Full-stack Geo-visualization 101: How to Make Productive Webmaps

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As we are facing exploding data with larger volumes and higher frequency, the ability to visualize large amount of information in real time on interactive map has never been more crucial for GI scientists and specialists. Web-based platform, with the support of mapping library leaflet and noSQL database MongoDB, is becoming more popular for its open-source and real-time nature. This workshop will be a professional technical training on full-stack geo-visualization for starters. The workshop will consist of four parts.

1. A short ice-breaking activity and a short pre-activity survey. The first part will take 10 – 15 minutes.
2. A brief introduction to the basic concepts of web-based platform, the mapping library, and the backend infrastructure. The mini lecture will put emphasis on the basic concepts with easy examples; however, depending on the prior knowledge of the audience, I will also adjust the content of the lecture. The mini lecture will take 30 – 40 minutes.
3. An interactive hand-on programming lab, where everyone will have a chance to build a small webmap project. Each participant will receive a data pack with necessary data and demos. I will build the map from the scratch with the audience and show the whole process of programming and debugging. This will take around 40 – 50 minutes.
4. A dedicated Q&A and post-activity survey time. Participants will be given time to finish their project and ask any questions they are interested in.

Author: Luyu Liu is a PhD student in the Department of Geography in the Ohio State University. Mr. Liu has been leading and participating in more than 5 geo-visualization projects since 2017; one interactive dashboard was awarded Reginal Sustainability Award by Mid-Ohio Regional Planning Commission.

Some geo-visualization projects:

<https://morpc-rsd.asc.ohio-state.edu/>

<http://curio.osu.edu/mapgallery/>

Prerequisite:

Skill requirement:

* You should know the basic ideas of GIS, such as map, layer, and point/polyline/polygon.
* You should have basic PC and Internet knowledge.
* Some programming experiences are preferred, but not limited to a specific language or web programming. You are also welcomed to attend the workshop even if you have zero programming experience.
* Some database knowledge is necessary if you want to continue the back-end section, such as database, database management system, and database GUI.

Hardware requirement:

* A PC with Windows 10 operating system is preferred.
* Internet is necessary.
* If you want to finish the back-end part, you will need a PC with the administrator privilege.

Software checklist walkthrough: <https://www.youtube.com/watch?v=Ii1PSJVzwNo>

For front-end only:

* Visual Studio Code: <https://code.visualstudio.com/download>
* GitHub Desktop: <https://desktop.github.com/> and a GitHub account which can be created from here: <https://github.com/>
* Firefox Browser Developer Edition: <https://www.mozilla.org/en-US/firefox/developer/>
  + Go to <https://addons.mozilla.org/en-US/firefox/addon/cors-everywhere/> and install the add-in on your firefox developer edition.
* Demo package: The relevant demo and data files can be downloaded from <https://drive.google.com/drive/folders/1bcTXVv_XR8ciBf0wT3UFUQMqpxhhke-E?usp=sharing> All files will be updated before the workshop.

For back-end (need administrator privilege):

* Python 3: <https://www.python.org/downloads/> You can use any version from 3.4 to 3.9.
* EVE library in Python 3: type in: pip3 install eve or python –m pip install eve
* MongoDB database: <https://www.mongodb.com/try/download/community>
* Robo3T: <https://robomongo.org/download>