Challenges and improvement :MR-CNN

Challenges

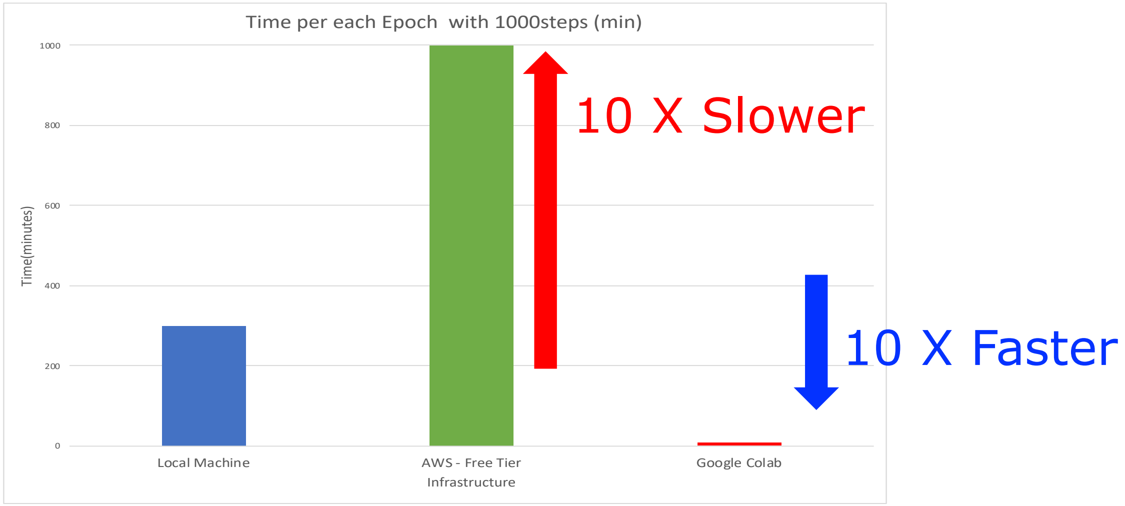
- Speed and training time

Solution

- AWS-Free tier
- GPU with G-Colab

Result

- 10x slower
- 10x faster



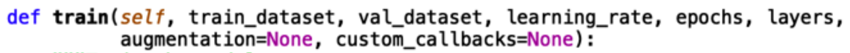
Training condition of MR-CNN

Training images	Validation images	Training Epoch	Steps per Epoch	Callbacks
• 330	• 52	• 50	• 1000	• mAp • precision • recall • loss

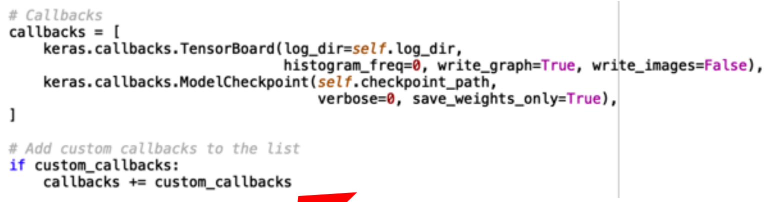
Training system	Annotation	class	weight	Backbone
• Laptops • AWS EC2 • G- Colab	• polygon • via VIA	• 1 • ‘scratch’	• coco	• ResNet 101

Modification of MR-CNN package

@ model.py from mrcnn package

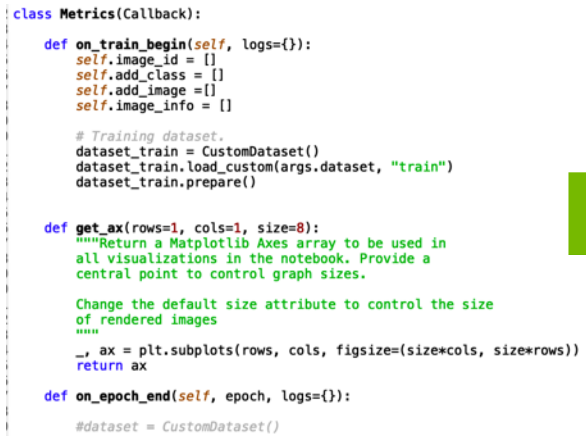


```
def train(self, train_dataset, val_dataset, learning_rate, epochs, layers,
          augmentation=None, custom_callbacks=None):
```

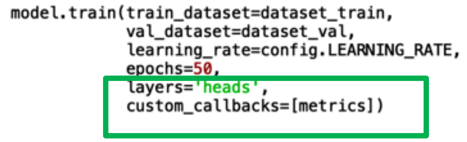


```
    # Callbacks
    callbacks = [
        keras.callbacks.TensorBoard(log_dir=self.log_dir,
                                    histogram_freq=0, write_graph=True, write_images=False),
        keras.callbacks.ModelCheckpoint(self.checkpoint_path,
                                        verbose=0, save_weights_only=True),
    ]

    # Add custom callbacks to the list
    if custom_callbacks:
        callbacks += custom_callbacks
```

