PGD Mid Exam (Deep Learning) 2024

MCQS:

1- Which of the following activation functions can lead to vanishing gradients?
(i) ReLU (ii) Tanh (iii) Leaky ReLU (iv) Sigmoid

2- After training a neural network, you observe a large gap between the training accuracy (100%) and the test accuracy (42%). Which of the following methods is commonly used to reduce this gap?
(i) GANs (ii) Dropout (iii) Sigmoid activation (iv) RMSprop optimizer

3- Which of the following is true about Batch normalization?
(i) Batch norm is another way of performing dropout.
(ii) Batch norm makes training faster.
(iii) In Batch norm, the mean is computed over the features.
(iv) Batch norm is a non-linear transformation to center the dataset around the or

4- Which of the following propositions are true about a CONV layer? (Check all that apply.)
(i) The number of weights depends on the depth of the input volume.
(ii) The number of biases is equal to the number of filters.
(iii) The total number of parameters depends on the stride.
(iv) The total number of parameters depends on the padding.

5- What is Error Analysis?
(i) The process of analyzing the performance of a model through metrics such as precision, recall or F1-score.
(ii) The process of scanning mis-classified examples to identify weaknesses of a model.
(iii) The process of tuning hyper parameters to reduce the loss function during training.
(iv) The process of identifying which parts of your model contributed to the error.

Task 1:

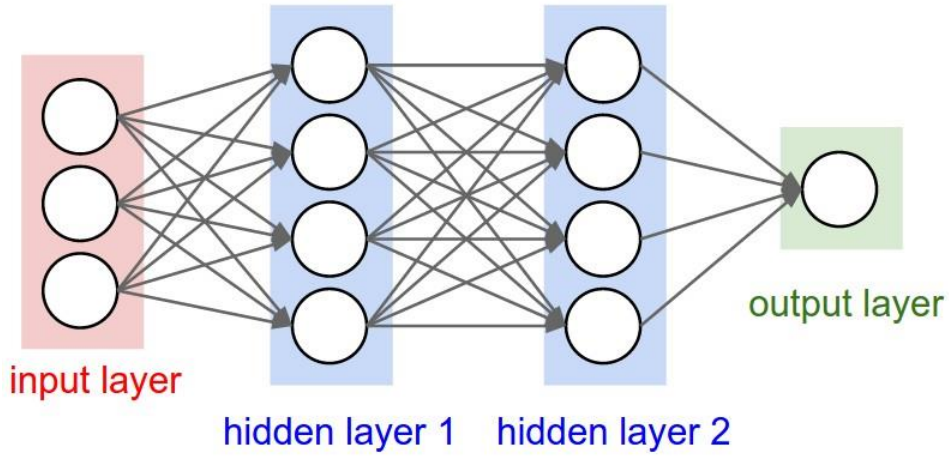
How can you create an image classifier for fruits and vegetables using TensorFlow in Python, including steps for preprocessing the data, building a neural network model with multiple layers, training the model, and evaluating its performance?
Dataset link: https://drive.google.com/file/d/1CGiAWso43GCsNo_faRq4jdDIlmwy7YI4/view

Task 2:

Face Emotion detection is a one of Advanced Deep Learning Projects in Python, helps to improve your deep learning skills. You have to perform these taks like how to read images from directory to TensorFlow arrays, creating a Keras layers model, training model with images, predicting values from images.
Dataset link: https://drive.google.com/file/d/14FJae0kO2hUztFr6BwjZCl2fqIMxNzJT/view

Task 3:

Calculate Trainable parameters from the given image.



Answer any 4 questions

(a) You want to solve a classification task. You first train your network on 20 samples. Training converges, but the training loss is very high. You then decide to train this network on 10,000 examples. Is your approach to fixing the problem correct? If yes, explain the most likely results of training with 10,000 examples. If not, give a solution to this problem.

(b) Give two benefits of using convolutional layers instead of fully connected ones for visual tasks.

(c) As you train your model, you realize that you do not have enough data. Name the data augmentation techniques that can be used to overcome the shortage of data.

(d) Which regularization method leads to weight sparsity? Explain why.

(e) What do you understand by the term Activation Function Discuss any 2 Activation function?