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Advanced Artificial Intelligence – Assignment 7

Architecture Model's Report

While trying to train the cifar dataset which has 50000 train images and 10000 test images in 10 classes of objects. We have tried to combine different number of layers with different number of neurons with different activation functions which could help us in extracting the model with the best accuracy. Please find the different architectures used here described below along with their architectural diagrams.

Architecture 1-

The architecture 1 model consists of 6 convolution 2D layers, 6 batch normalization layers, 3 max pooling 2D layers and a few more output layers. In this layer the RELU activation function is applied to the convolution layers. The relu function is basically used to convert all the negative values to 0 and then return the positive and 0 values as the final output. Thus, trying to improve the accuracy of the model and softmax function is used in output layer for calculating the output.

In this architecture, we have not applied data augmentation and used adam optimizer with a few of its best parameters in order to achieve higher accuracy. Also, the training data is split here into sub training and validation sets where the training is performed on the sub training subset so obtained.

The accuracy obtained from this model is 79.97%.

Architecture 2-

The architecture 1 model consists of 6 convolution 2D layers, 6 batch normalization layers, 3 max pooling 2D layers and a few more output layers. In this layer the RELU activation function is applied to the convolution layers. The relu and tanh functions are basically used to convert all the negative values to 0 (relu) and then return the positive and 0 values as the final output. Thus, trying to improve the accuracy of the model. Here, we apply the relu and tanh activation function in alternating order on the layers so as to compute the output properly and precisely and softmax function is used in output layer for calculating the output.

In this architecture, we have applied data augmentation while fitting the training data to the model so as to improve the efficiency and used SGD optimizer with a few of its best parameters in order to achieve higher accuracy. Also, the training data is split here into sub training and validation sets (1/5 th of training data) where the training is basically performed on the sub training subset so obtained.

The accuracy obtained from this model is 29.67%.

Architecture 3-

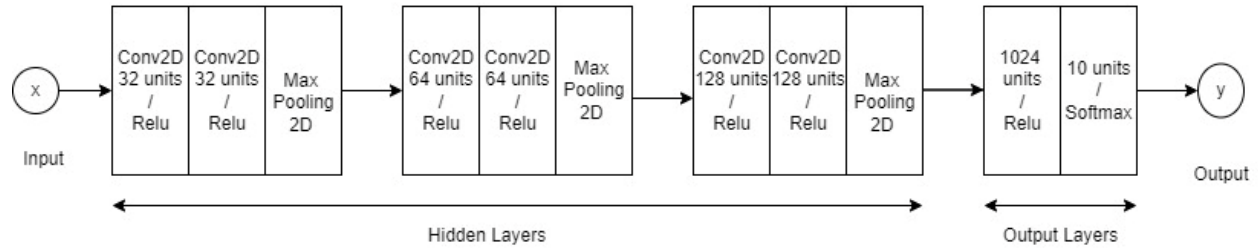
The architecture 1 model consists of 4 convolution 2D layers, 4 batch normalization layers, 2 max pooling 2D layers and a few more output layers. In this layer the RELU activation function is applied to the convolution layers. The relu and tanh functions are basically used to convert all the negative values to 0 (relu) and then return the positive and 0 values as the final output. Thus, trying to improve the accuracy of the model. Here, we apply the relu and tanh activation function in alternating order on the layers so as to compute the output properly and precisely and softmax function is used in output layer for calculating the output.

In this architecture, we have applied data augmentation while fitting the training data to the model so as to improve the efficiency and used RMSprop optimizer with a few of its best parameters in order to achieve higher accuracy. Also, the training data is split here into sub training and validation sets (1/5 th of training data) where the training is basically performed on the sub training subset so obtained.

The accuracy obtained from this model is 19.85%.

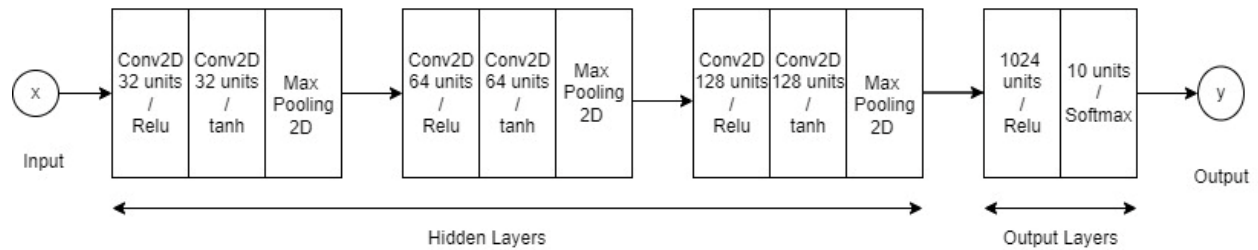
Please find the architecture diagram for the mentioned models below-

Test Accuracy = 79.97%



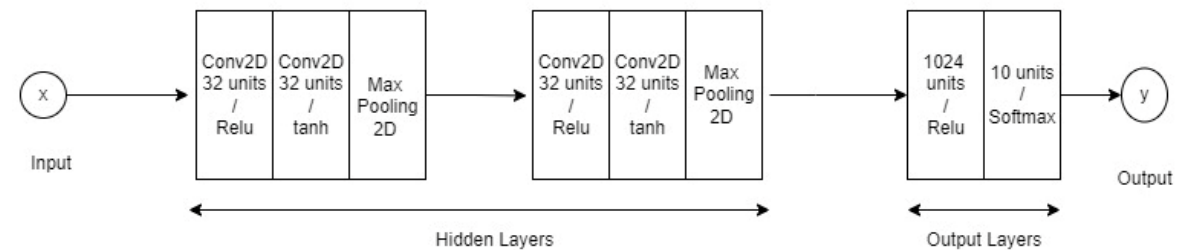
Architecture Model - 1

Test Accuracy = 29.67%



Architecture Model - 2

Test Accuracy = 19.85%



Architecture Model - 3
