Comparasion of Two Methods in Ajax Table Loading

Experiment Design for Computer Science

Meng LI(201620728)

1. Introduction

There is no production or result about my research now, so I want to talk about a framework. This framework can be found in my github (https://github.com/lm2343635/Mengular), which includes 2 parts: JavaScript Ajax Loading and Java Template Engine. In this report, I will compare two loading method in the function of JavaScript ajax table loading (I will call it ajax table loading from now). At first, I will explain the meaning of ajax table loading.

For traditional web development, we use PHP, Java, ASP .NET and other programming language for background service program, they have to prepare their own template file such as jsp file in Java Web development. To create a table, code in jsp would like this:

```
<table>
    <tbody>
    <%
    for(Item item in items) {
        %>
        <tr>
            <td><%=item.attribute_1%></td>
            <td><%=item.attribute_2%></td>
            ...
            <td><%=item.attribute_n%></td>
        </tr>
        <%
    }
    %>
    </tbody>
</table>
```

This style is same in PHP and other background service programming, which is difficult to read, especially for front end Engineer who only care about browser side. This style is not comply with MVC(Model-View-Controller) standard. And we can image a situation that a table has many rows, for instance, more than 10000 rows. It is no doubt that we could not use such style to show this 10000 rows in a html documents because it is too scroll to create this html document and transfer it to browser. If we can load 100 rows at first, and when we scroll the page down, more 100 rows are loaded dynamically by ajax, things will be better. In fact, peoples are doing like this method. Web applications of Google photos will not load all your photos, when you scroll it down, more photos will be loaded automatically.

The question is how to create dom element dynamically after loading table data asynchronously There is a function called `$.append()` in jQuery framwork which can append a child element to a parent element, the core question is how to create this child element. We can call a function `document.createElement()` provided by native Javascript API or the equal function in jQuery like `$("<tr>")`. However, this method is just suitabled for such simple situations. With the increment of child element's complexity, a lots of html document is written in javascript which is not convenient to read and rewrite. Thus, we hope a template egine for front end development just like the same thing in background service programming.

2. Goal

At first, we prepare a template as which has been introduced in part 1.

```
<table id="example-table">
  <tbody>
    <tr id="${id}$" class="mengular-template example-table-template">
        <td>${attribute_1}$</td>
            <td>${attribute_1}$</td>
            ...
            <td>${attribute_1}$</td>
    </tr>
  </tbody>
</table>
```

The row document `<tr>` is the part that we want to load asynchronously. It has two classes incuding `mengular-template` which is defined in `mengular.css` in order to instruct the element is a row template, and `example-table-template` which is assigned by ourself for finding template element. Then we can user the core function `$.mengular(template, data)`(it is a jQuery style function) in Mengular framework to load data. This function has two parameters: the first parameter `template` is the css selector of template dom elemtent you want to use, and the second parameter `data` is the data of row which can be a json object or a json array. A json object represent the data of one row, while a json array represent the data if multiple row. My goal is to compare the time of using json object and json array to load table. For instance, there is a json array named `items` downloaded from server asynchronously. We use json object as sencond parameter:

```
for(var item of items) {
  $("#example-table").(".example-table-template", item);
}
```

or use json array as second parameter

```
$("#example-table").(".example-table-template", items);
```

You might think that the first method has no meaning because it is just a for-each loop compared to the second method. However, when we consider a situation to bind some event to the dom element, it is more convinient to do this in the first method like this:

```
for(var item of items) {
  $("#example-table").(".example-table-template", item);

  //Bind a click event for this `<tr>` dom element
 //There is an id attribute `id="${id}$"` in `<tr>` dom element which is replaced by `item.id`.
  //Thus we can use jQuery selector `$("#" + item.id)`,
  //to get this dom element in order to bind a event for it.
  $("#" + item.id).click(function() {
    //Do something...
  });
}
```

If we use the second method, we shoud bind event after dom element loaded:

```
$("#example-table").(".example-table-template", items);
for(var item in items) {
  $("#"+item.id).click(function() {
    //Do something...
  });
}
```

3. Hypothesis

Based on this goal, I want to compare the run time of the two method using json object and using json array. Some factors like the number of rows and the number of events need to bind will influence the result. My hypohesis is:

H1: Using json object is better than using json array.

H2: Using json array is better than using json object.

The run time of loading rows is evaluation standard of these two method. In other words, the faster it runs, the better it is.

4. Experiments

To test the run time of it, I designed an experiment. The source code of this experiment can be found in `Mengular`'s github repository(https://github.com/lm2343635/Mengular/blob/master/WebContent/testArray.html, https://github.com/lm2343635/Mengular/blob/master/WebContent/testObject.html). I concentrated on two factors introduced above: number of rows and the number of events. Number of rows is from 100 to 1000, which means there are how many rows in the table. Numbers of events if from 1 to 10, which means there are how many events binded to `<tr>` dom element. In this experiment, all javascript events are onclick events binded with jQuery function `$.click()`.

test of using json object 64 70 78 59 54 53 53 51 61 56 100 136 101 108 117 113 118 109 100 108 196 201 155 150 163 178 208 219 281 174 268 232 237 250 292 214 236 228 296 234 273 453 276 281 359 306 333 318 332 290 325 438 346 552 400 417 459 542 383 423 416 483 731 454 495 580 478 1273 1008 890 654 739 826 837 519 573 728 526 536 726 518 778 630 630 708 646 760 792 880 745 809 778 728 746 771 881 937 944 1014 744

test of using json array 43 58 68 48 44 41 37 39 43 43 100 94 72 80 80 80 73 94 96 77 121 172 135 138 160 108 102 120 117 123 158 184 177 162 150 161 157 162 306 309 153 180 187 211 189 247 240 240 617 519 377 276 236 233 378 429 214 265 295 245 299 262 281 331 267 283 316 326 290 283 258 253 262 329 267 283 277 378 282 309 282 327 351 302 320 363 318 312 327 389 281 335 329 389 336 338 370 594 346 356