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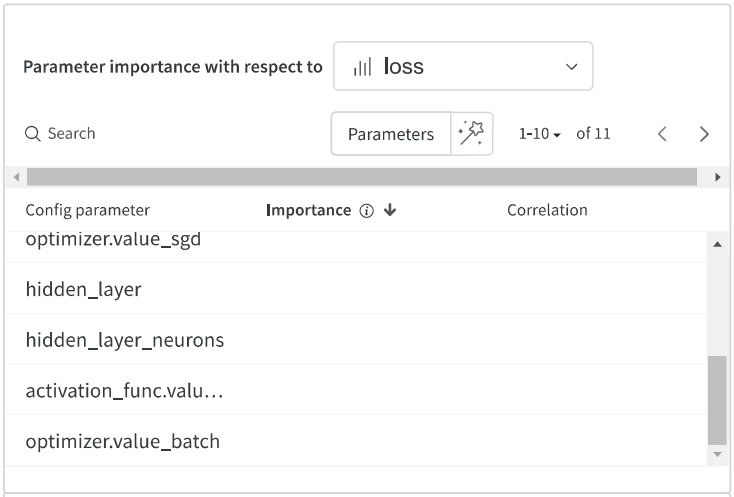
Task 3: MLP regression

For this task we have implemented a class for MLP regression. We analyse the performance of our classifier against different set of hyperparameters. Here we vary the no of epochs, learning rate, activation functions, optimizers, no of hidden layers, and the no of neurons in the hidden layer.

Anushka Agrawal

Graphical Analysis



Run set 46

Name (4	activatio	hidden_l	hidden_l	lr	optimizer	epochs	loss
	relu	3	8	0.0001	sgd	750	2.847
	tanh	3	5	0.00005	mini-bat	1000	3.151
	tanh	2	10	0.00005	mini-bat	1000	3.352
	tanh	1	12	0.00005	mini-bat	2000	3.411
	sigmoi	4	12	0.0001	mini-bat	1500	3.413
	relu	1	8	0.0001	sgd	2000	3.552

👁	relu	2	10	0.00005	batch	2000	3.58
👁	relu	2	10	0.00001	sgd	2000	3.642
👁	tanh	2	8	0.00005	sgd	1500	3.662
🙈	relu	1	12	0.00005	mini-bat	2000	3.69
👁	relu	4	10	0.00001	sgd	500	3.747
👁	sigmoi	3	10	0.0001	sgd	2000	3.816
👁	tanh	4	8	0.0001	sgd	2000	3.844
👁	tanh	3	12	0.00001	mini-bat	1500	3.917
👁	tanh	2	12	0.00001	mini-bat	2000	3.964
👁	sigmoi	1	10	0.0001	batch	500	4.085
👁	sigmoi	3	5	0.0001	sgd	750	4.203
🙈	relu	3	5	0.0001	mini-bat	1500	4.207
👁	relu	1	8	0.00000	sgd	2000	4.267
👁	tanh	2	8	0.00005	batch	500	4.272
👁	relu	2	8	0.00001	sgd	1000	4.355
👁	sigmoi	4	5	0.0001	sgd	2000	4.42
👁	tanh	2	12	0.0001	sgd	1500	4.66
👁	sigmoi	2	12	0.00005	mini-bat	750	4.697
👁	sigmoi	4	5	0.0001	mini-bat	750	4.71
👁	tanh	4	12	0.0001	mini-bat	1000	4.788
👁	tanh	1	5	0.00005	mini-bat	1500	4.906
👁	sigmoi	1	5	0.00005	sgd	500	4.909
👁	tanh	3	8	0.00000	batch	2000	5.01
👁	tanh	2	12	0.00001	sgd	750	5.131
👁	relu	2	5	0.00000	sgd	500	5.309
👁	tanh	1	12	0.00001	sgd	500	6.532
👁	relu	4	5	0.00005	batch	2000	7.319
👁	relu	1	10	0.00000	mini-bat	1500	7.551
👁	relu	2	10	0.00000	mini-bat	750	8.825
👁	sigmoi	1	8	0.00000	sgd	1000	8.926
👁	sigmoi	3	12	0.00001	sgd	1000	8.945
👁	tanh	1	10	0.00000	batch	500	11.985
👁	tanh	2	10	0.00000	sgd	1500	15.413
🙈	tanh	2	10	0.00000	mini-bat	1500	16.706

👁	sigmoi	2	5	0.00000	batch	750	17.644
👁	sigmoi	1	5	0.00000	batch	1000	23.184
👁	sigmoi	3	10	0.00000	batch	750	25.223
👁	sigmoi	4	12	0.00001	mini-bat	1000	26.782
👁	tanh	4	8	0.00001	mini-bat	500	27.042
👁	sigmoi	2	5	0.00000	mini-bat	1000	31.599
👁	tanh	2	8	0.00000	batch	500	159.36
👁	tanh	3	8	0.00000	mini-bat	500	162.98
👁	tanh	3	12	0.00000	mini-bat	500	162.98
👁	relu	3	10	0.0001	batch	500	223.25

