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BT – Thực hành 03

Q1.

```
function TH03_Q1(n)
    fprintf('\n Load du lieu train');
    imgTrainAll = loadMNISTImages('./train-images.idx3-ubyte');

    lblTrainAll = loadMNISTLabels('./train-labels.idx1-ubyte');

    fprintf('\n Load du lieu test');
    imgTestAll = loadMNISTImages('./t10k-images.idx3-ubyte');

    lblTestAll = loadMNISTLabels('./t10k-labels.idx1-ubyte');

    nTrainImages = size(imgTrainAll, 2);
    nTrainLabels = size(lblTrainAll, 1);

    nTestImages = size(imgTestAll, 2);
    nTestLabels = size(lblTestAll, 1);

    nSizeofImage = size(imgTrainAll, 1);

    figure;
    img = imgTrainAll(:, n);
    img2D = reshape(img, 28, 28);
    strLabelImage = num2str(lblTrainAll(n));
    strLabelImage = [strLabelImage, '(', num2str(n),')'];
    imshow(img2D);
    title(strLabelImage);

end
```

n	Kết quả
1	5
500	8
5000	2
10000	7
59000	4

Q2.

```
function TH03_Q2(n)
    fprintf('\n Load du lieu train');
    imgTrainAll = loadMNISTImages('./train-images.idx3-ubyte');

    lblTrainAll = loadMNISTLabels('./train-labels.idx1-ubyte');

    fprintf('\n Load du lieu test');
    imgTestAll = loadMNISTImages('./t10k-images.idx3-ubyte');

    lblTestAll = loadMNISTLabels('./t10k-labels.idx1-ubyte');

    nTrainImages = size(imgTrainAll, 2);
    nTrainLabels = size(lblTrainAll, 1);

    nTestImages = size(imgTestAll, 2);
    nTestLabels = size(lblTestAll, 1);

    nSizeofImage = size(imgTrainAll, 1);


    figure;
    img = imgTestAll(:, n);
    img2D = reshape(img, 28, 28);
    strLabelImage = num2str(lblTestAll(n));
    strLabelImage = [strLabelImage, '(', num2str(n),')'];
    imshow(img2D);
    title(strLabelImage);

end
```

n	Kết quả
1	7
500	6
5000	0
9000	0

Q3.

```
function TH03_Q3()
    fprintf('\n Load du lieu train\n');
    imgTrainAll = loadMNISTImages('./train-images.idx3-ubyte');

    lblTrainAll = loadMNISTLabels('./train-labels.idx1-ubyte');

    fprintf('\n Load du lieu test\n');
    imgTestAll = loadMNISTImages('./t10k-images.idx3-ubyte');

    lblTestAll = loadMNISTLabels('./t10k-labels.idx1-ubyte');

    nTrainImages = size(imgTrainAll, 2);
    nTrainLabels = size(lblTrainAll, 1);

    nTestImages = size(imgTestAll, 2);
    nTestLabels = size(lblTestAll, 1);

    nSizeofImage = size(imgTrainAll, 1);

    count = 0;
    tongcong = 0;
    for i=0:9
        for j=1:60000
            if(lblTrainAll(j) == i)
                count = count + 1;
            end
        end
        fprintf("Nhan [%d] co: %d anh\n", i, count);
        tongcong=tongcong+count;
        count = 0;
    end
    fprintf("Tong cong so anh train la: %d", tongcong);
end
```

Nhan [0] co: 5923 anh

Nhan [1] co: 6742 anh

Nhan [2] co: 5958 anh

Nhan [3] co: 6131 anh

Nhan [4] co: 5842 anh

Nhan [5] co: 5421 anh

Nhan [6] co: 5918 anh

Nhan [7] co: 6265 anh

Nhan [8] co: 5851 anh

Nhan [9] co: 5949 anh

Tong cong so anh train la: 60000

Q4.

```
function TH03_Q4()
    fprintf('\n Load du lieu train\n');
    imgTrainAll = loadMNISTImages('./train-images.idx3-ubyte');

    lblTrainAll = loadMNISTLabels('./train-labels.idx1-ubyte');

    fprintf('\n Load du lieu test\n');
    imgTestAll = loadMNISTImages('./t10k-images.idx3-ubyte');

    lblTestAll = loadMNISTLabels('./t10k-labels.idx1-ubyte');

    nTrainImages = size(imgTrainAll, 2);
    nTrainLabels = size(lblTrainAll, 1);

    nTestImages = size(imgTestAll, 2);
    nTestLabels = size(lblTestAll, 1);

    nSizeofImage = size(imgTrainAll, 1);

    count = 0;
    tongcong = 0;
    for i=0:9
        for j=1:10000
            if(lblTestAll(j) == i)
                count = count + 1;
            end
        end
        fprintf("Nhan [%d] co: %d anh\n", i, count);
        tongcong=tongcong+count;
        count = 0;
    end
    fprintf("Tong cong so anh test la: %d\n", tongcong);
end
```

