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An E-commerce Website Migration Software Tool for Small Businesses

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Abstract

The project aims to develop a migration software tool for the small business on a well-known e-commerce platform, such as eBay and Taobao, so that they can launch their own independent e-commerce sites to further expand their business. The software tool is able to extract data from the e-commerce platform and generate a new well-designed full-functional sane-commerce website. The user can choose what data they want to transfer and choose a satisfactory website template, then the software will automatically generate a fully functional offline website and sent the open source code to the user. Users can add functions by themselves by modifying the code, such as advertisements recommendations. Besides, because the data migration and construction of e-commerce website may involve in legal issues, the software have a legal terms database, and on this basis to build a search engine combining with special query features. User can query relevant legal provisions and relevant situations to manage legal risks including contractual and intellectual property issue. In order to facilitate the communication between users and users and between users and our staff, and to facilitate the solution of problems and sharing experience, this project also established a social platform, which realized the functions of email registration, verification code login, Posting, comment, private message, thumb up, follow, website visit statistics. The software have warning mechanism to alert merchants about legal risks and possible solutions. Our software also has a data analysis function, which can provide real-time visualization of product data and order information in real time. It also provides Uthis project for users to quickly access application performance monitoring (APM), logs and infrastructure indicators.

摘要

该项目旨在在知名的电子商务平台（例如 eBay 和淘宝网）上为小型企业开发数据迁移软件工具，以便他们可以搭建并运营自己的独立电子商务网站来进一步扩展业务。该软件工具能够从电子商务平台中提取数据，并生成一个设计良好的功能齐全的电子商务网站。用户可以选择要传输的数据并选择一个满意的网站模板，然后该软件将自动生成功能齐全的离线网站，并将开放源代码发送给用户。用户可以通过修改代码自己添加功能，例如广告推荐。此外，由于数据迁移和搭建电子商务网站可能涉及法律问题，因此该软件具有法律条款数据库，并在此基础上构建了具有特殊查询功能的搜索引擎。用户可以查询相关法律规定和相关情况，以管理包括合同和知识产权问题在内的法律风险。为了方便用户与用户之间以及用户与我们工作人员之间的交流，同时为了方便解决问题和分享经验，我还建立了一个社交平台，实现了邮件注册、验证码登录、发帖、评论、私人留言、点赞、关注、网站访问统计功能。此外，该软件具有警告机制，可向商家发出有关法律风险和可能解决方案的警报。我们的软件还具有数据分析功能，可以实时提供产品数据和订单信息的实时可视化，同时它还为用户提供 UI 以便用户快速访问应用程序性能监测 (APM)、日志和基础设施指标等数据。

Chapter 1: Introduction

This project aims to build an application that can capture the commodity data of e-commerce platform stores, import the data into the database and produce an e-commerce website. The motivation of the project is to help e-commerce platform owners build and operate their own independent e-commerce sites to further expand their business. This project began with an assessment of small business processes on e-commerce platforms, as well as the technical and legal requirements required to build an e-commerce website. The project also analyzed whether crawlers violated laws according to previous cases, and analyzed the potential and advantages of the project by comparing similar software and websites in the market. The purpose of doing this is to have a deeper understanding of the product and the market environment, and to provide ideas for the design and development of the software. The analysis of relevant laws is conducive to avoiding risks and reducing future losses.

The development of this project adopts the Scrum method in agile development, which is essentially based on user needs. After the requirements are finalized, the software development adopts the iterative and step-by-step thinking, which is divided into three modules: Web Application, Crawl Toolkit and E-Commerce Website and four iterations. The four iterations are based on functional requirements, user stories and MoSCoW Rules. After each playtest, the testers' opinions and feedbacks will determine the functional focus and system optimization for the next iteration.

Web Application uses the current mainstream Java EE enterprise framework SSM (Spring + Spring MVC + MyBatis) to build. Spring MVC is used for request forwarding and view management, Spring is used for business object management, and MyBatis is used as a persistence engine for data objects. The CRAWL Toolkit is divided into two Python scripts. One is for web crawling using Selenium+ PhantomJS +Firefox + BeautifulSoup, and the other is for extracting data from CSV files crawled by the CRAWL Toolkit and draining it into the database. E-Commerce website is built using Java and Springboot + Spring MVC + JPA framework. The framework uses a two-phase commit format. Two-phase commit mainly ensures the atomicity of distributed transactions. In the Prepare phase, the transaction coordinator sends a PREPARE message to each participant, and each participant either returns a failure directly or executes the transaction locally. In the Commit phase, if the coordinator

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receives a failure message or a timeout from the participant, it will send a Rollback message directly to each participant, otherwise, the coordinator will send a Commit message. Participants perform commit or rollback operations according to the coordinator's instructions, releasing all lock resources used during transaction processing. The purpose of the two-phase commit is clear: commit the transaction as late as possible, so that the transaction does as much work as it can before committing. Besides, the project uses Redis to store the cache, uses Kafka to build an asynchronous messaging system, implements global search using Elasticsearch, uses Spring Security and Apache Shiro for permission control and information encryption, uses Logstash and Kibana to achieve These functions above basically meet all the needs of potential users.

For web front-end development, this project uses DIV + CSS, which means that the HTML code of the web page mainly uses DIV to divide the page into one area to separate the structure and performance. After Thymeleaf template engine generates the HTML, the static page is built, it is dynamically loaded using JavaScript, and the web page is updated asynchronously through AXIOS(AJAX).

The basic functions of this project include login, registration, information encryption, modification of user information, search engine, recommendation of legal provisions, template selection, data capture, data import database, and generation of e-commerce website. E-commerce site has the functions of login, registration, user modification of personal information, list products, add to the shopping cart, purchase goods, order inquiry, payment method chosen, comment, search engine. Management interface has administrator management of commodity information, administrator view user information, administrator view of order information, logistics system and management modification of order status. Additional functions realized in this project include sending email, login with verification code, upload head portrait, access control, interceptor intercept, posting posts, posting comments, list posts and comments, thumb up for posts and comments, following users, list followings and followers, message notification(comment message, follow message, like message and law message), private message chat, real-time monitoring of website data, and data analysis. These functions above basically meet all the needs of potential users.

Chapter 2: Background

2.1 Evaluation of the small business process

2.1.1 Definition of small business

China defines the scale of small enterprises in accordance with the industries defined in the "Notice on Issuing the Standards for the Classification of Small and Medium-sized Enterprises"[1]. However, because the goods sold in online stores on Taobao or eBay involve various industries, there is no specific unified standard. Therefore, most cases results are used as the standard. Generally, a company with no less than 10 employees and no more than 100 employees is a small company. Other countries' evaluation standards are basically the same as China's

2.1.2 Small Business process on online retail platform

Customer positioning

General online shops will first analyse their target customers, including their hobbies, buying habits, buying frequency, etc., and do a systematic research on this to better grasp the direction of the market. For that the virtuality of online small shops makes buyers and sellers communicate only through words or text, it cannot objectively reflect the wishes of customers. Therefore, the managers of online stores will fully understand the psychology of consumers and adopt effective sales methods to make more netizens their customers.

Pricing

The advantage of a small online store is that it can make use of the interactive function of the network to enable the merchant to directly face the customer. According to the price feedback from customers and the response of the competitor, the price of the product can be adjusted almost instantly. In normal condition, merchants will increase Customer Delivered Value (The difference between Total Customer Value and Total Customer Cost) by increasing TCV and reducing TCC to gain a competitive advantage [2]. Therefore, the standard of pricing is to make customers feel value for money or value for money.

Service positioning

The pre-sales service of general online stores is mainly to make the store's webpage well, which is to make the store's webpage not only distinctive and vivid, but also humanized. The stores webpage is also made to have large product information, clear classification and rich content.

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It must be convenient for customers to find and browse, so that customers can easily obtain the information of the required products, purchase the products happily, communicate quickly and conveniently, truly experience the difference from the traditional physical market, and truly realize the speed and convenience of the virtual market. The merchants can use network tools to recommend and introduce new products to customers; establish online forums for products, take advantage of the intuitive, interactive, and fast characteristics of the Internet, and adopt corresponding methods to provide customers with comments, discussions, feedback and other columns, encourage customers to actively participate in information and topics of interest or interest, and put forward their own views suggestions, and fully understand customers' evaluations and expectations of products.

Many merchants pay special attention to after-sales service. The after-sales service must be accurate, timely, home delivered and in place, that is, when the customer orders the goods, the delivery must be timely and accurate, and the service must be thoughtful and meticulous. For example, for customers who consume gifts as gifts, the service will reflect fashion and taste. Merchants will respond to customers' queries and complaints in front of the public, enhance the relationship between merchants and customers, and improve customer satisfaction. Practice has proved that good after-sales service can firmly grasp customers, which is the secret to the success of many stores.

2.2 The technical requirements on setting up an e-commerce website

2.2.1 E-commerce website characteristics

In addition to the basic characteristics of a website, an e-commerce website should also have the following characteristics [3]:

Virtuality. Customers can only understand the shape, characteristics, price and method of application of the products on the e-commerce website through the pictures and descriptions of the products. Therefore, the feeling of the product is not as specific as shopping in a traditional store, unless the product has been used before.

Commerciality. The e-commerce website provides a trading platform for buyers and sellers. Meanwhile, the commercial website can obtain the information left by the customer and the transaction product. Through statistics and analysis of the obtained data, the owner of website can analyse and obtain the sales status of the product and the customer's consumption tendency in time, and adjust the supply or develop new customers according to the analysis results.

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Integrity. The operation of an e-commerce website involves all aspects. All links are required to function well, such as website production, buyer and seller, banking, insurance, streaming, integrity of both parties to the transaction, and laws. All of these are all an integral whole. If there is a problem in a certain link, it may not achieve the purpose of profitability.

Scalability. To ensure the normal development of corporate business activities, the scale of the number of visitors must be taken into consideration. If the customer cannot be responded and dealt with quickly during the peak period of customer visits, it will cause system congestion. So for an e-commerce website, only the expandable system is stable. If you can easily and flexibly expand the functions of the website and add new services according to the needs of business development or technological update, the image and benefits of the enterprise can be further enhanced.

Safety. Whether for customers or businesses, security is the top priority for online transactions to prevent viruses, Trojan horses or information leakage. Therefore, the construction of an e-commerce website must consider security solutions, such as firewalls, security certification, security protocols, virus protection and other security measures.

2.2.2 E-commerce website construction plan

Demand design

According to the project requirements, the online mall system, as a user shopping system, should include two major parts: the user's front-end shopping and the administrator's back-end management. After analysis and design, the front user part is mainly divided into user registration, login, shopping, electronic payment, comments, forums, announcements. The administrator background management part is mainly divided into commodity management, order management, forum management, bulletin management, user management, comprehensive query, sales statistics, data analysis, system management these modules [2].

Design of the development architecture of the system

According to the characteristics of e-commerce websites, the system is divided into application layer, component layer and core layer in development.

The application layer mainly includes the Uthis project of the system, the interface logic of the system, and related product functions and services, including product search, online communication, and order placement.

The component layer mainly includes the processing of various business logics, such as product

query.

The core layer mainly processes the user's business, including the system's business layer, business control layer, system model service, data access layer, etc.[6]

Design of database schema

The main idea of e-commerce website database design is separation of reading and writing, and vertical division.

The database is divided into query database and transaction database. The query database is mainly responsible for the user's query service, while the transaction database is mainly responsible for the writing of transaction orders, and the transaction database is divided into multiple sub-databases to support high concurrency. The separation of the database fully embodies the principle of reading and writing classification of the database.

The vertical division of data is mainly to divide different databases according to different business functions. The division of databases is mainly used to meet business and capacity scalability, data isolation and other requirements. According to the above principles, the database is divided into merchant database, user database, commodity database, order database, etc.[4]

Choose a domain name and space

A good domain name is half the success of an e-commerce platform. A domain name can represent a business name. Be cautious when choosing a domain name and don't register it lightly. It must be decided with a long-term perspective. The domain name should not exceed six letters, and the suffix should be com. In this way, users can easily remember in future promotion.

Web design.

The website art design must generally be consistent with the company's overall image, and must comply with CI specifications. Designers need to pay attention to the use of web colours, pictures, and layout planning to maintain the overall consistency of the web pages. Designers should reasonably use CSS and HTML technologies and art design software to improve the usability and aesthetics of web pages.

Initially launch the website

After completing the above steps, upload the program to the space to test the function and performance of the website, such as checking the speed of website opening, whether the website

function can operate normally, whether the link of the website can be opened, whether the content of the website is disordered, and so on. If a website is released to users without preliminary testing, it will affect the image of the corporation.

Website maintenance

Website maintainer need to maintain servers and related software and hardware, assess possible problems, formulate response times, update and adjust content, and formulate relevant website maintenance regulations to institutionalize and standardize website maintenance. Maintaining databases and effectively using data are important content of website maintenance, therefore, database maintenance should be paid great attention to.

2.3 The legal requirements on setting up an e-commerce website

2.3.1 Legal terms concerning to e-commerce operators

According to China's E-commerce Law, users of our software should belong to e-commerce operators engaged in the business activities of selling goods or providing services through the Internet and other information networks, so they should strictly abide by the E-commerce Law. E-commerce operators should follow the principle of voluntary, equality, fairness, integrity, abide by the law and business ethics, fair to participate in market competition, performance of the protection of the rights and interests of consumers, environmental protection, the protection of intellectual property rights, the network security and the obligation of personal information protection, product and service quality responsibility, accept the supervision of the government and society. E-commerce operators shall perform their tax obligations in accordance with the law, obtain administrative licenses in accordance with the law, and disclose product or service information in a comprehensive, true, accurate and timely manner to protect consumers' right to know and to choose. E-commerce operators should continuously publicize their business license information and administrative license information related to their business operations in a prominent position on their homepage.

E-commerce operators who collect and use the personal information of their users shall abide by the provisions of laws and administrative regulations on the protection of personal information. E-commerce operators shall clearly state the methods and procedures for user information inquiry, correction, deletion, and user cancellation, and must not set unreasonable conditions for user information inquiry, correction, deletion, and user cancellation.

E-commerce operators shall not conduct false or misleading commercial propaganda, deceive

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or mislead consumers by fictitious transactions, fabricating user reviews, etc. E-commerce operators who provide consumers with search results of goods or services based on their hobbies, consumption habits and other characteristics should also provide consumers with options that are not specific to their personal characteristics, and respect and equally protect the legitimate rights and interests of consumers. E-commerce operators who send advertisements to consumers address the performance, function, origin, use, quality, composition, price, producer, expiration date, and promises of the product. If there is any indication of the content, provider, form, quality, price, promise, etc. of the service, it shall be accurate, clear and understandable.

The use of an automatic information system by an e-commerce party to conclude or perform a contract has legal effect on the party who uses the system. E-commerce operators shall clearly, comprehensively and clearly inform users of the steps, precautions, download methods and other matters for entering into a contract, and ensure that users can read and download them conveniently and completely. E-commerce parties may agree to use express logistics to deliver the goods, and when this method is used, the time when the consignee signs for receipt is the delivery time. E-commerce parties may agree to use electronic payment methods to pay the price.

E-commerce operators shall establish a convenient and effective mechanism for complaints and reports, disclose information such as complaints and reporting methods, and accept and handle complaints and reports in a timely manner. In the handling of e-commerce disputes, e-commerce operators should provide original contracts and transaction records.[5]

2.3.2 Legal terms concerning to e-commerce platform operators

If the software user is considering upgrading the e-commerce website to an e-commerce platform for other e-commerce operators to sell goods and services, please pay attention to the following terms.

The e-commerce platform operator shall submit the identity information of the operator on the platform to the market supervision and management department in accordance with regulations, prompt the operator who has not registered as a market entity to register in accordance with the law, and cooperate with the market supervision and management department to address the characteristics of e-commerce. Operators who should register as market entities provide convenience for registration. Operators of e-commerce platforms shall take technical measures and other necessary measures to ensure the safety and stable operation of their networks,

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prevent network illegal and criminal activities, effectively respond to network security incidents, and ensure the safety of e-commerce transactions. The operator of an e-commerce platform shall record and preserve the goods and service information and transaction information published on the platform, and ensure the integrity, confidentiality, and availability of the information. The storage time of commodity and service information and transaction information shall be no less than three years from the date of completion of the transaction. E-commerce platform operators shall follow the principles of openness, fairness, and justice, formulate platform service agreements and transaction rules, and clarify their rights and obligations in terms of entering and exiting the platform, guaranteeing the quality of goods and services, protecting consumer rights, and protecting personal information. E-commerce platform operators shall continuously publicize platform service agreement and transaction rules information or the link identification of the above information in a prominent position on their homepage, and ensure that operators and consumers can read and download them conveniently and completely.

E-commerce platform operators shall establish a sound credit evaluation system, publicize credit evaluation rules, and provide consumers with a way to evaluate the goods sold or services provided on the platform. The operator of an e-commerce platform shall not delete the consumer's evaluation of the goods sold or the services provided on the platform. E-commerce platform operators shall display the search results of goods or services to consumers in a variety of ways based on the prices, sales volume, credit, etc. of the goods or services; for goods or services ranked by bidding, the “advertisement” shall be clearly marked.[5]

2.3.3 Legal terms concerning to data extraction

Many large-scale e-commerce websites have clear legal provisions to restrict information and data. For example, without the consent of the website owner, no one may, by himself, authorize or assist a third party to conduct, including access to Taobao.com and its systems Robots, spiders and other programs or equipment monitor, copy, spread, display, mirror, upload, download, etc., obtain and use any content on the website without authorization. If the website data is crawled without the permission of the website owner, it is likely to violate the Computer Fraud and Abuse Act (CFAA) and the Digital Millennium Copyright Act (DMCA). Since the users are not allowed to be troubled by the law due to web data crawling, they can chose to use a ready-made crawling tool, which is recognized by most e-commerce websites in China and import the output file into the web application.

2.3.4 Are web crawlers legal?

A platform uses a crawler tool to browse the web content of another platform and grab the information it finds from it. The behaviour satisfying these characteristics is defined as a web crawler.

In the United States, there are four main legal ways for courts to regulate data crawlers: trespass to chattels; Breach of contract; Violations of copyright; Violations of the Computer Fraud and Abuse Act. The CFAA Act creates civil and criminal liability for "purposely unauthorized or unauthorized access to a computer information system and thereby obtaining information from any protected computer." The U.S. Supreme Court further explained that the CFAA defines two types of unauthorized access to a protected computer information system that constitute a crime: unauthorized access; Improper use of authorized access.[6]

However, in China, when the court decides that the web crawler is illegal, it mainly refers to the "operator's legitimate rights and interests" stipulated in Article 2 of the Anti-Unfair Competition Law. On this basis, it determines that the unauthorized web crawler of the third party and the massive acquisition of data operator's user data are illegal. However, the court only defined platform data or data products as the comparative advantage of enterprises in competition to protect exclusive interests, that is to say, the court did not recognize the property rights of enterprises to data.

Through the analysis of existing cases, data attributes and authorization mode can significantly affect the legitimacy of data crawlers in both China and the United States. Based on the consideration of public interest, the United States believes that the crawling of public original data can be carried out without authorization, while other types of data are protected to varying degrees.

However, in China, even the public original data can only be legally retrieved by obtaining "triple authorization". As for the non-public data, derivative data, etc., the strict legal protection is self-evident. In addition, other factors, such as how much a firm has invested in its data, may also come into play when courts consider the legality of data crawling. As for the authorization mode, the widely used Robots protocol is not legally enforceable, TOS prohibition is.

When a data crawling party violates these general prohibitions, the opposing company will often send cease-and-desist letters and erect IP barriers, which are explicit revocations of authorization in both China and the United States. If the data being crawled belongs to the type that requires authorization from the enterprise, the crawler must stop the crawling behaviour

after receiving such representation, otherwise it will bear legal liability. Furthermore, if the collaboration is conducted through the Open API project or similar means, the termination of the collaboration is the withdrawal of the license. Finally, in the United States, being known to a crawler and not stopping the crawler may create an implied license that justifies the crawler.

On the whole, the protection of personal data information in the United States has experienced a relatively long development process, and its attitude is gradually inclined to the public interest, while China's "triple authorization" mode reflects the careful protection of personal interests.

