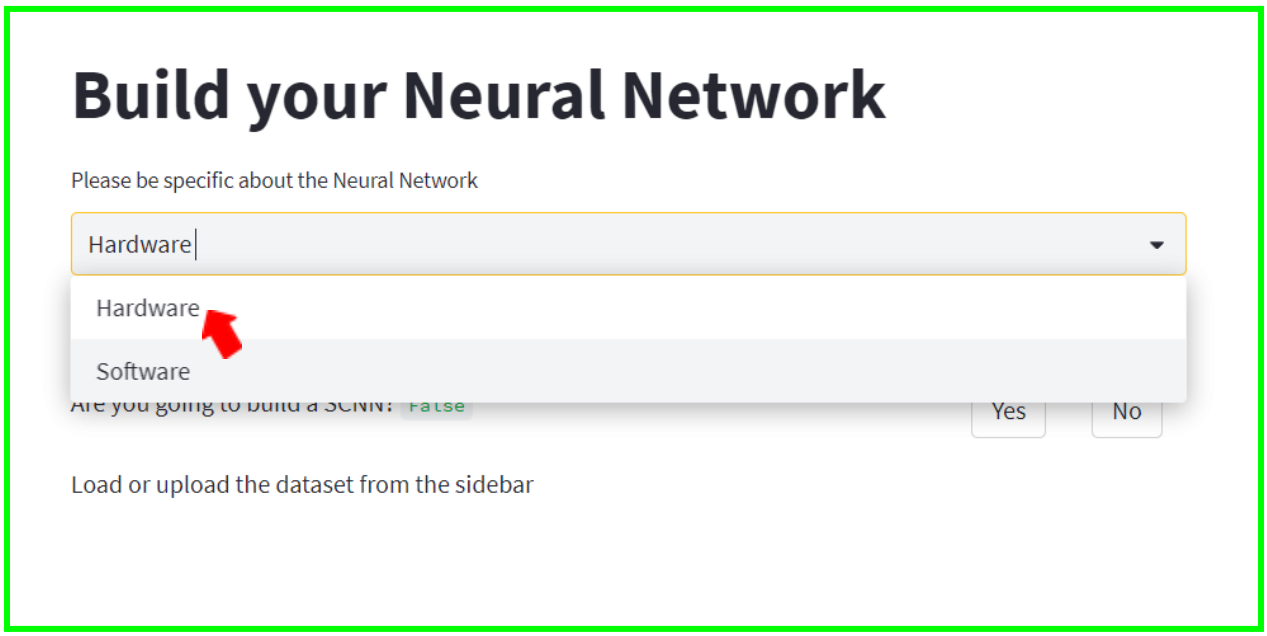
Website User Manual

Memristor-Based Neural Search Optimization GUI

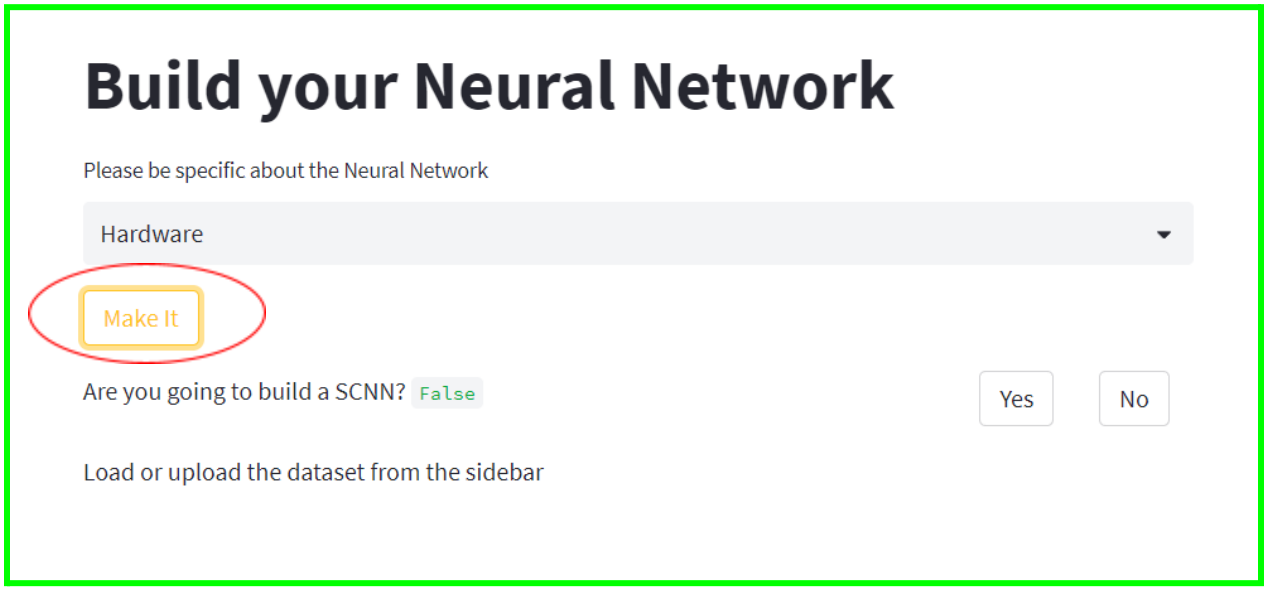
Step 1

First, the user can make the