TensorFlow Object Detection Model Training Arguments and Pipeline Confi

1. Model Training Arguments

1. --model_dir: Directory to store checkpoints and logs.

2. --pipeline_config_path: Path to pipeline config file.

3. --num_train_steps: Override the number of training steps.

4. --checkpoint_dir: Directory to store checkpoints for evaluation.

5. --eval_timeout: Timeout for evaluation in seconds.

6. --alsologtostderr: Logs output to terminal as well as log files.

7. --sample_1_of_n_eval_examples: Evaluates every nth example.

8. --record_summaries: Record TensorBoard summaries during training.

9. --hparams_overrides: Override hyperparameters with a comma-separated string.

10. --log_step_count_steps: Frequency of logging steps to terminal.

11. --fine_tune_checkpoint: Path to the checkpoint for initializing model (fine-tuning).

12. --fine_tune_checkpoint_type: Specifies which variables to restore (classification/detection).

13. --run_once: Whether to run evaluation only once.

14. --use_tpu: Enable TPU for training (if available).

15. --num_workers: Number of worker threads for input pipeline.

16. --train_batch_size: Overrides batch size for training.

17. --eval_batch_size: Overrides batch size for evaluation.

2. Pipeline Configuration File Overview

The pipeline configuration file (pipeline.config) defines the model architecture, dataset paths, hyperparameters,

and training details. It consists of several key sections:

Model Section:

Defines the model architecture like SSD, Faster R-CNN, or CenterNet.

Train Config:

Includes batch size, data augmentation, optimizer settings, and fine-tuning options.

Eval Config:

Settings for evaluating the model, such as evaluation batch size and metrics.

Train Input Reader:

Defines the training dataset and augmentation strategies.

Eval Input Reader:

Defines the evaluation dataset (usually without augmentation).

3. Common Data Augmentation Techniques

1. Random Horizontal Flip: Flips images horizontally with a probability.

2. Random Crop: Crops images randomly within a specified range.

3. Random Adjust Brightness: Adjusts the image brightness randomly.

4. Random Adjust Contrast: Alters image contrast randomly.

5. Random Adjust Saturation: Changes image saturation.

6. Random Rotation: Rotates images by a random degree.

7. Random Pad Image: Pads the image randomly.

8. Random Distortion of Bounding Boxes: Distorts bounding boxes around objects.