Assignment 2 Question 3

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1   Logistic regression and Regularization

1. **l1 Normalization**

Table 1: Accuracy on varying lamda parameters for l1 normalization

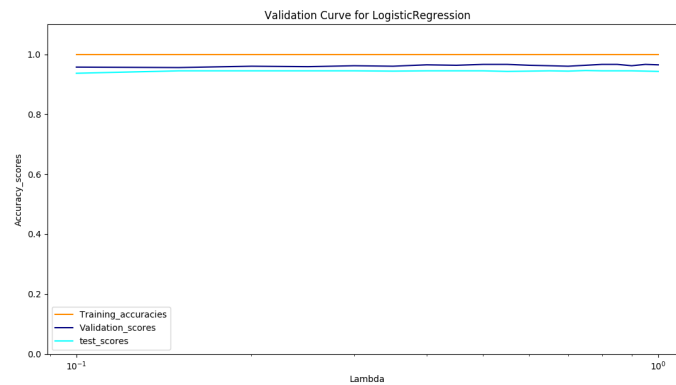| Lambda	Test	Validation
0.1	0.9368327402	0.9573170732
0.15	0.9448398577	0.9557926829
0.2	0.9448398577	0.9603658537
0.25	0.9448398577	0.9588414634
0.3	0.9448398577	0.9618902439
0.35	0.9439501779	0.9603658537
0.4	0.9448398577	0.9649390244
0.45	0.9448398577	0.9634146341
0.5	0.9448398577	0.9664634146
0.75	0.9457295374	0.9634146341
0.8	0.9448398577	0.9664634146
0.9	0.9448398577	0.9618902439
0.95	0.9439501779	0.9664634146
1	0.9430604982	0.9649390244

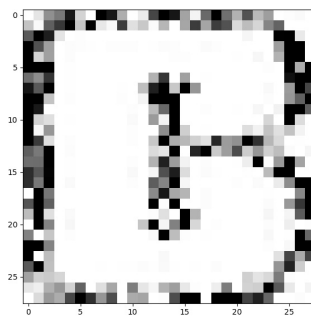Figure 1: Plots showing the validation and test curves on varying the lambda parameter.

Figure 2: Activation map for l1 normalization.

2. **l2 normalization**

Table 2: Accuracy on varying lamda parameters for l2 normalization

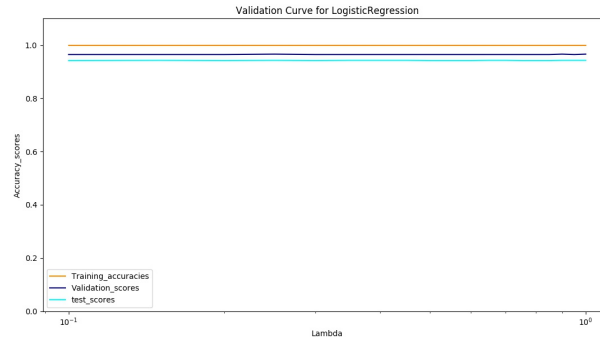| Lambda	Test	Validation
0.1	0.9421708185	0.9649390244
0.15	0.9430604982	0.9649390244
0.2	0.9421708185	0.9649390244
0.25	0.9430604982	0.9664634146
0.3	0.9421708185	0.9649390244
0.35	0.9430604982	0.9649390244
0.4	0.9430604982	0.9649390244
0.45	0.9430604982	0.9649390244
0.5	0.9421708185	0.9649390244
0.55	0.9421708185	0.9649390244
0.8	0.9421708185	0.9649390244
0.85	0.9421708185	0.9649390244
0.9	0.9430604982	0.9664634146
1	0.9430604982	0.9664634146

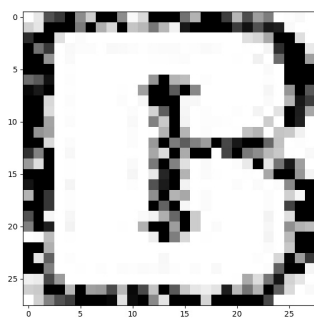Figure 3: Plots showing the validation and test curves on varying the lambda parameter.

Figure 4: Activation map for l2 normalization.