2.4 Evaluation of current market assessment and product strength

According to my search and query results, there are already website design tools or software on the market that can directly build a website and automatically generate a domain name, and even submit the URL directly to search engines such as Baidu and Google. In addition, after the user successfully builds the website, the website can also be maintained, backed up, and so on. Although this kind of software is very convenient for enterprises and website designers, it is difficult for users to obtain the back-end code of the website, and they can only manage the website on the site building tool. In this case, the user is basically bound to the site building tool, completely dependent on the site building tool, and is limited by the function of the site building tool. The protection of data information and the protection of data transmission can only rely on the site building tool as well. This is not conducive to e-commerce operators who want to expand their functions and strengthen the protection of user information and related data. Besides, there is also software on the market that captures product data from stores on e-commerce websites and configures online stores. However, the captured data package is only convenient to continue importing on the same e-commerce platform, and it is difficult to import it directly into the database. Therefore, it needs to adjust the format of the data package file and import the product images into the database independently.

While the web application guarantees that it can generate a well-designed full-functional website that can be directly launched, it also integrates the existing store data capture function and the search and recommendation functions for related legal terms. Users can generate a website with one click and obtain the open source code of the website.

2.5 Framework introduction

2.5.1 Spring MVC

The Spring MVC framework is an open source Java platform that makes it easy and fast to

provide comprehensive infrastructure support for developing powerful Java-based Web applications. Spring MVC replaces the previous servlets, optimizes the Controller layer, and handles requests primarily through annotations in the Controller front-end controller, resolving the coupling between Java code and servlets. Whatever the front end request is, it will be lightly processed by the Controller, forwarded, and processed by the scheduler on the back end, and the correct view and response will be returned.[7]

The Controller, Model, and View are the three-tier architecture of Spring MVC. The Model encapsulates the application data. The View is responsible for presenting the data, and typically it generates HTML output that the client browser can interpret. The Controller is responsible for processing the user request, building the appropriate model, and passing it to the View for parsing and presentation.

Spring MVC workflow steps are shown in Figure 1. First of all, the user sends the request to the front-end controller (DispatcherServlet). After receiving the request, DispatcherServlet does not process it itself, but delegates it to other parsers to process it. It acts as a unified access point and carries out global process control. The DispatcherServlet asks HandlerMapping to look for a Handler. The HandlerMapping will map the request to a HandlerExecutionChain object and return a Handler to the front-end controller. The DispatcherServlet asks the HandlerAdapter to execute the Handler, and the HandlerAdapter will wrap the Handler as an adapter to support multiple types of handlers. When the HandlerAdapter is finished, it will call the real handler's function processing method based on the result of the adaptation, and complete the function processing. And returns a ModelAndView object to the Controller, which is one of the underlying objects of the Spring MVC framework, including the Model and View. The DispatcherServlet requests the ViewResolver to parse the view, which resolves it into the real view (JSP) based on the logical view name. The ViewResolver returns the View to the DispatcherServlet, and the View is rendered based on the incoming Model data, which in this case is actually a Map data structure. Finally, the system returns control to the DispatcherServlet, which returns a response to the user, and the process ends.

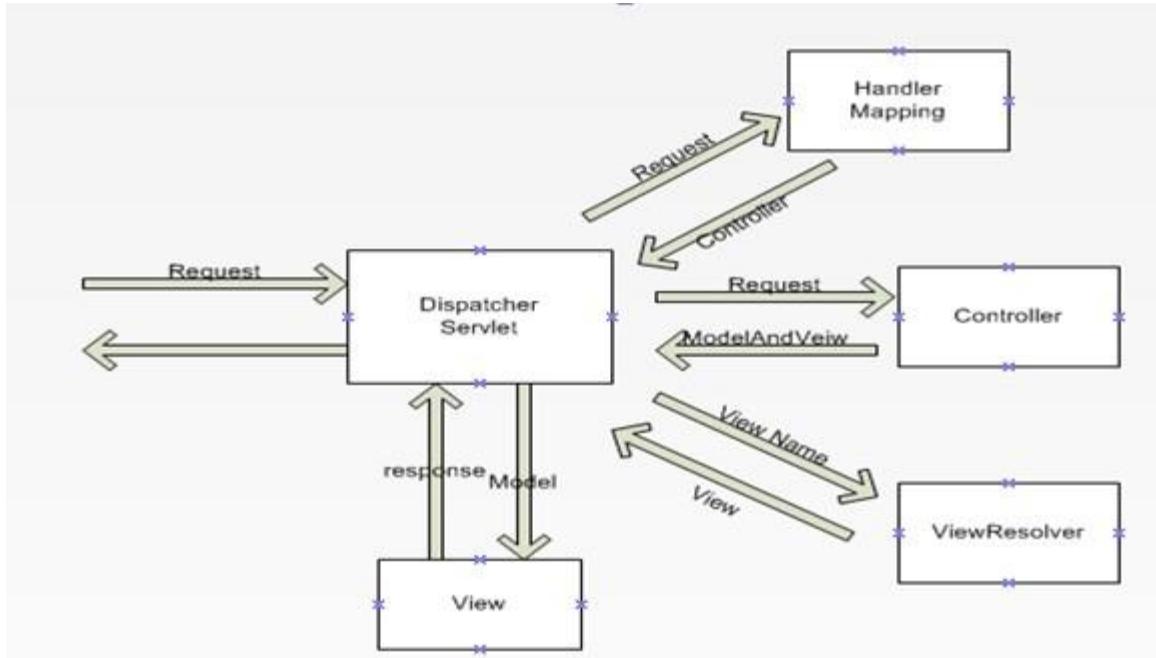


Figure 1 Spring MVC framework

2.5.2 Spring Security

Enterprise system applications, is must consider the safety and reliability of the system, the level to enterprise Web application development process, the safety of the logged in user authentication and authority distribution is one of the essential design module, if developed, will cost a lot of time, not only affect the development progress, and to effectively guarantee the safety and reliability is not necessarily. By using existing components that have been proven safe and effective over time, software development costs can be reduced and development cycles shortened. In Java Web enterprise application development, choosing Spring Security to protect Web applications is a very good choice. Spring Security is a Security module in a Spring project that makes it easy to integrate seamlessly with a Spring project. In particular, adding Spring Security to your Spring Boot project is much easier.[8]

The core functions of Spring Security include: authentication, authorization and attack protection. At its core is Security Filter Chains that are automatically configured once the project is started.

The detailed workflow is shown in Figure 2. The client initiates a request to enter the Security filter chain. LogoutFilter determines whether it is a logout path. If it is a logout path, it goes to LogoutSuccessHandler. If it succeeds, it goes to LogoutSuccessHandler. If the logout failed by ExceptionTranslationFilter; If the path is not logged out, go directly to the next filter. When to UsernamePasswordAuthenticationFilter determine whether for the login path, if it is, then enter

the filter for the login operation, if the login fails to AuthenticationFailureHandler login failure processing, If the login succeeds to AuthenticationSuccessHandler login successful CPU processing, if not the login request is not into the filter. When to FilterSecurityInterceptor get URI, according to the URthis project to find the corresponding authentication manager, authentication authentication manager to do the work, If the authentication succeeds, it goes to the Controller layer or it goes to the AccessDeniedHandler authentication failure handler.

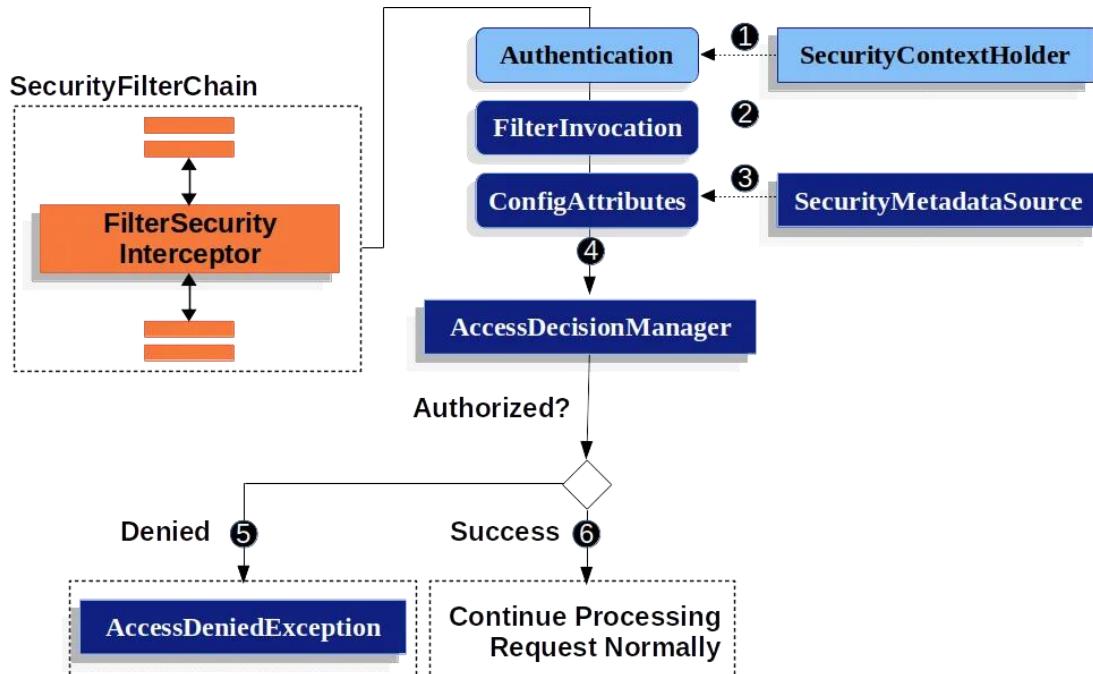


Figure 2 Spring Security Filter Chains[9]

2.5.3 Apache Shiro

Apache Shiro is a powerful and easy-to-use Java security framework that performs authentication, authorization, cryptography, and session management and can be used to secure any application. It has fantastic web application support, allowing users to create flexible security policies based on application URLs and web protocols[10].

Shiro adopts modular design and has good robustness and ease of use. Apache Shiro framework provides a series of security management modes such as authentication, access authorization, data encryption, session management, etc., which can provide security solutions for various information systems. It is a security technology framework widely used by JavaEE platform in the industry at present. Apache Shiro framework is mainly composed of four parts: Authentication, Authorization, Session Management Cryptography. Apache Shiro login authorization process is as follows: First, Apache Shiro interacts data with the system by Sub-Object object to obtain user information that needs to be verified; And then hand it to the SecurityManager object for verification; The SecurityManager object is the core object in Shiro,

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which is responsible for implementing authentication authorization in collaboration with various modules. After the SecurityManager gets the user information, it will call the Realm object to get the database user data information, as well as the role, permissions and other information to realize the whole process of authentication authorization. The Realm object is similar to the Data Access Layer DAO object in the project that implements the connection between the Shiro framework and the database.

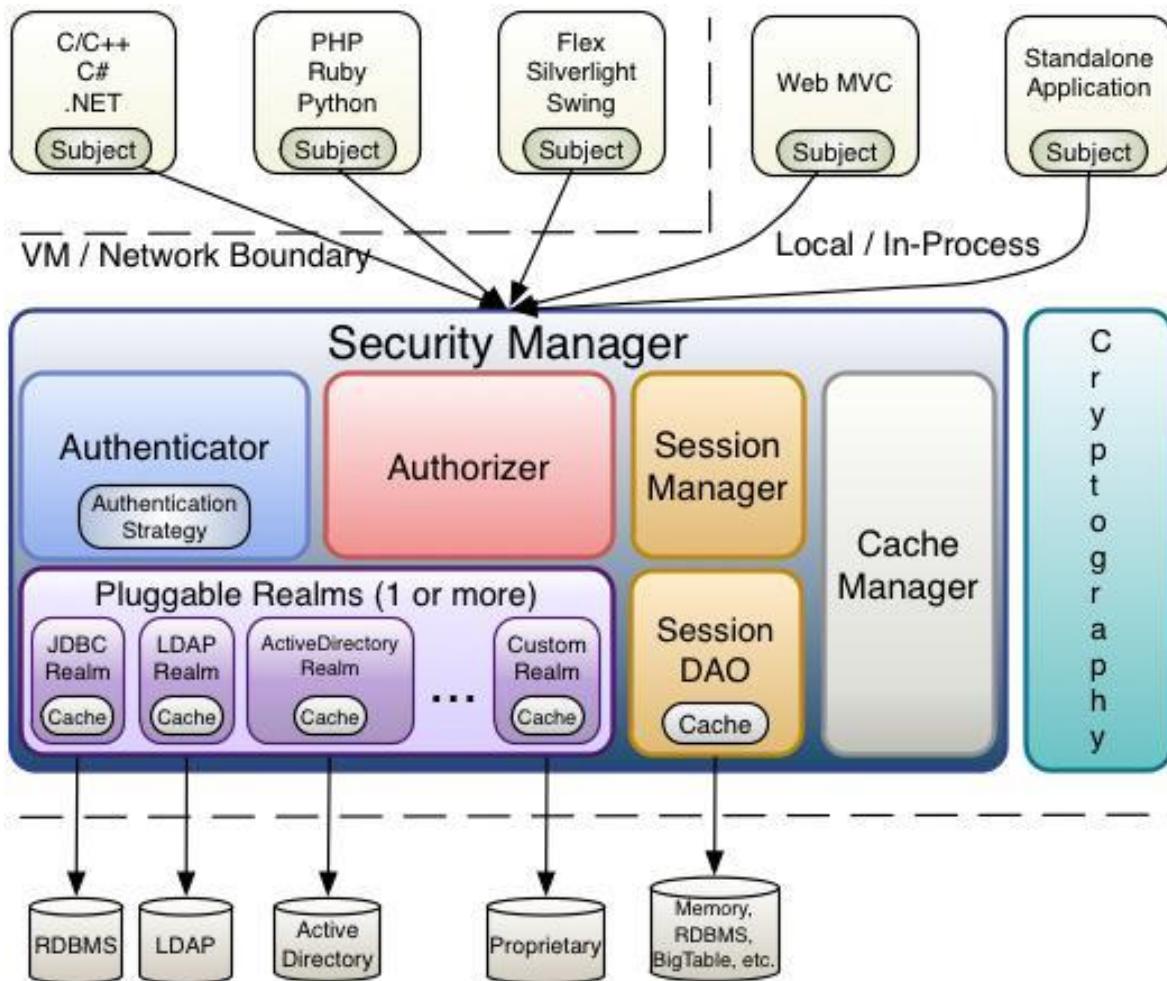


Figure 3 Apache Shiro framework[11]

2.5.4 Redis

Redis is an open source, high-performance, key-value distributed storage database that supports a wealth of data types to meet the real-time needs of high concurrent reads and writes. Compared with other key-value caching products, Redis has three features: It supports the persistence of data, which can save the data in memory in the disk, and it can be reloaded for use when restarted. It supports more data types, including list, set, zset, hash and other data structures. It supports data backup, that is, data backup in master-slave mode.[12]

Redis has both the same instructions for different common data types and specific instructions

for different data types. At the same time, Redis has the Java version client Jedis, Jedis has one of the main features of Java multi-threading, through the thread to optimize the system resources, through the thread operation of Redis data, and according to the actual situation of the thread recycling, greatly improve the use efficiency of Redis. In order to improve the data retrieval speed, it needs to use some caching technology. The biggest advantage of Redis is that it can cache the data into memory and can be sharded, and it has high read and write efficiency. , on this basis of Redis sorting, you can also use a variety of different ways to meet the various needs of the business, in order not to affect the rate of data query, data are generally in memory cache down first, the difference is Redis will be after a period in the disk to the updated data for writing and coverage, Or you can write the modified action to a log file and append it to the previous log file. The former is the default RDB storage mode, known as RDB, which writes data to a temporary file. Wait until the end of the persistence, with this temporary file, replace the last persisted file, so as to achieve the purpose of data recovery. The advantage is that it only needs to use a separate child process to carry out the persistence operation, and does not need the main process to carry out any IO operation, so as to ensure the high efficiency of Redis; Disadvantage: RDB will persist after a period of time. If Redis fails during the persistence period, data will be lost. Therefore, this method is more suitable for the time when data requirements are not rigorous. Since only the data of the interface needs to be cached, RDB storage mode technology is adopted in this paper to meet the requirements.

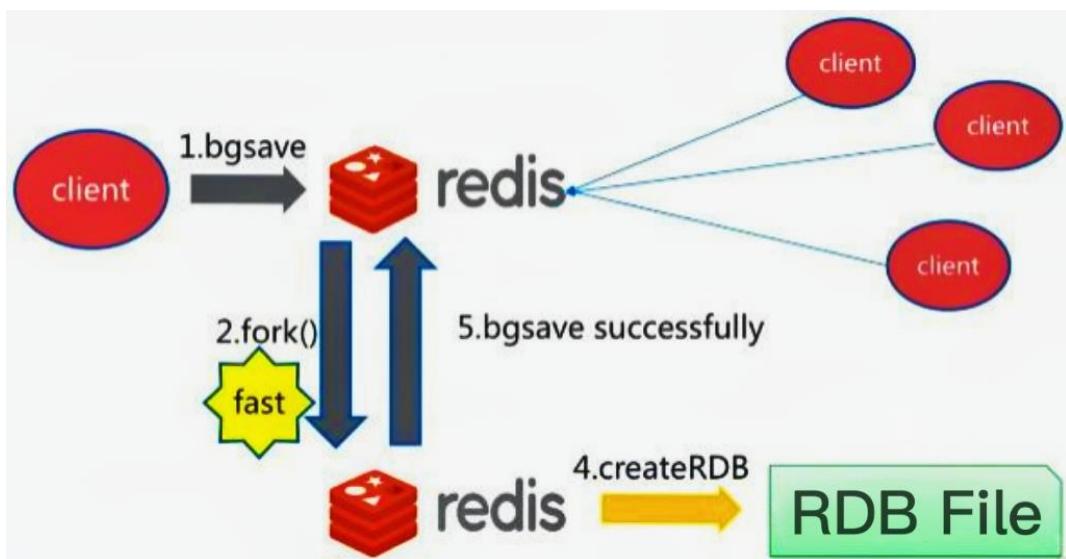


Figure 4 Redis working process

At present, Redis has been widely used. Domestic Taobao, Sina and foreign GitHub are all using Redis caching service. Of course, before the Redis caching technology can be used, a distributed data storage system must be built. In order to improve the efficiency of Redis

distributed data storage, the load of the database must also be taken into consideration, so it needs to build an additional distributed storage system during the development. The traditional relational database uses the CPU or memory to evaluate the cost, but the storage mode and data type of this system are often not very comprehensive. In the process of actual operation, real-time statistics are carried out on the data of multiple types of resources. After the completion of the thread that executes the processing task, the response to the main thread that never serves is completed. Then, based on this, the influencing factors that affect the validity of data storage are determined to realize the reliability evaluation and storage of distributed data

2.5.5 Apache Kafka

Apache Kafka is a distributed publish-subscribe messaging system and a powerful queue that can handle large amounts of data and enable you to pass messages from one endpoint to another for persistent operations. Kafka is suitable for offline and online messaging consumption. Kafka messages are kept on disk and replicated within the cluster to prevent data loss. Kafka is built on top of the ZooKeeper synchronization service. It integrates very well with Apache Storm and Spark for real-time streaming data analysis.[13]

The overall structure of Kafka is very simple. It is explicitly distributed, and there can be multiple producers, Kafka brokers and consumers. The Producer and consumer implement the interface registered by Kafka, and the data is sent from the Producer to the broker, and the broker acts as an intermediate buffer and distributor. The broker distributes consumers registered to the system. Broker acts like a cache, between active data and offline processing systems. The communication between client and server is based on the simple, high-performance, and programming language-independent TCP protocol.

