成都理工大学中英合作办学
CDUT Sino-British Collaborative Education

OXFORD BROOKES UNIVERSITY

UNDERGRADUATE PROJECT PROPOSAL

Project Title:	**A Smart Web-based Toy Customization System**
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1 Introduction

1.1 Background

Nowadays, toy industry has been developed online stores and designed various models for customers to select and buy them. However, this industry has not provided a service in that customers have the right to design their toys based on basic models. In terms of this problem, a web application will be principally designed to provide basic models for customers to customize their toys and make orders online. This web application will benefit customers who are going to own an exclusive toy or send it to others such as parents, lovers, children, and so forth. Also, manufacturers of this toy can profit from this web application. Meanwhile, delivery companies can be beneficial in delivering toys to customers.

1.2 Aim

Develop an online shopping mall with features that allow users to design their toys based on basic models, such as adding decorations and changing toy colors, and make an order so that they receive their physical toy. In addition, several basic functions of online shopping stores are provided for users.

1.3 Objectives

The objectives of this project are as follows:

a. Complete a background review of the existing online toy stores
b. Complete a background review of the existing customer services robots based on deep learning
c. Develop the framework of the web application
d. Develop the basic toy models and related toy accessories
e. Develop function of decorating toys
f. Develop customer service robot
g. Complete other related shopping online functions
h. Testing and maintenance of the web application

1.4 Project Overview

This web application is an online shopping store that develops principally for customizing exclusive toys online and delivering products to destinations. Customers can design their toys, such as adding fashion accessories, wearing clothes, and so forth, based on basic models. Once customers finished their specified models, they could make an order and check the logistic of their order. Meanwhile, the web application provides customer services robots for users to consult related problems

First of all, the audience could be people who want to buy an exclusive toy for themselves or others including parents, lovers, and children. In addition, the audience also could be people who just attract by the design of basic models.

2 Background Review

Summary of existing approaches

2.1.1 Summary of the existing mainstream online toy stores

Web application	**Jellycat**[1]	**POP MART**[2]	**NIKE**[3]	**LEGO**[4]	**Mattel**[5]
Make an order	√	√	√	N/A	√
Check logistic	√	√	√	N/A	√
Customize toys	N/A	N/A	√	N/A	N/A
Sign up and log in	√	√	√	√	√
Shopping trolley	√	√	√	N/A	√
Customer service	N/A	N/A	N/A	√	N/A

robot					

Table 1 The existing online toy stores

Previous online shopping stores [1], [2], [3], [4] and [5] provide services including browsing products, searching wanted toys, categorizing products to make them easier to find, and signing up or off, and logging in or off customers' accounts. No related functions for making orders are developed because LEGO has no direct-sale store in China [4]. However, a customer service robot has been developed for customers to consult and solve problems among five web applications [4]. Previous online toy stores [1], [2], [3] and [5] solve the problems that users want to consult by providing customer service hotlines and bulletin boards, which are more likely to spend customers more time for searching answers or wasting more human resources to resolve duplicate issues.

The online shopping web that includes a service where people can customize their shoes based on several classic shoe models [3]. Users can choose the color and texture of each part of the shoes. In addition, users can store their designed models on their shopping trolleys and the website provides several designed models for users to inspire their models. Also, customers can share a picture of their designed shoes with others. According to this web application, the technology of changing the projected texture will be useful for developing the toy's color. The limitations are that set-related their shoes by browsing pictures including each part of the shoes instead of viewing spatial shoe models.

2.1.2 Summary of existing QA system

System features	KBQA	FAQ	MRC
Construction costs	High	Low	Low
Precision	High	Normal	High
Recall	Low	Normal	Normal

Reasoning Ability	High	None	Low
Data Management	Refined knowledge management, easy to maintain	QA-list management, hard to maintain	Easy to manage text

Table 2 Compared the features of the existing QA system

3 Methodology

3.1.1 Approach

The approach of this project is as follows:

Research and development methodology	Approach
Software development model	Agile
Requirement gathering and specification method	Use cases, follow people around, and prototyping
Test and Evaluation	1. Breaking down the test project into small pieces 2. Analyze software requirements specifications 3. Create a test specification 4. Set up a test environment 5. Execute the test case 6. Evaluate the result and report the flaw and areas of improving models 7. Maintenance

Table 3 The related approach of this project

3.2 Technology

3.2.1 Development environment: IDEA

This web application will be mainly based on Java language to develop, considering IDEA is an integrated development environment for Java Language. Therefore, it is easy

to develop and manage projects. In addition, in the past, I had the experience of using IDEA-programmed coursework and set-related configurations.

