

EE 367 Project Proposal

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Introduction

KCF algorithm which is widely used in target tracking has a response map that deletes areas other than tracking area and concentrates on the remaining part of the map. This turns into an issue if there are any obstacles and in real life target tracking, there are multiple obstacles unlike the data sets that represent ideal tracking field. Object detection are usually through radiance field and this adds additional flaws to the algorithm. To overcome this, I am working on an algorithm that would depend on track's histogram change.

Related Work

Multiple works have been kick started in this subject of interest which includes usage of code recognition on the target for optimized field enhancement. This solution, again, works well for only a particular set of data sets. KCF was improvised by redefining the object detection layer which would again fail in the real world scenario due to high rate of histogram changes. Target scale pyramid approach is a novel method but still has an issue where in occlusion reduces the efficiency.

Approach

I will be starting my algorithm based on confidence map. Confidence map will try to eliminate the issue of high rate of histogram change by dynamic improvement. The radical overlap of Bayesian and confidence map will improve the target tracking. Although the fps of my algorithm would be slower than that of MOSSE and DCF algorithm, the accuracy of the proposed algorithm will be improved, which lays the foundation for the accurate tracking target

Expected final result

The image given below shows the exact target tracked with 3.2% deviation which would be my expected result as well.



Reference picture taken from [3]

Milestones and Timeline

Matlab will be used primarily for coding. Camera setup of Go Pro with gimbal on a quadcopter will be used to test the algorithm during weeks 3-4.

My timeline is as follows:

Week 0-1:

Take reference points from research papers and develop the code for Bayesian visual tracking

Week 1-2:

Write the code for confidence map and check it out on sample data sets

Week 3-4:

Implement the algorithm on real time data and perform corrections to reduce deviations.

References:

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3. Zhu J, Lao Y and Zheng YF. Object tracking in structured environments for video surveillance applications. *IEEE Trans Circ Syst Video Technol* 2010; 20(2): 223–235
4. Mazinan AH and Amir-Latifi A. Applying mean shift, motion information and Kalman filtering approaches to object tracking. *Isa Trans* 2012; 51(3): 485–497
5. Chen S, Li S, Ji R, et al. Discriminative local collaborative representation for online object tracking. *Knowledge Base Syst* 2016; 100(C): 13–24