HW

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Object Detection - Essential Tensorflow functions.

Functions :-

1. `tf.image.decode_jpeg()`

Purpose :- Converts image file into a tensor
Usage :- Used to read image input before detections.

```
image = tf.image.decode_jpeg(image_bytes)
```

2. `tf.image.resize()`

Purpose :- Resizes images to model's required input size
Usage :-

```
image = tf.image.resize(image, (300, 300))
```

3. `tf.keras.layers.Conv2D()`

Purpose : Extracts features from images
Usage

```
layer = tf.keras.layers.Conv2D(32, (3,3))
```

4. `tf.keras.layers.MaxPooling2D()`

Purpose : Reduces image size while keeping important features

```
pool = tf.keras.layers.MaxPooling2D((2,2))
```

5. tf.image.crop_and_resize()

Purpose: Extracts Regions of Interest (ROI).

roi = tf.image.crop_and_resize(images, boxes, box_indices, crop_size)

6 tf.image.non_max_suppression()

Purpose:- Removes duplicate bounding boxes

Selected = tf.image.non_max_suppression(boxes, scores, max_output_size=5)

7. tf.keras.losses.Huber()

Purpose:- loss function for bounding box regression

loss = tf.keras.losses.Huber()

8. tf.keras.applications.MobileNetV2()

Purpose = Pretrained backbone network

base_model = tf.keras.application.MobileNetV2(weights='imagenet')

9. tf.image.draw_bounding_boxes()

Purpose = Draws bounding boxes on detected objects

output = tf.image.draw_bounding_boxes(images, boxes)

(10) tf.keras.Model()

Purpose: Defines complete object detection model.

model = tf.keras.Model(inputs, outputs)