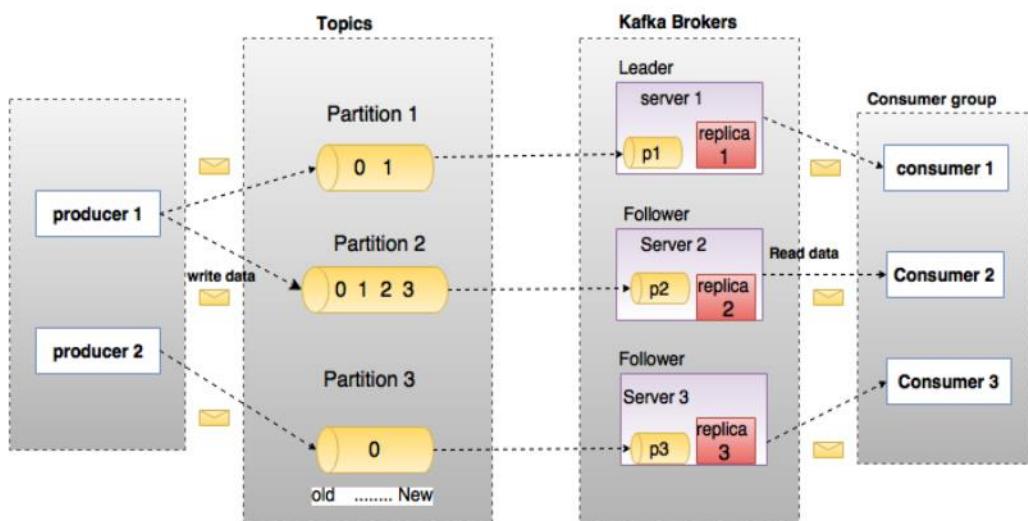


Figure 5 Apache Kafka basic design[13]

Application scenarios include message queue, behavior tracking, meta-information monitoring, log collection, stream processing, event source, and commit log. In this project, Kafka is mainly used to process and send comments, thumb up, attention and other system notifications, and use events for encapsulation, and build a powerful asynchronous message system. Kafka has better throughput, built-in partitioning, redundancy, and fault tolerance than most messaging systems, making Kafka a great solution for large-scale messaging applications. Messaging systems generally have relatively low throughput, but require much smaller end-to-end latency and often rely on the strong persistence guarantees provided by Kafka. In this space, Kafka is comparable to traditional messaging systems such as ActiveMQ or RabbitMQ.

2.5.6 Elasticsearch

Elasticsearch is a distributed free and open source search and analysis engine suitable for all types of data including text, numbers, geospatial, structured and unstructured data, etc. Elasticsearch is fast, has the advantages of scalability and flexibility. In addition, Elasticsearch has a large number of powerful built-in functions that can facilitate users to store and search data more efficiently[1]. With the increase of the number of index libraries, Elasticsearch cluster can be easily expanded to hundreds of service nodes to cope with index writing and search queries of large data scale, with high availability and high concurrency.

The essence of Elasticsearch index design is also to improve the performance of search. Inverse index plays a role in improving the speed of document search. Inverse index is a specific storage form of "word-document matrix", through which you can quickly get a list of documents containing the word by word [14]. Elasticsearch will rebuild a forward index into an inverted index, i.e. a mapping from file ID to keyword into a mapping from keyword to file ID. Each keyword corresponds to a series of files in which the keyword occurs. Inverse indexing generally means finding key according to value. That is, the entire document can be found by keyword.

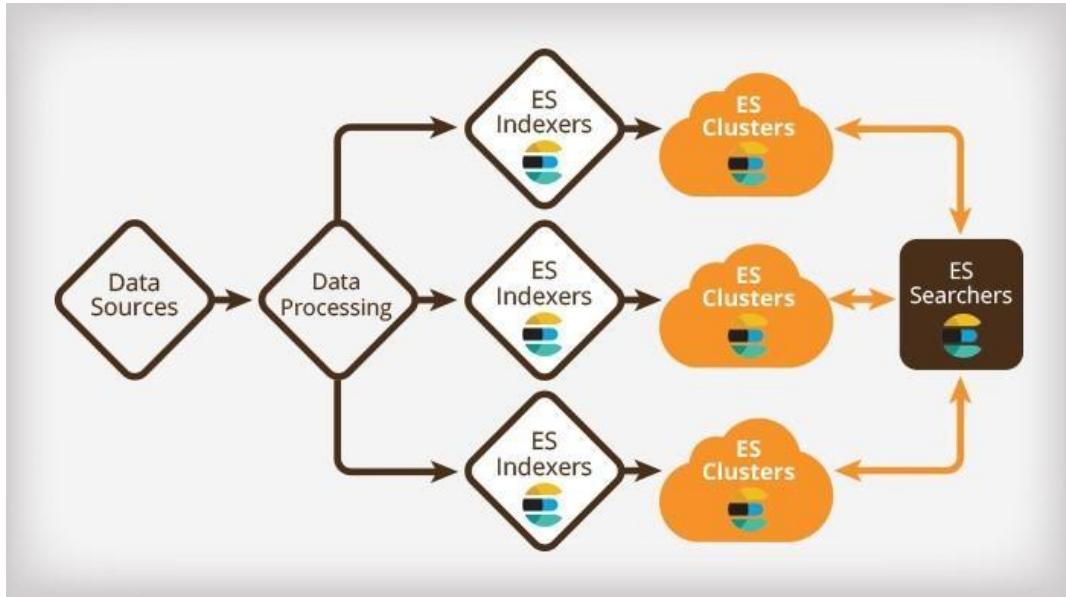


Figure 6 Elasticsearch working process

2.5.7 PhantomJS

PhantomJS is a headless WebKit scriptable with a JavaScript API, simply a programmable headless browser, can be used for page automation, web monitoring, web crawlers and so on. In this project take advantage of its direction in the web crawler, first of all, the ghostDriver opens the page, and then in the pages to obtain the use of JS to download and render information, or access to the link to use JS to jump after the real address. Although the efficiency is very low because many requests will be sent in the process of acquiring pages, the simulation login can crack many anti-crawler technologies, so it can ensure that all the data can be captured.

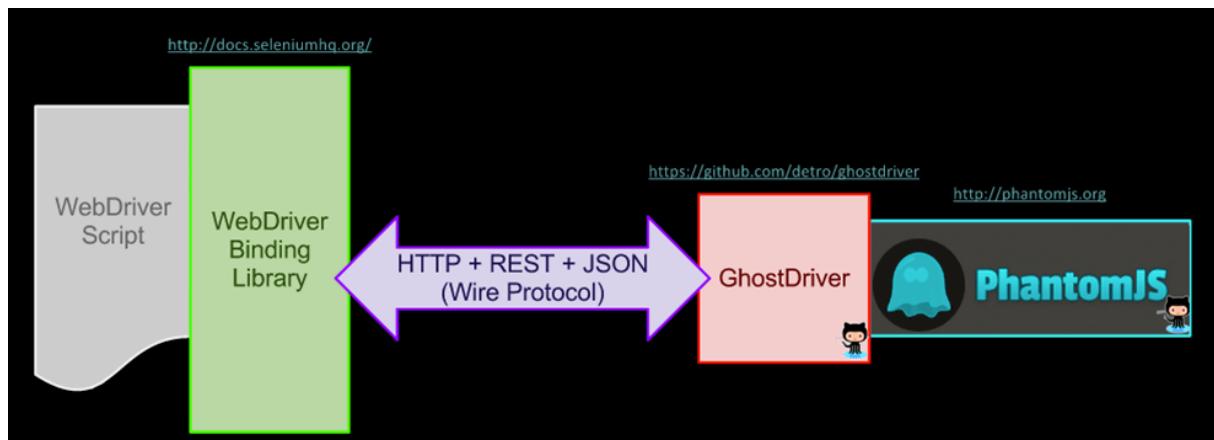


Figure 7 PhantomJS interact with WebDriver

2.5.8 ELK

Elk is short for Elasticsearch, Logstash and Ki Bana. Elasticsearch is the core platform. In the industry, the combination of Elk is mainly used for data processing, data storage and data display. Elasticsearch is an open source distributed search and big data processing platform. It

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is an open source, distributed and RESTFUL information retrieval framework built on Lucene. It can search in real time and support data indexing using JSON via HTTP.

Logstash is a data management tool with built-in analysis and transformation tools. It is a conduit for receiving, processing, and forwarding data. Logstash is responsible for data reception, parsing, filtering and output. Logstash event/message processing pipeline is divided into four sub-modules: input, decoding, filter and output. Each sub-module runs on an independent thread. Communicate through pipes.

Kibana is an open source Web visualization tool for summarizing, analyzing and searching Elasticsearch, Logstash and other important data with a friendly interface.

FileBeat, it is a lightweight log collection and processing tool (Agent), FileBeat occupy fewer resources, suitable for the collection of logs on various servers and then pass to Logstash, FileBeat belongs to BEATS. At present BEATS contains four tools: PacketBeat (collect network traffic data), TopBeat (collect system, process and file system level CPU and memory usage data, FileBeat (collect file data, WinLogBeat (collect Windows event log data).[15]

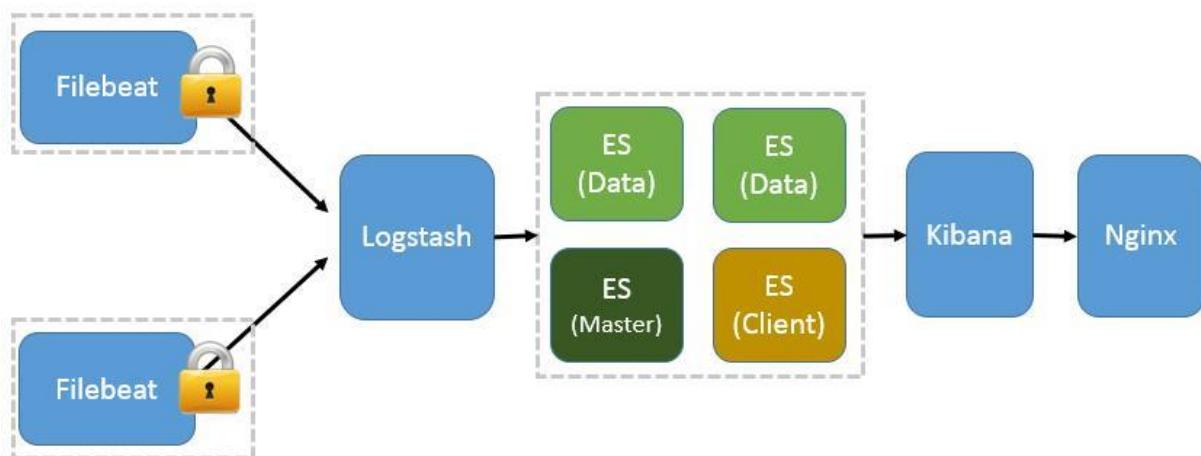


Figure 8 ELK framework

Chapter 3: Design and Implementation

3.1 Agile project management

this project have incremental development by using Agile project management method “Scrum”. There are three phases including initial phase (Outline planning and Architectural design), a series of sprint cycles (Assess, Select, Develop and Review) and the project closure phase.

3.1.1 First Phase: Outline Planning and Architectural Design

Time schedule

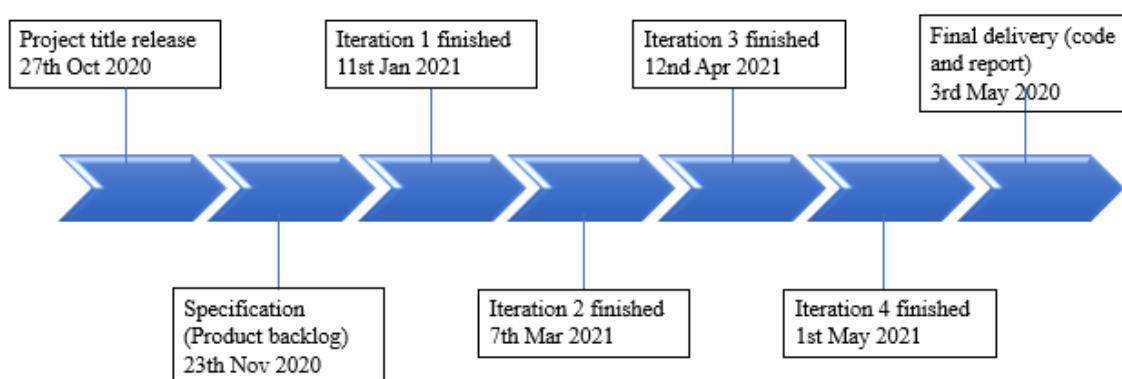


Figure 9 Time schedule

The Design of Software Structure

All data is recorded in MySQL database.

The structure of migration software tool is formed of four main front-end interface:

The web application user interface, which is an interactive interface with crawling data and generating website function, Posting and commenting function, social networking function, reminder function and legal provision search function.

The web application management interface, which contains data statistics and analysis functions.

The e-commerce website user interface, which is used for consumers to register or log in to purchase products and make comments.

The e-commerce website management interface, which is used by web application users to add, delete, update the products information and to remind the merchants of delivery.

3.1.2 Second Phase: The Sprint Cycle

Assess (Product backlog)

Firstly, this project mainly focused on the requirements finding and project planning. A list of product requirements were identified in a prioritized order ---Product Backlog.

Select (Requirements)

At the beginning of each iteration cycle, this project select the functions implemented during iteration period from the Product Backlog and get a Sprint Backlog.

Develop (Java coding)

This project selected some stories as the targets and refined stories to smaller Sprint Backlog. this project choose programming priorities based on the amount of engineering and the importance of functionality.

Review (Finish coding)

This project optimized and finalized the program and took tests to perfect the function of the software. At last, this project summarized and discussed the improved areas which will be placed in the product requirements of next iteration so that it can be ensured what this project developed can adapt to changes.

3.1.3 Third Phase: The Project Closure

Through planning and the next six months of the cycle, my users stayed in touch with the Scrum Master and the developers throughout the process. The e-commerce website migration software related solutions can meet all the needs of current users. Now this project are in the closing phase of the project, where this project will complete the documentation required for the project and summarize the project experience

3.1.4 Risk Management

This project followed the process of risk management. First, risks were identified in project, product and business. Then the likelihood and consequence of these risks were accessed and draw up plans to minimize the effects of the risks, 30% was added for anticipated problems and another 20% were added to cover unanticipated problems. Throughout the project, although there were a lot of risks, including Java code crawler failure, unexpected bugs, and the two programs not being able to interact successfully, the problem was eventually resolved.

3.2 Requirements

3.2.1 Apply the Requirements Finding Techniques

Observation

After observed several similar websites that can automatically build websites, such as Fanke, Huawei Cloud, Tencent Cloud, and software that can crawler, such as Hand Toolbox. Here's what were found in common:

Users can design the front end of the website by themselves.

The system has a huge resource base for users to use and reference.

Users can operate and monitor the website 24 hours a day.

Users can conduct multi-dimensional statistical analysis of website data, and then optimize brand operation strategy.

Users can design a website and submit it to search engines such as Baidu.

Crawler software can crawl more websites and faster.

In addition, most systems have their own sophisticated VIP systems that use different methods, such as website purchases, coupons, etc.

Based on observation, the importance of simple process and diversified function was realized, this project also found some additional requirements :

(1) In order to prevent malicious automated robots from using the website, registration needs to be activated via email, and login needs to be entered a verification code.

(2) Users often input invalid content in boxes, so the verification of input plays an important role in software.

(3) The website manager often needs to conduct statistics and analysis on the click events of the website. The project added methods and visual interfaces that can count the Unique Visitor and Daily Active User of the website.

(4) Users may have questions about the operation of the website and relevant laws. The project have designed a search engine for social networking platform and legal provisions so that users can search and search the previous posts and legal provisions.

(5) In order to prevent users from using the software without checking relevant legal provisions, the project designed that the system will automatically send reminders to users when users

successfully register.

Interviewing

It needs to do some interviews to understand the needs of web applications. People in two roles (shop owners and e-commerce site users) were interviewed. Store owners say an open app that transfers data from other platforms and automatically generates websites is necessary. The security of the transmission process and the beauty and complete function of the generated e-commerce website have been attached great importance. In addition, whether the application is used legally is a top priority. Users of e-commerce websites think that the pages of e-commerce platforms should be beautifully made, the purchase price should be clear, and the goods should be faithful. In addition, the data security of users has also been attached great importance.

Background reading

In order to figure out users' further requirements, it is very essential to be close to reality and accurately find out what they truly need. A number of case studies are did, including legal provisions of e-commerce platforms and illegal cases of computer crawlers, the documentation of existing system and other comments of real users are studied and referred.

3.3 Writing user stories

3.3.1 Functional requirements

Functional requirements for web application

Customers using web application to capture online store data will not violate any legal terms.

Customers have multiple website templates to choose from.

Customers can monitor the use of web pages and order status on the web application.

The web application will recommend and prompt the relevant legal terms to the user.

The captured data package can be directly imported or generated into a database.

The web application has information or picture sharing function.

The web application has thumb up, follow and comment functions.

The web application has chat function.

The web application has a search engine for legal provisions.

Functional requirements for e-commerce website

Customers can choose the quantity and style of the products to be fetched.

The e-commerce website has a chat function.

The e-commerce website has shopping cart, orders, reviews and search functions.

The e-commerce website must have a logistics system.

The e-commerce website has an administrator control system.

The e-commerce website has data analysis and data visualization system.

3.3.2 Other requirements

Reliability requirements

The system should always run normally and will not quit or break down unexpectedly. Basic restrictions and error checking must be considered.

Usability requirements

The web application should be easy to use. The web application should be user friendly.

Security requirements

The web application and e-commerce website should be able to protect the user's personal information and guarantee the security of data transmission

Implementation requirements

The web application is developed using Java as a stand-alone application with simple graphic user interface should be used. All input and output data should be stored in the same database.

Maintainability requirements

The web application should be flexible and extensible, so that it can be used in a general market in the future. The web application should be capable of adapting to such future changes.

3.3.3 Priorities the user stories (using MoSCoW Rules)

Stories are divided into must have, should have, could have and want to have. Then MoSCoW rules were used to do the prioritization. For the elements that must have, they are put into high priority. Meanwhile, the elements which is put into low priority are the elements users want to have.

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Table 1: Priorities

Story ID	Story Name	MoSCoW rule	Priority
So01	Data capture	Must have	Very high
So02	Generate website	Must have	Very high
So03	View stats	Must have	High
So04	Generate database and code package	Should have	Medium
So05	Multiple templates selection	Should have	Medium
So06	Security of the transmission process	Should have	Medium
So07	Law terms search function	Should have	Medium
So08	Law terms recommendation	Could have	Low
So09	Chat function	Could have	Low
So10	Sharing function	Could have	Low
So11	Mail send function	Could have	Low
So12	Login verification code function	Could have	Low
So13	Website usage monitor	Want to have	Very low
So13	VIP system	Want to have	Very low
So14	Thumb and comment function	Want to have	Very Low
We01	Customer view stats	Want to have	Very low
We02	Commodity recommendation function	Want to have	Very low
We03	Commodity purchase function	Must have	Very high
We04	Management function	Must have	Very high
We05	Comment function	Must have	High
We06	Search and sharing function	Must have	High
We07	Payment method selection	Should have	Medium
We08	Logistics system	Should have	Medium

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We09	Chat function	Could have	Low
We10	Data analytic	Could have	Low

3.3.4 Iteration planning

The iteration planning is did based on the priority above

Table 2: Iteration planning

Story ID	Story Name	Iteration planning
So01	Data capture	1
So02	Generate website	2
So03	View stats	3
So04	Generate database and code package	1
So05	Multiple templates selection	2
So06	Security of the transmission process	3
So07	Law terms search function	2
So08	Law terms recommendation	4
So09	Chat function	4
So10	Share function	4
So11	Mail send function	2
So12	Login verification code function	4
So13	Website usage monitor	4
So13	VIP system	4
So14	Thumb and comment function	4
We01	Customer view stats	4
We02	Commodity recommendation function	3
We03	Commodity purchase function	1

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We04	Management function	1
We05	Comment and sharing function	3
We06	Search function	2
We07	Payment method selection	1
We08	Logistics system	3
We09	Chat function	4
We10	Data analytic	3

3.3.5 Adapt to changes

Facing risks during the whole project, some of iterations planning are adjusted. Since this project is divided into three major modules, separately Web Application module, Data Capture Toolkit module and E-Commerce Website module, the whole iteration process is inclined to the modular completion mode. During the development process, the multiple template selection feature was very difficult to implement, so it was developed in the fourth iteration. In addition, when compiling the packet capture module, the format conversion and import of the CSV packet obtained by data capture using the existing crawler software are not ideal, so the crawler toolkit is developed independently for users to choose.

