Lab8: Project Progress Report

Guanfang Dong ,Yingnan Ma

Five Tasks:

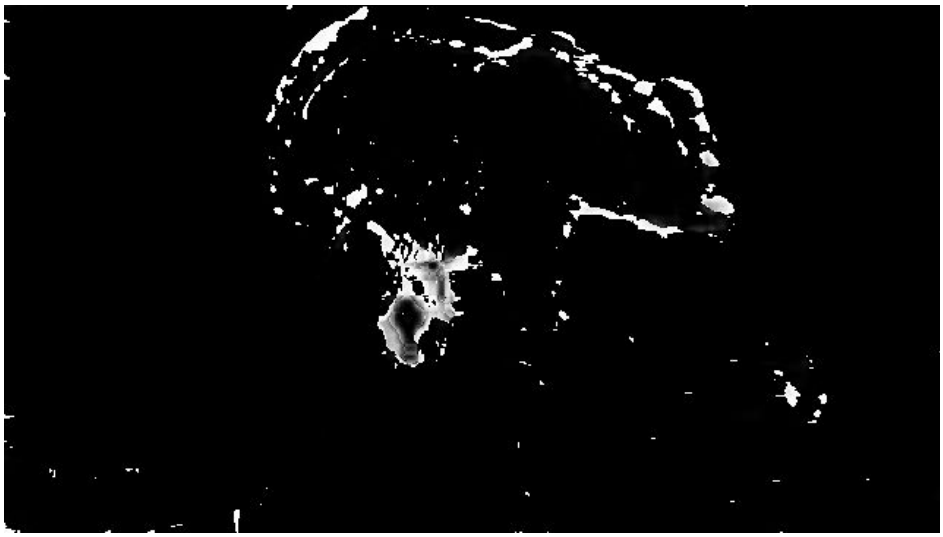
(High Priority)

1. Implement Robust PCA (Done)

   File: Robust_PCA.py

   Description: For this task, we implement Robust PCA based on the angle matrix we obtained. Class Robust_pca returns Lk Sk, which represent background matrix and foreground matrix separately.

   Result:



2. Testing different parameters in Robust PCA (Done)

File: Robust_PCA.py

Description: For this task, we test foreground result based on different Robust PCA parameters.

Parameters we finally pick:

```
self.M = M
self.S = np.zeros(self.M.shape)
self.Y = np.zeros(self.M.shape)
self.L = np.zeros(self.M.shape)
self.lam = 1/np.sqrt(np.max(self.M.shape))
self.mu = 10*self.lam
self.mu_inv = 1/(self.mu)
self.tolerance = 1e-6
self.max_iter = 1000
```

3.Make foreground video for all frames (Done)

File: make_video.py

Description: Implement background subtraction for all frames. After we obtain foreground images, we integrate foreground images into a video.

Link: The foreground video for robust pca:

https://www.youtube.com/watch?v=PilArGdprZA

The foreground video for average magnitude:

https://www.youtube.com/watch?v=ANbZXkYlef8

4. Calculate foreground area by using average magnitude method (Done)

File: BS_average_magnitude.py

Description: We first calculate the flow between two frames. Then, for each pixel, we calculate the the moving magnitude. After that, we calculate the average of the magnitude. This average value should be the approximate value for background moving magnitude. Therefore, if we minus the magnitude matrix by this average value and find the absolute value of the matrix, the result should be the foreground matrix.

(Optional)

5. Get final foreground video (In progress)

   For this task, we will implement the method to get final foreground video, based on the gray scale foreground video we obtained.

Github:
https://github.com/guanfangdong/Background_Subtraction_with_a_Freely_Moving_Camera