# Abhay Doke Intelligent Visual Computing Assignment 1

#### 1. Learned Weights w

## a. Without Regularization

## b. With Regularization

#### 2. Output Probabilities

# a. Without Regularization

	Salarization		
Test Example	Probability	Test Example	Probability
No.		No.	
1	0.9999	12	0.9939
2	0.0046	13	0.0001
3	0.0086	14	0.9998
4	0.9997	15	0.9995
5	0.0059	16	0.0607
6	0.0001	17	0.9997
7	0.0035	18	0.9998
8	0.9993	19	0.0133
9	0.9999	20	0.0001
10	0.0002	21	0.0065
11	0.9997	22	0.3719

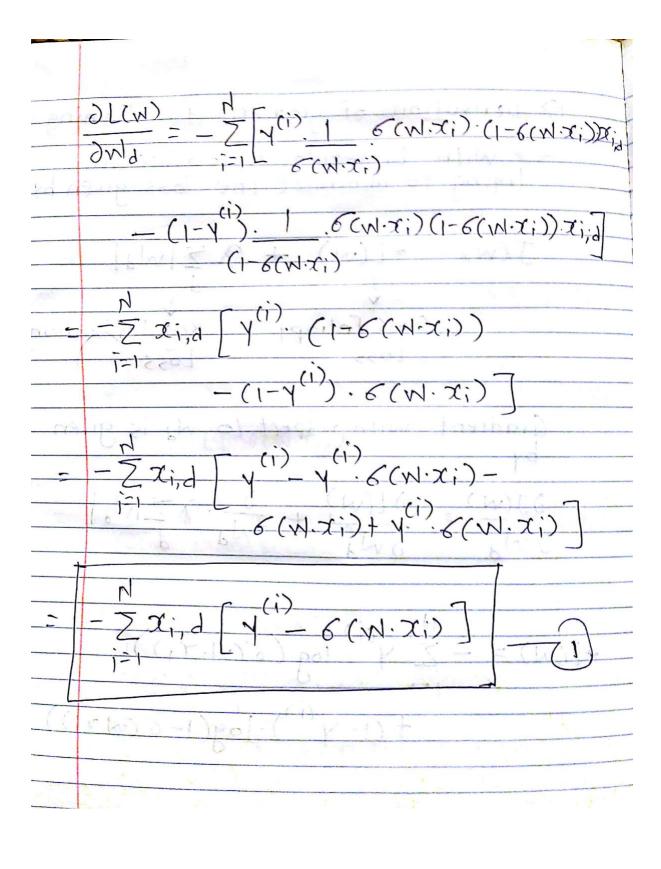
**Test Error = 4.55% (21/22 correct predictions)** 

# b. With Regularization

Probability	Test Example No.	Probability
0.9795	12	0.8841
0.0630	13	0.0040
0.0787	14	0.9778
0.9669	15	0.9586
0.19600	16	0.1331
0.0077	17	0.9704
0.0884	18	0.9732
0.9503	19	0.0674
0.9860	20	0.0047
0.0055	21	0.0653
0.9915	22	0.5852
	0.9795 0.0630 0.0787 0.9669 0.19600 0.0077 0.0884 0.9503 0.9860 0.0055	No.  0.9795 12 0.0630 13 0.0787 14 0.9669 15 0.19600 16 0.0077 17 0.0884 18 0.9503 19 0.9860 20 0.0055 21

**Test Error = 0% (22/22 correct predictions)** 

	Derivation of gradient for training
	> With Li regularization, we are trying to minimize the loss given by
	J(W) = = (W) + 2 [W]
	Cross Entropy Regularization Loss Loss
	Gradient with respect to Wa is given
	18M1 ZV. 6 + (M) 7 = (M) C PMC + (M) 7 C
• <u>[</u> (	$(M) = -\frac{N}{2} \cdot \log(6(M \cdot x_i))$ $+(1-Y^{(i)}) \cdot \log(1-6(M \cdot x_i))$



$$\frac{\partial}{\partial w_{d}} = \frac{2}{4} \left( - \frac{1}{2} \right) \text{ if } w_{d} < 0$$

$$= \frac{1}{4} \left( \frac{1}{2} \right) \text{ if } w_{d} > 0$$

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