Nhan [0] co: 980 anh

Nhan [1] co: 1135 anh

Nhan [2] co: 1032 anh

Nhan [3] co: 1010 anh

Nhan [4] co: 982 anh

Nhan [5] co: 892 anh

Nhan [6] co: 958 anh

Nhan [7] co: 1028 anh

Nhan [8] co: 974 anh

Nhan [9] co: 1009 anh

Tong cong so anh test la: 10000

Q5

```
function TH03_Q5(n)
    fprintf('\n Load du lieu train\n');
    imgTrainAll = loadMNISTImages('./train-images.idx3-ubyte');

    lblTrainAll = loadMNISTLabels('./train-labels.idx1-ubyte');

    fprintf('\n Load du lieu test\n');
    imgTestAll = loadMNISTImages('./t10k-images.idx3-ubyte');

    lblTestAll = loadMNISTLabels('./t10k-labels.idx1-ubyte');

    nTrainImages = size(imgTrainAll, 2);
    nTrainLabels = size(lblTrainAll, 1);

    nTestImages = size(imgTestAll, 2);
    nTestLabels = size(lblTestAll, 1);

    nSizeofImage = size(imgTrainAll, 1);

    nNumber = n;
    figure;
    img = imgTestAll(:, nNumber);
    img2D = reshape(img, 28, 28);
    strLabelImage = num2str(lblTestAll(nNumber));
    strLabelImage = [strLabelImage, '(', num2str(nNumber),')'];
    imshow(img2D);
    title(strLabelImage);

end
```

n	5	500	900
Kết quả	4	6	8

Q6

```
function TH03_Q6()
    fprintf('\n Load du lieu train');
    imgTrainAll = loadMNISTImages('./train-images.idx3-ubyte');

    lblTrainAll = loadMNISTLabels('./train-labels.idx1-ubyte');

    Mdl = fitcknn(imgTrainAll', lblTrainAll);

    fprintf('\n Load du lieu test');
    imgTestAll = loadMNISTImages('./t10k-images.idx3-ubyte');

    lblTestAll = loadMNISTLabels('./t10k-labels.idx1-ubyte');


    nTrainImages = size(imgTrainAll, 2);
    nTrainLabels = size(lblTrainAll, 1);

    nTestImages = size(imgTestAll, 2);
    nTestLabels = size(lblTestAll, 1);

    nSizeofImage = size(imgTrainAll, 1);

    nNumber = randi([1 nTestImages]);

    imgTest = imgTestAll(:, nNumber);
    lblPredictTest = predict(Mdl, imgTest');

    lblImgTest = lblTestAll(nNumber);
    figure;
    img2D = reshape(imgTest, 28, 28);
    imshow(img2D);

    strLabelImage = "Ban dau ";
    strLabelImage = [strLabelImage, num2str(lblTestAll(nNumber)), '.'];
    title(strLabelImage);

    strLabelImage = [strLabelImage, ' Du doan: '];
    strLabelImage = [strLabelImage, num2str(lblPredictTest), '.' ];
    if(lblPredictTest == lblImgTest)
        strLabelImage = [strLabelImage, ' Ket qua dung. '];
    else
        strLabelImage = [strLabelImage, ' Ket qua sai. '];
    end

    title(strLabelImage);
end
```

Q7

```
function TH03_Q7(n)
    fprintf('\n Load du lieu train');
    imgTrainAll = loadMNISTImages('./train-images.idx3-ubyte');
    lblTrainAll = loadMNISTLabels('./train-labels.idx1-ubyte');

    fprintf('\n Load du lieu test');
    imgTestAll = loadMNISTImages('./t10k-images.idx3-ubyte');
    lblTestAll = loadMNISTLabels('./t10k-labels.idx1-ubyte');


    nTrainImages = size(imgTrainAll, 2);
    nTrainLabels = size(lblTrainAll, 1);

    nTestImages = size(imgTestAll, 2);
    nTestLabels = size(lblTestAll, 1);

    nSizeofImage = size(imgTrainAll, 1);



    Mdl = fitcknn(imgTrainAll', lblTrainAll);
    count = 0;
    for i=1: 100
        imgTest = imgTestAll(:, i);
        lblPredictTest = predict(Mdl, imgTest');
        lblImgTest = lblTestAll(i);
        if(n==lblImgTest)
            if(lblPredictTest == lblImgTest && lblPredictTest == n)

            else
                count = count + 1;
            end
        end
        fprintf('Xong hinh thu %d\n', i);
    end
    fprintf('\nLabel [%d]   ---   So anh bi sai la: %d\n', n, count);

end
```

GHI CHÚ: bài này em làm được nhưng máy em chạy mãi 1 tiếng hơn mới xong 1 label, nên phiền thầy kiểm tra thuật toán, còn kết quả từng label chắc nhờ thầy chạy giùm

Label	Số ảnh sai
0	
1	6
2	
3	
4	
5	

6	
7	
8	
9	