BÀI TẬP THỰC HÀNH 4

KHẢO SÁT BỘ DỮ LIỆU KHUÔN MẶT

Họ và tên: Tống Duy Tân
MSHV: CH1702016
Link github: https://github.com/tanUIT/VRA

Q1:

```
function question1(n)
  imgTrainDatas = load('imgTrainImagesAll.mat');
  imgTrainLabels = load('lblTrainLabelsAll.mat');
  allImagesTrain = imgTrainDatas.imgTrainImagesAll;
  allLabelsTrain = imgTrainLabels.lblTrainLabelsAll;
  img2D = reshape(allImagesTrain(:, n), 112, 92);
  imgLabel = num2str(allLabelsTrain(n));
  figure
  imshow(img2D);
  title(imgLabel);
end
```

Q2:

```
function question2(n)
  imgTrainDatas = load('imgTestImagesAll.mat');
  imgTrainLabels = load('lblTestLabelsAll.mat');
  allImagesTest = imgTrainDatas.imgTestImagesAll;
  allLabelsTest = imgTrainLabels.lblTestLabelsAll;
  img2D = reshape(allImagesTest(:, n), 112, 92);
  imgLabel = num2str(allLabelsTest(n));
  figure
  imshow(img2D);
  title(imgLabel);
end
```

Q3:

```
function question3()
  imgTrainLabels = load('lblTrainLabelsAll.mat');
  allLabelsTrain = imgTrainLabels.lblTrainLabelsAll;
  numLabelsTrain = size(allLabelsTrain, 2);
  fprintf('Tong so label la: %d\n',numLabelsTrain);
  countLabel = zeros(1, 40);
  for i = 1:numLabelsTrain
     countLabel(allLabelsTrain(i)) = countLabel(allLabelsTrain(i)) + 1;
  end

  for j = 1:40
```

```
    fprintf('So anh co label %d la: %d\n', j, countLabel(j));
  end
end
```

Q4:

```
function question4()
  imgTestLabels = load('lblTestLabelsAll.mat');
  allLabelsTest = imgTestLabels.lblTestLabelsAll;
  numLabelsTest = size(allLabelsTest, 2);
  fprintf('Tong so label la: %d\n',numLabelsTest);
  countLabel = zeros(1, 40);
  for i = 1:numLabelsTest
     countLabel(allLabelsTest(i)) = countLabel(allLabelsTest(i)) + 1;
  end

  for j = 1:40
    fprintf('So anh co label %d la: %d\n', j, countLabel(j));
  end
end
```

Q5:

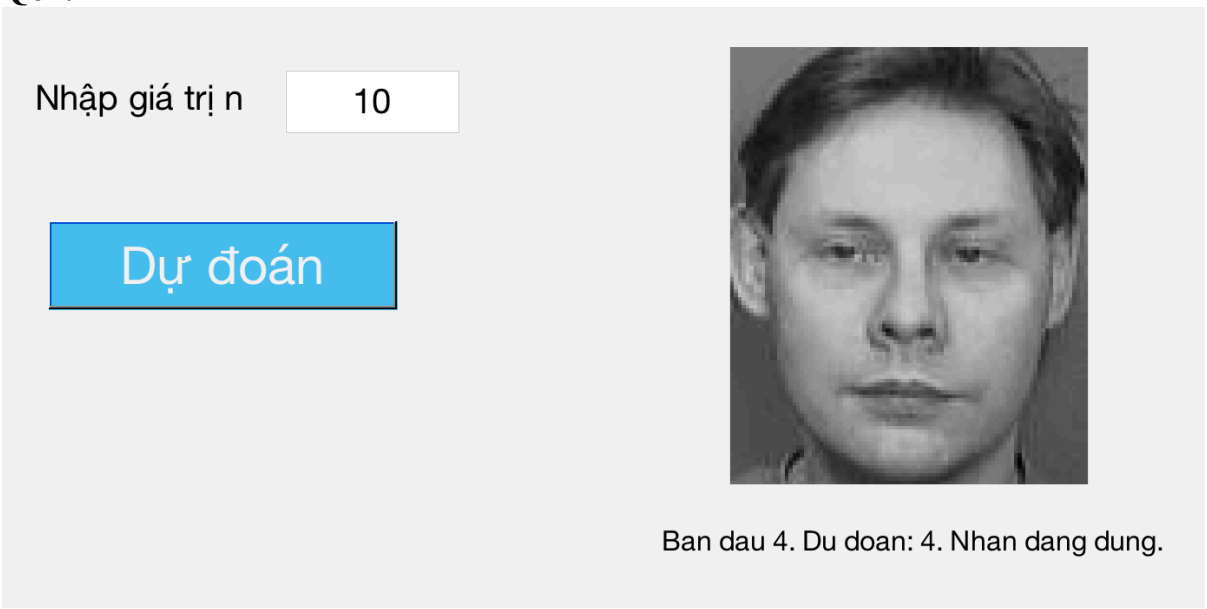
```
function question5(n)
    imgTrainDatas = load('imgTrainImagesAll.mat');
    imgTrainLabels = load('lblTrainLabelsAll.mat');
    imgTrainAll = imgTrainDatas.imgTrainImagesAll;
    lblTrainAll = imgTrainLabels.lblTrainLabelsAll;

    Mdl = fitcknn(imgTrainAll' , lblTrainAll);

    imgTrainDatas = load('imgTestImagesAll.mat');
    imgTestAll = imgTrainDatas.imgTestImagesAll;
    imgTest = imgTestAll(:, n);
    lblPredictTest = predict(Mdl, imgTest');
    fprintf('Ket qua nhan dang cua anh co thu tu %d trong tap test la: %d\n', n,
lblPredictTest);
end
```

