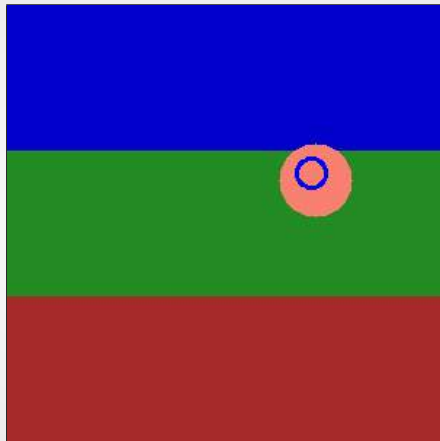# Computer Vision Spring 2019 Problem Set #5
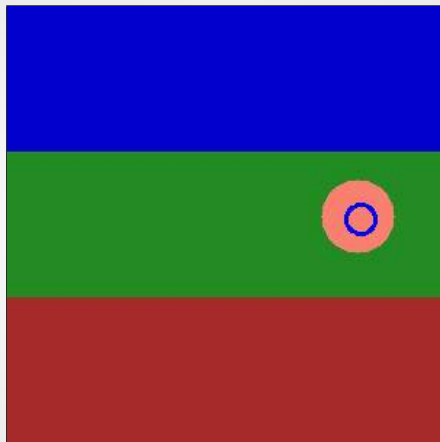
Yanjin Long
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1b: KF Tracking a circle
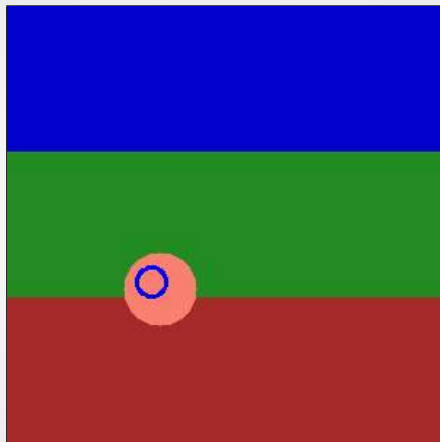

ps5-1-b-1

1b: KF Tracking a circle (cont.)

ps5-1-b-2
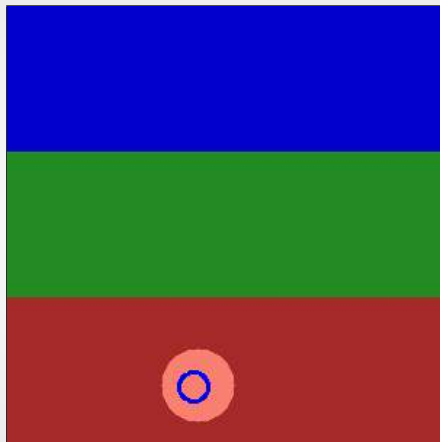
1b: KF Tracking a circle (cont.)

ps5-1-b-3

1b: KF Tracking a circle (cont.)

ps5-1-b-4

1c: KF Tracking pedestrians

ps5-1-c-1

1c: KF Tracking pedestrians

ps5-1-c-2
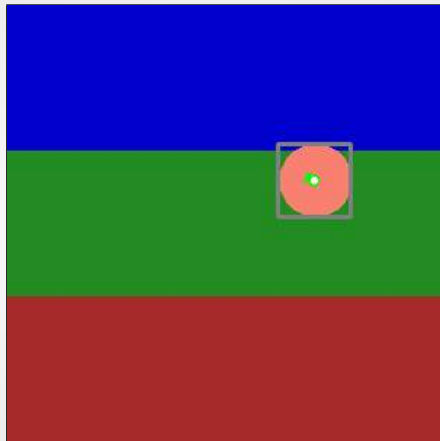
1c: KF Tracking pedestrians

ps5-1-c-3

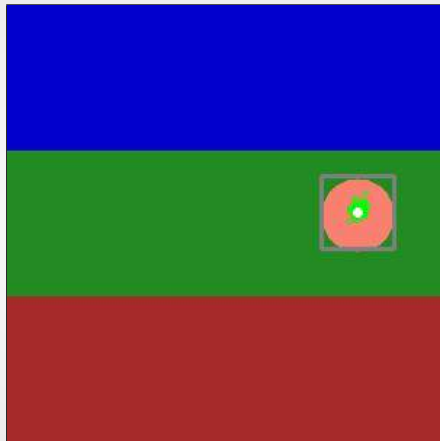# 1c: KF Tracking pedestrians

ps5-1-c-4

2a: PF Tracking a circle

ps5-2-a-1

2a: PF Tracking a circle (cont.)

