Documentation for Autolab-plot

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1 Introduction

Autolab-plot is a website demonstrating the figures and trajectories of different robots in Autonomy Lab at Simon Fraser University. It has been rewritten into libraries in order to facilitate extension. It is written in HTML, Javascript, PHP, and a little of C++.

2 Framework and Examples

The framework is as Figure 1. I split the plot library and the method library apart in order to avoid large computation on webpage. The plot library is in charge of generating plots on a webpage, and the method library is for computation on a server. They communicate asynchronically.

2.1 Client Webpage Level

Client webpages demonstrate plots with javascript plot libraries. It can be written in HTML and Javascript by users of Autolab-plot. When a canvas is reserved in the layout of HTML, an object of a plot class is instantiated, and show function is called, a plot is generated.

In the directory, index.html and test.html belong to this level.

2.2 Plot Library Level

Plot Library is utilized to generate various of plots and functional modules of Autolab-plot. It is called by client webpages. phpComm is used to communicate with php program, and retrieve data from the server. The library is written in Javascript as a js file. In the directory, parameter.js and plot_methods.js belong to this level.

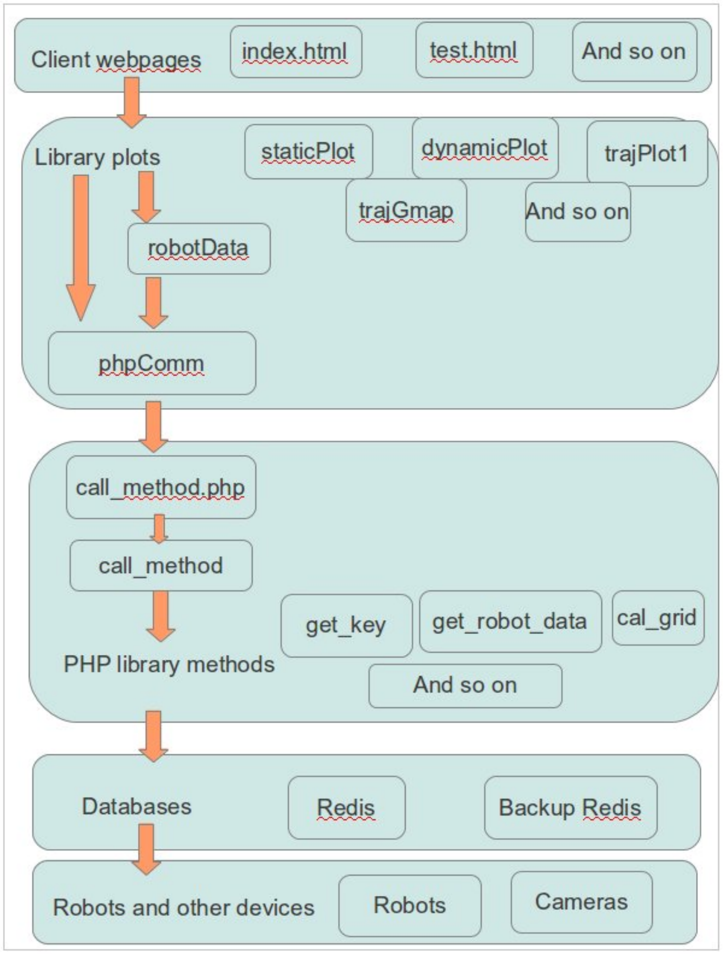

Figure 1: Hierarchical chart

Lets take “staticPlot” class in plot_methods.js as an example. First, create a new HTML file. To include the library, add the following code into $< head >< /head >$.

$< scriptlanguage = ”javascript”type = ”text/javascript”src = ”./flot/jquery.js” >< /script >$

$< scriptlanguage = ”javascript”type = ”text/javascript”src = ”./flot/jquery.flot.js” >< /script >$

$< scriptsrc = ”plot\_methods.js” >< /script >$

To reserve space for this plot, add the following code into $< body >< /body >$.

$< divid = ”staticPlot” >< /div >$

To create a new static plot, add the following code into $< script >< /script >$.

var sp = new staticPlot();

To show the plot on a webpage, add

sp.show();

Now, you can see the plot on this webpage.

2.3 Method Library Level

The method library is utilized to connect with databases and do some computation on the server. It is written in PHP, and called by plot library level. In this directory, call_method.php, parameter.php, and connect_redis.php belong to this level. call_method.php is called directly by a plot library object, and it calls call_method function in connect_redis.php to assign the corresponding method to call.

Lets take get_robot_data function as an example. In higher level, it is called by phpComm in plot_methods.js asynchronically. It retrieves robot discription data from Redis server by

$\$ret = \$client- > get(\$i);$

And send data back to webpage by

$echo\$ret.”,”;$

2.4 Databases

The recommend database to integrate with our system is Redis. The PHP codes in method library level communicate with Redis by predis library. A backup database is deployed in order to save old robot data.

2.5 Robots and Other Devices

Robots and other devices can communicate with our system via Redis.

Lets take Chatterbox 18 as an example. First, we configure ROBOT_NAME in plot_methods.js and $ROBOT_NAME in connect_redis.php to add “cb18” (without quotes, by default it is there). When the robot is running, it upload a string to Redis describing its status whose key is “cb18” (without quotes), and value is “time x y voltage current” (without quotes). The method library level codes read this key, and send it to webpages.

3 Installation

Autolab-plot is developed in Ubuntu 11. Compatibility with other platforms is not tested.

Install Apache and PHP first. Put the entire directory of Autolab-plot into the base directory for the web documents (default as /var/www). flot, jsDraw2DX, and predis libraries are within our package. Open a browser and lead to the corresponding url (default as localhost/autolab-plot). You can see a variety of plots there.

If you want to connect with database and communicate with robots, please install Redis and configure the IP address in Autolab-plot.

4 APIs

4.1 Plot Library Level

4.1.1 labLogo

1. canvas The place to hold the labLogo by HTML. (”labLogo”)
2. border
3. width
4. align Layout of HTML. I am not sure if they can be substituted by CSS.
5. logo_width The percentage of logo width.

4.2 Method Library Level

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