decision regarding the desired subject on which the neural network will be constructed.



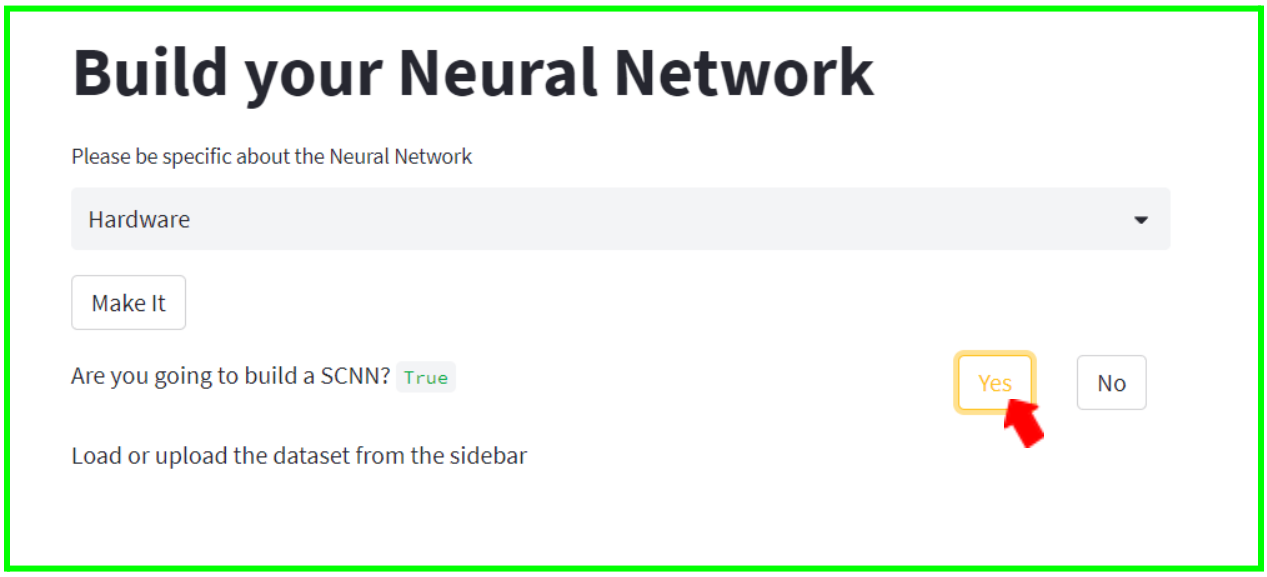
Step 2

Then, the user has to click on the “Make it” button.



