PATTERN RECOGNITION AND MACHINE LEARNING

LAB 07
LAB REPORT

QUESTION 1.

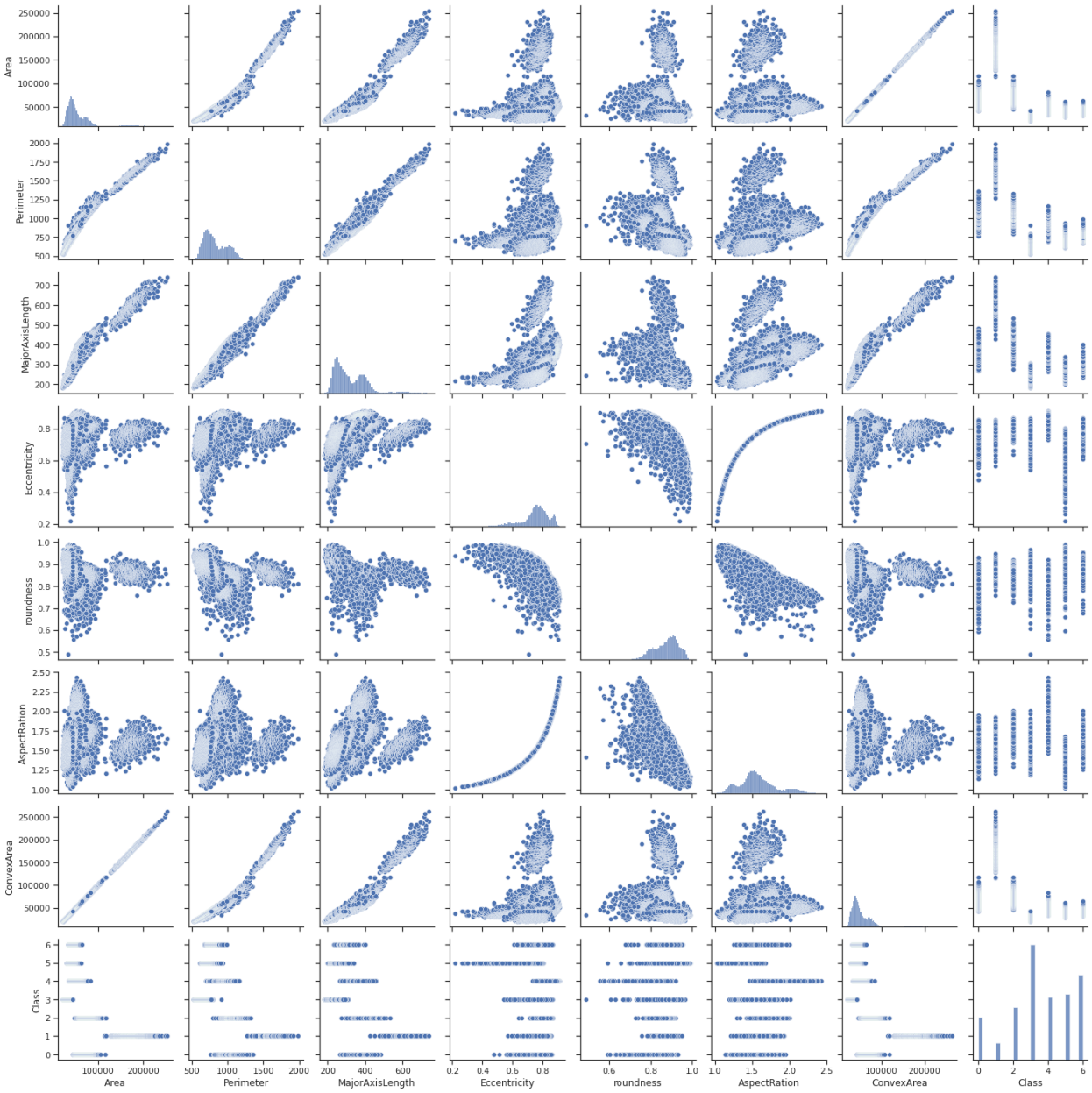
- In preprocessing, column ‘Sex’ is Label Encoded.
- ‘Rings’ column is custom encoded into 3 classes as 0 for 0 - 8, 1 for 9 - 10 and 2 for 11 - 28 depicting life.

