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NAME: SEAN XANDER B. AQUINO | BSCS - 2A

The classification task utilized the Iris dataset information collected from the UCI Machine Learning Repository. The dataset features multiple classes which are indicated through features measuring different attributes of the samples. The dataset received preprocessing through the application of a standard scaler to normalize all numerical attributes. The categorical information received one-hot encoding treatment in order to make the neural network training process possible.

To maintain adequate training capability and independent validation\Validation of the model, the data was divided into training and test sets in an 80/20 ratio. Principal Component Analysis (PCA) divided the data into a two-dimensional space to represent a major portion of data variance. Through this approach, the reader gained understanding regarding both the structure and its possible separation capabilities.

The implementation of a neural network used Keras Sequential. The artificial neural network functioned through three layers where the input took the data, while the hidden layer operated with ReLU activation on its 10 units and the output section contained three neurons which used softmax activation. The model incorporated L2 regularization with dropout regularization as prevention methods against overfitting. The training process lasted 100 epochs with a batch size of 8 while using categorical crossentropy as the loss function under adam weight update rules. We evaluated the classification model using accuracy along with loss metrics that were computed for training data sets and validation data sets.

The model reached a 95.83% test accuracy which signifies its robust performance. Model performance showed improving training accuracy with stable validation accuracy indicating proper learning occurred. The majority of classifications remained correct in the confusion matrix as most errors happened between related subject classes.

The following section displays evaluation metrics for the model:

2 Training Accuracy: 80.21%

Validation Accuracy: 95.83%

Training Loss: 0.5485

Validation Loss: 0.4449

The model exhibited stable training while showing minimal overfitting through its accuracy and loss pattern thus demonstrating generalization capability. This model achieved successful classification of input data with high accuracy levels which indicated reliability for handling this classification work.