3.2.2 Database

MYSQL would be used for storing data, and Navicat Premium would be used for managing the database.

3.2.3 Development Technologies

Back-end technology	**Reason**
Spring	The dependencies between objects are given to Spring for easy decoupling and simplified development provides integration support for other good open-source frameworks
Mybatis	Mybatis separates the SQL statements from the Java source program and writes them in a separate XML file, making it much easier to maintain the program
SpringMVC	SpringMVC develops web application cleaner and connects Spring better

Table 4 Back-end technologies used in this project

Front-end technology	**Reason**
Vue	Considering the toys' model needed to apply to web page and interacted with users, the interaction between Vue and Unity cannot use the third-party Plug-in to accomplish the constructing method of front-end are separate HTML, CSS, and JS which is similar to previous development habitats

3Dmax	3Dmax is the mainstream and mature software to construct models. Compared with other software, it is easier to learn and build models. In addition, 3dmax can use Vary render toy models so that toys look more vivid.
Unity	Unity provides functions that models made from 3Dmax to be decorated by programming so that the customizing function can be completed extends to the HTML5 web platform based on WebGL technology

Table 5 Front-end technologies used in this project

3.2.4 The system structure

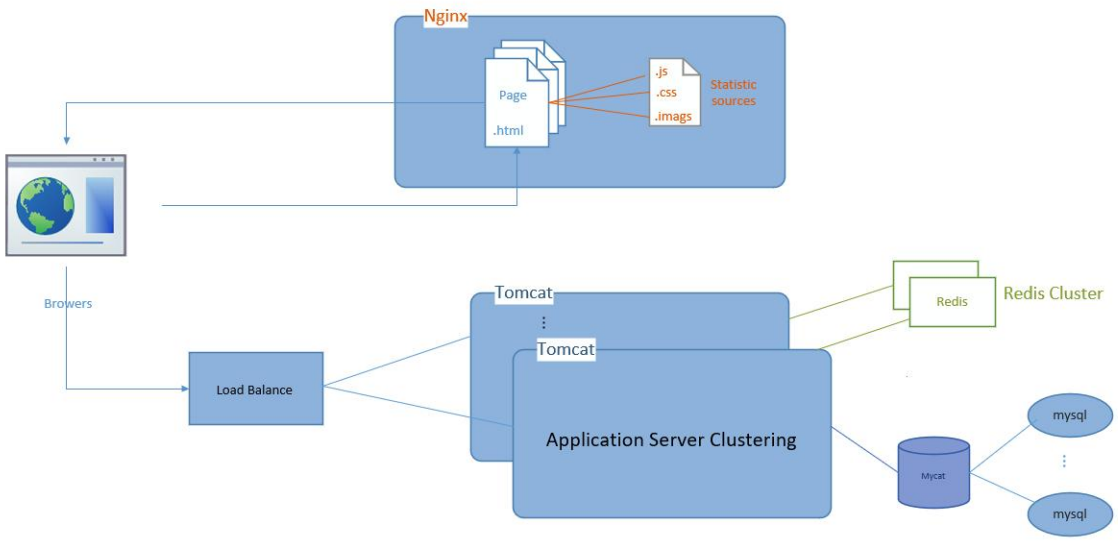

Figure 1 The system structure of this web application

3.3 Version management plan

The GitHub platform would be used for the version management of this project to record the progress of the project. Here is the URL of the GitHub account to be used: https://github.com/Wangyiting1234/project

4 Project Management

4.1 Activities

Objectives	Activities
Complete a background review of the existing online toy stores	a. Search mainstream online toy stores b. Create feature comparison table c. Summary limitations and disadvantages
Complete a background review of the existing customer services robots based on deep learning	a. Conduct a systematic search of existing customer services robots b. List different types of robots c. Create a feature comparison table d. Complete a literature search e. Decide to use which type of robot
Develop the framework of the web application	a. Install indeed software for constructing the web application b. Configure the environment of web application c. Design UI of the basic framework of web application
Develop the basic toy models and related toy accessories	a. Design the basic model and accessories of toys b. Modify the draft of toys c. Build models and accessories in 3Dmax d. Modify and perfect models
Develop the function of decorating toys	a. Upload the models from 3dmax to Unity b. Program to decorate accessories on models c. Deploy the Decorative function in the web application

