Report 4

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Objectives achieved this week

- Connect the user interface with machine learning algorithm implementations.
- Create another thread to implement the machine learning algorithm to boost up run time efficiency.

Objectives for next week

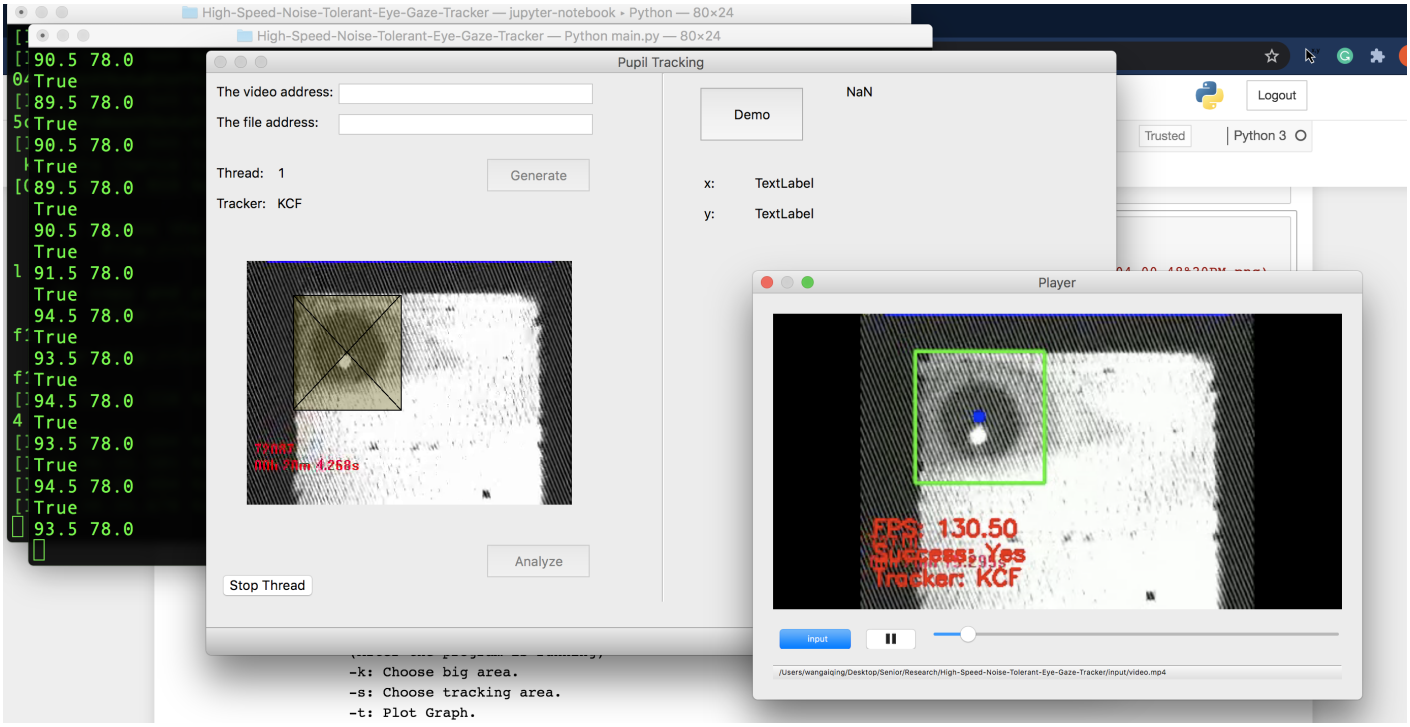
- Clean up the user interface.
- Adding more algorithms to refine eye-tracking system.
- Parallelize Hough Transform.

Results Demo

The terminal on the far left is showing tracking data in thread #2.

The user interface on the middle enables user to select region of search.

The user interface on the right gathers all the images we've processed so from and convert them to video for users to view, Which also enables jumping and stopping.



Explanation

Reason to store results as pictures instead of cv2.imshow() in the loop

-PyQt5 won't allow another thread showing the video as cv2 built-in functions. Therefore, the easiest workaround is to convert to pictures and to construct all the pictures to images before running it other another widgets.

Advantages and disadvantages of threads

-Reasons for using threads is for users to interact with the interface when the calculation is under process. However, even though the user experiences ameliorates, too many threads might slow down the process. Need to think about the trade offs-later.

Conclusion

-Even though PyQt had a lot of restrictions in terms of multi-threading, a workaround shows its success. The only drawback for constructing video during the process of analyzing frames is its limitation to display in real-time.