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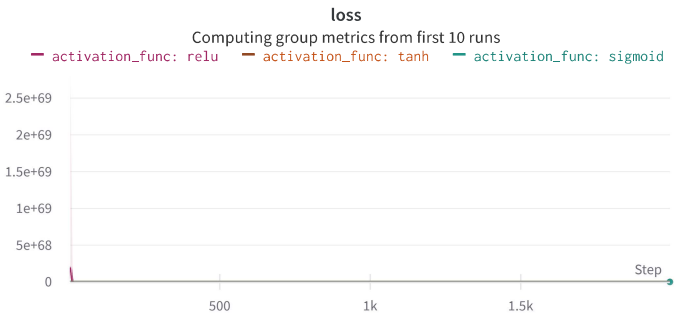
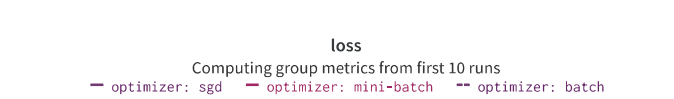
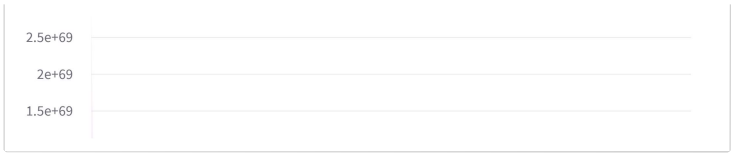
Grouped by activation function

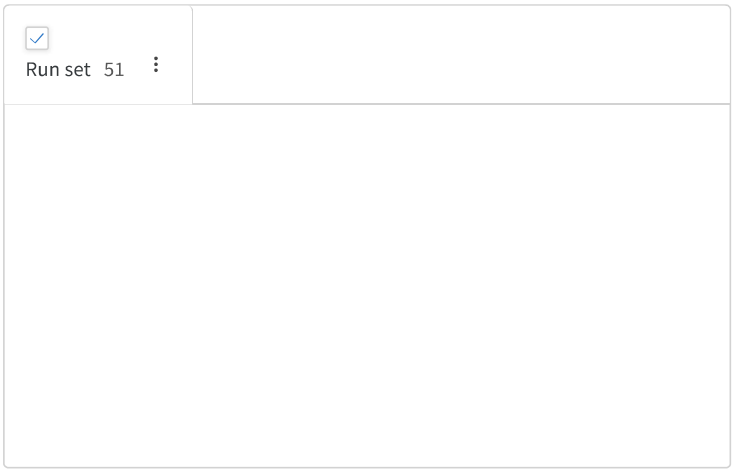


Run set 51

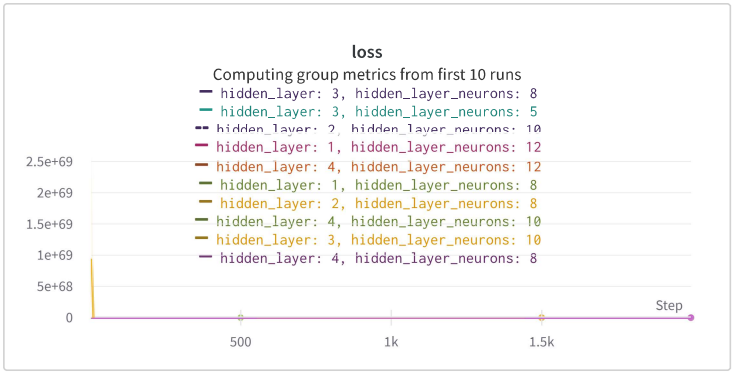
Grouped by optimizer

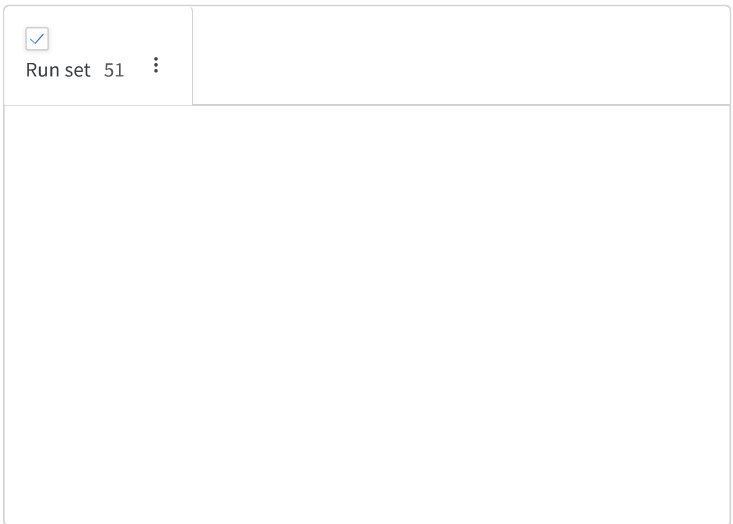






Grouped by hidden layer and hidden layer neurons





From the above combinations we observe that among all the activation function relu performs better than others. 'sgd' optimisers performs the best among the optimisers and we can have 1-2 hidden layers in the neural network to capture the relation between the input feature and output in the dataset. The best combinations of the

parameters we get is activation_function = 'relu', optimiser = 'mini-batch', hidden_layers = 1, hidden_layer_neurons = 5, learning rate = 0.0001, max_epochs = 5000. For this we get a mse loss of 2.847.

https://wandb.ai/anushka-agrawal/4-mlp-regression/reports/Task-3-MLP-regression--Vmlldzo1NzQ2NDMy