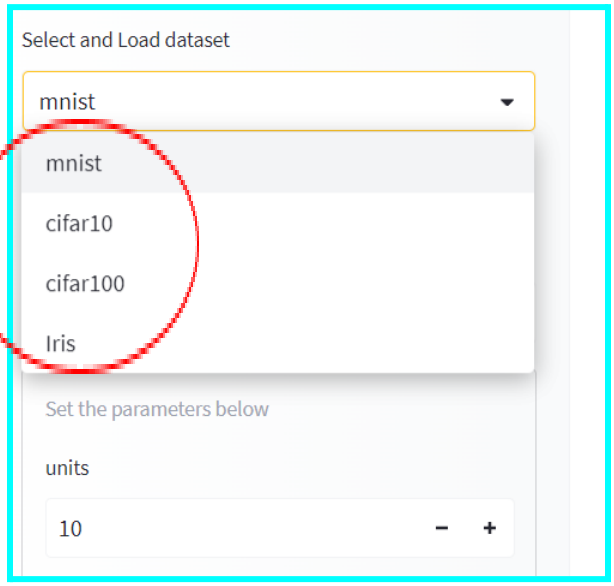
Step 3

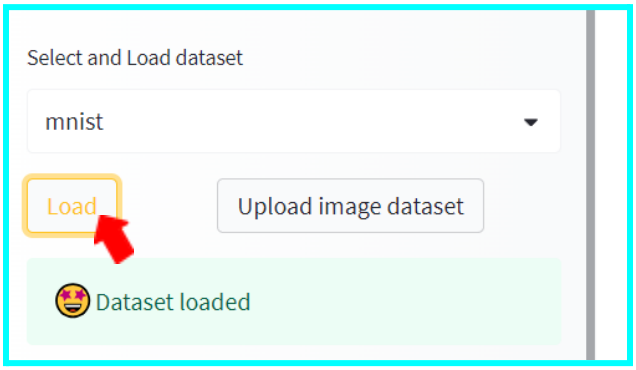
If the user is constructing Spiking Neural Network, double-click on “Yes” or else “No”.



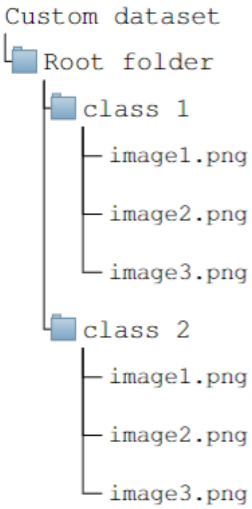
Step 4

Load the default dataset or custom dataset. Custom dataset folder should follow the format given below.



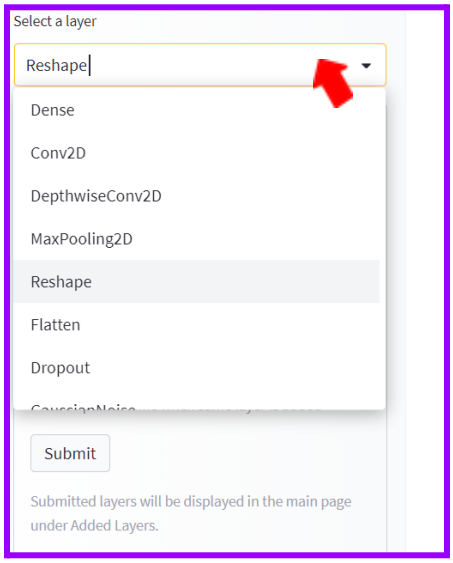


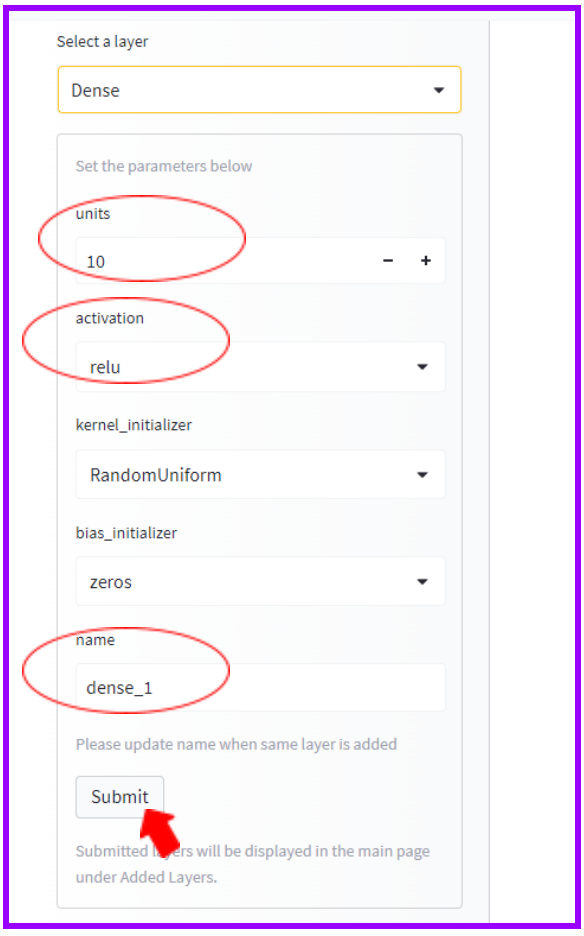
The custom dataset folder should follow the format given below.



