

Image Segmentation on Indian Driving Dataset

Conclusions :-

1. There are a total of 8 models implemented for this case study.
2. The images are resized into shape of (256,320) to fit the models architecture
3. The 8 models are UNet and SegNet and their variations.
 - 3.1. UNet
 - 3.2. UNet with Image Augmentation
 - 3.3. VGG16(encoder)+UNet(decoder) - the encoder part of UNet is replaced with VGG16 with weights trained on ImageNet dataset.
 - 3.4. VGG16(encoder)+UNet(decoder) with Image Augmentation.
 - 3.5. SegNet
 - 3.6. SegNet with Image Augmentation
 - 3.7. VGG16(encoder)+ SegNet (decoder) - the encoder part of SegNet is replaced with VGG16 with weights trained on ImageNet dataset.
 - 3.8. VGG16(encoder)+ SegNet (decoder) with Image Augmentation.
4. VGG16(encoder)+UNet(decoder) model takes very less time to train when compared to other models because there are very smaller number of trainable parameters.
5. The performance metric for this case study is MIoU – Mean Intersection over Union.
6. VGG16(encoder)+UNet(decoder) with Image Augmentation gave the best metric value among all other models.
7. MIoU achieved for this model is 0.5732 for the validation data.

8. The below table is the comparison of all models.

Model	Augmentation	MIoU
UNet	No	0.5209
UNet	Yes	0.4989
VGG16(Encoder)_UNet(Decoder)	No	0.5533
VGG16(Encoder)_UNet(Decoder)	Yes	0.5732
SegNet	No	0.5439
SegNet	Yes	0.5139
VGG16(Encoder)_SegNet(Decoder)	No	0.4825
VGG16(Encoder)_SegNet(Decoder)	Yes	0.5092

9. After evaluating the best model i.e., VGG16(encoder)+UNet(decoder) with Image Augmentation the MIoU achieved for test data is 0.5600