Machine Learning Methodologies and Applications (AI6012) Individual Assignment

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1 Question 1 (10 marks)

Suppose there are C classes, 0, 1, ..., C -1

$$For\ c > 0: \quad P(y = c \mid x) = \frac{\exp\left(-w^{(c)^T} x\right)}{1 + \sum_{c=1}^{C-1} \exp\left(-w^{(c)^T} x\right)} = \hat{y}_c \tag{1}$$

$$For\ c > 0: \quad P(y = 0 \mid x) = \frac{1}{1 + \sum_{c=1}^{C-1} \exp\left(-w^{(c)^T} x\right)} = \hat{y}_0 \tag{2}$$

2 Question 2 (5 marks)

2.2. Answer:

C=0.01	**C=0.05**	**C=0.1**	**C=0.5**	**C=1**
0.84958	0.85038	0.85038	0.85050	0.85032

Table 1: Classification accuracy on running linear kernel SVM on 3-fold cross-validation using training set with different values of the parameter C in {0.01, 0.05, 0.1, 0.5, 1}

2.3. Answer:

	g=0.01	**g=0.05**	**g=0.1**	**g=0.5**	**g=1**
C=0.01	0.76377	0.76433	0.77096	0.76377	0.76377
C=0.05	0.78871	0.83293	0.83029	0.76961	0.76377
C=0.1	0.83226	0.83754	0.83717	0.79092	0.76377
C=0.5	0.84411	0.84546	0.84559	0.82507	0.77772
C=1	0.84682	0.84589	0.84651	0.82956	0.78668

Table 2: Classification accuracy on running rbf kernel SVM on 3-fold cross-validation using training set with parameter gamma in {0.01, 0.05, 0.1, 0.5, 1} and different values of the parameter C in {0.01, 0.05, 0.1, 0.5, 1}

2.4. Answer:

	kernal=Linear, C=1
Accuracy of SVMs	0.84733

Table 3: Classification accuracy on running linear kernel SVM on 3-fold cross-validation using test set with different values with C=1

3 Question 3 (5 marks)

4 Question 4 (5 marks)

	kernal=Linear, C=1
Accuracy of SVMs	0.84733

Table 4: Classification accuracy on running linear kernel SVM on 3-fold cross-validation using test set with different values with C=1