```
clear all, clc
```

Setup paths

```
videoPath = 'test_clip.mp4';
centroidModelPath = 'models/centroids.200823_193403.UNet';
topdownModelPath = 'models/topdown.200823_204048.UNet';
```

Initialize

```
% Load models and configs.
centroidConfig = loadJobConfig(centroidModelPath);
inputScale = centroidConfig.data.preprocessing.input_scaling;

topdownConfig = loadJobConfig(topdownModelPath);
bboxSize = [topdownConfig.data.instance_cropping.crop_size topdownConfig.data.instance_croppin

centroidModel = loadModel(centroidModelPath);
```

```
Warning: Loss function 'loss_fn' is not supported.
Warning: Keras network has multiple outputs and does not include loss information specifying the output layer
 types. importKerasLayers inserts placeholder layers for the outputs. Find and replace the layers by using
 findPlaceholderLayers and replaceLayer, respectively.
```

```
topdownModel = loadModel(topdownModelPath);
```

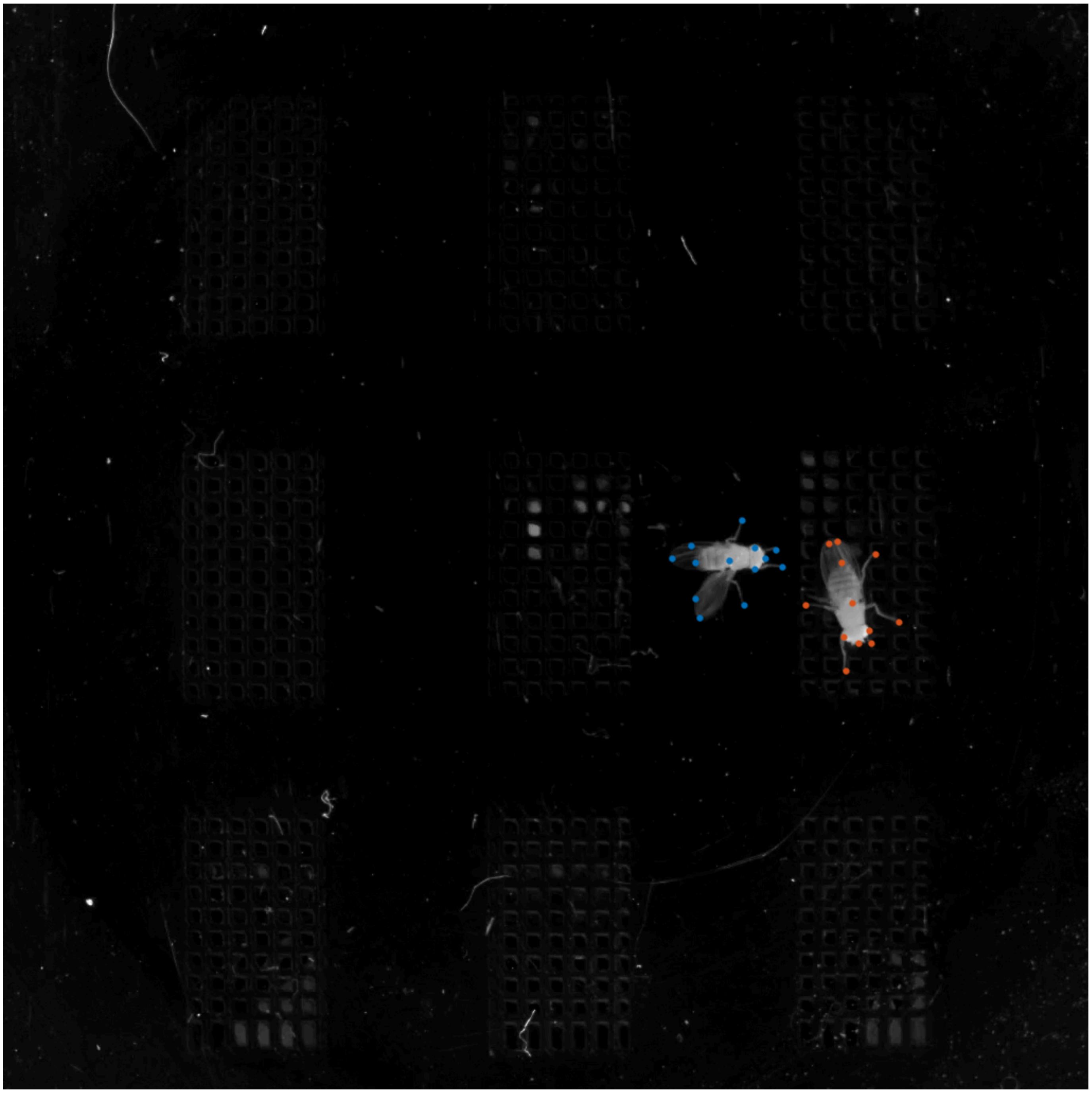
```
Warning: Loss function 'loss_fn' is not supported.
Warning: Keras network has multiple outputs and does not include loss information specifying the output layer
 types. importKerasLayers inserts placeholder layers for the outputs. Find and replace the layers by using
 findPlaceholderLayers and replaceLayer, respectively.
```

```

% Open video.
vr = VideoReader(videoPath);
```

