looking for advisor for an image visualization project

7 封邮件

Liangdong Xu <liangdox@andrew.cmu.edu> 2022年3月26日 13:44
收件人：Jim McCann <jmccann@cs.cmu.edu>

Dear Prof. McCann

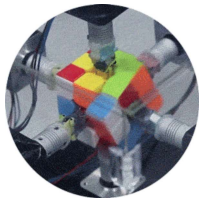
My name is Liangdong Xu and I am a graduate student pursuing a master's degree at CMU's INI department, MSIN program. I am looking for an advisor for my degree-required project. I wonder if you were interested.

My proposed project is to develop a web-based image visualizer library for python. I am also willing to work on a different project if you have projects you need help with.

As the current most popular programming language in the world, Python is well-known for its flexibility and a massive number of libraries. However, when it comes to image visualization. Python seems to be a little bit outdated. Matplotlib is still one of the most used image visualization tools even if its original purpose was data plotting. It is very clunky to use and feels very outdated. So, I want to propose a more modern web-based python library focused on image visualization. It will spawn a webpage for image displaying and support basic annotation functions like adding patches and rectangles for computer vision visualization. I believe this library will be very helpful for many researchers and developers.

As for my background. I have high proficiency in C++, Golang, and python programming. I have developed a Qt-C++ desktop app for ICDAR-2015 csv visualization in the past. I also have full-stack development experience thanks to my Internet Application undergraduate track.

Thank you very much for taking the time to read my email. I would greatly appreciate it if you could kindly reply to this email.



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https://github.com/Dedsec-Xu

Jim McCann <jmccann@cs.cmu.edu> 2022年3月28日 11:31
收件人：Liangdong Xu <liangdox@andrew.cmu.edu>

Interesting. Before I commit to advising:
(1) could you tell me a bit more about how your proposal differs from web-wrapped python notebooks in current use (Jupyter, Colab)?
(also, more API design context would be good -- what is clunky in matplotlib? how would your proposal differ from, say, opencv? or image-processing libraries like imagemagick?)
(2) what time commitment would be required for me to advise in this project?

Cheers,
--Jim
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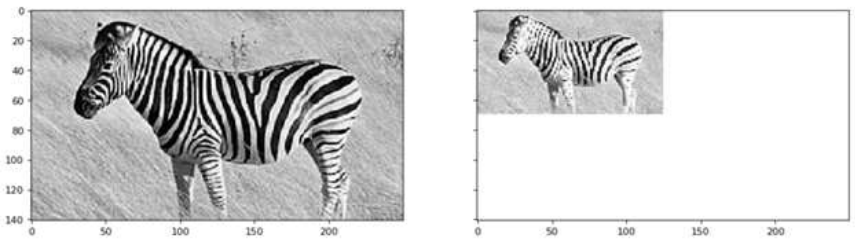
Liangdong Xu <liangdox@andrew.cmu.edu> 2022年3月29日 08:00
收件人：Jim McCann <jmccann@cs.cmu.edu>

Dear Prof. McCann

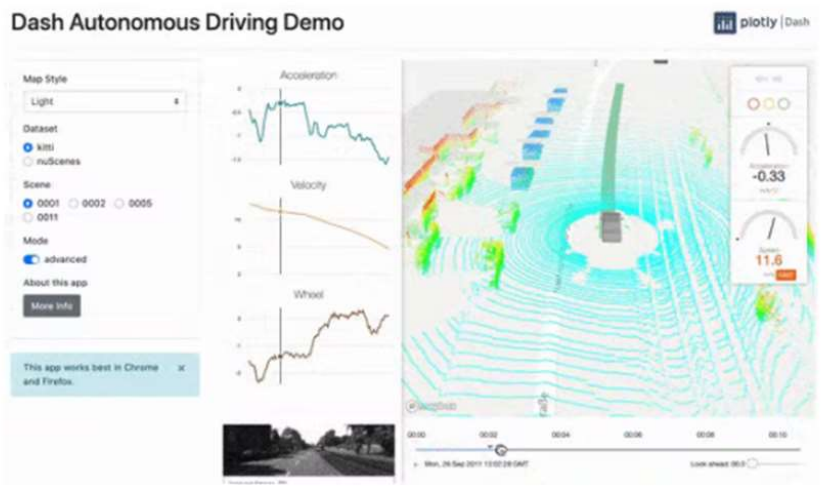
Thank you for your interest!

I did a thorough research about my proposed project. The package will not try to be a replacement for web-wrapped python notebooks. Instead, it will work in correlation with it. For example, if used in the command-line program. It will spawn a small web-based object that shows the image. If the package is used in notebooks, it will show a web object where the output of the notebook will be. This is a photoshoped demonstration of what it may look like.

