

Spring 2018 Research Project Proposal

Design for Everyone

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Big Picture

Nowadays technology has approached our everyday life. With the help of different apps and tools, most of the things can be done on electronic devices. Professional applications like CAD make mass customization possible for general audience. However, there are still many difficulties for everyone to develop their own ideal objects.

This research aims at developing a online platform which provides a visual interface that can be easily used to design and customize objects by everyone. Unlike some professional developing tools which requires a lot of complex process and precise adjustments, this website allows users to customize a object with essential data inputs. By doing so, developing process will be much more user-friendly.



Figure 1.1 From INPLUS.TW, JIA YING

Specific Project Scope

The research will first focus on a user-friendly interface for box-based instruction design. With several necessary inputs like height, width, and depth, and a few choices for customized design like material thickness, edge joints options and so on, users are able to design their own box-based objects.

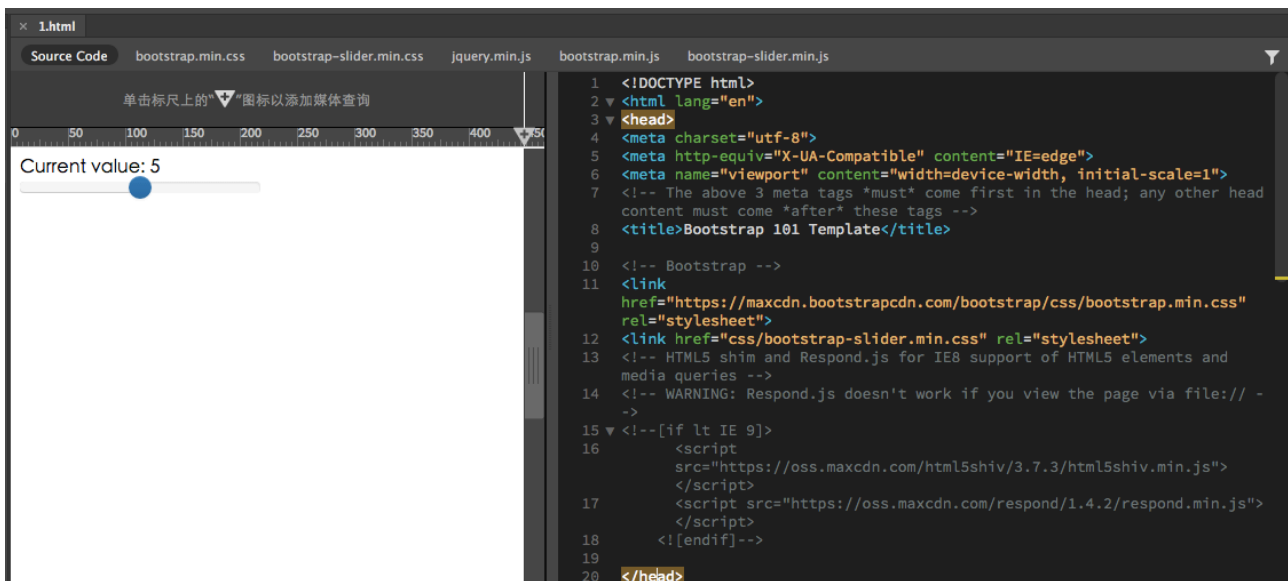


Figure 2.1 Slider provided by bootstrap, one of the basic input formats

What's more, the interface will allow users to have an instant look of the product from multiple perspectives. To reach this goal, 3D rendering technique is supposed to be applied in the future.

Now I've already prepared 3D rendering script, so the next step of vital importance is to design the back end. One solution I've found so far to editing the panel is to use jCanvas. It may allow us to make changes on the panel by revising inner parameters. The picture shown as follows is the source code of jCanvas.

```

<div class="row">
  ::before
  <div class="span3 leftCol" id="leftCol">_</div>
  <div class="span6" id="rightCol" style="height: 877px;">
    <div id="rightColHeader">_</div>
    <div id="vizArea">
      <canvas id="vizCanvas" width="460" height="807" style="z-index: 1;" = $0
      <canvas id="testCanvas" width="460" height="807" style="z-index: 1; display:none;">
    </div>
  </div>
  <div class="span3" id="adCol">_</div>
  <div id="blueprintDialog" class="modal hide fade">_</div>
  <div id="AddMatDialog" class="modal hide fade">_</div>
  <div id="aboutDialog" class="modal hide fade">_</div>
  ::after
</div>

```

Background & Related Work

This project aims at developing an user interface based on JavaScript. To start with, getting familiar with html and javascript is needed. Since my initial goal is to make a user-friendly interface, so I'll import some jQuery files in order to add some animation effects for basic functions. To have a better interface with instant changes on a 3D model, I decided to import 3D rendering technologies like boxcutter and bootstrap which allow users to interact with the model online.

One of the related problems is to build the connection between input parameters and the instant changing 3d model especially when it comes to different types of object and different operations. Till now, I've read the code of 3d rendering files and researched some related algorithms. What I need to do next is to design a algorithm which can be applied into general situations and found the way to realize the operation on the 3d model.

To sum up:

1. This project is based on JavaScript. It is written in js, html, css and so on.
2. JS and JQuery for user interface, animation effects and basic functions.
 - e.g. bootstrap-slider, Jcanvas

3. JS for 3D rendering.
 - e.g. boxcutter, bootstrap
4. Refer to this website: [Maker case](#).

Goals

Ideally, in the end of this summer, this website will allow general users to customize objects at will. Only by providing essential parameters and making simple choices can they design their own objects at will. What's more, they are supposed to download the draft of the object as well. Through an online user interface like that, everyone can make out designs without professional skills and complicated manipulations. So that it can not only save designers' time but also encourage more and more individuals to join in designing.

Deliverables

For this project, I'll have a few JavaScript scripts providing animation effects for basic functions. Besides, I'll have several html files for front end design. Along with html, there will be a few css files which help with the character type and format as well.

Timeline

week 1:

Get familiar with JavaScript and Asp.net.

Install DW and practice js.

week 2:

Write the research proposal.

Learn the function provided in libraries like bootstrap, bootstrap-slider.

week 3:

Work on interface design. Make out basic functions.

Conceptualize a solution to variable box-based constructions.

week 4:

Work on parameter design which can be used for variable box-based constructions.

Import 3D rendering frameworks.

week 5:

Build connections between parameters input and 3D models.

Conduct unit test on basic functions.

week 6:

Expand usability and develop extra functions.

Develop one more mode to fit another construction.

Conduction integration test on the whole website.

week 7:

Adjust improper functions and beautify the interface.

Finish documentation.

Reference

1. Jon Duckett, JavaScript and JQuery: Interactive Front-End Web Development, Wiley (2014).
2. Jonas Fagerberg, ASP.NET Core 2.0 MVC And Razor Pages For Beginners: How to Build a Website (2017).
3. Jon Hollander, Freelance Creator, MakerCase (2012).
<http://www.makercase.com/>
4. Jia Ying, Figure 1.1, Inplus.TW, <https://inplus.tw/archives/9405>