PC Builder Web Application

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***Abstract* —With the rapid development of technology, computers have already become an essential part of our life, especially for students as well as people who are engaged in the information technology field. Since nowadays people rely much on computers, a suitable computer can significantly improve the efficiency of their daily jobs. Although it is easy for us to purchase any computer or parts online, choosing a hardware configuration of a computer can still make us very indecisive. A computer without an appropriate configuration will potentially cost more to upgrade later. Therefore, the purpose of our work is to help people purchase the hardware of a computer which can highly meet their needs. Also, our application will sync our users with the most recent technology not only because of the dynamic change of user needs but also the rapid iteration of technology.**

***Keywords***—**PC hardware**, **web application, PC builder**

1. Introduction

This web application provides specialized hardware guidance for different groups of customers such as students, engineers and so on. Today people benefit from web services a lot with its advantage on reducing cost and saving time. We are going to apply the Responsive Web design to make the user feel comfortable with the browsing experience when they visit our website.

In our application, we will use React and Google Firebase as a database to support the frontend application. Here are some basic processes for the new user when they visit our website the first time. First of all, when they visit our website, they will be directed to the main page with login/register window. Then they can have a quick registration. Our website will ask users to enter their name and email address. As long as they finish this simple registration. The website will automatically send a link to the email to verify the account. Once the link been clicked, it means that the account has been successfully registered. The users can login onto their account by their email address and password next time.

Moreover, after the user logs in onto their account, they can get some hardware products when they enter some keywords in the search bar. Before they use the search bar, we have the “Questions and Answer” part by which we will ask users to provide information such as age, job title, and requirements for the computer which can leave out and avoid the unwanted products in advance. For example, if the user is a student who is majoring in computer science, we will provide them with hardware suitable for database programming, game design, and many other computer science related tasks.

Last but not least, we have the forum for users to share their experience of purchasing the hardware and their specific specs to fulfill their requirements. They can comment on other users’ purchase plans as well. Our website will also have a section which shares technical articles to educate users with knowledge regarding PC hardware.

1. Literature Survey

As we all know, there are plenty of manufactures providing customized hardware products to meet the needs of the customers. However even with so many modernized online shopping platforms, it is still not straightforward for users to find a hardware product with satisfaction.

Based on our survey, there are some common pain points people may have for their computers. Some people complained of the issue of the computer not being responsive once they use it to watch their favorite TV series. Other people are glooming about hardware overheating and the concern for safety. And another quite common problem people have is the tradeoff between limited budget and performance.

When we did customer research, we met with two users who can represent a significant number of users. Nancy, a Computer Science student, found that there are so many laptop brands with similar hardware. As a result, she had a hard time making a purchase decision.

Han, an Engineer who is an experienced IT professional, still struggles to find right PC hardware which can match his field of work.

With our survey and research, we can see that finding the right hardware configuration with a limited budget is a general challenge faced by everyone. This is also our solution’s market fit. Our solution tries to provide a one-stop experience to facilitate and guide customers to find hardware to meet their technical and financial requirement in a timely fashion.

1. Project Requirements

Software Requirements:

Client side:

* Mozilla Firefox 4.0 or above, Microsoft Edge, Google Chrome.

Server side:

* Virtual host.
* Operating system, Windows/Linux.
* Host space, independent web space, 3G.
* Network bandwidth and traffic, flow limit 120g/month. The number of concurrent connections is 500.

Hardware Requirements:

* We need the version of the processor after Intel Core 2 Duo.
* The operating System should be capable of running the browsers.

Functional Requirements:

* We should enable users to login and register easily.
* We should set the system for the user to access the email, then they also need to set the password for the application as well.
* We should redirect logged-in users to the homepage.
* We should keep the users logged until the users logout manually.
* Users should be able to update their personal information after login.
* Users can view and search products by keyword.
* User can upload, edit and delete pictures and comments.
* Users can search related articles and leave comments.
* The administrators can manage user information. They can help users to manage their accounts better.
* Users can request technical support from the administrators (online chat).

Technical Requirements:

* This is a web application which should support users browse from PC end and mobile end.
* This web and mobile application are going to use React.
* Other technologies used would be HTML, Google Firebase, and CSS.
* Database administrator can manage database skillfully.
* Data from the website should be backed up daily.

Usability Requirements:

* The web application will be functional in all the major web browsers.
* The web application will have a simple user interface
* We set up two kinds of permissions: user and administrator, which can effectively control the access qualification of corresponding permissions and prevent or restrict illegal access.