3.4 General project design and evaluation

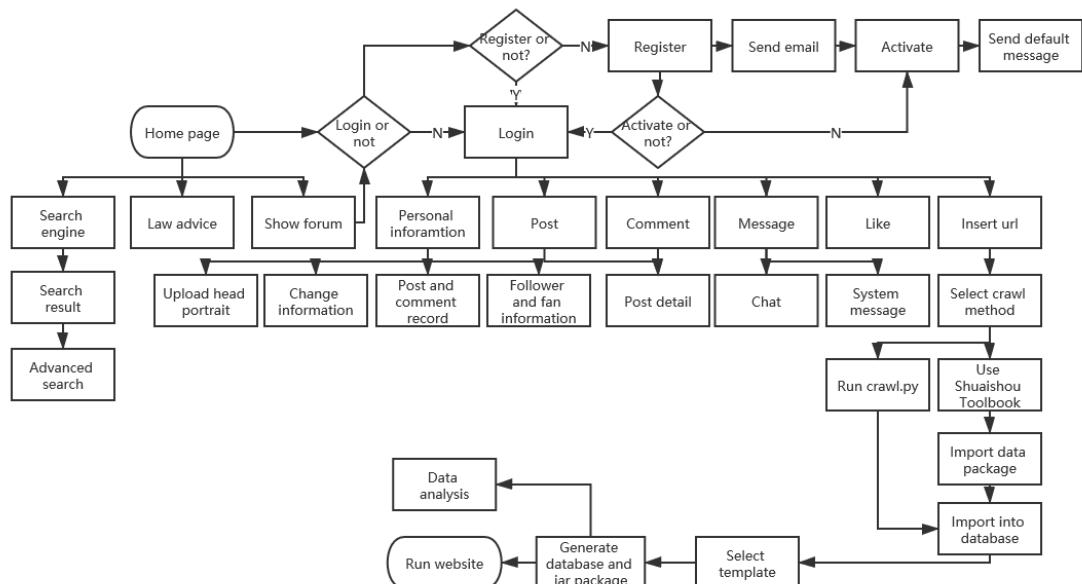


Figure 10 Web application flow chart

3.4.1 Project framework

Develop software: IntelliJ IDEA, Maven, Navicat Premium, MySQL, Jupyter Notebook

Web Application

Language: Java + HTML + CSS

Environment: JDK 11, Tomcat

Framework: Spring + Spring MVC + Mybatis + JQuery + Bootstrap

Middleware

Access control: Spring Security

Cache: Redis

Asynchronous messaging system: Kafka

Database

Language: SQL

Crawl Toolkit

Language: Python

Package: Selenium + PhantomJS + Firefox + BeautifulSoup + pymysql + Pandas

E-commerce Website

Language: Java + HTML + CSS

Environment: JDK 11, Tomcat

Framework: Spring Boot + Spring MVC + JPA + Vue.js + JQuery + + Bootstrap

Middleware

Encryption: Apache Shiro

Cache: Redis

Search engine: Elasticsearch

Log management: Logstash

Data analytic: Kibana

3.5 Construction of the database

3.5.1 Design concept and basic logic

Table 3: Database design Table

Table	Introduction
Law_terms	Store law terms, such as E-commerce law, Robots Exclusion Protocol and other related law terms.
Software_discuss_post	Store post information sent by the users.
Software_message	Store message information, which contains messages sent between users, as well as system default messages
Software_user	Store user information
Software_comment	Store comment information
Shop_category	Store classified information, such as women's clothing, flat screen TV, sofa, etc
Shop_product	Store product information, such as LED flat panel TV, water heater
Shop_product_es	Use to interact with Elasticsearch
Shop_productimage	Store product picture information, such as 5 pictures displayed on the product page
Shop_property	Store attribute information, such as color, weight, brand, manufacturer, model, etc., which is actually a product description
Shop_propertyvalue	Store property value information, is an intermediated table associated with product table
Shop_review	Store product review information
Shop_user	Store user information
Shop_order	Store order information, including mailing address, phone number
Shop_orderItem	Store order item information, including product type, quantity, etc. The order items table is a special table, which is actually an intermediate table associated with several tables

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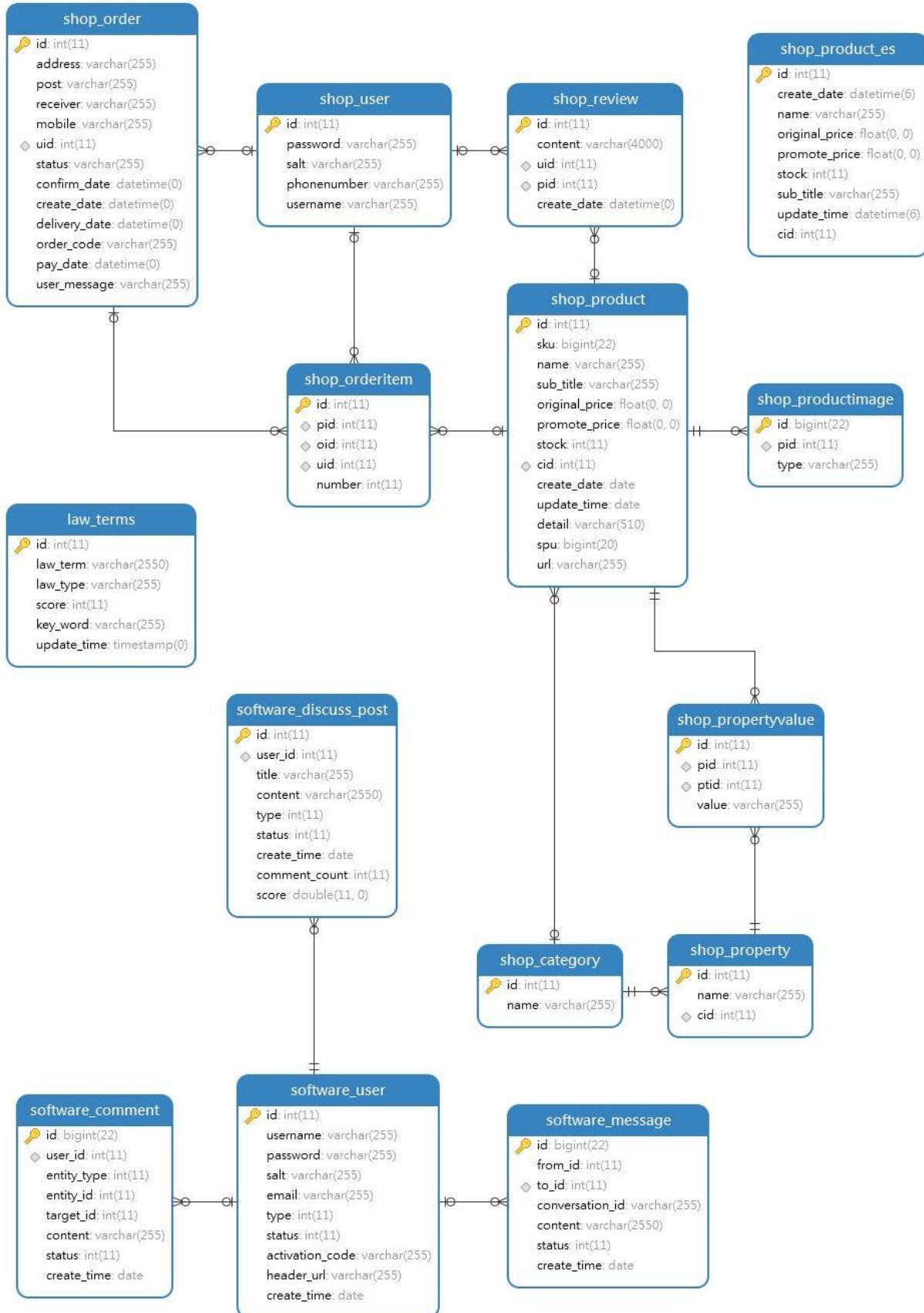


Figure 10 ER diagram

3.6 Construction of the web application

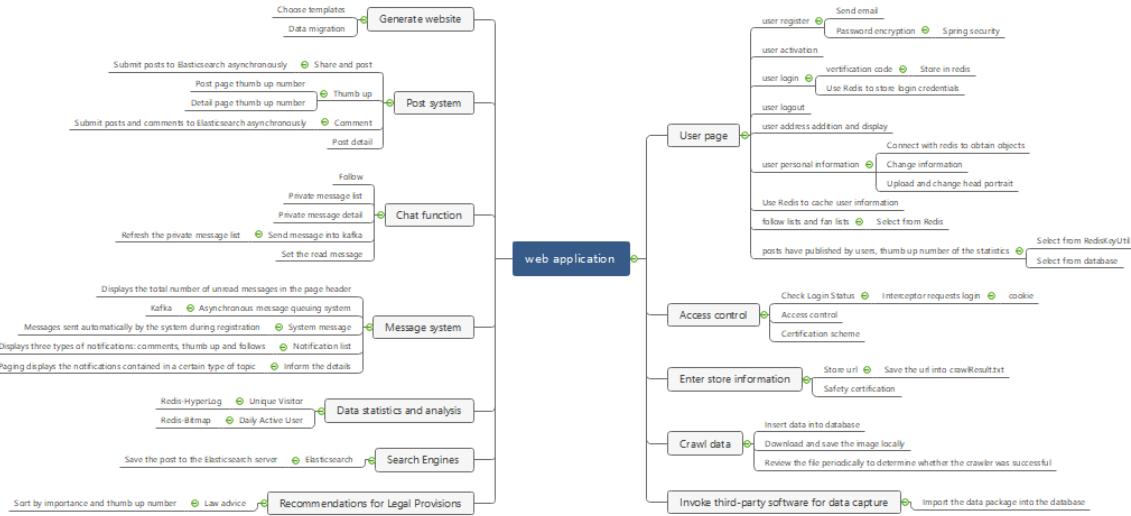


Figure 11 Web application structure and function

3.6.1 Basic flow

Firstly, the core functions of SpringBoot are starting dependencies, automatic configuration and endpoint monitoring. The properties are usually configured in the application.yml file and SpringBoot project is launched through SpringbootApplication program, which automatically configures the Tomcat application server for us. It needs to implement a browser to send a request to the server, which intercepts and accepts the request through the Controller layer, and then calls the Service layer for business logic processing, while the Service layer calls the database for data processing through the DAO layer, encapsulates the obtained data into the Model after the final processing and passes it to the View layer. The project will use the Thymeleaf template engine to generate dynamic HTML. Mybatis, as the framework of data layer technology to realize data interaction operation, is based on JDBC to realize the interaction with the database, and on the basis of JDBC operation to do the packaging and optimization.

3.6.2 Front-end

The structure of web application system is formed of five main project interface:

User interface, which is used by users to register, login as well as supplement or modify the personal information. Post records and comment records are also viewed in the User interface. Besides, information about followings and followers and can also be viewed.

Functional interface, which contains website and function introduction. The users can

choose a function to execute.

Post interface, which used to display existing the posts. Also users can post, comment, thumb up and follow the posters in this interface.

Message interface, which used by users to chat with other users and to view chat logs and system default messages(thumb up message, comment message, follow message and system alert message).

Search and help interface, which provides related law information and advice for users.

There are interactions between each interface. The detailed page results are shown in the appendix.

3.6.3 User module

Mail sending

In order to facilitate authentication, bind a user's associated information, make a login account, retrieve the password, receive email notification and other reasons, the users of web application need to enter their own mailbox when registering and activate the account before using.

First SpringMail needs to be called. By using Thymeleaf to generate dynamic web pages through the template engine, and then use JavaMailSender class to implement the function of sending mail.

Register

First, submit registration data through the form to the LoginController. The Commons Lang package is imported to determine whether a collection or string is null. The UserService server verifies whether the account already exists and the mailbox is registered. Then the CommunityUtil util class is used to generate a random string and use MD5 for password encryption, and then the written data is assigned to the User object, and then the User data is inserted into the database by calling the UserMapper of the DAO layer. The UserService server sends an activation email to the user. A method is created at the business layer to encapsulate the activation logic, changing the user's activation state. When the user clicks the activation email, the user status will change from 0 to 1 and become the activated status. The registration is successful.

Generate verification code

Import the Kaptcha jar package. Since Springboot does not integrate Kaptcha, it needs to configure it independently. By configuring the class KaptchaConfig configuration, the class is then loaded into the Spring container. Write a separate method in the Controller class that returns the CAPTCHA image to the browser. In the front end, with JS implementation, click on the hyperlink to achieve dynamic refresh function.

Sending system default message

When the user is successfully activated, the system will call LawMapper to query the legal provisions with high score and thumb up number, and send these legal provisions to the user by default in the form of system messages. The user can check them in the message notification page, and the number of unread messages on the home page will be refreshed.

List follower and following

First, the Spring project integrates Redis. Then, write a utility class, RedisKeyUtil, to get a key in Redis based on the entity type and entity ID. Add a method to query users' following entities and users' followers in FollowService. After retrieving key and value from RedisKeyUtil, use a List to record all followings or followers. Each person has a HashMap to keep user information and time of following. Add methods to get the list of followers and fans in FollowController, and implement paging function. It also needs to implement a method to determine whether user is followed by others.

Cache module

Use Redis to store CAPTCHA, login credentials, and user information.

In LoginController, the system stores the verification code in Redis and randomly generates a UUID as the authentication code. Text is the verification code, which is stored in the simplest value format (redisKey, text), and the valid time is set to 60s. In addition, the server will send the authentication code ownership, or the authentication code ID KaptChaOwner, in a cookie to the client.

In the UserService class, user information is searched according to the credentials, and the system is set to select the value from the cache first. When the value cannot be

obtained, it will be added to the cache by UserMapper, and the cached data will be cleared when our data is changed.

3.6.4 Post module

Add post

Firstly, the author interacts with the database through DiscussSpostMapper, defines a method to save posts in the business layer, realizes the function of adding posts in the presentation layer, and finally uses JS to perform asynchronous refresh in the front end.

Using asynchronous requests (Ajax), incremental updates are rendered on the page without the need to refresh the entire page (partial updates). Import the fastjson jar package, which can output JSON formatted data to the browser, the browser will convert it into JS object, get the corresponding value of each key, and realize the interaction between the front and back ends.

Transaction management

A transaction is a logical execution unit consisting of a sequence of N database operations that are either executed in full or abandoned. Using declarative transactions in Spring transaction management, the registered user and the automatic sending of the new person check-in post are treated as one transaction in the service layer through the @Transactional annotation.

Show comments

In the data layer, CommentMapper is used to query a page of comment data by entity and the number of comments by entity. At the service layer, CommentService deals with the service of looking up comments and looking up the number of comments. When the controller layer displays the detailed data of a post, it displays all the comment data of the post at the same time.

Add comments

Adding comments needs to ensure the isolation of transactions, because it needs to update the number of comments in adding comments, and the number of comments added and updated posts are encapsulated into one transaction in a declarative transaction.

Thumb up

First, the Service layer implements thumb up, queries the number of thumb up of an entity, and queries the thumb up status of a person to an entity by using redisTemplate.opsForSet() method. In the controller layer, when users thumb up, system accept a POST request, then call the method in the Service layer to complete thumb up, query number, status function, and then add the result to the map and return it.

The system also needs to count the number of likes a user has received so far. After using Redis to record the information of each like, the system defines another method every time the user thumbs up, adding the corresponding value of the key in Redis to 1, if the like is cancelled, the system will subtract 1. The key here corresponds to the entity of thumbs up post or comment rather than the user who thumbs up, and the value corresponds to the entity's like number.

Follow

The follow function is implemented in a similar way to the thumb up function. The difference is that the system stores followers and followings using a ZSet data structure, which is sorted by the following time.

3.6.5 Message module

Private messages list

The Service layer queries the current user's session list and queries the private messages contained in each session. After the Controller layer gets the private message list and the private message details with a certain person respectively, each session in the front end only displays one latest private message. This module needs to support paging.

Sending private messages

The system uses the asynchronous way to send private message, after sending successful, automatically refresh private message list. When the user accesses the private message details, the private message displayed is set to read state.

Sending system notifications

Spring implements system notification by incorporating Kafka into an asynchronous message queue system. After the user comments, thumbs up and follows, the system

will send the system notification asynchronously, so the it can encapsulate three behaviors as events, and then after each event occurs, the producer will trigger the event, and the consumer will automatically send the in-site notification. The logic of the producer is simple, and the event is published to the specified topic via the KafkaTemplate. At this time, the system listens to the topic, obtains the record data and the event object. The event object encapsulates the event information, such as a user thumbs up to a post, then the event encapsulates the user information, post information and so on. Through the event program, the system to send notifications can be encapsulated in message, and then added to the table in database.

Display system notification

The system needs to display the system notifications on the message page, when the user receives thumbs up, comments, and follows. Each category is a topic. On this page, the system will display a topic under the latest notice, it also needs to query a topic contains notice number. When the user check the notice each time, the number of notifications decreases by 1, so the system should query the number of unread notifications first and finally queries the list of notifications contained in a topic. The access methods of the above four kinds of data are written into the MessageMapper. When the user clicks on the system notification list, the MessageController will query three types of notification respectively, encapsulate user information, entity type, entity ID, post ID and other information through MessageVO, and finally encapsulate it into the Model. In addition, the system also needs a MessageInterceptor to display the number of unread messages on the home page.

3.6.6 Search engine module

id	law_term	law_type	score	key_word	update_time
1	E-commerce operators shall register as market subjects in accordance with the law. E-commerce	1 Obligation	2021-05-01 16:13:25		
2	E-commerce operators shall fulfill their tax obligations according to law and enjoy priE-commerce	2 Obligation	2021-05-01 16:13:25		
3	E-commerce operators shall obtain administrative licenses in accordance with law if E-commerce	2 Obligation	2021-05-01 16:13:25		
4	The commodities sold or services provided by e-commerce operators shall comply wE-commerce	1 Obligation	2021-05-01 16:13:25		
5	E-commerce operators selling commodities or providing services shall, according to E-commerce	1 Obligation	2021-05-01 16:13:25		
6	An e-commerce operator shall continue to publicize business license information, ad E-commerce	1 Obligation	2021-05-01 16:13:25		
7	Where an e-commerce operator terminates its engagement in e-commerce on its oE-commerce	1 Obligation	2021-05-01 16:13:25		
8	E-commerce operators shall disclose commodity or service information in a comprE-commerce	2 Obligation	2021-05-01 16:13:25		
9	Where an e-commerce operator provides search results for commodities or services E-commerce	1 Obligation	2021-05-01 16:13:25		
10	E-commerce operators shall draw consumers' attention to the bundling of commodi E-commerce	1 Obligation	2021-05-01 16:13:25		
11	An e-commerce operator shall deliver commodities or services to consumers in the iE-commerce	1 Obligation	2021-05-01 16:13:25		
12	Where an e-commerce operator collects a deposit from a consumer in accordance vE-commerce	1 Obligation	2021-05-01 16:13:25		
13	Where an e-commerce operator has a dominant market position due to such factors E-commerce	1 Obligation	2021-05-01 16:13:25		
14	E-commerce operators shall, in collecting and using their users' personal information E-commerce	2 Data Collection	2021-05-01 16:13:25		

Figure 22 Law terms database

Spring integrates with Elasticsearch. Using an interface LawRepository inheritance ElasticsearchRepository. NativeSearchQuery is to the entrance of the search criteria. Using elasticsearchTemplate.search() to search. Elasticsearch can add tags to the search words to highlight the search results.

```
nativeSearchQueryBuilder.withQuery(QueryBuilders.queryStringQuery(keyword));
HighlightBuilder highlightBuilder = new HighlightBuilder()
    .field("keyword")
    .preTags("<span style=\"color: red\">")
    .postTags("</span>");
```

Figure 33 Highlight setting code

3.6.7 Access control and security module

At present, all the functions that have been developed have corresponding interface paths. Although the user cannot see some function entrance before logging in, if the user knows the corresponding function path, they can directly input the path to access it. Therefore, the system needs to verify the user's login status. When the user is not logged in, the system should deny access to these functions at the server side.

Authorization configuration

Assign access rights to all requests in the current system (normal user, host, administrator). In SecurityConfig class, permission control is carried out through Spring Security, which is mainly divided into authorization and handling when permissions are not enough. Here the system only has previous uploading profile pictures, following, commenting and other functions. The previously implemented functions are accessible to all users, administrators, and moderators (if logged in). Place-top function and delete function will need to assign permissions. When permissions are insufficient, check whether it is due to no login or insufficient permissions, redirect to the login page if not logged in, redirect to the rejected page if permissions are insufficient.

Check login status and certification scheme

Bypassing the Security authentication process, the original authentication scheme of the system is adopted. After checking the credentials in LoginCheckInterceptor class, the authentication result of the user is constructed and stored in SecurityContext, so as to facilitate the authorization by Security.

