fileNames = ["blurpcb.jpg","sherlock.jpg","peacock.jpg","fabric.png","greens.jpg", ...

"hands1.jpg","kobi.png","lighthouse.png","office\_4.jpg", ...

"onion.png","pears.png","yellowlily.jpg","indiancorn.jpg", ...

"flamingos.jpg","sevilla.jpg","llama.jpg","parkavenue.jpg", ...

"strawberries.jpg","trailer.jpg","wagon.jpg","football.jpg"];

filePath = fullfile(matlabroot,"toolbox","images","imdata")+filesep;

filePathNames = strcat(filePath,fileNames);

testImages = imageDatastore(filePathNames);

montage(testImages)

testImage = "C:\Program Files\MATLAB\R2023a\toolbox\images\imdata\blurpcb.jpg";

Ireference = imread(testImage);

Ireference = im2double(Ireference);

imshow(Ireference)

title("High-Resolution Reference Image")

scaleFactor = 0.25;

Ilowres = imresize(Ireference,scaleFactor,"bicubic");

imshow(Ilowres)

title("Low-Resolution Image")

[nrows,ncols,np] = size(Ireference);

Ibicubic = imresize(Ilowres,[nrows ncols],"bicubic");

imshow(Ibicubic)

title("High-Resolution Image Obtained Using Bicubic Interpolation")

Iycbcr = rgb2ycbcr(Ilowres);

Iy = Iycbcr(:,:,1);

Icb = Iycbcr(:,:,2);

Icr = Iycbcr(:,:,3);

Iy\_bicubic = imresize(Iy,[nrows ncols],"bicubic");

Icb\_bicubic = imresize(Icb,[nrows ncols],"bicubic");

Icr\_bicubic = imresize(Icr,[nrows ncols],"bicubic");

Iresidual = activations(net,Iy\_bicubic,41);

Iresidual = double(Iresidual);

imshow(Iresidual,[])

title("Residual Image from VDSR")

Isr = Iy\_bicubic + Iresidual;

Ivdsr = ycbcr2rgb(cat(3,Isr,Icb\_bicubic,Icr\_bicubic));

imshow(Ivdsr)

title("High-Resolution Image Obtained Using VDSR")

roi = [360 50 400 350];

montage({imcrop(Ibicubic,roi),imcrop(Ivdsr,roi)})

title("High-Resolution Results Using Bicubic Interpolation (Left) vs. VDSR (Right)");

bicubicPSNR = psnr(Ibicubic,Ireference)

vdsrPSNR = psnr(Ivdsr,Ireference)

bicubicSSIM = ssim(Ibicubic,Ireference)

vdsrSSIM = ssim(Ivdsr,Ireference)

bicubicNIQE = niqe(Ibicubic)

vdsrNIQE = niqe(Ivdsr)

scaleFactors = [2 3 4];

vdsrMetrics(net,testImages,scaleFactors);