Object detection using YOLOV3.

- Determining the existence, position, and nature of one or several objects inside a picture. Yolo, short for 'you only look once', is an object detection model that employs a deep convolutional neural network.
- Define a YOLOv3 model using Keras. The model consists of a series of convolutional blocks, skip connections, and upsampling layers. The YOLOv3 architecture predicts bounding boxes and class probabilities at multiple scales.

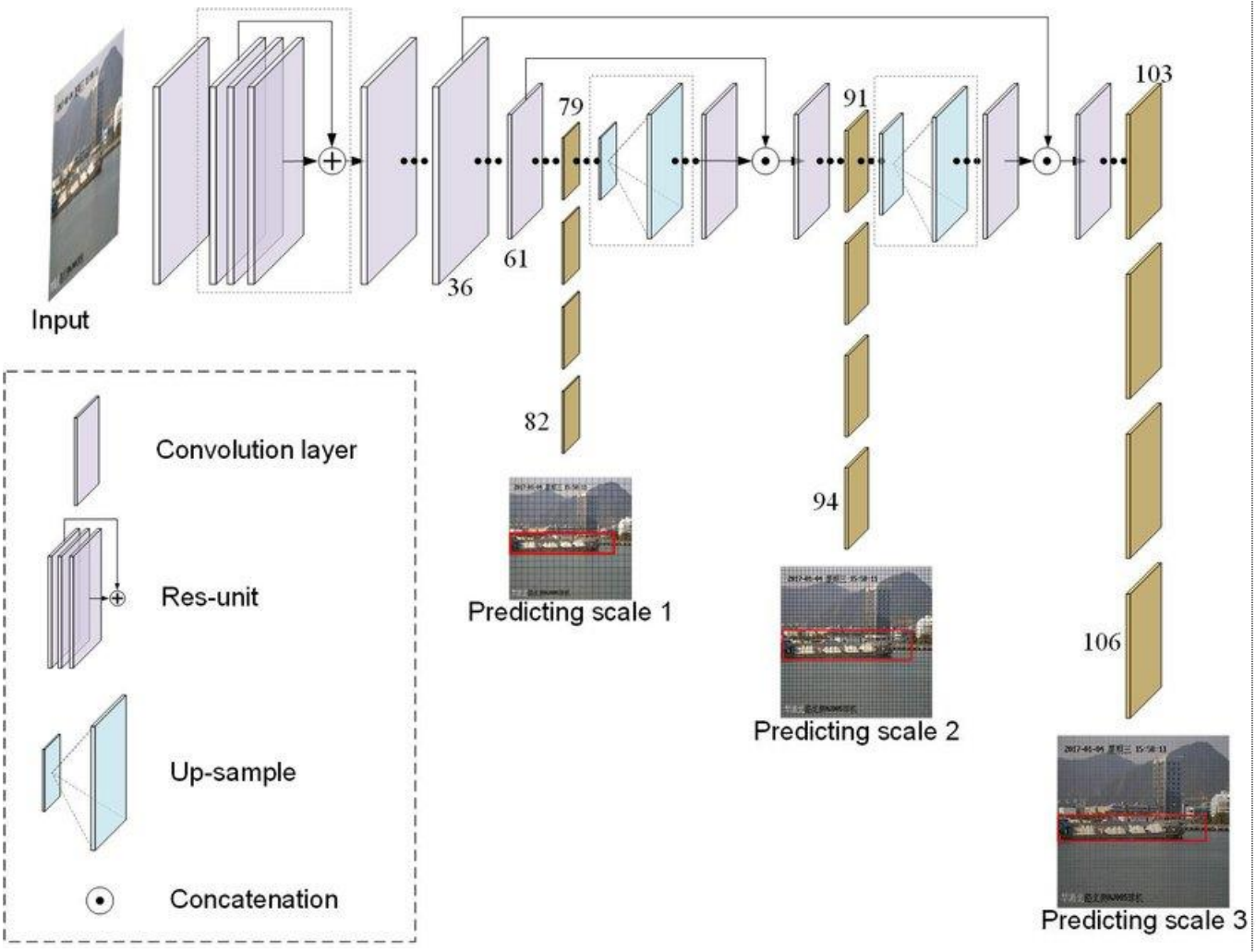

Figure 1: source:https://www.researchgate.net/figure/The-framework-of-YOLOv3-neural-network-for-ship-detection_fig2_335228064, YOLOV3 Architecture

- The model takes an input tensor named input image and produces a list of output tensors yolo 82, yolo 94, yolo 106. YOLO often uses multiple scales to detect objects at different sizes in the input image.
- Load the pre-trained YOLOV3 model.
- Bring the input image to standard size.
- Make the predictions (three predictions at different scales is obtained).
- Define the anchors.

- YOLOv3 uses different anchors on different scales. The YOLOv3 model predicts bounding boxes on three scales and in every scale, three anchors are assigned. So, in total this network has **nine** anchor boxes.
- Iterate through all the grids and find the bounding box coordinates, dimensions, objectness score, and class probabilities for which the objectness score is greater than 0.65.