Run inference on video frames.

```
frameIdx = 1;

% Load image.
img = rgb2gray(vr.read(frameIdx));
img = single(img) / 255;

% Find centroids.
centroidConfmaps = centroidModel.predict(imresize(img, inputScale));
centroidPeaks = impeaksnms(centroidConfmaps, 0.3);
centroidPeaks = centroidPeaks / inputScale;
centroidPeaks = centroidPeaks * centroidConfig.model.heads.centroid.output_stride;

% Predict pose on crops.
crops = arrayfun(@(i)centerCrop(img,centroidPeaks(i,1),centroidPeaks(i,2),bboxSize), 1:size(ce
cropConfmaps = cellfun(@(x)topdownModel.predict(x), crops, 'UniformOutput',false);
cropPeaks = cellcat(cellfun(@findAllPeaks, cropConfmaps, 'UniformOutput',false),3);
cropPeaks = cropPeaks * topdownConfig.model.heads.centered_instance.output_stride;
```

```
allPeaks = cropPeaks + permute(centroidPeaks, [3 2 1]) - (bboxSize * 0.5);

% Visualize
vizPeaks(img, allPeaks)
```



Helper functions

```
function net = loadModel(modelPath)
    if ~endsWith(modelPath, '.h5')
        modelPath = fullfile(modelPath, 'best_model.h5');
    end
    lgraph = importKerasLayers(modelPath,'ImportWeights',true);
    outLayer = regressionLayer('Name','output');
    lgraph = replaceLayer(lgraph, lgraph.Layers(end).Name, outLayer);
    net = assembleNetwork(lgraph);
end
function jobConfig = loadJobConfig(modelPath)
    jobConfig = jsondecode(fileread(fullfile(modelPath, 'training_config.json')));
end
function crop = centerCrop(img, x, y, bboxSize)
    R = imref2d(bboxSize, [x - bboxSize(1)/2, x + bboxSize(1)/2], [y - bboxSize(1)/2, y + bboxS
    crop = imwarp(img,affine2d(),'OutputView',R);
end
function peaks = findAllPeaks(confmaps, minThresh)
    if nargin < 2; minThresh = 0.2; end
    C = size(confmaps,3);
    peaks = NaN(C, 2);
    for c = 1:C
        [point, val] = imargmax(confmaps(:,:,c));
        if val >= minThresh
            peaks(c,:) = point;
        end
    end
end
function vizPeaks(img, allPeaks)
    figure
    imshow(img, 'Border', 'tight'), hold on
    for i = 1:size(allPeaks,3)
        plot(allPeaks(:,1,i),allPeaks(:,2,i),'.','MarkerSize',10)
    end
end
```