Video Processing - Finding Objects and Scenes

Objectives

1. Open and write videos using Matlab
2. Use pretrained models to identify objects in a streaming video.

How to read and write videos in Matlab

For processing video files in Matlab you may use videoReader (https://www.mathworks.com/help/matlab/ref/videoreader.html?s_tid=doc_ta) .

Classifying Objects Using Pretrained Deep Learning Neural Networks

Make sure that you have installed the Add-on Package "Matlab Support Package for USB Webcams" if you are using Matlab offline. For Matlab online, there is no need to install the package.

Matlab allows you to load pre-trained deep learning neural network models [1] for object identification. These are mostly networks trained using the ImageNet database (https://www.image-net.org/) which contains 14 million plus images that have been categorised by human observers. It is credited for contributing to the advancement of Deep Learning. Many research groups have shared their trained classifier models openly.

In this activity we try out live object identification in video. Copy the code below:

```
clear all; close all;


cam = webcam;
nnet = alexnet; %image size [227, 227]
%nnet = googlenet; %image size [224,224]
%nnet= mobilenetv2; %image size [224,224]
for i = 1:120


    img = cam.snapshot;
    pic = imresize(img,[227,227]);
    label = classify(nnet,pic);imshow(pic)
    title(upper(char(label)));
end
```

Procedure

1. Modify the code above to allow object identification in a video file.
2. Explore other contributed deep learning neural networks.
3. Bonus worthy : Figure out equivalent video processing tools in Python
4. Bonus worthy : Investigate contributed deep learning NN for action detection

References

[1] https://www.mathworks.com/help/deeplearning/ug/pretrained-convolutional-neural-networks.html