Step 5

Choose the **layers** according to the neural network architecture. Give No. of neurons, activation, the name for each layer

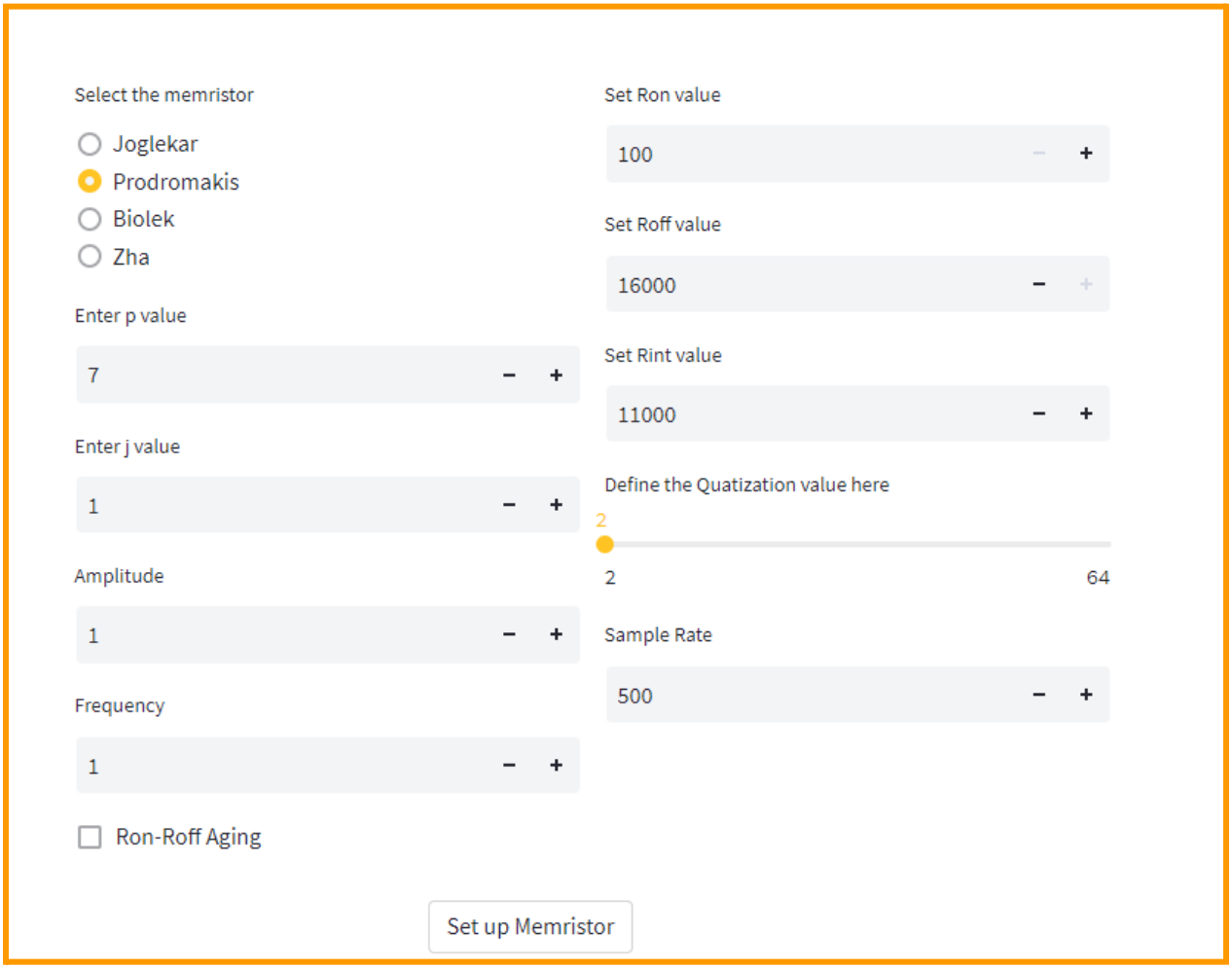




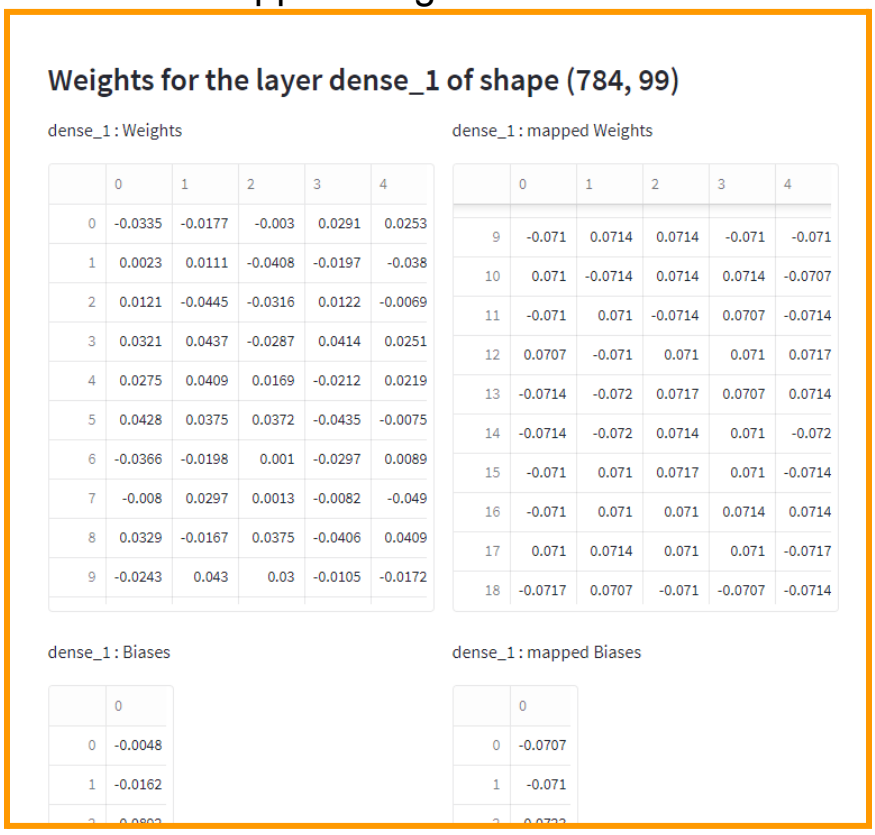
Compile and fit the model with suitable parameters then the user can see the result below after clicking the “Submit all” buttonc

Step 5

Choose the desired memristor model, then set up the parameters accordingly. Now the user can click on the “Set Up Memristor” button.



Now you can see the mapped weights below



Weights for the layer dense_1 of shape (784, 99)

dense_1 : Weights

	0	1	2	3	4
0	-0.0335	-0.0177	-0.003	0.0291	0.0253
1	0.0023	0.0111	-0.0408	-0.0197	-0.038