3.7 Construction of the crawl toolkit

3.7.1 Python crawler scripts

The CrawlController in Web application uses the Runtime.getRuntime().exec() method to run the Python script. Because what needs to be crawled is a dynamic web page, the whole web page will not be generated directly, but dynamically generated by Ajax and other technologies. Thus, the Python script uses Selenium+ PhantomJS +Firefox to simulate an unbounded browser, to simulate user actions, to perform page drop-down and page clicks. The script uses BeautifulSoup package to parse web page. The script will capture the text data into the database, download the product image to the local and rename the product image. If an error occurs during run time, the script writes the log information to a crawresult.txt file and, if successful, writes Success to the same file. After the Python script finishes running, the system opens CrawResult.txt to see if the crawler was successful and send the result to the front-end. If the crawler fails, the system suggests that the user re-enter the URL and re-run the crawler script. Because there are legal risks in using the crawler script developed in this project, the system will issue a risk warning to users before running the script.

3.7.2 Use crawler software to crawl

The Web application also provides users with other ways to import data. Users can use the Shuaishou Toolbox to grab the store data first, and upload the data packets output by the software to the server through the browser page, and the server will run another Python script. The script uses the Pandas package to extract the data from the CSV file and store it in the database.

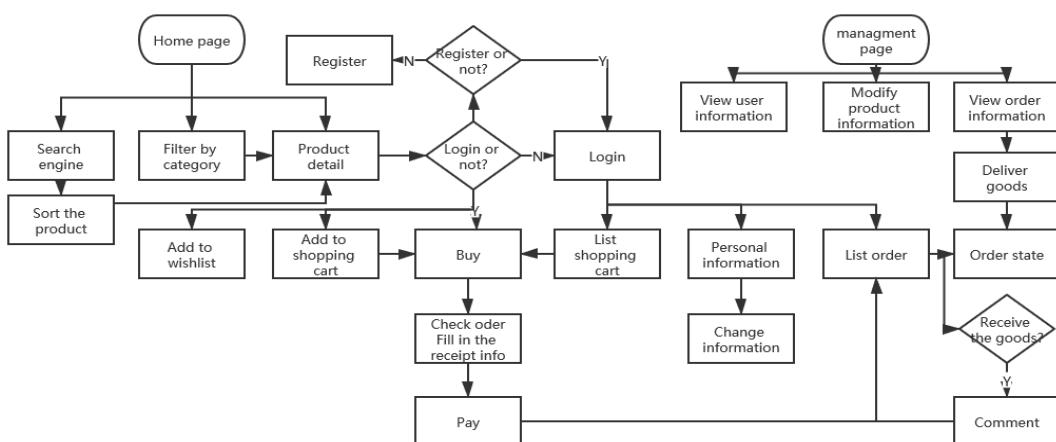


Figure 42 E-commerce website flow chart

3.8 Construction of the e-commerce website

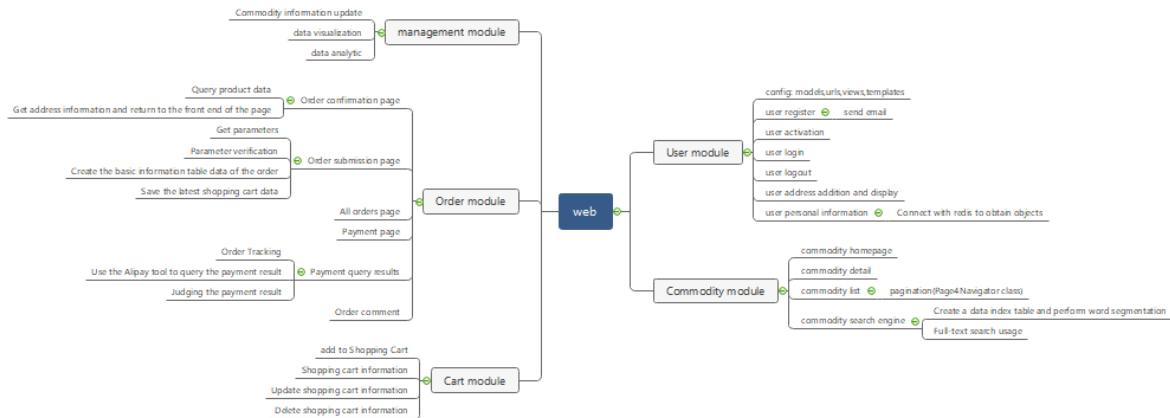


Figure 53 E-commerce website structure and function

3.8.1 Basic flow

The whole project uses Springboot framework, which provides application monitoring at run time, and greatly improves the development and deployment efficiency, optimizes the code. Basic flow is the same as web part. The only difference is that the e-commerce website is based on JpaRepository<T, ID> interface to manipulate the database.

3.8.2 Front-end

The structure of self-service system is formed of two main project interface:

User interface, which is used by users to browse and query products, modify personal information, add to shopping cart, purchase products, view orders, add comment, etc.

Management interface, which is used by site managers to change products information, view user information, view order information, update delivery state, etc.

Thymeleaf

Thymeleaf is an HTML5 templating engine with a much more elegant implementation mechanism than other engines. I use it to optimize the structure of front-end code.

```

<body>
    <div id="workingArea">
        <div th:replace="include/fore/top::top" ></div>
        <div th:replace="include/fore/search::html" ></div>
        <div th:replace="include/fore/home/homePage::html" ></div>
        <div th:replace="include/fore/footer::html" ></div>
    </div>
</body>

```

Figure 64 Front-end code structure

Basic function

Basic functions like registration, login, modifying information, adding to shopping cart, buying goods, filling in comment and viewing the order are all realized through the basic working process. The user sends a request from the browser, the Springboot application receives the request and forwards it to the specified Controller for processing. The Controller send the HTML back to front-end with no data. The JS code on the HTML send request again. The service layer processes logic and operates database through the DAO layer, the DAO layer retrieves the corresponding data and encapsulates data into Model entity and finally the controller layer passes it to the view layer in the form of a JSON array. The page does not refresh because the data is retrieved via Ajax

Security module

Realm is a component that can access application-specific security data such as users, roles, and permissions, and Realm converts the application-specific data into a format that Shiro can understand. The system gets the username and password, gives it to Shiro, and Shiro gives it to Realm to determine if it exists in the database. The encryption of user information is done with Realms. The dogetAuthorizationInfo method is used for authorization, and the dogetAuthenticationInfo method is used for authentication.

Cache module

Similar to Web Application, Redis is used to cache user credentials, user information and shopping cart information.

Products sorting module

Products sorting is implemented using the compare method in the Comparator<T> interface. There are commodity price sorting, commodity creation date sorting, commodity evaluation number sorting and commodity comprehensive rating sorting. The comprehensive rating sorting is based on the number of orders multiplied by the rate of praise to achieve.

Search engine module and data analysis

Since the site from which the project crawled the data was a Chinese site, the search engine needed to use IK_SMART of IK Analyzer for Chinese word segmentation. In

addition, the system also needs real-time monitoring of orders on the website, so the automatic synchronization of data is controlled by setting the time. Logstash keeps track of the last time it was synchronized. If the next time it was synchronized is longer than that, `update_time` will be updated when the data is modified. Time synchronization can be used to synchronize the modified content. With Logstash's real-time monitoring of the site, Kibana can be used directly for data visualization and analysis.

Management module

The implementation of the management module is through the `EntityManager` object in JPA, using the basic CRUD framework for database operations. Figure 15 shows the process of displaying and modifying the `Property` data on the management side. The process of managing product data and category data is basically similar.

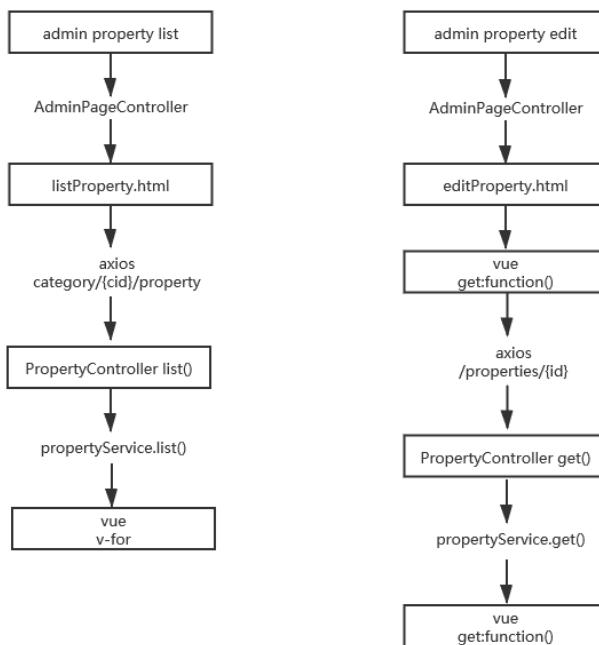


Figure 75 Operation process

The management module also covers the logistics system, in which the administrator will express the goods and update the order status to have been sent after receiving the user's goods order.

Chapter 4: Results and Discussion

4.1 Outcome

4.1.1 Web application

Send email function. (The simulation view is shown in Appendix Figure 16)

Login verification code function. (The simulation view is shown in Appendix Figure 17)

Legal notice function. (The simulation view is shown in Appendix Figure 18)

Upload head portrait function. (The simulation view is shown in Appendix Figure 19)

Search function. (The simulation view is shown in Appendix Figure 20)

Post function and forum page. (The simulation view is shown in Appendix Figure 21)

Post detail page. (The simulation view is shown in Appendix Figure 22)

Comment function. (The simulation view is shown in Appendix Figure 23)

Message function. (The simulation view is shown in Appendix Figure 24)

Follow function. (The simulation view is shown in Appendix Figure 25)

Chat function. (The simulation view is shown in Appendix Figure 26)

Crawl result test. (The simulation view is shown in Appendix Figure 27)

Kafka test success. (The simulation view is shown in Appendix Figure 39)

4.1.2 E-commerce website

Product page. (The simulation view is shown in Appendix Figure 28)

Product detail page. (The simulation view is shown in Appendix Figure 29)

Password encryption function. (The simulation view is shown in Appendix Figure 30)

Shopping cart page. (The simulation view is shown in Appendix Figure 31)

Order page. (The simulation view is shown in Appendix Figure 32)

Order check page. (The simulation view is shown in Appendix Figure 33)

Product sorting page. (The simulation view is shown in Appendix Figure 34)

Comment page. (The simulation view is shown in Appendix Figure 35)

Management page. (The simulation view is shown in Appendix Figure 36)

Logistics supply system. (The simulation view is shown in Appendix Figure 37)

Data analysis. (The simulation view is shown in Appendix Figure 38)

4.2 Discussing

At present, the testers of the website application are satisfied with the basic functions of the project website. Compared with the humanized design, the generated website has complete functions and beautiful pages. However, there are still some problems, such as slow crawler speed, slow production speed of the website, and too basic functions.

At present, the system of this project is not mature enough, and there is still a great way to improve. First of all, it should increase the choice of page template types and build a template library. Further, the web page can be independently designed, and the front-end users of each function module can design patterns, colors and shapes. The crawler toolkit needs to be extended to multiple e-commerce platforms. Add VIP system, and exclusive VIP function. Add the function of automatically generating domain name and upload the designed website directly to Baidu, Google and other search engines and other functions. Post to have top posts and new post function, there is a fixed algorithm for the post rating.

Chapter 5: Conclusion and Further Work

In this project, I tried to build a system that could capture the commodity data of e-commerce platform stores and generate a new e-commerce website. Finally, the basic functions required have been successfully realised, and on this basis, search engine, social platform, chat function, data analysis, data encryption and other functions have been successfully implemented. In the middle of the project, I had some hesitation about whether to develop a software or a web page, but at last, under the guidance of my teacher, I chose to develop a website application, for that the website has greater commercial value. In addition, I could not use frameworks like Kafka and Elasticsearch at the beginning, so I had to learn and configure them from scratch, and encountered many bugs in the process. Finally, with my unremitting efforts, I successfully implemented the asynchronous messaging system and search engine. If I can do this project again, I may choose to spend more time on the production of the e-commerce website, and make this website into an enterprise-level website that can directly generate websites and go online. If I had more time, I would write a front-end CSS for one or more new e-commerce sites to give users more page choices.

Although the basic functions of this project have been relatively comprehensive, there is still a lot of space and value for expansion of this website. The most important extension is the ability for users to independently design the front end of the site. Briefly, for each different function module, users can fill the pattern, change the color, shape and graph, etc., in a simple framework. For example, the registration function is fixed, and users can add pictures, divide areas, and so on based on a simple framework. Eventually, the system will integrate the front-end code of these functions together to produce a new fully functional website. In order to achieve this functionality, I need to learn more about how each interface works and how to use it, as well as how to change the structure of the front end through the back end code. At present, there is no website and software to combine website design, website construction and data migration together. In addition, from a practical application of point of view, automatic website construction will reduce the threshold of website construction and save website builders a lot of time. Therefore, this project has a good prospect.

References

- [1] Notice on Issuing the Standards for the Classification of Small and Medium-sized Enterprises. *The State Council of China*, 2020.
- [2] Philip, J.A.(2006). *Marketing Management: Application, Planning, Implementation and Control*. NJ: Prentice Hall.
- [3] Fangyu L., & Yefei L., C.(2011). Usability evaluation of e-commerce on B2C websites in China. *International conference on advanced in control engineering and information science*. 2011:5297-5302.
- [4] Lusheng P., C.(2015). Design and Implementation of Distributed Electronic Commerce Website. *Automation & Instrumentation*.(6), pp.100-102.
- [5] E-commerce Law. *Fifth Session of the Standing Committee of the 13th National People's Congress*, 31 August, 2018.
- [6] Computer Fraud and Abuse Act (CFAA), *Title 18 U.S.C., Statute 1030*, 1986.
- [7] Yunqiao Q., C.(2020). Web Application and Implementation Based on Spring Security Authentication and Authorization. *Software Development & Application*. 2020.11.005, pp. 14-16.
- [8] Masting (2020). *Spring Security Introduction*. Retrieved May 3, 2021 from Blog Garden website: <https://www.cnblogs.com/masting/p/12820343.html>
- [9] SHIRO (2021). *Application Security With Apache Shiro*. Retrieved February 26, 2021 from Apache-shiro introduction website: <https://www.infoq.com/articles/apache-shiro/>
- [10] OSC (2018). *Shiro Quick Start Cases*. Retrieved February 26, 2021 from OSCCHINA website: <https://my.oschina.net/u/4270211/blog/3820568>
- [11] Li C., & Qing A., C.(2021). Research on page caching based on Redis technology. *Electronic Information*. 1671-7341. 202112035, pp- 74-76.
- [12] BOOTWIKI (2021). *Apache Kafka Basic*. Retrieved May 3, 2021 from BOOTWIKI.COM website: <https://www.bootwiki.com/apachekafka/apache-kafka-fundamentals.html>
- [13] Yunhong S., & Qionggui W., C.G.(2021). Design and implementation of a whole network traffic monitoring system based on Elasticsearch big data search engine. In *The 14th National Conference on Signal and Intelligent Information Processing and*

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Applications. 11 April, 2021 (pp. 474-478).

- [14] Xiaolong R., & Haolin Z., C.(2020). Exploration and Analysis Model Research of Apache Log real-time Analysis System based on ELK. *Computer and Information Technology*. 28(1), pp. 54-57.

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Appendix

北京邮电大学本科毕业设计（论文）任务书

Project Specification Form

Part 1 – Supervisor

论文题目 Project Title	An e-commerce website migration software tool for small businesses		
题目分类 Scope	Software Development	Implementation	Software
主要内容 Project description	<p>Many small businesses started out on a well-known e-commerce platform, such as eBay (or Taobao in China) because of the low cost and hassle free setup. After a few years of success, they may want to launch their own independent e-commerce website to further extend the businesses.</p> <p>This project aims to develop a migration software tool to make the transition smooth and effortless. This tool should be able to import eBay (or Taobao) data on to the new website. After the migration, the new website should be fully functional as an e-commerce platform and some advanced functions must be considered such as data analysis. Relevant legal issues must be considered such as contractual issues for migration of data or linking from the platform websites and intellectual property issues that may impact the migration of data including linking from platform site to merchants own website.</p>		
关键词 Keywords	e-commerce, data processing, legal contract		
主要任务 Main tasks	<p>1 Evaluate the small business process on eBay (or Taobao) and the technical and legal requirements on setting up an e-commerce website.</p> <p>2 Develop a software tool that can extract the required information.</p> <p>3 Build an e-commerce website by using the migration tool to import data.</p> <p>4 Examine any contractual obligations with the platform sites and examine any restrictions arising under intellectual property laws affecting such migration.</p>		
主要成果 Measurable outcomes	<p>1 A functional software tool that can extract information from eBay (or Taobao).</p> <p>2 A fully working well designed e-commerce website that can import data using the migration tool.</p> <p>3 A query feature into the migration software tool, as a value addition, that manages the legal risks to the extent possible and otherwise alerts the merchants to the legal risk and possible solutions.</p>		

北京邮电大学 本科毕业设计（论文）任务书

Project Specification Form

Part 2 - Student

学院 School	International School	专业 Programme	e-Commerce Engineering with Law		
姓 Family name	Zhang	名 First Name	Haohui		
BUPT 学号 BUPT number	2017212901	QM 学号 QM number	171049893	班级 Class	2017215111
论文题目 Project Title	An e-commerce website migration software tool for small businesses				
论文概述 Project outline	<p>The project aims to develop a migration software tool for the small business on a well-known e-commerce platform, such as eBay and Taobao, so that they can launch their own independent e-commerce sites to further expand their business. The software tool is able to extract data from the e-commerce platform and generate a new well-designed full-functional sane-commerce website. The user can choose what data they want to transfer and choose a satisfactory website template, then the software will automatically generate a fully functional offline website. Besides, because the data migration may involve in legal issues, the software have special query features. User can query relevant legal provisions and relevant situations to manage legal risks including contractual and intellectual property issue. The software have warning mechanism to alert merchants about legal risks and possible solutions.</p> <p>I choose to use Agile project management method [1] to develop this data migration software. All the analysis, code and design need to be focused in this project.</p> <p>First of all, we need to identify the requirements. I suppose to use the ‘interviewing’ fact-finding technique, for that the users of the migration software is definitely certain group, namely small business owners. Then, list the product requirements in a prioritized order and write the user stories and Product Backlog based on the interviewing results [2].</p> <p>The second steps is to design a software. The software must include a basic interface. The software should cover a data capture function to capture data from a specific online store on a well-known e-commerce platform, and package it into a data package or json file. Here it can use existing data capture tools such as the shuaishou toolbox [3], or write crawler code to crawl website data. If using crawling, the related legal issues need to be taken into consideration.</p> <p>Besides, the software should have a query feature, the user can find and inquire relevant legal information. The information is stored in a file or a database. The software is written in JAVA language.</p> <p>The third part, extract the information in the data package or json file and stores it in the database. Before this step, it needs to design a database, such as an EER model. The key thing is to match the structure of the data. SQL language will be used here.</p> <p>In the fourth part, the user selects the template of the e-commerce website, which is provided by the software. The number of templates should be as large as possible. In addition, the website template provided by our software should be able to meet the functions required by all e-commerce websites. Then, the software imports the data in the data package or json file into the template, and the user can preview the rendering in the software. After the user has registered</p>				

An E-commerce Website Migration Software Tool for Small Businesses

	<p>the domain name and purchased the server, the website can be launched. Here we use JAVA, HTML, CSS language to build the website.</p> <p>The fifth part is to import the data in the database into elasticsearch and parse it into an inverted index. When users search on the website, the background will use the ik-analyser [4] for word segmentation, search for relevant information in elasticsearch, sort all the searched information, and then print it on a new page according to the order. In addition, all data in the database will be synchronized to logstash and visualized in kibana [5]. Users can monitor the transaction volume and the number of orders in real time.</p> <p>The sixth step is to write some data analysis functions in the back end of the web page, and use the data visualization plug-in to display the analysis results, for example, D3.js, Chart.js [6]. It is worth noting that the login on the web side needs to be divided into two parts, namely administrator login and regular user login. Only the management view requires a plug-in for data visualization, and there are also features that can change the functionality or data of the web pages in the administrator view.</p> <p>The last step is to test and optimize the code and the software function. The whole process will go through three to five iterations.</p> <p>Reference:</p> <p>[1] Wikipedia, (2020). <i>Agile software development</i>. [online] Available from: http://en.wikipedia.org/wiki/Agile_software_development [Accessed 19 November 2020].</p> <p>[2] Mountain Goat Software, (2020). <i>User Stories and User Story Examples by Mike Cohn</i>. [online] Available from: https://www.mountaingoatsoftware.com/agile/user-stories [Accessed 19 November 2020].</p> <p>[3] Shuaishou, (2020). <i>Shuaishou Toolbox Introduction</i>. [online] Available from: http://www.shuaishou.com/products/ToolBox/tg/820887.html [Accessed 10 November 2020].</p> <p>[4] Medcl, (2020). <i>IK Analysis for Elasticsearch</i>. [online] Available from: https://github.com/medcl/elasticsearch-analysis-ik [Accessed 16 November 2020].</p> <p>[5] harrytruman, (2020). <i>ELK + Ansible Tower</i>. [online] Available from: https://github.com/harrytruman/elk-ansible [Accessed 16 November 2020].</p> <p>[6] GitHub, (2016). <i>Data visualization tools for the web</i>. [online] Available from: https://github.com/showcases/data-visualization [Accessed 16 November 2020].</p>
Ethics	Please confirm that you have discussed ethical issues with your Supervisor using the ethics checklist (Project Handbook Appendix 2). [YES]

An E-commerce Website Migration Software Tool for Small Businesses

	Summary of ethical issues: (put N/A if not applicable) N/A
中期目标 Mid-term target. It must be tangible outcomes, E.g. software, hardware or simulation. It will be assessed at the mid-term oral.	The software should be able to extract the data on a well-known e-commerce platform and import the data into the database. I need design at least one web page template. The software can directly generate a web page with the basic functions of an e-commerce site and import the data into it.

