**PREREQUISITES:**

The train.txt file has to be pasted on MATLAB root folder. The MATLAB root folder can be known by typing pwd on command window of MATLAB

**KEY EQUATIONS:**

x=[x11 x21  y=[y1  theta=[0

x12 x 22  y2  0

… … …. 0]

x1100 x2100 ] y100]

x=[1 x11 x21

1 x12 x22

……

1 x1100 2100  ]

m=100

d=3

h=g(theta1+theta2\*x1+theta3\*x2)

h= (1./(1+exp(-(theta1+theta2\*x1+theta3\*x2)))

h=(1./(1+exp(-x\*theta))

Learning rate=alpha=0.001

theta1=theta1-alpha\*( ∂ cost)/ (∂ theta1)

theta1=theta1-(alpha/m)\*sum(sigmoid(x\*theta-y))\*x(:,1)

theta2=theta2-alpha\*( ∂ cost)/ (∂ theta2)

theta2=theta2-(alpha/m)\*sum(sigmoid(x\*theta-y))\*x(:,2)

theta3=theta3-alpha\*( ∂ cost)/ (∂ theta3)

theta3=theta3-(alpha/m)\*sum(sigmoid(x\*theta-y))\*x(:,3)

**Code with Explanation:**

**%initially data is loaded and separated into x and y**

data=load('train1.txt');

d=size(data);

d=d(2);

x=data(:,1:(d-1));

y=data(:,d);

**%now ones column is added to make matrix multiplication easier**

m=length(x);

x1=ones(m,1);

x=[x1,x];

**%initial theta values are set**

theta=zeros(d,1);

**%learning rate is set**

alpha=.001;

**%Iterations is done to find the correct weights**

for i=1:150000

theta(1)=theta(1)-(alpha/m)\*(sum((1./(1+exp(-x\*theta)))-y));

theta(2)=theta(2)-(alpha/m)\*(sum(((1./(1+exp(-x\*theta)))-y).\*x(:,2)));

theta(3)=theta(3)-(alpha/m)\*(sum(((1./(1+exp(-x\*theta)))-y).\*x(:,3)));

end

**%the results are predicted for the given data**

**%its 1 if the resuts are above 0.5 and 0,otherwise**

w=theta

nTest = size(x,1);

res = zeros(nTest,1);

%based on weights obtained,we classify the given data as 0 or 1

for i = 1:nTest

sigm = sigmoid([x(i,:)] \* w);

if sigm >= 0.5

res(i) = 1;

else

res(i) = 0;

end

end

**% now error is found between the predicted data and the given data**

errors = abs(y - res);

err = sum(errors)

**% The correct percentage is found using the given formula, this can be increased by decreasing the learning rate or increasing the now of iterations**

correct\_percentage = (1 - err / size(x, 1))\*100

OUTPUT

err =9

correct\_percentage =91