@ Our algorithm

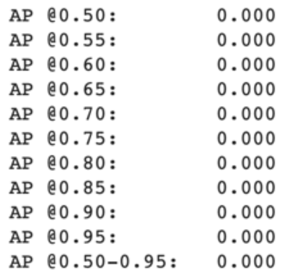


```
class Metrics(Callback):

    def on_train_begin(self, logs={}):
        self.image_id = []
        self.add_class = []
        self.add_image =[]
        self.image_info = []

        # Training dataset.
        dataset_train = CustomDataset()
        dataset_train.load_custom(args.dataset, "train")
        dataset_train.prepare()


    def get_ax(rows=1, cols=1, size=8):
        """Return a Matplotlib Axes array to be used in
        all visualizations in the notebook. Provide a
        central point to control graph sizes.

        Change the default size attribute to control the size
        of rendered images
        """
        _, ax = plt.subplots(rows, cols, figsize=(size*cols, size*rows))
        return ax

    def on_epoch_end(self, epoch, logs={}):

        #dataset = CustomDataset()
```



```
model.train(train_dataset=dataset_train,
            val_dataset=dataset_val,
            learning_rate=config.LEARNING_RATE,
            epochs=50,
            layers='heads',
            custom_callbacks=[metrics])
```

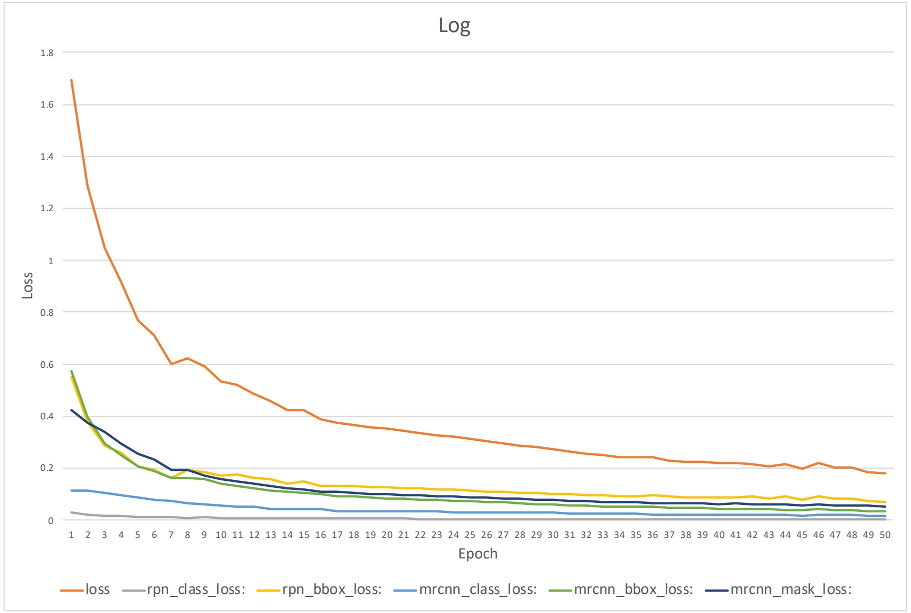
@ Result

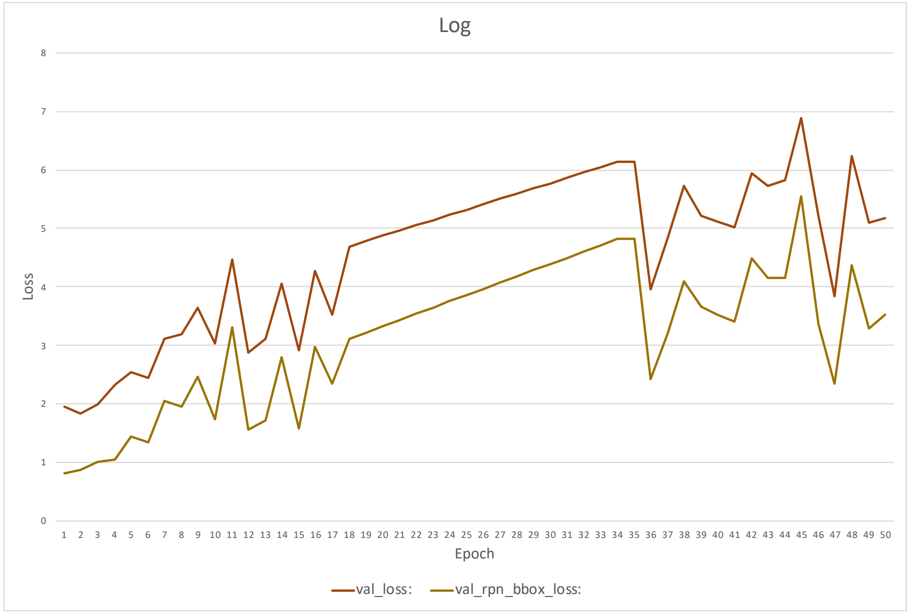


```
AP @0.50:        0.000
AP @0.55:        0.000
AP @0.60:        0.000
AP @0.65:        0.000
AP @0.70:        0.000
AP @0.75:        0.000
AP @0.80:        0.000
AP @0.85:        0.000
AP @0.90:        0.000
AP @0.95:        0.000
AP @0.50-0.95:   0.000
```