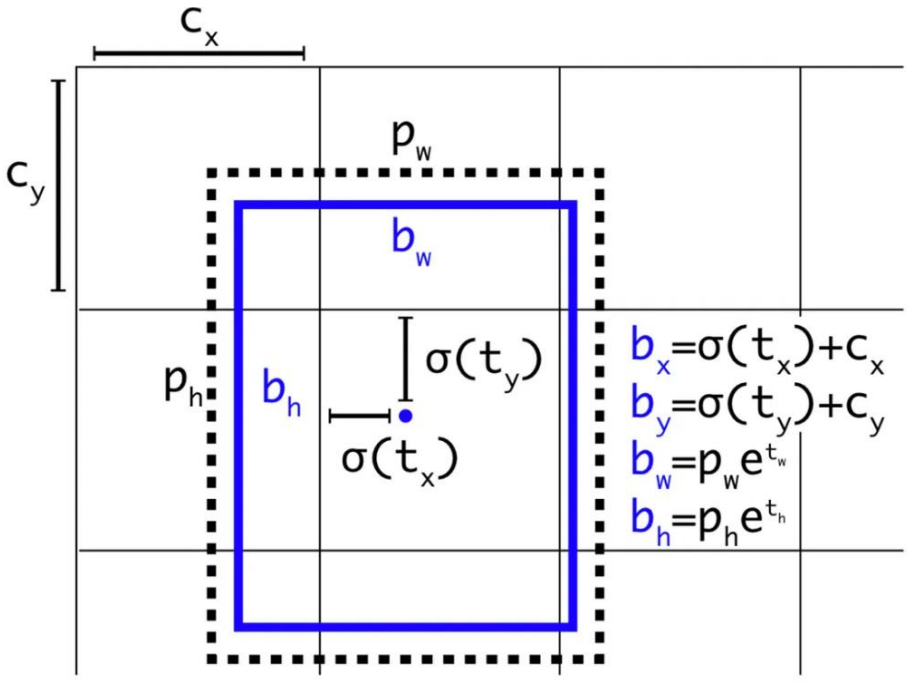

Figure 2: source:https://medium.com/@Shahidul1004/yolov3-object-detection-f3090a24efcd, Bounding box coordinates and dimensions.

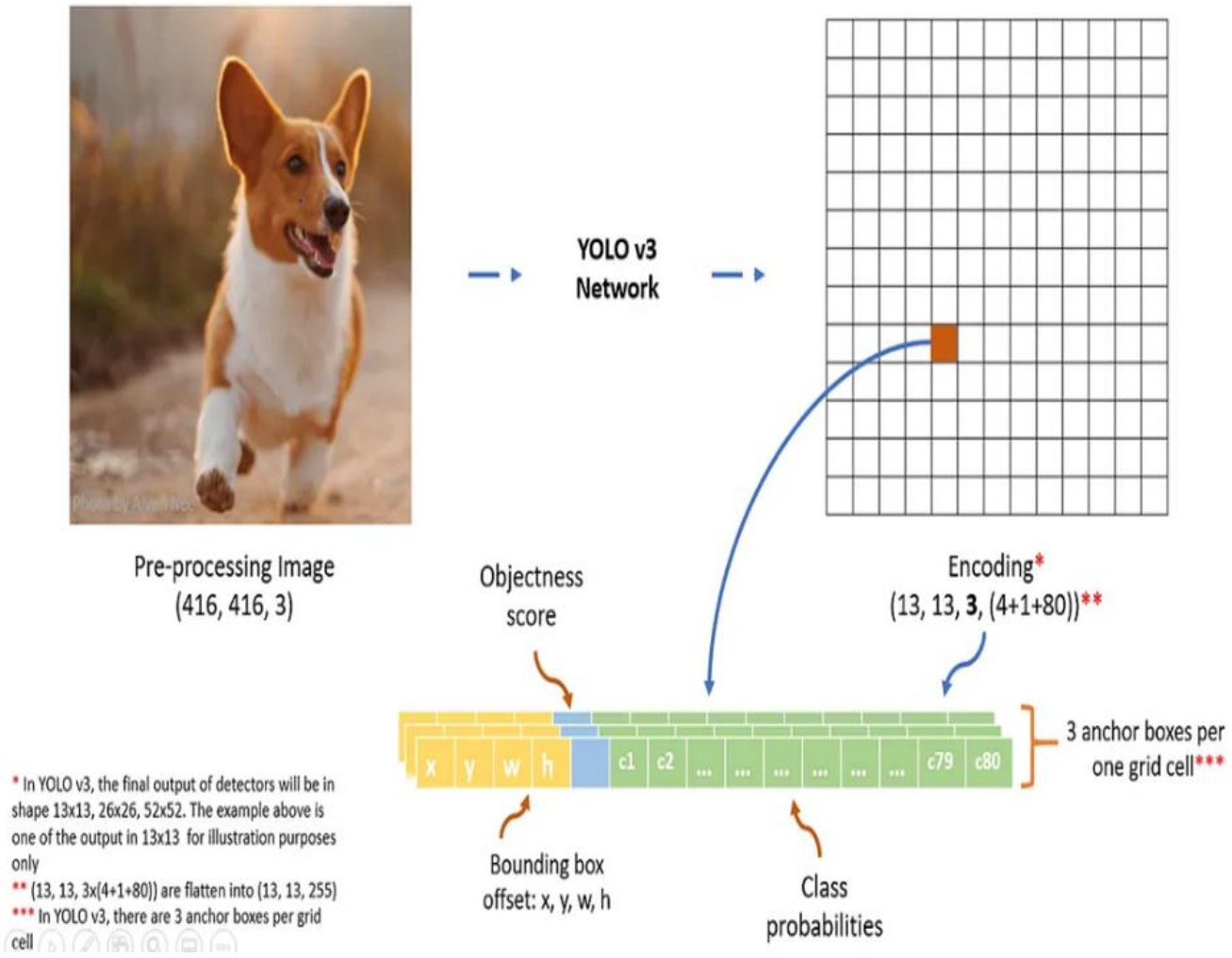

Figure 3:source:https://medium.com/@Shahidul1004/yolov3-object-detection-f3090a24efcd, yolov3 output.

- correct the bounding box sizes, and apply non-maximum suppression.
- Print the detected objects and their confidence scores.
- Draws bounding boxes on the image and displays the result.

Output: