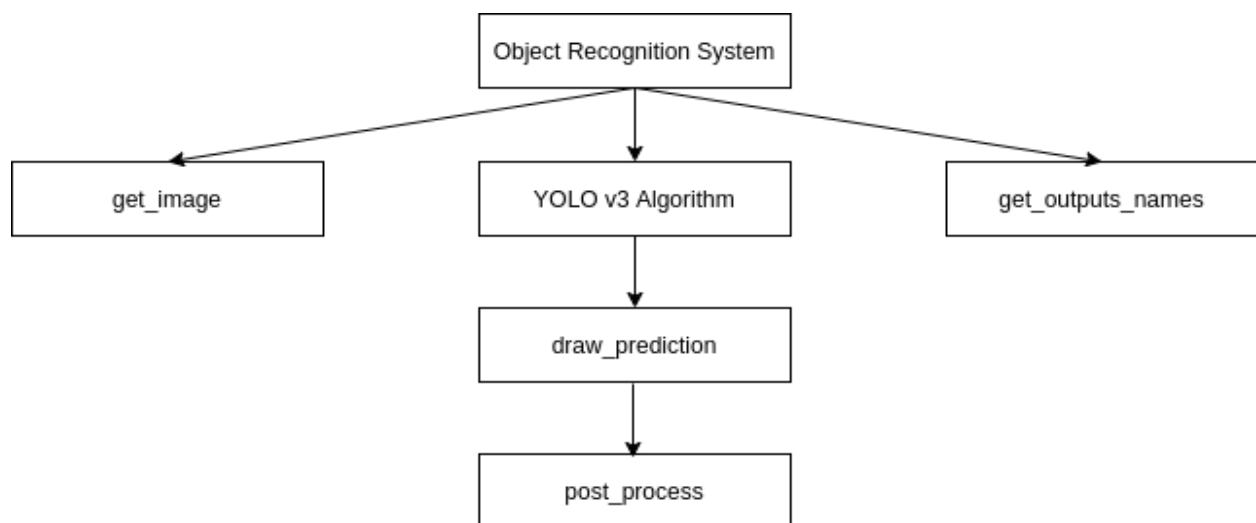
- **YOLO v3 Algorithm :**

YOLOv3 makes predictions at 3 different scales (similar to the FPN):

- In the last feature map layer.
 - Then it goes back 2 layers back and up samples it by 2. YOLOv3 then takes a feature map with higher resolution and merges it with the upsampled feature map using element-wise addition. YOLOv3 apply convolutional filters on the merged map to make the second set of predictions.
 - Repeat 2 again so the resulting feature map layer has good high-level structure (semantic) information and good resolution spatial information on object locations.
- **Get_image** : Captures a single image from the webcam and returns it.
 - **drawPred** : Draw the predicted bounding box and get the label for the class name and its confidence.
 - **Postprocess** : Remove the bounding boxes with low confidence using non-maxima suppression and scan through all the bounding boxes output from the network and keep only the ones with high confidence scores and assign the box's class label as the class with the highest score.
 - **getOutputsNames** : Get the names of the output layers of the objects.

Block Diagram:

The Block diagram of the Object Recognition System is as follows



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Data Flow Diagram:

The Data flow diagram of the Object Recognition System is as follows