2	0.0121	-0.0445	-0.0316	0.0122	-0.0069
3	0.0321	0.0437	-0.0287	0.0414	0.0251
4	0.0275	0.0409	0.0169	-0.0212	0.0219
5	0.0428	0.0375	0.0372	-0.0435	-0.0075
6	-0.0366	-0.0198	0.001	-0.0297	0.0089
7	-0.008	0.0297	0.0013	-0.0082	-0.049
8	0.0329	-0.0167	0.0375	-0.0406	0.0409
9	-0.0243	0.043	0.03	-0.0105	-0.0172

dense_1 : mapped Weights

	0	1	2	3	4
9	-0.071	0.0714	0.0714	-0.071	-0.071
10	0.071	-0.0714	0.0714	0.0714	-0.0707
11	-0.071	0.071	-0.0714	0.0707	-0.0714
12	0.0707	-0.071	0.071	0.071	0.0717
13	-0.0714	-0.072	0.0717	0.0707	0.0714
14	-0.0714	-0.072	0.0714	0.071	-0.072
15	-0.071	0.071	0.0717	0.071	-0.0714
16	-0.071	0.071	0.071	0.0714	0.0714
17	0.071	0.0714	0.071	0.071	-0.0717
18	-0.0717	0.0707	-0.071	-0.0707	-0.0714

