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Link GitHub: https://github.com/vra-nhanlt/vra-nhanlt

BÀI TẬP THỰC HÀNH 4

Thay thế dữ liệu chữ viết tay thành dữ liệu khuôn mặt

I. NỘI DUNG CÁC HÀM

Chức năng	Nội dung lệnh/hàm
Load data	`imgsTrainingFileName = './ORLFaceDB/imgTrainImagesAll.mat';` `labelsTrainingFileName = './ORLFaceDB/lblTrainLabelsAll.mat';` `imgsTestingFileName = './ORLFaceDB/imgTestImagesAll.mat';` `labelsTestingFileName ='./ORLFaceDB/lblTestLabelsAll.mat';` `load(imgsTrainingFileName);` `load(labelsTrainingFileName);` `load(imgsTestingFileName);` `load(labelsTestingFileName);` `// Gán lại tên các biến quen dùng (cho dễ dùng lại code cũ)` `imgsTrainingData = imgTrainImagesAll;` `labelsTrainingData = lblTrainLabelsAll;` `imgsTestingData = imgTestImagesAll;` `labelsTestingData = lblTestLabelsAll;`
Trích xuất feature dùng LBP	`% LBP` `featuresTrainingData = extractFeaturesLBPCustomSize(imgsTrainingData, 112, 92);` `featuresTestingData = extractFeaturesLBPCustomSize(imgsTestingData, 112, 92);`
	`function featuresData = extractFeaturesLBPCustomSize(imgsData, rows, columns)` `    imgsDataCount = size(imgsData, 2);` `    firstImgFeaturesData = extractFeaturesOneImgLBPCustomsize(imgsData, 1, rows, columns);` `    featuresData = zeros(length(firstImgFeaturesData), imgsDataCount);` `    featuresData(:, 1) = firstImgFeaturesData;`

	`` for i = 2:imgsDataCount featuresData(:, i) = extractFeaturesOneImgLBPCustomsize(imgsData, i, rows, columns); end end ```
	`` function featureVecto = extractFeaturesOneImgLBPCustomsize(imgsData, i , rows, columns) img1D = imgsData(:, i); img2D = reshape(img1D, rows, columns); featureVecto = extractLBPFeatures(img2D); end ```
Xây dựng model, chạy thử nghiệm Hiển thị kết quả	``` recoginzeAndShowResult(featuresTrainingData, labelsTrainingData, featuresTestingData, labelsTestingData, 'LBP', 1); function recoginzeAndShowResult(featuresTrainingData, labelsTrainingData, featuresTestingData, labelsTestingData, featureExtractor, k) model = fitcknn(featuresTrainingData',labelsTrainingData, 'NumNeighbors', k); results = predict(model,featuresTestingData'); correctResults = (results == labelsTestingData'); fprintf("correct recognition results count (using %s, k = %d): ", featureExtractor , k); correctResultsCount = sum(correctResults) end ```

Sử dụng các Feature extractor khác

<table>
<tr><td rowspan="2">Trích xuất feature dùng Histogram</td><td>featuresTrainingData = extractFeaturesHistogram(imgsTrainingData);
featuresTestingData = extractFeaturesHistogram(imgsTestingData);</td></tr>
<tr><td><pre>
function featuresData = extractFeaturesHistogram(imgsData)
    binsCount = 256;
    imgsDataCount = size(imgsData, 2);
    featuresData = zeros(binsCount, imgsDataCount);
    for i = 1:imgsDataCount
        featuresData(:, i) = imhist(imgsData(:, i), binsCount);
    end
end
</pre></td></tr>
<tr><td rowspan="2">Trích xuất feature dùng HoG</td><td><pre>
featuresTrainingData = extractFeaturesHoGCustomsize(imgsTrainingData, rows, columns);
featuresTestingData = extractFeaturesHoGCustomsize(imgsTestingData, rows, columns);
</pre></td></tr>
<tr><td><pre>
function featuresData = extractFeaturesHoGCustomsize(imgsData, rows, columns)
    imgsDataCount = size(imgsData, 2);
    firstImgFeaturesData = extractFeaturesOneImgHoGCustomsize(imgsData, 1, rows, columns);

    featuresData = zeros(length(firstImgFeaturesData), imgsDataCount);

    featuresData(:, 1) = firstImgFeaturesData;

    for i = 2:imgsDataCount
        featuresData(:, i) = extractFeaturesOneImgHoGCustomsize(imgsData, i, rows,
columns);
    end
end
</pre></td></tr>
</table>

	function featureVecto = extractFeaturesOneImgHoGCustomsize(imgsData, i, rows, columns) img1D = imgsData(:, i); img2D = reshape(img1D, rows, columns); featureVecto = extractHOGFeatures(img2D); end

II. KẾT QUẢ THỬ NGHIỆM

	K =1	K=3
Histogram	117/120	111/120
LBP	104/120	92/120
HoG	110/120	102/120