1. System Diagrams

Use-Case Diagram:-

ADMIN-



Figure 1. Admin diagram

USER-



Figure 2. User diagram

Flow Diagram:



Figure 3. Workflow diagram

1. Database Schema

Table Name: User

Description: To store the details of user and admin

Schema:

|  |  |  |
| --- | --- | --- |
| **Fields** | **Data Types** | **Constraints** |
| id | INT | Primary Key |
| user\_name | STR |  |
| password | STR |  |
| first\_name | STR |  |
| last\_name | STR |  |
| email | STR |  |
| Is\_active | BOOL |  |
| created\_at | DATETIME |  |
| updated\_at | DATETIME |  |
| update\_user | INT |  |
| role | INT |  |

Table 1. User table schema

Table Name: Product

Description: To store the details of product

Schema:

|  |  |  |
| --- | --- | --- |
| **Fields** | **Data Types** | **Constraints** |
| id | INT | Primary Key |
| code | STR |  |
| name | STR |  |
| brand | STR |  |
| created\_at | DATETIME |  |
| edited\_at | DATETIME |  |

Table 2. Product table schema

Table Name: Product\_Config

Description: To store the configurations of product

Schema:

|  |  |  |
| --- | --- | --- |
| **Fields** | **Data Types** | **Constraints** |
| product\_id | INT | Foreign Key |
| cpu | STR |  |
| memory | STR |  |
| motherboard | STR |  |
| harddisk | STR |  |

Table 3. Product\_Config table schema

Table Name: Occupation

Description: To store the occupation suitable of product

Schema:

|  |  |  |
| --- | --- | --- |
| **Fields** | **Data Types** | **Constraints** |
| id | INT | Primary Key |
| name | STR |  |

Table 4. Occupation table schema

Table Name: Usage

Description: To store the usages of product

Schema:

|  |  |  |
| --- | --- | --- |
| **Fields** | **Data Types** | **Constraints** |
| id | INT | Primary Key |
| name | STR |  |

Table 5. Usage table schema

Table Name: Product\_Occupation

Description: To store the relations among occupation and product

Schema:

|  |  |  |
| --- | --- | --- |
| **Fields** | **Data Types** | **Constraints** |
| product\_id | INT | Foreign Key |
| occupation\_id | INT | Foreign Key |

Table 6. Product\_Occupation table schema

Table Name: Product\_Usage

Description: To store the relations among usage and product

Schema:

|  |  |  |
| --- | --- | --- |
| **Fields** | **Data Types** | **Constraints** |
| product\_id | INT | Foreign Key |
| usage\_id | INT | Foreign Key |

Table 7. Product\_Usage table schema

1. Data Modeling



Figure 4. User table



Figure 5. Article and Message table



Figure 6. Product and Product Config table



Figure 7. Product\_Occupation and Product\_Usage table

1. Future Scope

For next stage, we have plan for several new features and functions.

* Merge login and register forms;
* Create dimension tables for users’ professional information and major usage of the computer;
* Link users’ pick with above tables to provide recommendation to users with similar needs;
* Create tables to support user forum including information like thread headline, content, author, creation time and edit time;
* Create user form to post thread onto the forum;
* Create pages for threads and create functions for users to leave comments;

We will hold virtual scrum meetings to scrum back

1. Product results

Here are the screenshots of the website implemented so far.

Graphical user interface, application

Description automatically generated

Figure 8. Login page

Graphical user interface

Description automatically generated

Figure 9. Login page with unformatted email

Graphical user interface, text, application, email

Description automatically generated

Figure 10. Admin page

1. Conclusions

The importance of computers remain and integral part of modern society and it is imperative that users of various backgrounds have a simple and intuitive platform in which to not only buy a computer, but to have it customized to his or her needs and budget. In this paper, we introduced the PC Builder web application developed in React and implementing Google Firebase, allowing for a modern and smooth user experience.

The aim of this work is to create a simple yet powerful website that conglomerates the latest computer parts on the market into one place. We want to eliminate the intimidating aspect of buying a customized PC by incorporating an easy to use interface where casual buyers can create a computer that balances both their personal needs and budget. Enthusiasts can find more detailed options allowing for advanced customization and part searches. Finally, with the addition of the rating system, forum section, and tech news pages, we aim to make the web app an interactive and social platform as well.

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