ps5-2-a-2

2a: PF Tracking a circle (cont.)
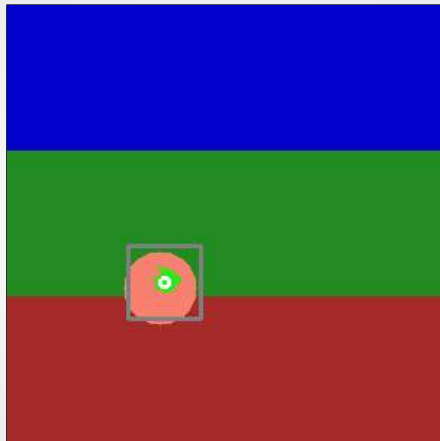
ps5-2-a-3

2a: PF Tracking a circle (cont.)
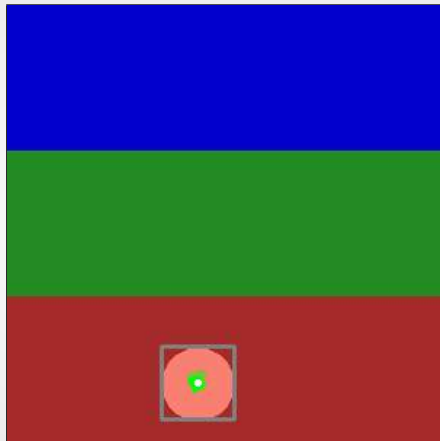
ps5-2-a-4

2b: PF Tracking noisy video

ps5-2-b-1

2b: PF Tracking noisy video (cont.)
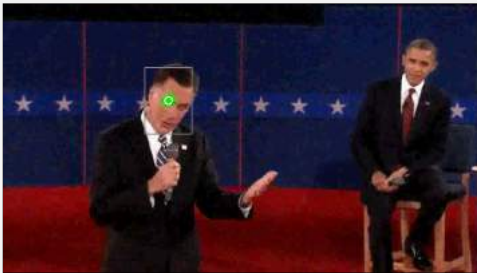
ps5-2-b-2

2b: PF Tracking noisy video (cont.)

ps5-2-b-3

2b: PF Tracking noisy video (cont.)

ps5-2-b-4

3a: PF Changes in Appearance

ps5-3-a-1

3a: PF Changes in Appearance (cont)

ps5-3-a-2

3a: PF Changes in Appearance (cont)

ps5-3-a-3

4a: PF Occlusions

ps5-4-a-1

4a: PF Occlusions (cont.)

ps5-4-a-2

4a: PF Occlusions (cont.)

ps5-4-a-3

4a: PF Occlusions (cont.)

ps5-4-a-4

4: Text response

Describe what you did. How did you modify the Particle Filter class to continue tracking after occlusions?

I try to find proper scale from previous template, ranging from 0.82 to 1.01. I pick the scale that generate minimum MSE between the scaled template and corresponding frame cut from current position/state.

However, when MSE is over some threshold, I will stop updating template and processing, as it indicates occlusion; I will keep using the most recent template right before occlusion. Once occlusion is clear, I will restart scaling and updating the template.

The threshold I used is relevant to how many frames there has been, since I need to take into consideration that the template is shrinking. Also, I need to consider how many frames since last recent clear templates. My final threshold is

$MSE < 1600 - frames * 2 + 100 * blockedframes$

5: Tracking multiple targets

ps5-5-a-1

5: Tracking multiple targets (cont.)

ps5-5-a-2

5: Tracking multiple targets (cont.)

ps5-5-a-3

5: Text response

Describe what you did. How different it was to use a KF vs PF? Which one worked best and why? Include details about any modifications you had to apply to handle multiple targets.

I think

my answer is ...

6: Challenge Problem

ps5-6-a-1

6: Challenge Problem (cont.)

ps5-6-a-2

6: Challenge Problem (cont.)

ps5-6-a-3

6: Challenge Problem Text response

Describe what you did. Did this task present any additional challenges compared to the previous sections? Include details about any modifications you had to apply.

I think

my answer is ...