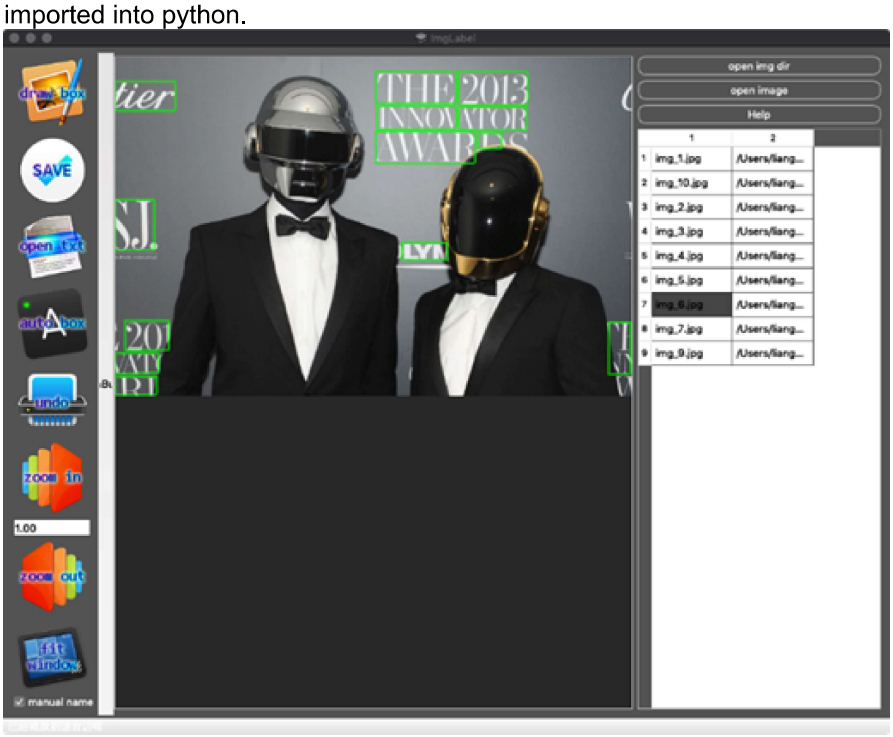
I think the main reason matplotlib feels clunky to me is that it is designed as a data-visualization tool. I feel it is very difficult to use when I was doing assignments for 16720 computer vision courses. For example, simply outputting an image requires at least 3 lines of code to create a plot, add a layer of the image with correct color space conversion, and display the plot. I think it really should just be one line. There's once I tried to display two images side by side with the same height and different widths. I searched for several hours. I find it is either impossible or there's no simple way to do it in 20 lines of code. It is also not very expandable. For example, if you want to display several images. Matplotlib requires you to do it in a subplot manner and the number and arrangement of the subplot must be hardcoded first. I can't even find a way to display multiple images of different sizes. I found a post about it on stack overflow, and this is the best result.



As for different API comparisons. I also did some research on that. I think the one that resembles my proposed work most is plotly. It is also a front-end graphing library. However, I find it is mainly for data visualization. So, I hope to develop one package that focuses on image-visualization tasks aimed at computer vision researchers. I am not proposing to develop an image-processing library. But just one for image visualization.



I developed a Qt-GUI tool in my undergraduate year to do image visualization for ICDAR 2015 dataset but that one works independently and uses csv file that python generated. I plan to develop a web-based package that can be imported into python.



So, in summary. My plan for this package is that it will be a simple-to-use package with a lot of predefined parameters. Instead of having to deal with dpi, axis, color space. You can simply import it and use one or two lines of code to display the image and the result is most likely what you want. You can also deeply customize it with more parameters. Another function is that you can change the output further in the web object instead of having to change the code. Because it is web-based. You have way more control over the output even after it is already displayed. For example, if it is a rectangle labeling mission. You can change the thickness of the rectangle in the output window. You can change the spacing if you display multiple images. I think it will be a good tool for researchers to easily get some demo images for their papers. I also want to reiterate that I am also willing to work on your project topic if you have something that I can work on.

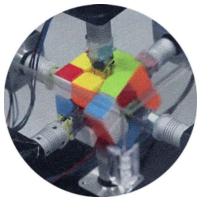
As for time commitment, I will work out a timeline and deliverables of the project that the advisor agrees with. Then, the advisor will have to determine the degree of completion and give a midterm and final grade. I will provide progress updates in a periodic manner. The frequency and method of the progress update will be determined by the advisor.

Thank you so much for taking the time to read this long email!

Respectfully,

Liangdong Xu

Liangdong Xu



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https://github.com/Dedsec-Xu

Jim McCann <jmccann@cs.cmu.edu> 于2022年3月28日周一 11:31写道:
[引用文字已隐藏]

Liangdong Xu <liangdox@andrew.cmu.edu> 2022年4月1日 10:58
收件人：Jim McCann <jmccann@cs.cmu.edu>

Dear Prof. McCann

Hello! Are you still interested in advising this project? I can provide more detail if you have any other questions. Again, I am also willing to work on other topics if you have another topic I can work on.

Sincerely,
Liangdong Xu

Jim McCann <jmccann@cs.cmu.edu> 于2022年3月28日周一 11:31写道:
> Interesting. Before I commit to advising:
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Jim McCann <jmccann@cs.cmu.edu> 2022年4月1日 11:14
收件人：Liangdong Xu <liangdox@andrew.cmu.edu>

Just observing my e-mail latency on this, it seems pretty clear I don't have time to advise such a project properly this semester; if the project is starting over the summer or next semester, however, I could advise.

Regardless, consider making the first task in the project interviewing ~5 people who do image-handling tasks in python (say, MSCV or PhD students) and writing down the tasks that they commonly do with images, how they do the tasks currently, and what their problems and solutions are. (Also, look at existing approaches outside of python -- e.g., matlab; C++ w/ opencv.) -- it's certainly okay to write software with yourself as an example user, but talking to other potential users will help define the use cases more clearly.

--Jim
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Liangdong Xu <liangdox@andrew.cmu.edu> 2022年4月1日 11:19
收件人：Jim McCann <jmccann@cs.cmu.edu>

Dear Prof. McCann

I am terribly sorry I missed the important time information in the previous emails. This project is planned to start next semester. I will add interviewing as the first step of my project.

Sincerely,
Liangdong Xu

Jim McCann <jmccann@cs.cmu.edu> 于2022年4月1日周五 11:14写道:
[引用文字已隐藏]

Jim McCann <jmccann@cs.cmu.edu> 2022年4月1日 13:41
收件人：Liangdong Xu <liangdox@andrew.cmu.edu>

Okay, if this starts next semester, I am happy to advise.

--Jim
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