Preprocessing Images

```
warning('off','images:initSize:adjustingMag')
set(groot,'DefaultAxesFontSize',16)
iOriginal = imread('9.jpg');% read in the original image
dim = size(iOriginal)       % size of the image
imshow(iOriginal)
title('Original')
```

Convert color image to grayscale image

```
iGray = rgb2gray(iOriginal);
imshow(iGray)
title('Gray')
```

Match input image with color pattern of training set

```
BW_Threshold = graythresh(iGray)/2;
iBW = imcomplement(imbinarize(iGray,BW_Threshold));
imshow(iBW)
title('Black & White')
```

Shrink and dilate black&white image until it's size is 28x28

Prepare variables for while loop

```
h = dim(1);
w = dim(2);
iDilated = iBW;
```

Iterate between shrinking and dilating image

```
while h > 28 && w > 28
iShrink = imresize(iDilated,[h w]);

    strelSize = floor(mean([h w]/115));
    SE = strel('diamond', strelSize);
    iDilated = imdilate(iShrink, SE);
    f=figure;f.Visible = 'On';
    imshow(iDilated)
    xlabel("w = "+w)
    ylabel("h = "+h)
    title("Iteration "+(1+floor(log2(dim(1)/w))))

    h = floor(h/2);
    w = floor(w/2);
end
```

Set the final image size and convert to uint8

```
iFinal = im2uint8(imresize(iDilated, [28 28]));
figure,imshow(iFinal)
xlabel("w = "+size(iFinal,1))
```

```
ylabel("h = "+size(iFinal,2))
title('Final')
```

```
close all
```