

HW3 regulations

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Link for overleaf document: <https://www.overleaf.com/1331652535wfrfmngbxkzy>.

1 cleveland dataset

results for cleveland dataset:

	L_1 Regularizer		L_2 Regularizer	
	Binary Error on Test Set	# 0 in weights	Binary Error on Test Set	# 0 in weights
$\lambda = 0.001$	0.1241	0	0.1172	0
$\lambda = 0.01$	0.1241	2	0.1241	0
$\lambda = 0.05$	0.1172	4	0.1241	0
$\lambda = 0.1$	0.1655	9	0.1172	0

2 digits dataset

Original dataset from https://scikit-learn.org/stable/modules/generated/sklearn.datasets.load_digits.html. Split 20% as testing dataset. Label [6,9,1] as -1, [8,0,7] as +1, and abandon others to create a new dataset, provided as digits_preprocess.npy. learning rates is set to 0.01

Results when max iterations = $10 ** 4$:

	L_1 Regularizer		L_2 Regularizer	
	Binary Error on Test Set	# 0 in weights	Binary Error on Test Set	# 0 in weights
$\lambda = 0$	-	-	0.1028	8
$\lambda = 0.0001$	0.0981	8	0.1028	8
$\lambda = 0.001$	0.0935	15	0.0935	8
$\lambda = 0.005$	0.0888	26	0.0981	8
$\lambda = 0.01$	0.0794	36	0.0981	8
$\lambda = 0.05$	0.1028	52	0.1168	8
$\lambda = 0.1$	0.1355	57	0.1215	8

Results when max iterations = $10 ** 5$:

	L_1 Regularizer		L_2 Regularizer	
	Binary Error on Test Set	# 0 in weights	Binary Error on Test Set	# 0 in weights
$\lambda = 0$	-	-	0.1075	8
$\lambda = 0.0001$	0.1075	10	0.1075	8
$\lambda = 0.001$	0.1075	16	0.1075	8
$\lambda = 0.005$	0.0888	29	0.0981	8
$\lambda = 0.01$	0.0747	37	0.0981	8
$\lambda = 0.05$	0.1028	52	0.1168	8
$\lambda = 0.1$	0.1355	57	0.1215	8