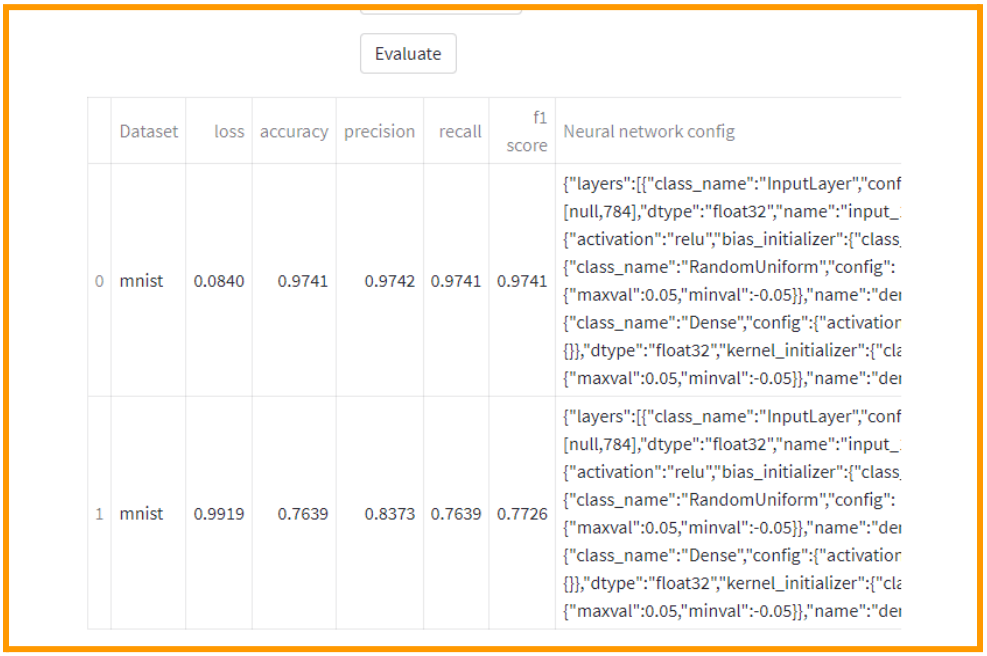
dense_1 : Biases

	0
0	-0.0048
1	-0.0162

dense_1 : mapped Biases

	0
0	-0.0707
1	-0.071

Click the “Evaluate” button. Results such as accuracy, loss, precision, Recall of hardware and software neural networks will be shown.



Evaluate

	Dataset	loss	accuracy	precision	recall	f1 score	Neural network config
0	mnist	0.0840	0.9741	0.9742	0.9741	0.9741	{"layers":[{"class_name":"InputLayer","conf [null,784],"dtype":"float32","name":"input_ {"activation":"relu","bias_initializer":{"class {"class_name":"RandomUniform","config": {"maxval":0.05,"minval":-0.05}},"name":"de {"class_name":"Dense","config":{"activatior {}},"dtype":"float32","kernel_initializer":{"cl {"maxval":0.05,"minval":-0.05}},"name":"de
1	mnist	0.9919	0.7639	0.8373	0.7639	0.7726	{"layers":[{"class_name":"InputLayer","conf [null,784],"dtype":"float32","name":"input_ {"activation":"relu","bias_initializer":{"class {"class_name":"RandomUniform","config": {"maxval":0.05,"minval":-0.05}},"name":"de {"class_name":"Dense","config":{"activatior {}},"dtype":"float32","kernel_initializer":{"cl {"maxval":0.05,"minval":-0.05}},"name":"de