ASSESSMENT TEST

Position Ref: V10037 - AI Engineer

QUESTIONS

1. What are some common activation functions used in deep learning and when would you use each?

ANSWER:

2. Describe a time when you used data augmentation to improve a model's performance.

ANSWER:

3. Explain how you would go about fine-tuning a pre-trained neural network for a new task.

ANSWER:

4. How would you approach diagnosing and addressing overfitting in a deep-learning model?

ANSWER:

ASSIGNMENT

1. Implement a convolutional neural network (CNN) in TensorFlow or PyTorch, in order to perform semantic segmentation on the attached image dataset (*Semantic-segmentation-dataset.zip*). The total volume of the dataset is 72 images grouped into eight tiles. The segmentation classes are as follows:
- Building
- Land
- Road
- Vegetation
- Water
- Unlabeled

Split the total dataset into training and test sub-datasets, by taking the dataset's size limitation into account. Report the final results by printing out the trained model. Apply predictions using the test sub-dataset, and report performance metric(s). Provide visualizations of sampled outputs portraying the aerial image and the ground truth mask, along with the corresponding segmentation prediction. Include your code implementation for all the above.

Note 1: Achieving high-performance indices in the test sub-dataset is NOT among the assignment's objectives, so do not be discouraged by the relatively small dataset.

Note 2: It is suggested to rely on an existing architecture, e.g. U-Net, for implementing the deep neural network.

Note 3: Provide comments accompanying your code to elaborate on your implementation.

Note 4: Explain the reason behind your approach, e.g. justify why you selected a 70%-30% split into training-test datasets.

Note 5: Class colours are in **hex format (listed in json file)**, whilst the mask images are in **RGB**. Use an online available converter, if needed.

Note 6: If limited computing resources are available, it is recommended to take measures such as decreasing the training iterations (epochs).

ANSWER: