Colour-Based Tracking using Mean Shift

Part I

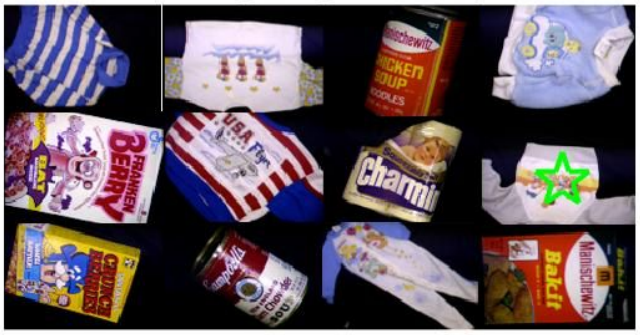
Algorithm:

1. read all the model images and collage image
2. for each model image, turn model image and collage image into color histogram
3. calculate the ratio histogram = min(model_histogram/collage_histogram, 1)
4. back project the ratio histogram to collage image
5. convolve the back projected image using conv2
6. find pixels that has larger than 90% maximum intensity
7. filter object with the largest area using bwpropfilt
8. find the centroid of the object
9. mark the centroid with green star onto original collage image

Results:

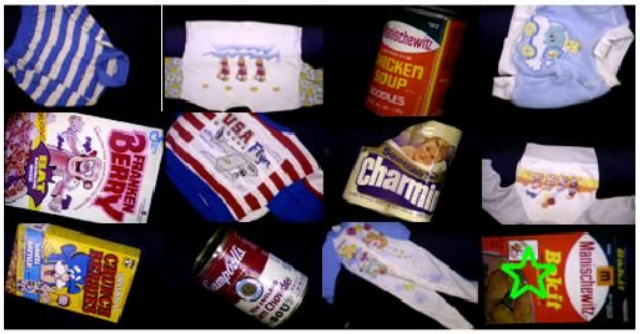
Model image

Location on collage image mark with yellow star



Model image

Location on collage image mark with yellow star

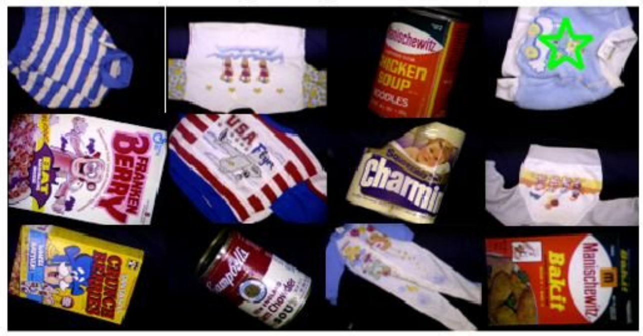


Model image

Location on collage image mark with yellow star

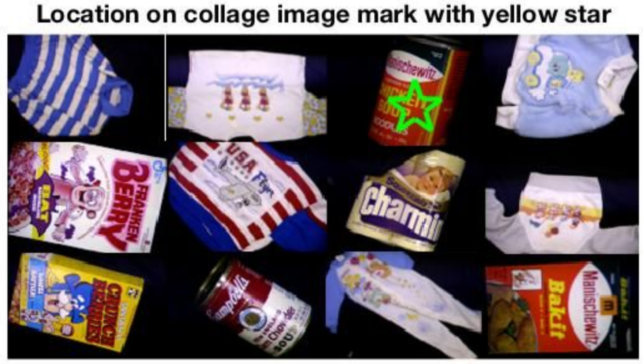
Model image

Location on collage image mark with yellow star



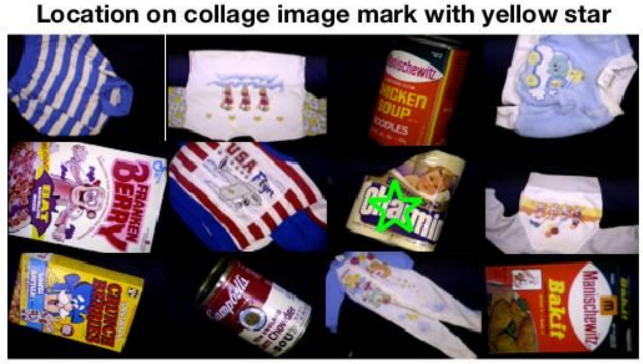
Model image

Location on collage image mark with yellow star



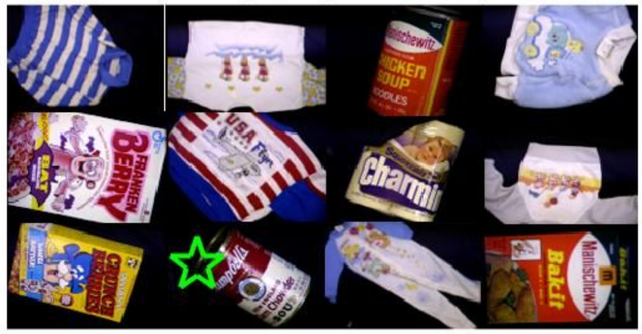
Model image

Location on collage image mark with yellow star



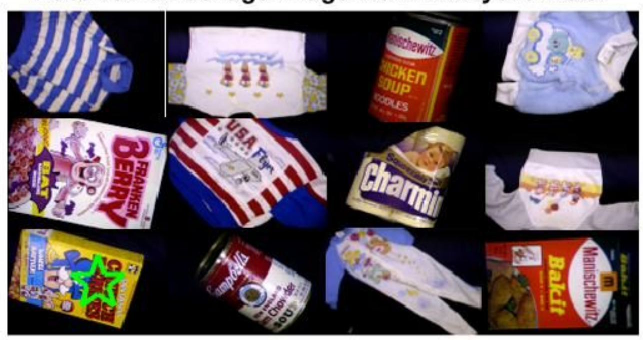
Model image

Location on collage image mark with yellow star



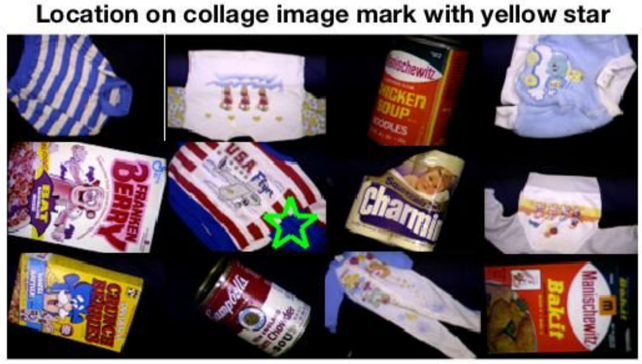
Model image

Location on collage image mark with yellow star



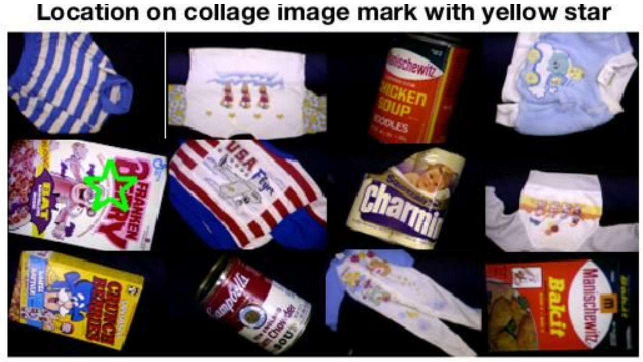
Model image

Location on collage image mark with yellow star



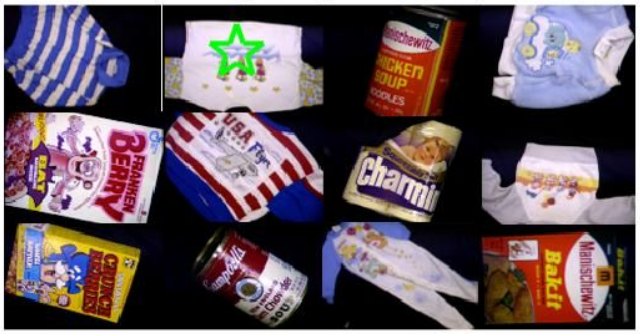
Model image

Location on collage image mark with yellow star



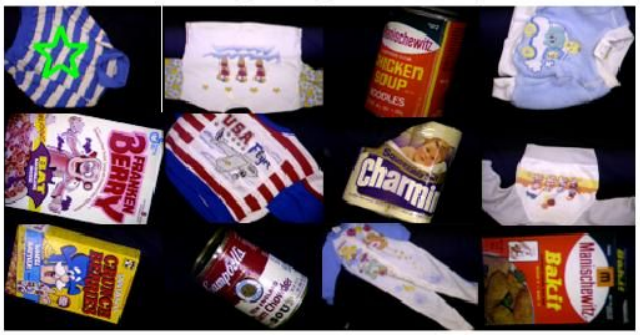
Model image

Location on collage image mark with yellow star



Model image

Location on collage image mark with yellow star



Part II

Algorithm:

1. load the video
2. select region using mouse (ginput), then crop and save the selected image
3. repeat the same procedure from step 2 to step 9 in Part I for each frame
4. save marked frames into new video

Result:
Video Link: https://drive.google.com/open?id=0B7_2aMZCDP16a2YyOUVCaHJZeE0

Frame images (every 5 frame)









Part III

Algorithm:

1. load the video
2. select region using mouse (ginput), then crop and save the selected image
3. calculate the center coordinate of the region and turn selected image into color histogram
4. for each frame, turn the frame into histogram
5. calculate ratio histogram
6. back project the ratio histogram to the frame
7. for each pixel within the range of 2r to the center point, sum the weight calculated by backproject times the point
8. divide the sum by total weight and set it as the new point
9. check if the new point and the original point is with 5 pixel distance, if not, repeat step 7 and step 8 until we find the right mean
10. mark the new point onto the frame and save the frame
11. repeat step 4 to step 9 for each frame
12. save marked frame into new video

Result:
Video link: https://drive.google.com/open?id=0B7_2aMZCDP16YlU4VXBVLVBhVDQ

Frame images (every 5 frame)






Reference:
CMPT 412 - Professor: Brian Funt
Michael J. Swain and Dana H. Ballard. 1991. Color indexing. International Journal of Computer Vision 7, 1 (November 1991), 11-32.