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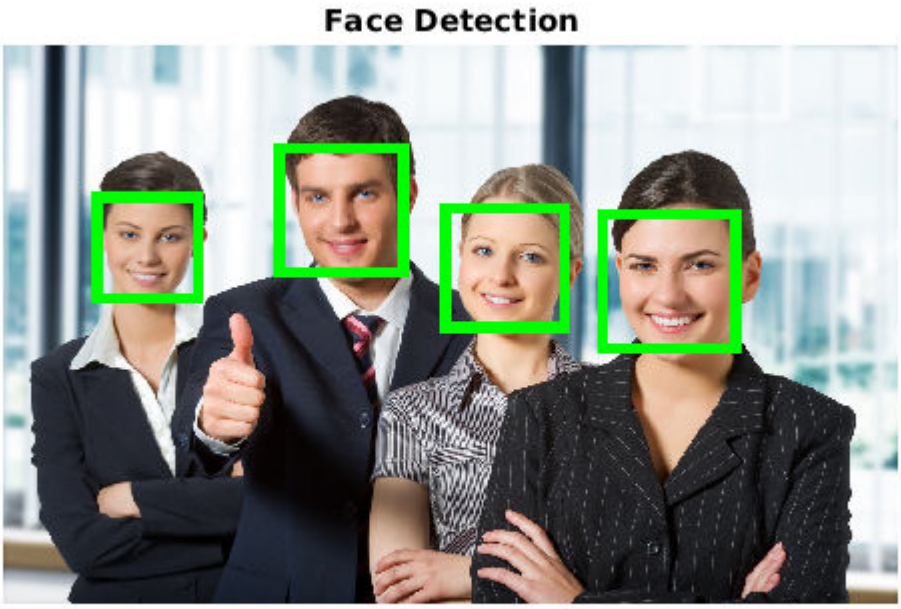
% Face Detection using Viola-Jones Algorithm in MATLAB
% Viola-Jones Algorithm is both feature and template based
% Detection is very fast
% Simple to understand and implement
% Less data needed for training than other ML models
% No rescaling of images needed (like with CNNs)
% Much more interpretable than contemporary models
% The algorithm has four stages:
% 1) Haar Feature Selection
% 2) Creating an Integral Image
% 3) Adaboost Training
% 4) Cascading Classifiers
% Following code is tested on three images officeimg,boywithdog,chimpanzee

%To detect Face
FDetect = vision.CascadeObjectDetector;

%Read the input image1 officeimg.jpg
I = imread('officeimg.jpg');
imshow(I);
title('Original Image')
```


```
%Returns Bounding Box values based on number of objects
BB = step(FDetect,I);
```

```
figure,
imshow(I);hold on
for i = 1:size(BB,1)
    rectangle('Position',BB(i,:),'LineWidth',4,'LineStyle','-','EdgeColor','g');
end
title('Face Detection');
hold off;
```




```
%Read the input image2 boywithdog.jpg
M = imread('boywithdog.jpg');
imshow(M);
title('Original Image')
```


```
%Returns Bounding Box values based on number of objects
BB = step(FDetect,M);

figure,
imshow(M); hold on
for i = 1:size(BB,1)
    rectangle('Position',BB(i,:),'LineWidth',4,'LineStyle','-','EdgeColor','g');
end
title('Face Detection');
hold off;
```


```
%Read the input image3 chimpanzee.jpg
G = imread('chimpanzee.jpg');
imshow(G);
title('Original Image')
```


```
%Returns Bounding Box values based on number of objects
BB = step(FDetect,G);

figure,
imshow(G); hold on
for i = 1:size(BB,1)
    rectangle('Position',BB(i,:),'LineWidth',4,'LineStyle','-','EdgeColor','g');
end
title('Face Detection');
hold off;
```

Face Detection