Neural Network Documentation

Dataset

The dataset used consists of randomly generated features and labels:

- **Features (X)**: Random data with 300 samples and 2 features per sample.

- **Labels (y)**: Random integers between 0 and 2, indicating 3 classes.

Model Architecture

The neural network architecture is as follows:

- **Input Layer**: 2 features

- **Hidden Layer**: 25 neurons with ReLU activation

- **Output Layer**: Softmax layer with 3 neurons (corresponding to the 3 classes)

Training Process

The neural network is trained using stochastic gradient descent with the following parameters:

- **Learning Rate**: 0.1

- **Regularization Parameter** (λ): 0.001

- **Number of Iterations**: 10,000

During training:

- Forward propagation computes predictions (probs).

- Cross-entropy loss is used to compute the cost function.

- Backpropagation computes gradients and updates parameters ($W1, b1, W2, b2$).

- Cost is printed every 1000 iterations for monitoring.

Accuracy and Insights

Accuracy is typically evaluated using a separate validation or test set:

- **Validation/Test Set**: Split data into training and validation/test sets.

- **Prediction**: Use trained parameters to predict outputs.

- **Accuracy Calculation**: Compare predicted outputs with actual labels.
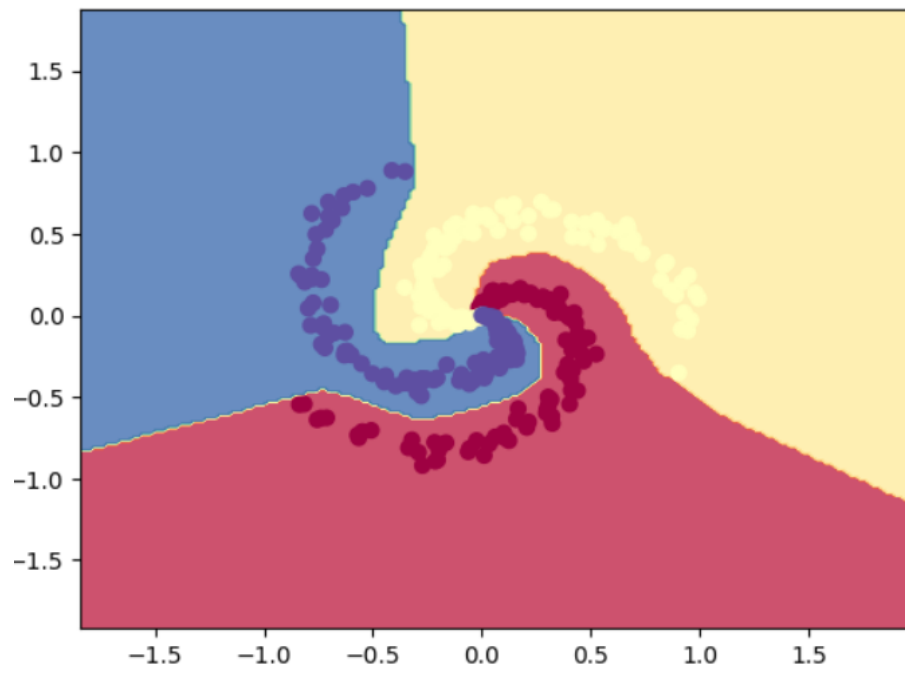
Figure 1: Neural Network Architecture

In this image the boundaries are decision boundaries each colour represents different class