**DEPTH MAP GENERATION USING MONOCULAR DEPTH ESTIMATION OF DEEP LEARNING**

**Software and Libraries:**

The following softwares and libraries are used to implement the thesis:

* Python
* TensorFlow and Keras
* NumPy
* Matplotlib
* OpenCV
* Operating System (os)
* Image Utilities (imutils)
* Scikit-image (skimage)
* Python Imaging Library (PIL)
* CSV (csv)
* Jupyter Notebook
* Kaggle

**Configuration:**

**The model was trained mostly on Kaggle because it needs high-end PC as well as GPU .**

* CPU : Intel Core i7 8th Gen
* GPU: 4GB AMD Radeon 530
* RAM: 8 GB
* Cloud GPU : 30 GB GPU T4 x2 (Kaggle)

**Dataset Preparation:**

The data is directly downloaded from gitlab. Here is the command with link of NYU-Depth-v2 dataset:

1. **git clone https://gitlab.com/siddinc/new\_depth.git ./data**
2. **https://www.kaggle.com/datasets/soumikrakshit/nyu-depth-v2**

**Dataset Preparation:**

Kaggle notebook links of the implementation:

1. <https://www.kaggle.com/code/dabbrata/inception-resnet-v2-saved-model>
2. <https://www.kaggle.com/code/dabbrata/densenet169-nyu>
3. <https://www.kaggle.com/dabbrata/unet-encoder-decoder-nyuv2>
4. [VGG19\_unet\_nyu | Kaggle](https://www.kaggle.com/code/debu109/vgg19-unet-nyu/notebook)
5. [resnet50\_bridge\_modify | Kaggle](https://www.kaggle.com/code/debu109/resnet50-bridge-modify)

**Workflow:**

* NYU-Depth-v2 dataset is collected from gitlab which contains indoor images.
* Then preprocessing of the images of the dataset with augmentation is done.
* Preprocessed images are used to train the model with some analysis.
* The trained depth estimation model is then used to perform segmentation on the dataset.
* Here U-Net architecture is used where the encoder part of the U-Net is substituted by the layers of different pre-trained models.
* Tuning of the customized loss functions are used here which basically designed for depth estimation.
* Using IRv2 model as encoder provides the highest accuracy among them.
* Finally the predicted depth map is generated by using the trained model and the result is compared with the Ground Truth depth map.