Work Plan (Gantt Chart)

Fill in the sub-tasks and insert a letter X in the cells to show the extent of each task

	Nov 1-15	Nov 16-30	Dec 1-15	Dec 16-31	Jan 1-15	Jan 16-31	Feb 1-15	Feb 16-29	Mar 1-15	Mar 16-31	Apr 1-15	Apr 16-30
Task 1 [Evaluate the small business process on eBay (or Taobao) and the technical and legal requirements on setting up an e-commerce website.]												
Evaluate the small business process on eBay and Taobao	X											
Evaluate the technical requirements on setting up an e-commerce website		X										
Evaluate the legal requirements on setting up an e-commerce website			X									
Task 2 [Develop a software tool that can extract the required information.]												
Develop the GUI of the software tool				X								
Use existing data capture tools to extract data or write crawling codes to extract data					X							
Generate database automatically and import the extracted data into the database						X						
Task 3 [Build an e-commerce website by using the migration tool to import data]												
Design a functional e-commerce website template							X					
Import the extracted data into the web pages								X				
Add the data visualization plug-in in the management view									X			
Optimizing web pages, design new website templates										X	X	
Task 4 [Examine any contractual obligations with the platform sites and examine any restrictions arising under intellectual property laws affecting such migration]												
Examine any contractual obligations with the platform sites									X			
Examine any restrictions arising under intellectual property laws affecting such migration										X		
Develop a query feature which manages the legal risks to the extent possible and otherwise alerts the merchants to the legal risk and possible solutions.										X		
Optimizing the software											X	X

北京邮电大学 本科毕业设计（论文）初期进度报告

Project Early-term Progress Report

学院 School	International School	专业 Programme	e-Commerce Engineering with Law		
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论文题目 Project Title	An e-commerce website migration software tool for small businesses				
已完成工作 Finished work: So far, I have completed the content of Gantt Chart TASK1, including evaluate the small Business Process on eBay and Taobao, evaluate the technical requirements on setting up an e-Commerce website.					
<h3>Introduction</h3> <p>Generally, the scale of small business processes regulated by most countries in the world is within the range of no less than 10 employees and no more than 100 employees. We elaborate the small business process on the online retail platform through three aspects: user positioning, pricing and service positioning. For the development of the whole project, we adopt the Scrum method in agile development, which is essentially based on user needs and adopts iterative and step-by-step thinking for software development [1]. Data migration software we use Shuaishou toolkit. For the design and implementation of e-commerce websites, in the initial stage of web development, they are all carried out in the form of more traditional JSP + JavaBean + servlet, which lacks the understanding and application of industry popular framework technology. Currently, we can use SSH framework and SSM framework for web construction. SSH (Structs + Spring + Hibernate) is a lightweight solution based on J2EE enterprise-level Web applications. The framework is based on the MVC development model, using the database mysql to establish a mathematical model, and the database access interface uses the Hibernate framework [2]. SSM (Spring + Spring MVC + MyBatis) is the current mainstream Java EE enterprise-level framework. It is a standard MVC model. Spring MVC is used for request forwarding and view management. Spring is used for business object management, and MyBatis is used as persistence engine for the data object [3]. Besides, with the large-scale and internationalization of e-commerce websites, they must support high-load access and high-concurrency transactions. Therefore, we use the high-performance server Tomcat to process user requests on the backend to form a distributed system, and use the distributed cluster system of distributed databases and applications. In this way, it can not only improve the business processing capacity of the system, but also reduce the error rate caused by high concurrency [3]. For web front-end development, we use DIV + CSS, which means that the HTML code of the web page mainly uses DIV to divide the page into one area to separate the structure and performance. CSS controls the display effect, and CSS beautifies each area [4]. After the static page is built, it is dynamic using JavaScript, and the web page is updated asynchronously through AJAX.</p> <p>We can use Lucence and Solr [5] to complete the site search function, and can also use the F + ELK ((Filebeat: data collection, Logstash: data processing, Elasticsearch: data storage, Kibana: data demonstration) to build Apache log real-time analysis system, based on log statistics, analysis, summarizes the regularity, depicting user behaviour, rapid detection and positioning the reason for the error, etc.[6] In addition, the user-based collaborative filtering algorithm is also used to implement the recommendation function of the e-commerce platform [5]. In the management end, sales statistics and related data analysis can be performed by using D3.js[7] and other data visualization plug-ins.</p>					

As for the legal evaluation of e-commerce websites and data migration, taking China as an example, we have to refer to the Electronic Signature Law, E-commerce Model Specifications, E-commerce Enterprise Qualification Standards, Advertising law, Contract Law, Computer Information Security Protection Rules, Consumer Protection Law and China Internet Domain Name Registration Rules.

Evaluation of the small business process

Definition of small business

China defines the scale of small enterprises in accordance with the industries defined in the "Notice on Issuing the Standards for the Classification of Small and Medium-sized Enterprises"[8]. However, because the goods sold in online stores on Taobao or eBay involve various industries, there is no specific unified standard. Therefore, we use most cases as the standard. Generally, a company with no less than 10 employees and no more than 100 employees is a small company. Other countries' evaluation standards are basically the same as China's

Small Business process on online retail platform

Customer positioning

General online shops will first analyze their target customers, including their hobbies, buying habits, buying frequency, etc., and do a systematic research on this to better grasp the direction of the market. For that the virtuality of online small shops makes buyers and sellers communicate only through words or text, it cannot objectively reflect the wishes of customers. Therefore, the managers of online stores will fully understand the psychology of consumers and adopt effective sales methods to make more netizens their customers.

Pricing

The advantage of a small online store is that it can make use of the interactive function of the network to enable the merchant to directly face the customer. According to the price feedback from customers and the response of the competitor, the price of the product can be adjusted almost instantly. In normal condition, merchants will increase Customer Delivered Value (The difference between Total Customer Value and Total Customer Cost) by increasing TCV and reducing TCC to gain a competitive advantage [9]. Therefore, the standard of pricing is to make customers feel value for money or value for money.

Service positioning

1. Provide diversified pre-sale services

The pre-sales service of general online stores is mainly to make the store's webpage well, which is to make the store's webpage not only distinctive and vivid, but also humanized. The store's webpage is also made to have large product information, clear classification and rich content. It must be convenient for customers to find and browse, so that customers can easily obtain the information of the required products, purchase the products happily, communicate quickly and conveniently, truly experience the difference from the traditional physical market, and truly realize the speed and convenience of the virtual market. The merchants can use network tools to recommend and introduce new products to customers; establish online forums for products, take advantage of the intuitive, interactive, and fast characteristics of the Internet, and adopt corresponding methods to provide customers with comments, discussions, feedback and other columns, encourage customers to actively participate in information and topics of interest or interest, and put forward their own views suggestions, and fully understand customers' evaluations and expectations of products [2].

2. After-sales service should be accurate, timely, home delivered and in place.

Many merchants pay special attention to after-sales service. The after-sales service must be accurate, timely, home delivered and in place, that is, when the customer orders the goods, the delivery must be timely and accurate, and the service must be thoughtful and meticulous. For example, for customers who consume gifts as gifts, the service will reflect fashion and taste. Merchants will respond to customers' queries and complaints in front of the public, enhance the relationship between merchants and customers, and improve customer satisfaction. Practice has proved that good after-sales service can firmly grasp customers, which is the secret to the success of many stores.

The technical requirements on setting up an e-commerce website

E-commerce website characteristics

In addition to the basic characteristics of a website, an e-commerce website should also have the following characteristics [10]:

Virtuality Customers can only understand the shape, characteristics, price and method of application of the products on the e-commerce website through the pictures and descriptions of the products. Therefore, the feeling of the product is not as specific as shopping in a traditional store, unless the product has been used before.

Commerciality The e-commerce website provides a trading platform for buyers and sellers.

Meanwhile, the commercial website can obtain the information left by the customer and the transaction product. Through statistics and analysis of the obtained data, the owner of website can analyze and obtain the sales status of the product and the customer's consumption tendency in time, and adjust the supply or develop new customers according to the analysis results.

Integrity The operation of an e-commerce website involves all aspects. All links are required to function well, such as website production, buyer and seller, banking, insurance, streaming, integrity of both parties to the transaction, and laws. All of these are all an integral whole. If there is a problem in a certain link, it may not achieve the purpose of profitability.

Scalability To ensure the normal development of corporate business activities, the scale of the number of visitors must be taken into consideration. If the customer cannot be responded and dealt with quickly during the peak period of customer visits, it will cause system congestion. So for an e-commerce website, only the expandable system is stable. If you can easily and flexibly expand the functions of the website and add new services according to the needs of business development or technological update, the image and benefits of the enterprise can be further enhanced.

Safety Whether for customers or businesses, security is the top priority for online transactions to prevent viruses, Trojan horses or information leakage. Therefore, the construction of an e-commerce website must consider security solutions, such as firewalls, security certification, security protocols, virus protection and other security measures.

E-commerce website construction plan

1. Demand design

According to the project requirements, the online mall system, as a user shopping system, should include two major parts: the user's front-end shopping and the administrator's back-end management. After analysis and design, the front user part is mainly divided into user registration, login, shopping, electronic payment, comments, forums, announcements. The administrator background management part is mainly divided into commodity management, order management, forum management, bulletin management, user management, comprehensive query, sales statistics, data analysis, system management these modules [2].

2. Design of the development architecture of the system

According to the characteristics of e-commerce websites, the system is divided into application layer, component layer and core layer in development.

(1) Application layer. The application layer mainly includes the UI of the system, the interface logic of the system, and related product functions and services, including product search, online communication, and order placement.

(2) Component layer. The component layer mainly includes the processing of various business logics, such as product query.

(3) The core layer. The core layer mainly processes the user's business, including the system's business layer, business control layer, system model service, data access layer, etc.[6]

3. Design of database schema

The main idea of e-commerce website database design is separation of reading and writing, and vertical division.

The database is divided into query database and transaction database. The query database is mainly responsible for the user's query service, while the transaction database is mainly responsible for the writing of transaction orders, and the transaction database is divided into multiple sub-databases to support high concurrency. The separation of the database fully embodies the principle of reading and writing classification of the database.

The vertical division of data is mainly to divide different databases according to different business functions. The division of databases is mainly used to meet business and capacity scalability, data isolation and other requirements. According to the above principles, the database is divided into merchant database, user database, commodity database, order database, etc.[11]

4. Choose a domain name and space

A good domain name is half the success of an e-commerce platform. A domain name can represent a business name. Be cautious when choosing a domain name and don't register it lightly. It must be decided with a long-term perspective. The domain name should not exceed six letters, and the suffix should be .com. In this way, users can easily remember in future promotion.

5. Web design.

The website art design must generally be consistent with the company's overall image, and must comply with CI specifications. Designers need to pay attention to the use of web colors, pictures, and layout planning to maintain the overall consistency of the web pages. Designers should reasonably use CSS and HTML technologies and art design software to improve the usability and aesthetics of web pages.

6. Initially launch the website

After completing the above steps, upload the program to the space to test the function and performance of the website, such as checking the speed of website opening, whether the website function can operate normally, whether the link of the website can be opened, whether the content of the website is disordered, and so on. If a website is released to users without preliminary testing, it will affect the image of the corporation.

7. Website maintenance

Website maintainer need to maintain servers and related software and hardware, assess possible problems, formulate response times, update and adjust content, and formulate relevant website maintenance regulations to institutionalize and standardize website maintenance. Maintaining databases and effectively using data are important content of website maintenance, therefore, database maintenance should be paid great attention to.

Reference

- [1] Mountain Goat Software, (2020). Learn About Agile. [online] Available from: <https://www.mountaingoatsoftware.com/agile> [Accessed 4 January 2021].
- [2] Yongjian Ting, G.(2020). Design and implementation of e-commerce website based on MVC architecture. *Computer Knowledge and Technology*. 16(21), pp.235-236.
- [3] Lanlan Gong, Xinghong Ling, G. (2020). Practice on development of SSM web application based on agile development. *Experimental Technology and Management*. 37(2), pp.160-164.
- [4] Xiaotong Zhao, G.(2020). Enterprise website construction in the application of the front-end framework technology. *IT CEO & CIO in Information Time*. 23(4), pp.15.
- [5] Qian Wu, Jie Ying, Xu Han, G.(2019). Design and implementation of high concurrency e-commerce platform based on SSM framework. *E-Business Journal*. 19(3), pp.63-66.
- [6] Xiaolong Ruan, Haolin Zhang, G.(2020). Exploration and Analysis Model Research of Apache Log real-time Analysis System based on ELK. *Computer and Information Technology*. 28(1), pp. 54-57.
- [7] GitHub, (2016). Data visualization tools for the web. [online] Available from: <https://github.com/showcases/data-visualization> [Accessed 16 November 2020].
- [8] Notice on Issuing the Standards for the Classification of Small and Medium-sized Enterprises. The State Council of China, 2020.
- [9] Philip Kotler, A.(2006). Marketing Management: Application, Planning, Implementation and Control. NJ: Prentice Hall.
- [10] Fangyu Li, Yefei Li, G.(2011).Usability evaluation of e-commerce on B2C websites in China. *International conference on advanced in control engineering and information science*. 2011:5297-5302.
- [11] Lusheng Pan, G.(2015). Design and Implementation of Distributed Electronic Commerce Website. *Automation & Instrumentation*.(6), pp.100-102.

Problems

At present, I have two problems. Firstly, there are too many legal provisions related to e-commerce websites, so it is difficult to take all the circumstances into consideration. Besides, the relevant legal provisions vary from country to country, and many countries have imperfect legal provisions on data migration, so it is impossible to make a comprehensive summary. The second problem is how to invoke the functions of off-the-shelf software in my own software programs. Third, I am not proficient in using the SSM framework, and I may encounter many problems in the programming process.

Solutions

For the first problem, the solution I can think of at present is to roughly enumerate and analyse the relevant clauses of big countries such as China, the United States and Europe, and analyse and evaluate the legal clauses of existing e-commerce websites (such as Taobao and eBay). As for the other two problems, I still need to check more information on the Internet and the explanation and code on GitHub to solve them.

是否符合进度？On schedule as per GANTT chart?

NO. Because I am preparing for GRE exam this days, so the GUI of the software tool is not completed, I will finish it after the exam immediately.

下一步 Next steps:

Now that the pre-assessment and preparation for software development have been basically completed, the next step is to use agile project development methods to develop software. First make a prototype, after that, program the GUI interface, and then implement data capture by calling the auxiliary tool suite. In the software I wrote. After implementing these functions, we started writing e-commerce web pages and imported the captured data packets into the database and displayed them on the web page.

北京邮电大学 本科毕业设计（论文）中期进度报告

Project Mid-term Progress Report

学院 School	International School	专业 Programme	e-Commerce Engineering with Law		
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BUPT 学号 BUPT number	2017212901	QM 学号 QM number	171049893	班级 Class	2017215111
论文题目 Project Title	An e-commerce website migration software tool for small businesses				
是否完成任务书中所定的中期目标 ? Targets met (as set in the Specification)?	YES				

已完成工作 Finished work:

Before the early-term report, I had already finished the introduction part and the technique evaluation and law evaluation parts of the Preliminary evaluation and description. Also, I had finished some of the GUI of the software part of the project.

2.1 Preliminary evaluation and description

2.1.3 General project evaluation

Develop software: IntelliJ IDEA, Maven, Navicat Premium Software

Language: Java

Environment: JDK 11

Database

Language: SQL

Website

Language: Java + HTML + css

Environment: JDK 11, Tomcat

Framework: Spring Boot + springmvc + Vue.js + JQuery + JPA + + BootStrap

Middleware

Encryption: Apache Shiro

Cache: Redis

Search engine: elasticsearch

Log management: logstash

Data analytic: Kibana

2.2 Construction of the database

2.2.1 Design concept and basic logic

Table	Introduction
Category	Store classified information, such as women's clothing, flat screen TV, sofa, etc
Product	Store product information, such as LED flat panel TV, water heater
ProductImage	Store attribute information, such as color, weight, brand, manufacturer, model, etc., which is actually a product description
Property	Store product picture information, such as 5 pictures displayed on the product page
PropertyValue	Store product review information

Review	Store user information
User	Store order information, including mailing address, phone number, etc
Order	Store order item information, including product type, quantity, etc
OrderItem	The order items table is a special table, which is actually an intermediate table associated with several tables

The User and Category tables have no arrows pointing to them, and therefore have no foreign keys. The foreign key (cid) of the Property table points to the id of the Category table.

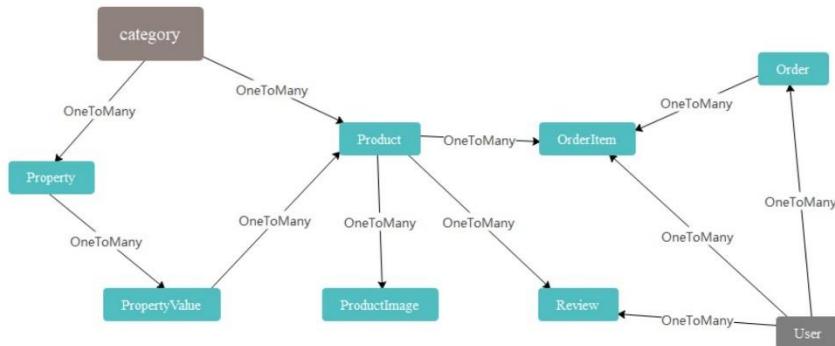
The PropertyValue table has two foreign keys, ptid to the id of the Property table and pid to the id of the Product table.

The foreign key (pid) of the ProductImage table points to the ID of the Product table.

The foreign key (uid) of the Order table points to the ID of the User table.

Review table has two foreign keys, uid to User table id, pid to Product table id.

The OrderItem table has three foreign keys, with the rid pointing to the ID of the Review table, the uid pointing to the ID of the User table, and the pid pointing to the ID of the Product table.



2.2.2 Table function

User Table The login page collects the user's account and password

Category Table The vertical navigation bar on the home page displays all 17 categories

Property Table Under the product details TAB of the product page, display all the properties set by the corresponding category of the product, that is, the specific description of the product.

Product Table The product information on the product page displays the product name, subtitle, original price, promotion price, sales volume, inventory and other information

PropertyValue Table Under the Product Details tab on the product page, display all the attribute values of this product

Product Image Table Display 5 individual images on the product page

Review Table The product page displays the evaluation information

Order Table The information of this form is displayed in the background management system.

Order Item Table The order item information seen in the shopping cart

2.3 Construction of the Software

2.3.1 Development Process

We have incremental development by using Agile project management method “Scrum”. There are three phases including 1) initial phase (Outline planning and Architectural design) 2) a series of sprint cycles (Assess, Select, Develop and Review) and 3) the project closure phase.