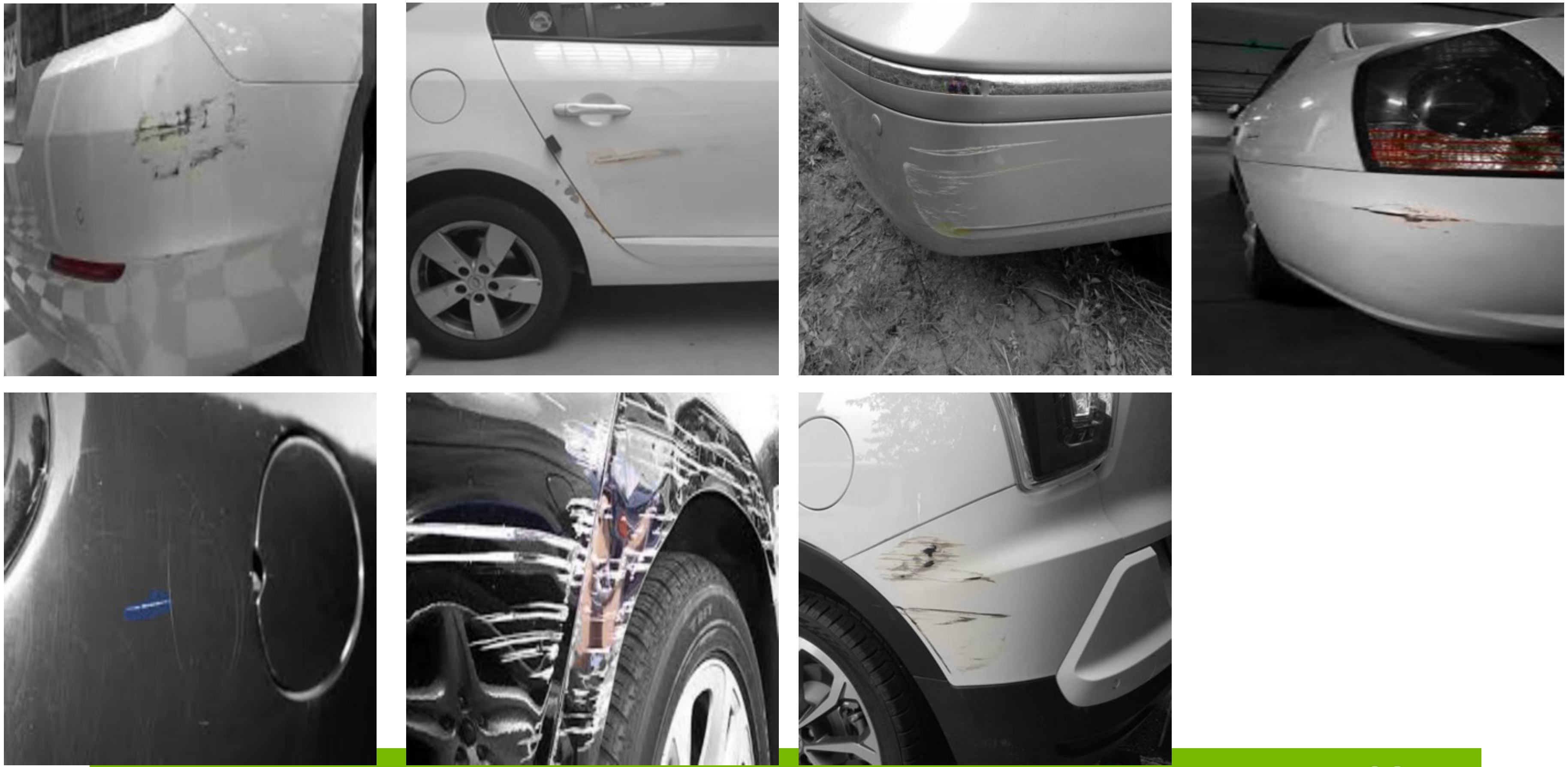
Result of MR-CNN

Log





Result of MR-CNN : segmentation



Result of MR-CNN : Errors