Develop customer service robot	a. Write the corpus of answers and questions b. Program to construct the robot c. Train and test robot d. Deploy robot into web application
Complete other related shopping online functions	a. Design UI of each function b. Develop the front-end part c. Develop the back-end part d. Build the connection of frontend and backend e. Test each function
Build database	a. Design EDR of this web application b. Construct each table and its relationship c. Connect database with back-end d. Test whether connects successfully
Testing and maintenance of the web application	a. Decide the development model b. Follow the rules of the software development model c. Maintenance

Table 6 The activities of each objective

4.2 Schedule

The schedule of this project is as follows:

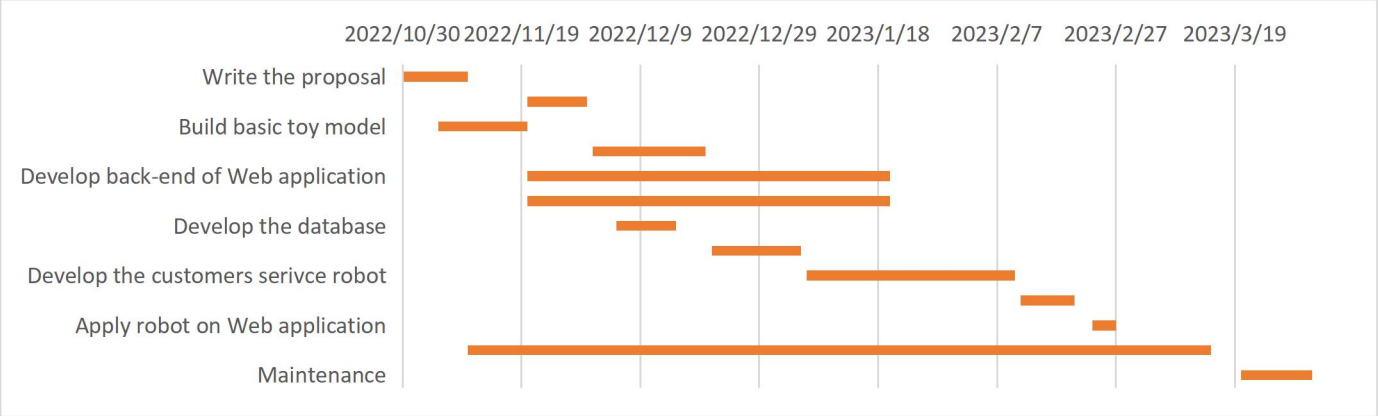

Figure 2 Gantt chart of this project

4.3 Data management plan

The data management plan for this project is as follows:

Data	Management method
Ethics forms	Documentations in folder
Plan (weekly meeting logs and schedule)	Documentations in folder
Reports	Documentations in folder
Literature	Mendeley
Testing and evaluation	Documentations in folder
Sprint plan	Documentations in folder

Table 7 The data management of this project

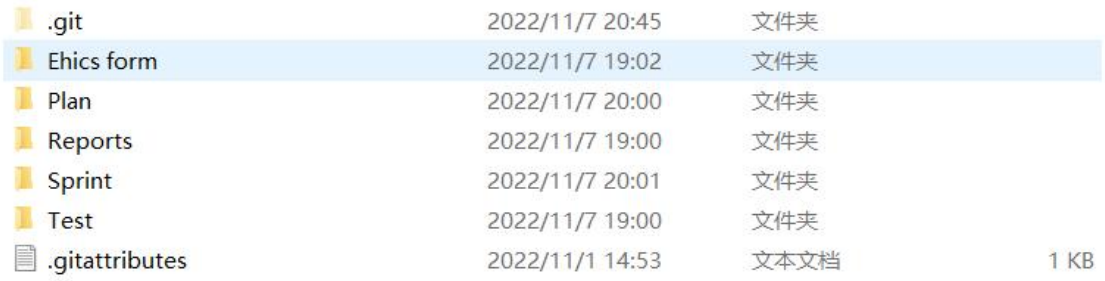

Figure 3 The folder structure of this project

GitHub platform would be used for uploading and updating all of data. Here is the URL of the GitHub account to be used: https://github.com/Wangyiting1234/project

4.4 Deliverables

The deliverables of this project are as follows:

a. Project proposal
b. Progress report
c. Code of project
d. Poster presentation
e. Final report

5 References

[1] Jellycat, “https://www.jellycat.com/us/,” 2022.

[2] POPMART, “https://global.popmart.com/,” 2022.

[3] NIKE, “https://www.nike.com/nike-by-you,” 2022.

[4] LEGO, “https://www.lego.com/zh-cn,” 2022.

[5] Mattel, “https://about.mattel.com/,” 2022.