	Sex	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight	Rings
0	2	0.455	0.365	0.095	0.5140	0.2245	0.1010	0.1500	2
1	2	0.350	0.265	0.090	0.2255	0.0995	0.0485	0.0700	0
2	0	0.530	0.420	0.135	0.6770	0.2565	0.1415	0.2100	1
3	2	0.440	0.365	0.125	0.5160	0.2155	0.1140	0.1550	1
4	1	0.330	0.255	0.080	0.2050	0.0895	0.0395	0.0550	0
...	...	...	...	...	...	...	...	...	...
4172	0	0.565	0.450	0.165	0.8870	0.3700	0.2390	0.2490	2
4173	2	0.590	0.440	0.135	0.9660	0.4390	0.2145	0.2605	1
4174	2	0.600	0.475	0.205	1.1760	0.5255	0.2875	0.3080	1
4175	0	0.625	0.485	0.150	1.0945	0.5310	0.2610	0.2960	1
4176	2	0.710	0.555	0.195	1.9485	0.9455	0.3765	0.4950	2

- Two parallel hidden layers with 110 and 90 neurons are taken.
- After running for epochs, training accuracy was reported to be around 55 - 56 %

QUESTION 2.

1)



- The 7 given features were considered, dropping the others.
- The data was normalized and split into train, test, val.

2)

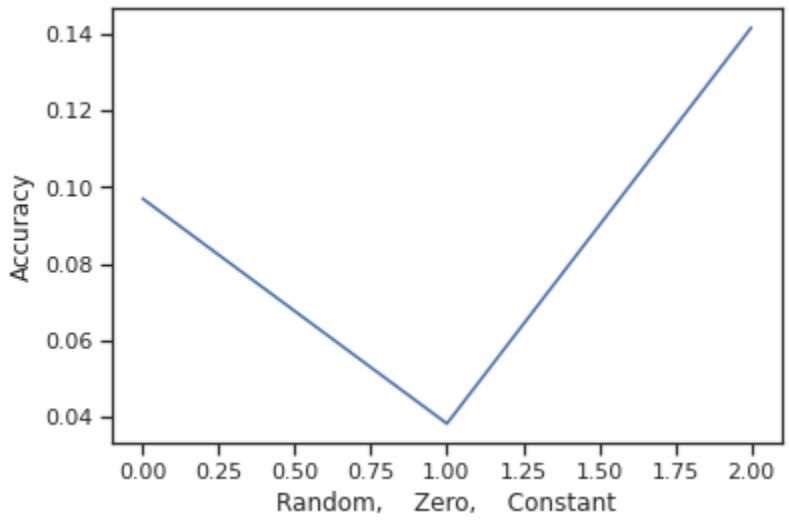
- Activation functions and their derivative functions were created from scratch.
- Forward propagation was done through a function with parameters describing weights, biases and activation functions. Weights and biases were initialized in a function with parameters describing allocation technique(Random for instance).
- Backward propagation was done using an approach given in Article.
- The model was trained in GraientDescent function referring to the same article.
- The accuracy was reported to be around 26%.

3)

- The model was trained for different activation functions, described by a parameter in Gradient Descent function.

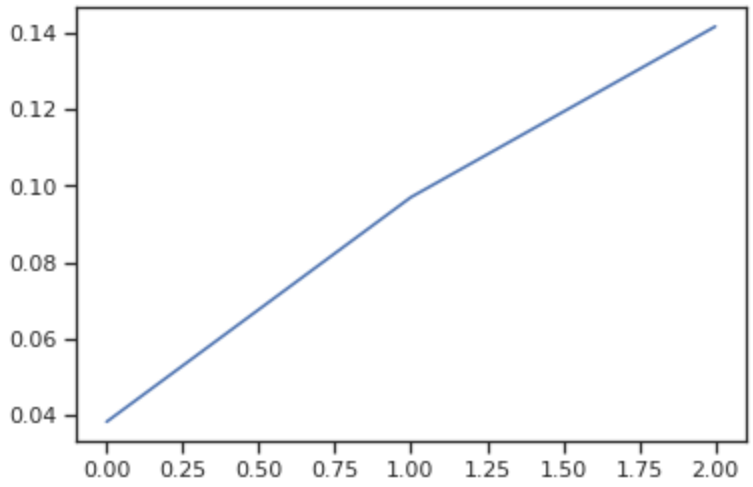
4)

- The model was trained for different parameter initialization techniques: Random, zeros and constant.



5)

- The model was experimented with 3 variations in the number of nodes.



6)

- The final weights of the model are stored.