Q6:

```
function question6(n)
    imgTrainDatas = load('imgTrainImagesAll.mat');
    imgTrainLabels = load('lblTrainLabelsAll.mat');
    imgTrainAll = imgTrainDatas.imgTrainImagesAll;
    lblTrainAll = imgTrainLabels.lblTrainLabelsAll;

    Mdl = fitcknn(imgTrainAll' , lblTrainAll);
```

```
    imgTrainDatas = load('imgTestImagesAll.mat');
    imgTrainLabels = load('lblTestLabelsAll.mat');
    imgTestAll = imgTrainDatas.imgTestImagesAll;
    lblTestAll = imgTrainLabels.lblTestLabelsAll;
    imgTest = imgTestAll(:, n);
    lblPredictTest = predict(Mdl, imgTest');
    lblImageTest = lblTestAll(n);

    figure;
    img2D = reshape(imgTest, 112, 92);
    imshow(img2D);
    strLabelImage = 'Ban dau ';
    strLabelImage = [strLabelImage, num2str(lblImageTest), '.'];
    strLabelImage = [strLabelImage, ' Du doan: '];
    strLabelImage = [strLabelImage, num2str(lblPredictTest), '.'];

    if(lblPredictTest == lblImageTest)
        strLabelImage = [strLabelImage, ' Nhan dang dung.'];
    else
        strLabelImage = [strLabelImage, ' Nhan dang sai.'];
    end
    title(strLabelImage);
end
```

Q6*:



Q7:

```
function question7(n)
    imgTrainDatas = load('imgTrainImagesAll.mat');
    imgTrainLabels = load('lblTrainLabelsAll.mat');
    imgTrainAll = imgTrainDatas.imgTrainImagesAll;
```

```
    lblTrainAll = imgTrainLabels.lblTrainLabelsAll;

    Mdl = fitcknn(imgTrainAll' , lblTrainAll);

    imgTrainDatas = load('imgTestImagesAll.mat');
    imgTrainLabels = load('lblTestLabelsAll.mat');
    imgTestAll = imgTrainDatas.imgTestImagesAll;
    lblTestAll = imgTrainLabels.lblTestLabelsAll;

    arrImagesNTest = [];
    for i = 1:size(imgTestAll, 2)
      if (lblTestAll(i) == n)
        arrImagesNTest = [arrImagesNTest, imgTestAll(:, i)];
      end
    end

    countFailure = 0;
    for i = 1:size(arrImagesNTest,2)
       imgTest = arrImagesNTest(:, i);
       lblPredictTest = predict(Mdl, imgTest');
       if (lblPredictTest ~= n)
          countFailure = countFailure + 1;
       end
    end

    fprintf('So luong anh co label %d bi nhan dang sai la: %d\n', n, countFailure);
end
```

Q7*:

```
function question7_advance(n)
    imgTrainDatas = load('imgTrainImagesAll.mat');
    imgTrainLabels = load('lblTrainLabelsAll.mat');
    imgTrainAll = imgTrainDatas.imgTrainImagesAll;
    lblTrainAll = imgTrainLabels.lblTrainLabelsAll;

    Mdl = fitcknn(imgTrainAll' , lblTrainAll);

    imgTrainDatas = load('imgTestImagesAll.mat');
    imgTrainLabels = load('lblTestLabelsAll.mat');
    imgTestAll = imgTrainDatas.imgTestImagesAll;
    lblTestAll = imgTrainLabels.lblTestLabelsAll;

    arrImagesNTest = [];
    for i = 1:size(imgTestAll, 2)
      if (lblTestAll(i) == n)
        arrImagesNTest = [arrImagesNTest, imgTestAll(:, i)];
```

```
      end
   end

   countFailure = zeros(1, 40);
   for i = 1:size(arrImagesNTest,2)
      imgTest = arrImagesNTest(:, i);
      lblPredictTest = predict(Mdl, imgTest');
      if (lblPredictTest ~= n)
         countFailure(lblPredictTest) = countFailure(lblPredictTest) + 1;
      end
   end

   for i = 1:40
      if (i ~= n)
         fprintf('So luong anh co label %d bi nhan dang sai thanh %d la: %d\n', n, i,
countFailure(i));
      end
   end
end
```

Q8:**

```
function question8_advance(k)
   imgTrainDatas = load('imgTrainImagesAll.mat');
   imgTrainLabels = load('lblTrainLabelsAll.mat');
   imgTrainAll = imgTrainDatas.imgTrainImagesAll;
   lblTrainAll = imgTrainLabels.lblTrainLabelsAll;

   Mdl = fitcknn(imgTrainAll' , lblTrainAll, 'NumNeighbors', k);

   imgTrainDatas = load('imgTestImagesAll.mat');
   imgTrainLabels = load('lblTestLabelsAll.mat');
   imgTestAll = imgTrainDatas.imgTestImagesAll;
   lblTestAll = imgTrainLabels.lblTestLabelsAll;

   lblResult = predict(Mdl,imgTestAll');
   nResult = (lblResult == lblTestAll');
   nCount = sum(nResult);
   percentageAccuracy = nCount*100/size(imgTestAll, 2);
   fprintf('=> Do chinh xac cua thuat toan knn voi %d nearest neighbors la %.2f\n', k,
percentageAccuracy);
end
```