Username: ddkatari@iu.edu;srriyer@iu.edu
Assignment no: 6

We have implemented KNN and Stochastic Neural Nets, and below are the analysis on them

Stochastic Gradient Neural Nets:
1. We analyzed that the accuracy rate depends upon various parameters. Some of the parameters we have tested with are below:
1. Learning rate
2. Number of nodes in the hidden layer
3. Number of iterations
4. Number of layers
5. initial value of weights (random values)
2. Note: Time represented in each category is relative to other records in the same category. Experiments were performed in parallel on machines with different throughput.
3. We have run our script multiple times by changes the above parameters. At every run, we have captured the way the overall error rate decreases with every iteration in graphs. In each of the graphs, X axis represents the number of iterations, while Y-axis represents the error deviation. The PNG images are present in the "Graphs" subdirectory of the repository. Below are the file naming conventions:
- Graphs for Hidden Layer Count: NN_[hidden_count]K_[Iterations]I
- For Learning Rate graphs: NN_[rate]R_[Iterations]I
- For Functions graphs: NN_[function_name]_[Iterations]I
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 So, to check the graph for error deviation varying hidden_count = 5,i.e. hidden nodes = 5 and iterations = 15, check for file NN_5K_5i
4. We have written the best model file (model_file) with 75.18% accuracy with below objects as we will be suggesting below parameters to client:

Learning Algorithm	Neural Net
alpha : (Learning Rate)	0.2
fn: The best function used	Sigmoid
hiddenCount: Number of nodes in Hidden Layer	15
Bias Value (not written to model file)	0.3
weights: The weight matrix for the layer	
avg_error: The average error for the model	0.322
Max_iterations(not written to model file)	15

5. To run the code with 1 hidden layer, please change the value of global variable
NN_train_fn = train_neural_network
For running the code with 2 hidden layers, please change the value of global variable
NN_train_fn = train_neural_network_multi