LAB ACTIVITY 6:
UNSUPERVISED LOGISTIC REGRESSION

CARANDO, Paolo Creas
GOMENDOZA, Frank
LIM, Theo Paolo
LORENA, Neil John
ZABAT, Juan Paolo

I. INTRODUCTION

We use logistic regression for machine learning and it uses a simple classification algorithm. Different hypothesis is used in predicting the probability for a given data in machine learning. For the unsupervised logistic regression deals with unlabeled data for machine learning.

II. PROCEDURE

1. Open Matlab/Octave. Load and run the file ex1b_logreg.m file. Update and insert your code in logistic_regression.m to obtain the value of objective function and its gradient.
2. After the iteration finishes, the accuracy rate on the training and test set will be outputted.
3. Implement logistic_regression.m to your training set examples x(i) and calculate the objective $J(\theta;X,y)$.
4. Calculate the gradient $\nabla\theta J(\theta;X,y)$ and store it to variable g. Also store the objective value output to variable f in your code.
5. After you have successfully stored the objective and gradient value to corresponding variables, you can now run ex1b_logreg.m to train the classifier and test it.
6. A 100% accuracy on both the training and testing sets is expected if correct implementation is performed.

III. RESULTS AND DISCUSSION

Optimization took: 22.237901 secs
Training accuracy: 100.0%
Test accuracy: 100.0%

Iter	Step Length	Function Val	Opt. Cond
1	1.21030e-06	6.55395e+03	4.08313e+03
2	1.00000e+00	2.16010e+03	1.51336e+03
3	1.00000e+00	1.27325e+03	8.95332e+02
4	1.00000e+00	6.87495e+02	4.70231e+02
5	1.00000e+00	4.05210e+02	2.62080e+02
6	1.00000e+00	2.41432e+02	1.42110e+02
7	1.00000e+00	1.48572e+02	7.60167e+01
8	1.00000e+00	9.34701e+01	3.91125e+01
9	1.00000e+00	6.01586e+01	1.94786e+01
10	1.00000e+00	3.93392e+01	9.68818e+00
11	1.00000e+00	2.50402e+01	5.20780e+00
12	1.00000e+00	1.51701e+01	6.03875e+00
13	1.00000e+00	1.31331e+01	1.50246e+01
14	1.00000e+00	6.09248e+00	5.42637e+00
15	1.00000e+00	4.21300e+00	1.82224e+00
16	1.00000e+00	3.00112e+00	8.37919e-01
17	1.00000e+00	1.77877e+00	5.27927e-01
18	1.00000e+00	9.29045e-01	2.75064e-01
19	5.00000e+00	6.63544e-01	1.96242e-01
20	2.50000e-1	5.30279e-01	1.63100e-01
21	6.25000e-02	4.96568e-01	1.48939e-01
22	1.95313e-03	4.95618e-01	1.48712e-01
23	1.22070e-04	4.95555e-01	1.48679e-01
24	3.81470e-06	4.9553e-01	1.48678e-01
25	1.19209e-07	4.9553e-01	1.48678e-01
26	5.96046e-08	4.9553e-01	1.48678e-01

27	2.98023e-08	4.9553e-01	1.48678e-01
28	7.45058e-09	4.9553e-01	1.48678e-01
29	0.00000e+00	4.9553e-01	1.48678e-01

IV. CONCLUSION

In this experiment, the group was able to attain to achieve the objectives of the laboratory which is to train the classifier examples and test it. For the results, we obtained successfully the different iterations as well as attained 100% accuracy for both the training and testing.

V. APPENDICES

```
for i = 1:m
    h = 1./(1+exp(-(theta' *
X(:,i))));
    g = g - ((y(i)-h) * X(:,i));
    f = f - (y(i)*log(h)+(1-
y(i))*log(1-h));
end
```

Code 1. Logistic Regression

```
g=g(:);
```

Code 2. Softmax Regression

```
function h=sigmoid(a)
  h=1./(1+exp(-a));
```

Code 3. Sigmoid

VI. BIBLIOGRAPHY

[1]http://ufldl.stanford.edu/tutorial/supervised/LogisticRegression/

[2]http://stats.stackexchange.com/questions/61390/is-there-unsupervised-regression