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classdef cia2lab < matlab.apps.AppBase
    % Properties that correspond to app components
    properties (Access = public)
        UIFigure                                matlab.ui.Figure
        ModelTestingLabel                       matlab.ui.control.Label
        TrainMLModelonPCpartsDATALabel         matlab.ui.control.Label
        EdgeDetectionAppliedonSelectedImageLabel matlab.ui.control.Label
        Label                                   matlab.ui.control.Label
        SelectImageButton                       matlab.ui.control.Button
        acclabel                                matlab.ui.control.Label
        TrainModelButton                       matlab.ui.control.Button
        UIAxes2_4                               matlab.ui.control.UIAxes
        UIAxes2_3                               matlab.ui.control.UIAxes
        UIAxes2_2                               matlab.ui.control.UIAxes
        UIAxes2                                 matlab.ui.control.UIAxes
        UIAxes                                  matlab.ui.control.UIAxes
    end
    % Callbacks that handle component events
    methods (Access = private)
        % Button pushed function: TrainModelButton
        function TrainModelButtonPushed(app, event)
            function hog = HOG(ds,i)
                hog =
extractHOGFeatures(im2gray(imresize(imread(ds.Files{i}],[224
224])), 'CellSize',[4 4]));
            end
            app.acclabel.Text = sprintf("model training...");
            ds = imageDatastore('E:\MATLAB CIA
2\pc_parts','IncludeSubfolders',true,'LabelSource','foldernames');
            [trainset,testset] = splitEachLabel(ds,0.8,'randomized');
            m = numel(trainset.Files); n = numel(testset.Files);
            trainfeat = zeros(m,length(HOG(trainset,1)),'single');
            testfeat = zeros(n,length(HOG(testset,1)),'single');
            for i = 1:m, trainfeat(i,:) = HOG(trainset,i); end
            for i = 1:n, testfeat(i,:) = HOG(testset,i); end
            model = fitcnet(trainfeat,trainset.Labels);
            pred = predict(model,testfeat);
            confmat = confusionmat(testset.Labels,pred);
            confusionchart(confmat);
            accuracy = sum(diag(confmat))/sum(confmat(:))*100;
            app.acclabel.Text = sprintf("Accuracy : %.2f%%\n Saved
Model",accuracy);
            save('mymodel.mat','model');
        end
        % Button pushed function: SelectImageButton
        function SelectImageButtonPushed(app, event)
            [fn,fp] = uigetfile({'*.jpg;'}, 'Select Input Image');

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        img = imread(fullfile([fp,fn]));
        figure;
        imshow(img, 'Parent', app.UIAxes);
        features = extractHOGFeatures(im2gray(imresize(img, [224
224])), 'CellSize', [4 4]);
        load("mymodel.mat", "model");
        pred = predict(model, features);
        app.Label.Text = sprintf("Predicted Label : %s", char(pred(1)));

        img = im2gray(img);
        sobel = edge(img, "sobel"); roberts = edge(img, "roberts");
        prewitt = edge(img, "prewitt"); canny = edge(img, "canny");
        imshow(sobel, 'Parent', app.UIAxes2); title("Sobel");
        imshow(prewitt, 'Parent', app.UIAxes2_2); title("Prewitt");
        imshow(roberts, 'Parent', app.UIAxes2_3); title("Roberts");
        imshow(canny, 'Parent', app.UIAxes2_4); title("Canny");
    end
end
% Component initialization
methods (Access = private)
    % Create UIFigure and components
    function createComponents(app)
        % Create UIFigure and hide until all components are created
        app UIFigure = uifigure('Visible', 'off');
        app UIFigure.Position = [100 100 790 733];
        app UIFigure.Name = 'MATLAB App';
        % Create UIAxes
        app.UIAxes = uiaxes(app UIFigure);
        title(app.UIAxes, 'Selected Input Image for Testing');
        app.UIAxes.Position = [411 461 267 162];
        % Create UIAxes2
        app.UIAxes2 = uiaxes(app UIFigure);
        app.UIAxes2.Position = [95 188 300 185];
        % Create UIAxes2_2
        app.UIAxes2_2 = uiaxes(app UIFigure);
        app.UIAxes2_2.Position = [447 188 300 185];
        % Create UIAxes2_3
        app.UIAxes2_3 = uiaxes(app UIFigure);
        app.UIAxes2_3.Position = [95 20 300 185];
        % Create UIAxes2_4
        app.UIAxes2_4 = uiaxes(app UIFigure);
        app.UIAxes2_4.Position = [447 4 300 185];
        % Create TrainModelButton
        app.TrainModelButton = uibutton(app UIFigure, 'push');
        app.TrainModelButton.ButtonPushedFcn = createCallbackFcn(app,
@TrainModelButtonPushed, true);
        app.TrainModelButton.Position = [162 664 100 23];
        app.TrainModelButton.Text = 'Train Model ';
        % Create acclabel

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        app.acclabel = uilabel(app.UIFigure);
        app.acclabel.FontWeight = 'bold';
        app.acclabel.Position = [428 648 233 55];
        app.acclabel.Text = {'Accuracy : 24.07'; 'Saved Model'};
        % Create SelectImageButton
        app.SelectImageButton = uibutton(app.UIFigure, 'push');
        app.SelectImageButton.ButtonPushedFcn = createCallbackFcn(app,
@SelectImageButtonPushed, true);
        app.SelectImageButton.Position = [162 512 100 23];
        app.SelectImageButton.Text = 'Select Image';
        % Create Label
        app.Label = uilabel(app.UIFigure);
        app.Label.FontWeight = 'bold';
        app.Label.Position = [431 440 228 22];
        app.Label.Text = '';
        % Create EdgeDetectionAppliedonSelectedImageLabel
        app.EdgeDetectionAppliedonSelectedImageLabel =
uilabel(app.UIFigure);
        app.EdgeDetectionAppliedonSelectedImageLabel.FontSize = 18;
        app.EdgeDetectionAppliedonSelectedImageLabel.FontWeight = 'bold';
        app.EdgeDetectionAppliedonSelectedImageLabel.Position = [45 381 375
23];
        app.EdgeDetectionAppliedonSelectedImageLabel.Text = 'Edge Detection
Applied on Selected Image';
        % Create TrainMLModelonPCpartsDATALabel
        app.TrainMLModelonPCpartsDATALabel = uilabel(app.UIFigure);
        app.TrainMLModelonPCpartsDATALabel.FontSize = 18;
        app.TrainMLModelonPCpartsDATALabel.FontWeight = 'bold';
        app.TrainMLModelonPCpartsDATALabel.Position = [63 693 298 23];
        app.TrainMLModelonPCpartsDATALabel.Text = 'Train ML Model on PC
parts DATA';
        % Create ModelTestingLabel
        app.ModelTestingLabel = uilabel(app.UIFigure);
        app.ModelTestingLabel.FontSize = 18;
        app.ModelTestingLabel.FontWeight = 'bold';
        app.ModelTestingLabel.Position = [63 569 125 23];
        app.ModelTestingLabel.Text = 'Model Testing';
        % Show the figure after all components are created
        app.UIFigure.Visible = 'on';
    end
end
% App creation and deletion
methods (Access = public)
    % Construct app
    function app = cia2lab
        % Create UIFigure and components
        createComponents(app)
        % Register the app with App Designer
        registerApp(app, app.UIFigure)

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        if nargout == 0
            clear app
        end
    end
end
% Code that executes before app deletion
function delete(app)
    % Delete UIFigure when app is deleted
    delete(app.UIFigure)
end
end
end
end

```

Output :