The Sprint Cycle

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- 1 Assess (Product backlog) Firstly, we mainly focused on the requirements finding and project planning. We identified a list of product requirements in a prioritized order ---Product Backlog.
2. Select (Requirements) At the beginning of each iteration cycle, an iteration planning meeting was held to select the functions implemented during iteration period from the Product Backlog and get a Sprint Backlog.
3. Develop (Java coding) I selected some stories as the targets and refined stories to smaller Sprint Backlog. I choose programming priorities based on the amount of engineering and the importance of functionality.
4. Review (Finish coding) I optimized and finalized the program and took tests to perfect the function of the software. At last, I summarized and discussed the improved areas which will be placed in the product requirements of next iteration so that it can be ensured what I developed can adapt to changes.

Writing User Stories

1. Function Requirements

Customers using software to capture online store data will not violate any legal terms.
Customers have multiple website templates to choose from.
Customers can monitor the use of web pages and order status on the software.
The software will recommend and prompt the relevant legal terms to the user.
The captured data package can be directly imported or generated into a database.
Customers can choose the quantity and style of the products to be fetched.
The website has a chat function.
The website must have a logistics system.
Website has information and picture sharing function.

2. Other Requirements

Reliability requirements The system should always run normally and will not quit or break down unexpectedly. Basic restrictions and error checking must be considered.

Usability requirements The software should be easy to use. The software should be user friendly.

Implementation requirements The software is developed using Java as a stand-alone application with Simple graphic user interface (GUI) should be used. All input and output files should be in simple text file format.

Maintainability requirements The software should be flexible and extensible, so that it can be used in a general market in the future. The software should be capable of adapting to such future changes.

Priorities the User Stories (Using MoSCoW Rules)

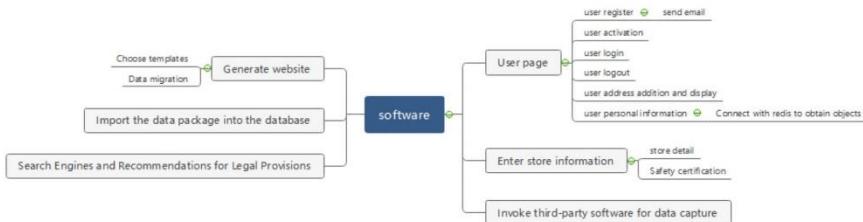
Story ID	Story Name	MoSCoW rule	Priority
So01	Data capture	Must have	Very high
So02	View stats	Must have	High
So03	Store owner identity verification	Must have	High
So04	Generate database	Should have	Medium
So05	Multiple templates selection	Should have	Medium
So06	Generate website	Must have	Very high
So07	Security of the transmission process	Should have	Medium
So08	Law terms recommendation	Could have	Low
So09	Website usage monitor	Want to have	Very low
So10	VIP system	Want to have	Very low
We01	Customer view stats	Want to have	Very low
We02	Commodity recommendation function	Want to have	Very low
We03	Commodity purchase function	Must have	Very high
We04	The way to pay	Should have	Medium
We05	Logistics system	Should have	Medium
We06	Chat function	Could have	Low
We07	Sharing function	Could have	Low

An E-commerce Website Migration Software Tool for Small Businesses

We08	Data analytic	Could have	Low
Iteration Planning			
We did the iteration planning based on the priority above			
Story ID	Story Name	Iteration planning	
So01	Data capture	1	
So02	View stats	2	
So03	Store owner identity verification	2	
So04	Generate database	3	
So05	Multiple templates selection	3	
So06	Generate website	1	
So07	Security of the transmission process	3	
So08	Law terms recommendation	4	
So09	Website usage monitor	5	
So10	VIP system	5	
We01	Customer view stats	5	
We02	Commodity recommendation function	5	
We03	Commodity purchase function	1	
We04	The way to pay	3	
We05	Logistics system	3	
We06	Chat function	4	
We07	Sharing function	4	
We08	Data analytic	4	

Adapt to changes

Facing risks during the whole project, we adjusted some of our iterations planning.



2.3.2 Front-end

The structure of self-service system is formed of three main GUI interface:

- 1) User interface, which is used by consumers to register, login as well as supplement or modify the personal information;
- 2) Functional interface, which means you can choose a function to execute;
- 3) Search and help interface, which provides related law information and advice for users.

Prototyping

Based on collected requirements, we designed prototype of our software so that we can get quick feedback at the early stage of design. We first do some low-fidelity prototyping using paper and sketch. To present our software clearly and get the feedback more precisely, we then improved our prototype by drawing using a website (MoDao.com).

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The screenshot displays the Data Migration Tools for E-commerce Websites software interface. The top portion of the interface shows a selection screen for different migration templates, specifically TEMPLATE 1, TEMPLATE 2, TEMPLATE 3, and TEMPLATE. Each template has a 'choose' button next to it. The bottom portion of the interface is a detailed configuration form for a migration from Taobao. It includes fields for 'name' (填入企业), 'e-mail' (Enter email for retrieving), 'password' (Cheng password), 'store owner name' (店主人姓名), 'store URL' (Store URL), and 'new URL' (New website). There is also a checkbox for agreeing to terms and conditions (I agree to (E&E Use Agreement) and (Our Privacy Agreement)) and a 'SUBMIT' button.

3. The prototype

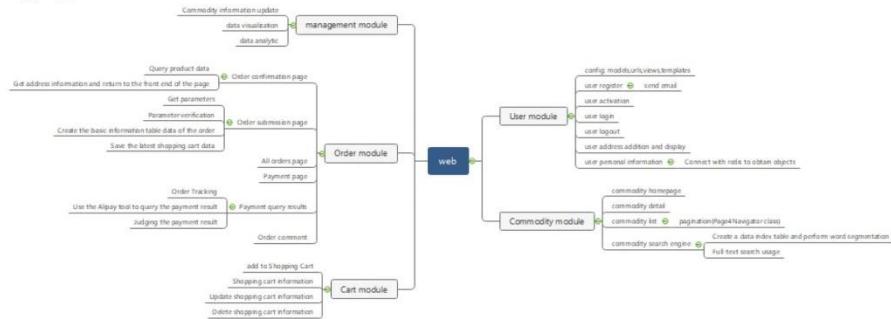
Then there is the interface prototype, the project design process with smooth communication with customers must have the prototype this link. With the help of interface prototype, it can achieve the consistency with customers' needs with low cost and high efficiency. We design multiple front end templates to better meet customer needs.

4. No-login module development

From the dependency between foreground modules, as well as the rationality of the development sequence to consider, the foreground functions are divided into functions that can be used without login, and functions that need login to access. Start with a series of logon-free features.

5. Login module development

Finally, there are the front desk functions that require login. This part of the function is basically shopping related.\



2.4.2 Front-side

Thymeleaf

Thymeleaf is an XML/XHTML/HTML5 templating engine with a much more elegant implementation mechanism than other templating engines. Because of the various bindings and controls in the form of attributes, the template does not break the syntax structure of HTML [1]. This gives you an important feature that no other template engine has: templates defined by Thymeleaf can be rendered properly. This makes it easy to change templates and tests.

```
<body>
<div id="workingArea">
    <div th:replace="include/fore/top::top" ></div>
    <div th:replace="include/fore/search::html" ></div>
    <div th:replace="include/fore/home/homePage::html" ></div>
    ● <div th:replace="include/fore/footer::html" ></div>
</div>
</body>
```

Vue.js

Vue.js is a progressive framework for building user interfaces. At its core is a system that allows declarative rendering of data into the DOM using a concise templating syntax: Vue's core library focuses only on the view layer, making it easy to get started and integrate with third-party libraries or existing projects. On the other hand, when used in conjunction with a modern toolchain and a variety of supporting libraries, Vue is perfectly capable of powering complex single-page applications [2].

Ajax

Ajax is a web development technology for creating interactive, fast and dynamic web applications. Ajax enables Web pages to be updated asynchronously, with a small amount of data exchanged

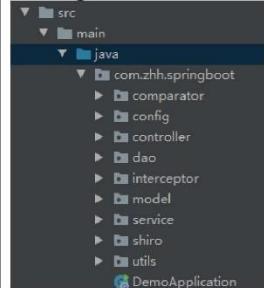
with the server in the background. This means that you can update parts of a Web page without reloading the entire page.

Data Visualization

2.4.3 Back-side

The whole project uses Spring Boot framework, which enables the project to run independently without external dependency on Servlet container, provides application monitoring at run time, and greatly improves the development and deployment efficiency, simplifies and optimizes the code.

Package introduction



Comparator Retrieves all data from the database and then sorts it.

Dao It inherits JPRepository, which provides various common features of CRUD and pagination.

Interceptor Distinguishing between logged in and unlogged browsing interface for page jump.

Model The main storage entity class.

Service It interacts purely with data in the database. Files in the package are reprocessed logic in the Dao layer for easier use by the Controller layer

Working Process

The user sends a request from the browser, and the Web application receives the request and forwards it to the specified Controller for processing. The specified Controller returns a page containing no data to the browser. The JS code of the page then sends another request, which the Web application receives, retrieves the corresponding data from the database, and then sends it to the browser in the form of a JSON array.

JPA

JPA, Java Persistence API, one of the goals is to provide a simpler programming model designed to standardize and simplify the Persistence of Java objects. The JPA framework supports container-level transactions such as large data sets, transactions and concurrency, which makes JPA go beyond the limitation of simple persistence framework and play a greater role in enterprise applications [3].

SHIRO

Realm is a component that can access application-specific security data such as users, roles, and permissions, and Realm converts the application-specific data into a format that Shiro can understand [4]. The encryption of user information is done with Realms.

```
@Override  
protected AuthenticationInfo doGetAuthenticationInfo(AuthenticationToken token) throws AuthenticationException {  
    String userName = token.getPrincipal().toString();  
    User user = userService.getByUsername(userName);  
    String password = user.getPassword();  
    String salt = user.getSalt();  
  
    SimpleAuthenticationInfo simpleAuthenticationInfo = new SimpleAuthenticationInfo(userName, password,  
        ByteSource.Util.bytes(salt),  
        getName());  
  
    return simpleAuthenticationInfo;  
}
```

Redis

Redis is a high performance key-value database. Redis uses memory as the data storage medium, which makes reading and writing data extremely efficient and more persistent. Redis supports master-slave synchronization [5]. Data can be synchronized from the master server to any number of slave servers, which can be associated with other slave servers, and can be configured in clusters to support large projects.

```
//Used to start the cache
@EnableCaching
@EnableJpaRepositories(basePackages = {"com.zhh.springboot.dao", "com.zhh.springboot.model"})
public class DemoApplication {
    static {
        //Use to check if the port has been started.
        //Check that port 6379 is started. 6379 is the port used by the Redis server. If it does
        PortUtil.checkPort( port: 6379, server: "redis server ", shutdown: true);
    }
}
```

Reference

- [1] Thymeleaf, (2021). What's thymeleaf. [online] Available from: <https://www.thymeleaf.org/> [Accessed 26 February 2021].
- [2] Vue.js, (2021).Vue.js introduction. [online] Available from: <https://cn.vuejs.org/v2/guide/> [Accessed 26 February 2021].
- [3] JPA, (2021). Spring Data JPA,. [online] Available from: <https://spring.io/projects/spring-data-jpa> [Accessed 26 February 2021].
- [4] SHIRO (2021). Application Security With Apache Shiro . [online] Available from: <https://www.infoq.com/articles/apache-shiro/> [Accessed 26 February 2021].
- [5] Redis, (2021). Introduction to Redis . [online] Available from: <https://redis.io/topics/introduction> [Accessed 26 February 2021].

尚需完成的任务 Work to do:

Create templates for multiple web front ends
Sites join search engines
Perfect software function
Software to add search engines and data analysis tools

存在问题 Problems:

How does a web back-end connect multiple front-end templates?

拟采取的办法 Solutions:

Make a software plug-in
Will page front templates only change color images and no functional elements, using Thymeleaf framework.

论文结构 Structure of the final report:

Title

Abstract and keywords

Chapter 1 Introduction

(Here I will briefly introduce the project the main function and propose of the project, and I will mention the framework and program language and technology I will use.

Chapter 2 Task splitting and description

2.1 Preliminary evaluation of the project

(Here I will perform a pre-development assessment of the entire project at the project, technical and legal levels and make a total integrated planning)

2.2 Construction of the database

(Here I will introduce how I build the database and write technical details.)

2.3 Construction of the software

2.3.1 Development process

2.3.2 Front-end

(Here I will talk about the process of building the GUI of the code.)

2.3.3 Back-end

(Here I will talk about the process of building the back-end of the software, introduce the logic and specification of the code.)

2.4 Construction of the website

2.4.1 Development process

2.4.2 Front-end

(Here I will talk about the process of building the front-end of the code, and introduce the logic and the techniques used)

2.4.3 Back-end

(Here I will talk about the process of building the back-end of the software, introduce the logic and specification of the code, and the framework of the program.)

Chapter 3 Introduction of the software function and website function

3.1 Data extract and migration

3.2 Advanced search and Law term recommendation

3.3 Generate website and automatic data transmission

3.4 Data analytic and data visualization

Chapter 4 Problems encountered and corresponding solutions

Chapter 5 Skills gained during the project

Chapter 6 Summery

Chapter 7 Reference

Chapter 8 Appendix and screenshot

北京邮电大学 本科毕业设计（论文）教师指导记录表

Project Supervision Log

学院 School	International School	专业 Programme	e-Commerce Engineering with Law							
姓 Family name	Zhang	名 First Name	Haohui							
BUPT 学号 BUPT number	2017212901	QM 学号 QM number	171049893	班级 Class	2017215111					
论文题目 Project Title	An e-commerce website migration software tool for small businesses									
Date: 03-10-2020 Supervision type: e-mail Summary: I introduced myself to Dr Ling, and discussed with Dr Ling the direction of the project and the functions that need to be implemented. In addition, I also made a simple assessment of the technology required for the project and the legal issues involved. Dr Ling responded and corrected my materials.										
Date: 04-11-2020 Supervision type: online meeting Summary: This is a group meeting. Everyone introduce themselves, let Dr Ling know us. Dr Ling introduced the project arrangement, meeting key points, time schedule and the introduction of project specification.										
Date: 08-1-2021 Supervision type: online meeting Summary: I showed my recent results to Dr Ling. At the meeting, Dr Ling explained my current problems and the direction for improvement. In addition, Dr Ling also gave me guidance on the writing of the early-term report.										
Date: 29-1-2021 Supervision type: online meeting Summary: I showed Dr Ling what I had accomplished since the last meeting. Dr Ling pointed out problems and made suggestions about what I had accomplished. In addition, Dr Ling also arranged an approximate time for the next meeting.										
Date: 19-2-2021 Supervision type: online meeting Summary: I showed Dr Ling the results of this time, and Dr Ling explained my current problems and the direction for improvement in the meeting. I discussed with Dr Ling a problem that I did not solve, and Dr Ling gave me a direction. In addition, Dr Ling also emphasized the materials required for mid-term acceptance and the corresponding submission time.										
Date: 3-3-2021 Supervision type: online meeting Summary: This is a group meeting. Everyone made his current results into ppt and displayed them. The teacher summarized everyone's problems and gave suggestions. In addition, the teacher also explained in detail the requirements for the mid-term acceptance.										
Date: 25-3-2021 Supervision type: online meeting										

An E-commerce Website Migration Software Tool for Small Businesses

Summary: I showed the recent results to Dr Ling. Dr Ling knew my progress and put forward requirements for my next stage of work. In addition, Dr Ling explained and summarized the results of my mid-term acceptance and reminded me of the submission time of the first draft of the final report.

Date: 22-4-2021

Supervision type: online meeting

Summary: I showed Dr Ling the modules I have completed and the functions implemented, and asked some key questions to Dr Ling. Dr Ling explained and explained the problems in the draft of my final report ,and gave some modules of the final report explanations and suggestions. In addition, Dr Ling reminded me the time for the final report and code, and urged me to make a finished product as soon as possible.

An E-commerce Website Migration Software Tool for Small Businesses



1326036712@qq.com, Hello!

You are registering COWCRAWL, this is an activation email, please click [this url](#), to activate your account!

Figure 16

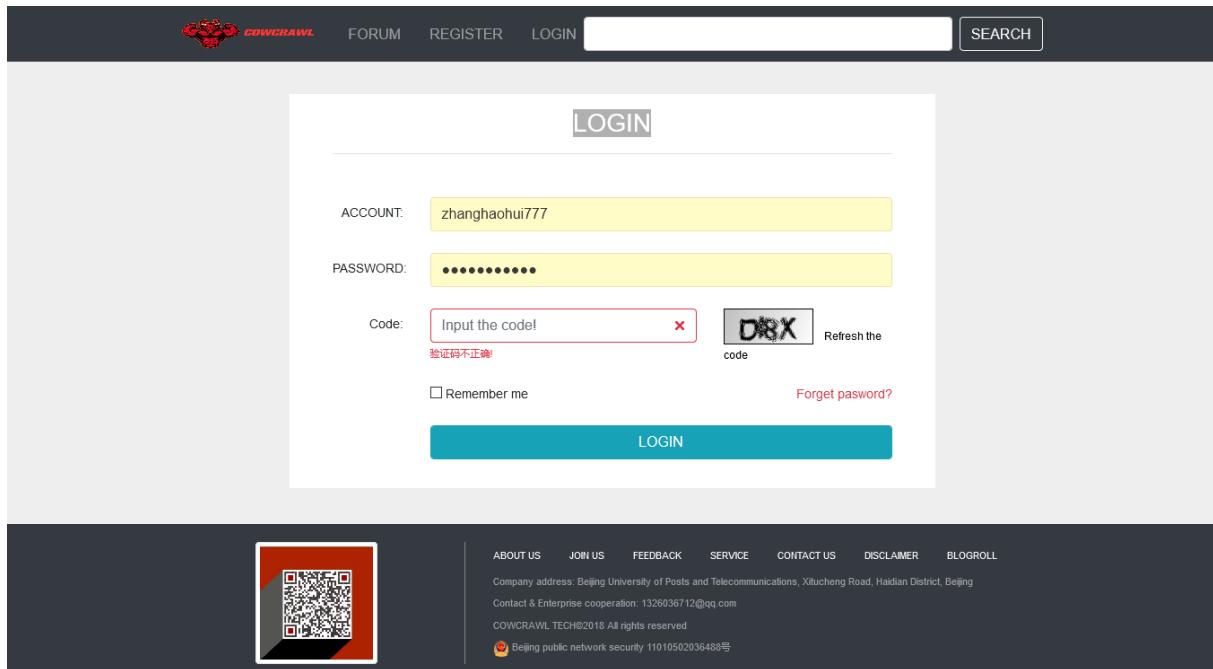


Figure 17

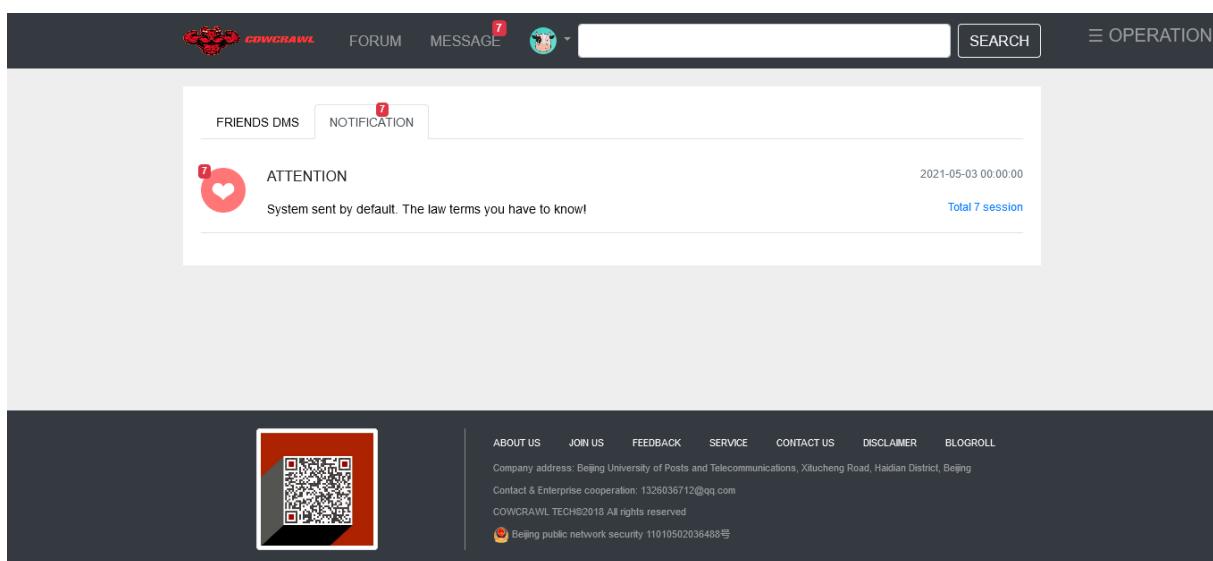


Figure 18

An E-commerce Website Migration Software Tool for Small Businesses

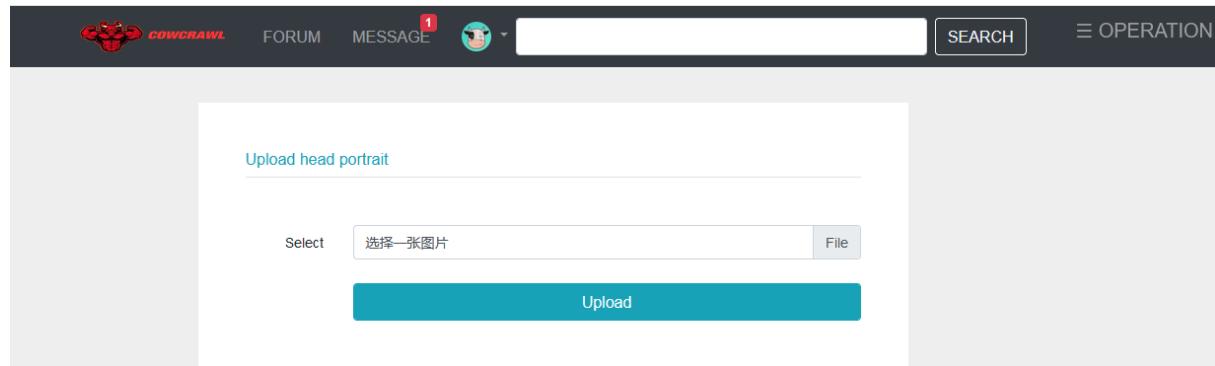


Figure 19

An E-commerce Website Migration Software Tool for Small Businesses

The screenshot displays a web-based application interface for managing e-commerce laws. At the top, there is a navigation bar with links for 'FORUM', 'MESSAGE' (with a red notification badge), 'SEARCH', and 'OPERATION'. Below the navigation, a section titled 'LAW ADVICE' is shown, specifically for 'E-commerce Law'. The page lists several articles, each with a title, a brief description, and a 'LIKE 0' button. The articles include:

- E-commerce Law: E-commerce operators shall fulfill their tax obligations according to law and enjoy preferential tax benefits according to law.
- E-commerce Law: E-commerce operators shall obtain administrative licenses in accordance with law if they need to obtain relevant administrative licenses for their business activities.
- E-commerce Law: E-commerce operators shall disclose commodity or service information in a comprehensive, true, accurate and timely manner to protect consumers' right to know and right to choose. E-commerce operators shall not fabricate transactions, fabricate user evaluations and other ways to carry out false or misleading commercial publicity, deceive and mislead consumers.
- E-commerce Law: E-commerce operators shall, in collecting and using their users' personal information, comply with the provisions of laws and administrative regulations on the protection of personal information.
- E-commerce Law for e-commerce platform: Operators of e-commerce platforms shall take technical measures and other necessary measures to ensure their network security and stable operation, guard against network illegal and criminal activities, effectively respond to network security incidents and ensure the security of e-commerce transactions.
- E-commerce Law - Contract: An e-commerce operator shall clearly, comprehensively and explicitly inform users of the steps, matters needing attention and downloading methods for concluding a contract, and ensure that users can read and download it conveniently and completely.
- Robots Exclusion Protocol: Robots exclusion is the file for security and privacy considerations, to prevent the search engine to grab sensitive information and set all content is contained in a test file (robots.txt), is the search engine to visit a website to view the first file. The principle of search engine is through a kind of spider program, automatically collect web pages on the Internet and obtain relevant information. And in view of the network security and privacy concerns, each site can set up its own Robots agreement, to express the search engine, which content is willing to allow collected by search engine, which is not allowed, the way to search engine, convenient crawler better grab your content, but also protect the small and medium-sized websites traffic balance. Avoid the crawler fast crawl to the website server to bring too much pressure.
- E-commerce Law: E-commerce operators shall register as market subjects in accordance with the law.
- E-commerce Law: The commodities sold or services provided by e-commerce operators shall comply with the requirements for the protection of personal and property safety and the requirements for environmental protection, and they shall not sell or provide commodities or services that are prohibited from trading by laws and administrative regulations.
- E-commerce Law: E-commerce operators selling commodities or providing services shall, according to law, issue paper invoices or electronic invoices and other purchase vouchers or service vouchers. The electronic invoice has the same legal effect as the paper invoice.
- E-commerce Law: An e-commerce operator shall continue to publicize business license information, administrative license information related to its business operations, information that does not need to be registered as a market subject in accordance with the provisions of Article 10 of this Law, etc. in a prominent position on its home page, or the link marks of the above-mentioned information. Where the information prescribed in the preceding paragraph is changed, the e-commerce operator shall timely update the public information.
- E-commerce Law: Where an e-commerce operator terminates its engagement in e-commerce on its own, it shall continuously publicize relevant information in a prominent position on the home page 30 days in advance.
- E-commerce Law: Where an e-commerce operator provides search results for commodities or services to a consumer based on his or her interests, hobbies, consumption habits and other characteristics, it shall at the same time provide such consumer with options that are not specific to his or her personal characteristics, and respect and equally protect the legitimate rights and interests of the consumer.
- E-commerce Law: E-commerce operators shall draw consumers' attention to the bundling of commodities or services in a conspicuous way, and shall not take bundling of commodities or services as an option of acquiescent consent.
- E-commerce Law: An e-commerce operator shall deliver commodities or services to consumers in the manner and time limit promised or agreed upon with consumers, and bear the risks and responsibilities in the transportation of commodities. However, the consumer chooses another express logistics service provider except.
- E-commerce Law: Where an e-commerce operator collects a deposit from a consumer in accordance with the contract, it shall clearly state the way and procedure for the return of the deposit, and shall not set unreasonable conditions for the return of the deposit. If a consumer applies for a refund of the deposit and meets the conditions for the refund of the deposit, the e-commerce operator shall refund the deposit in time.
- E-commerce Law: Where an e-commerce operator has a dominant market position due to such factors as its technological advantages, the number of users, its ability to control the relevant industries and the degree to which other operators depend on the e-commerce operator in transactions, it shall not abuse its dominant market position to eliminate or restrict competition.

At the bottom of the page, there is a footer with links for 'ABOUT US', 'JOIN US', 'FEEDBACK', 'SERVICE', 'CONTACT US', 'DISCLAIMER', 'BLOGROLL', and a QR code. There is also some small text about company address and legal notices.

Figure 20

An E-commerce Website Migration Software Tool for Small Businesses

The screenshot shows a forum interface with the following posts:

- Post 1: Hello by zhanghaohui777 at 2021-04-29 00:00:00. Likes: 2, Comments: 1.
- Post 2: Hello by zhanghaohui777 at 2021-04-29 00:00:00. Likes: 0, Comments: 1.
- Post 3: yanhaohan by zhanghaohui777 at 2021-04-29 00:00:00. Likes: 1, Comments: 2.
- Post 4: Come on by zhanghaohui777 at 2021-04-29 00:00:00. Likes: 0, Comments: 6.

At the bottom, there are navigation buttons: First, Previous, 1, Next, End.

On the right side, there is a sidebar with the following links:
Supplement Info
Select Template
Start Migration
Law Advice
Data analysis

Figure 21

An E-commerce Website Migration Software Tool for Small Businesses

The screenshot shows a forum interface. At the top, there's a navigation bar with icons for user profile, forum, message (with a red notification badge), search, and operation. Below the navigation, a post by 'zhanghaohui777' says 'Hello'. There are buttons for 'TOP', 'DIGEST', and 'DELETE'. Below the post, it says 'Send at 2021-04-29 00:00:00' and has 'LIKE 2 | REPLY 1'. A reply from 'jp2017212901' says 'Hello! Hello! Hello' with a timestamp '2021-05-04 00:00:00'. This reply has '1#', 'LIKE(0)', and 'REPLY(1)'. Below this, there's a text input field 'Send your opinion' and a 'REPLY' button. At the bottom of the main post area, there are navigation buttons: 'First', 'Previous', '1', 'Next', and 'End'. In the bottom right corner of the main post area, there's a 'COMMENT' button. The bottom of the page features a dark footer with a QR code, links to 'ABOUT US', 'JOIN US', 'FEEDBACK', 'SERVICE', 'CONTACT US', 'DISCLAIMER', and 'BLOGROLL', and some legal text.

Figure 22&23

An E-commerce Website Migration Software Tool for Small Businesses

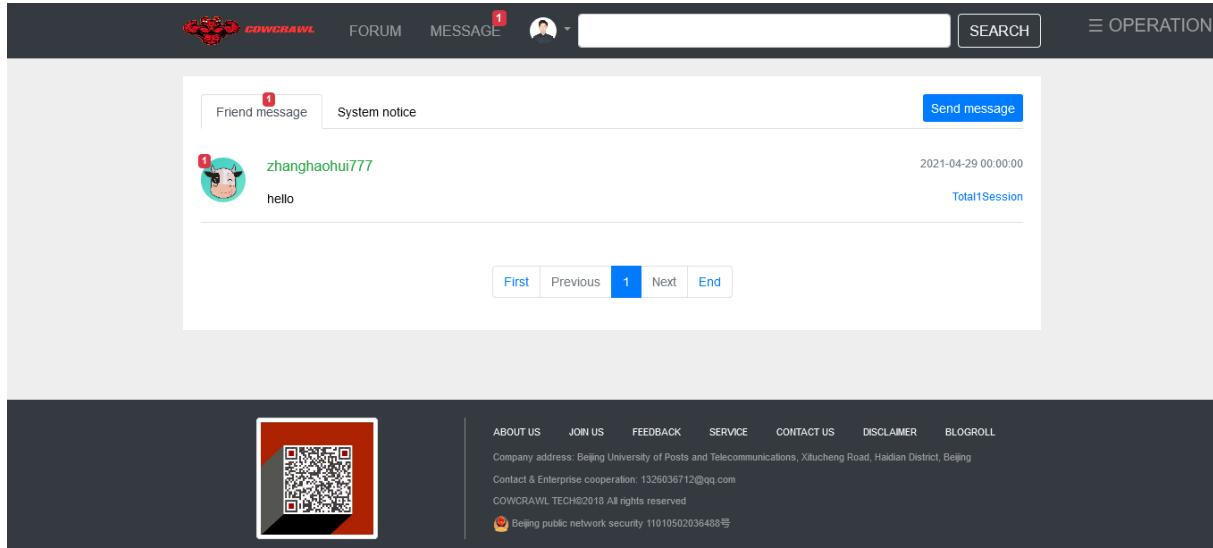


Figure 24

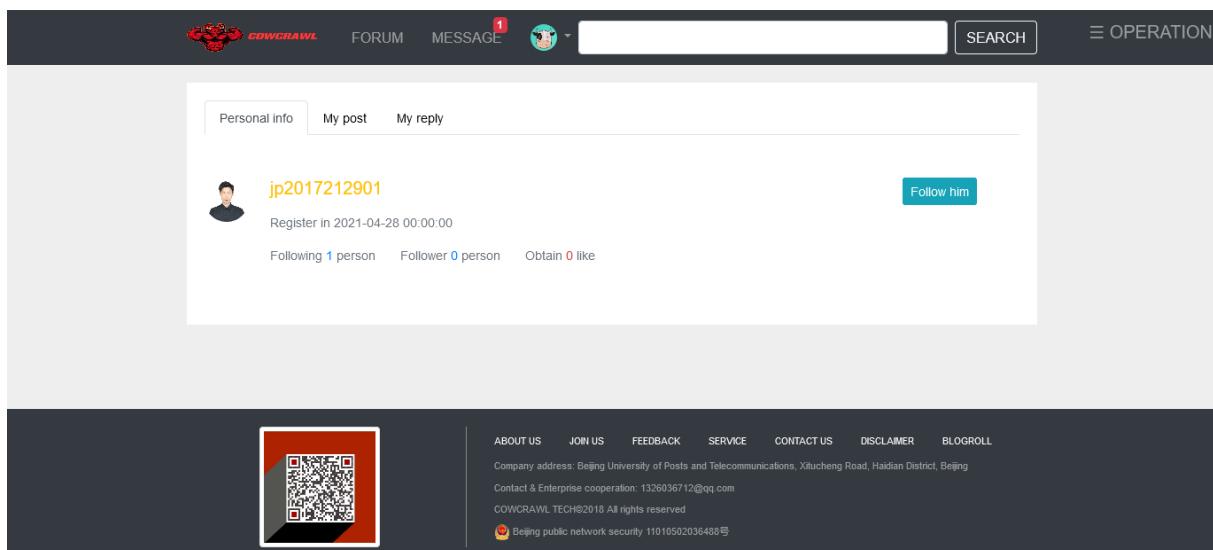


Figure 25

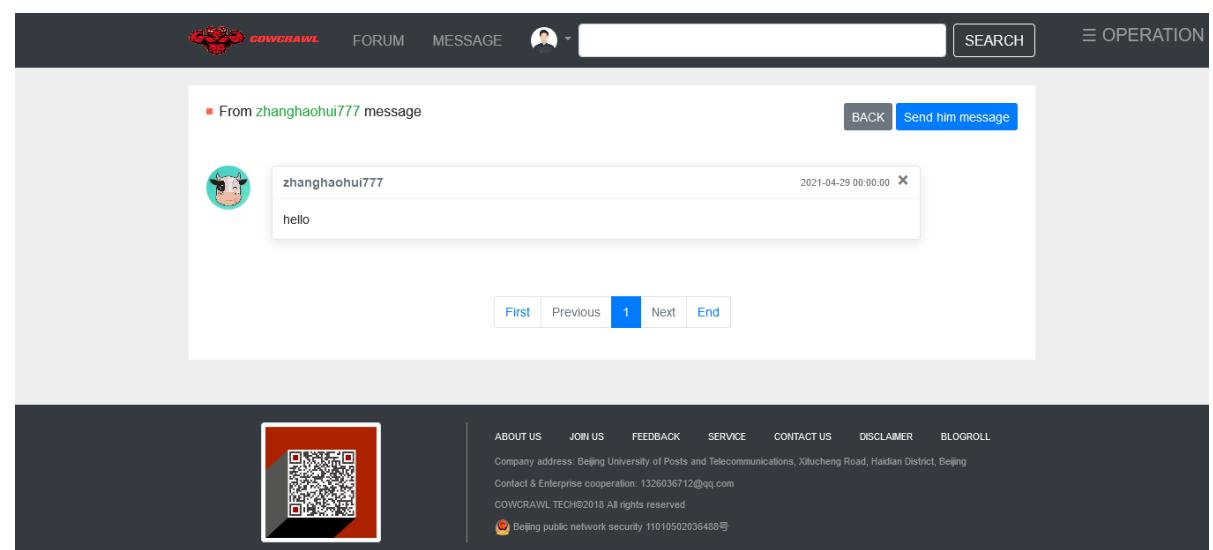


Figure 26

An E-commerce Website Migration Software Tool for Small Businesses

```
https://mall.jd.com/view_search-911752-0-99-1-24-1.html
category id = 1
category name = 健身训练器械
property number = 15
property id = 1
property name = 门上单杠
property id = 2
property name = 跳绳
property id = 3
property name = 负重沙袋
property id = 4
property name = 俯卧支撑架
property id = 5
property name = 健腹轮
property id = 6
property name = 腕力球
property id = 7
property name = 握力器
property id = 8
property name = 背力器
property id = 9
property name = 筋膜枪
property id = 10
property name = 筋膜刀
property id = 11
property name = 跳床
property id = 12
property name = 拉力器
property id = 13
property name = 拉筋板
property id = 14
property name = 飞力士棒
property id = 15
property name = 乒乓球训练器
['门上单杠', '跳绳', '负重沙袋', '俯卧支撑架', '健腹轮', '腕力球', '握力器', '背力器', '筋膜枪', '筋膜刀', '跳床', '拉力器', '拉筋板', '飞力士棒', '乒乓球训练器']
10021410523680
subtitle = 跳床
product id=1
http://img10.360buyimg.com/n7/jfs/t1/163412/37/20285/129531/60826bffBa26e325a/7fdb25cf7ee0f177.jpg!q90
TMT
TMT 跳跳床儿童家用室内蹦床成人健身小孩跳跳床玩具弹跳床 红色-旗舰店款1.4m直径-U型管脚 1    商品编号: 10021410523680    店铺: TMT户外官方旗舰店    商品毛重: 9.0kg    商品产地: 中国大陆    货号: BC1
```

Figure 27

An E-commerce Website Migration Software Tool for Small Businesses

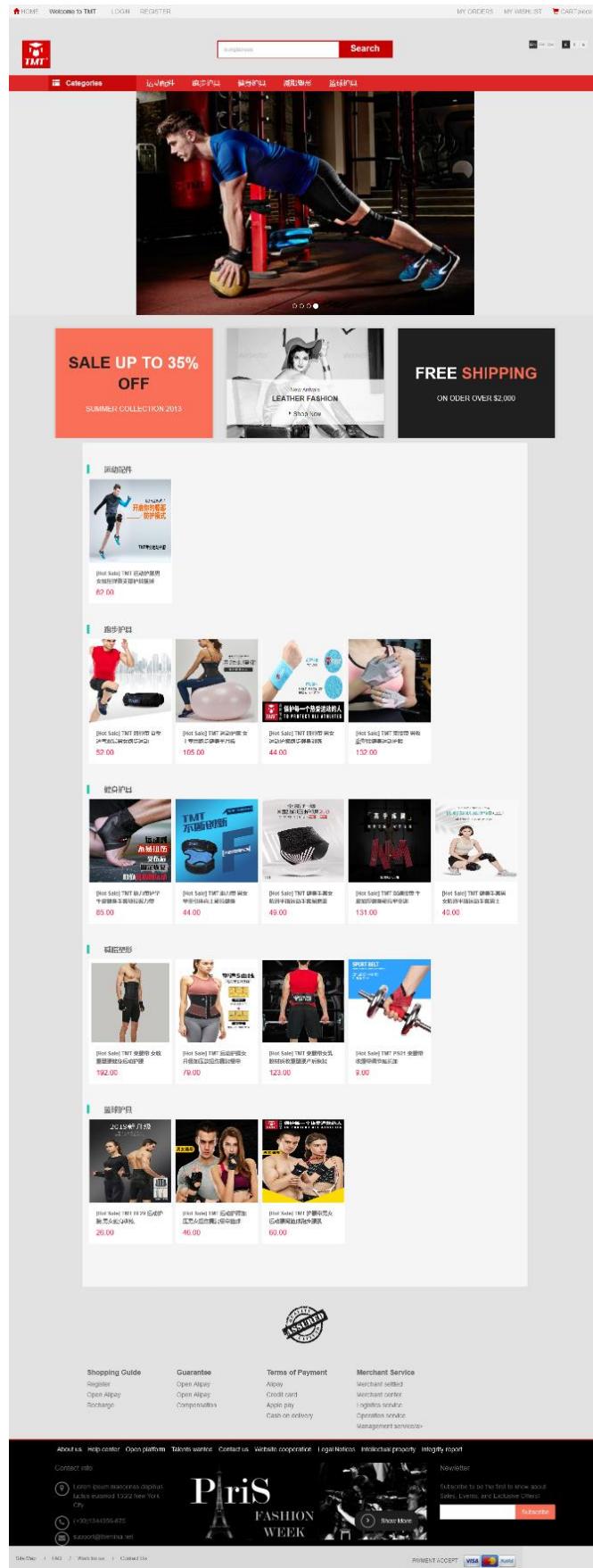


Figure 28

An E-commerce Website Migration Software Tool for Small Businesses



Figure 29

An E-commerce Website Migration Software Tool for Small Businesses

id	password	salt	phonenumber	username
1	bc4af4e5be1e738bc179ffijM4PAVnICuovrzdbC4FGs	13304002000	Zhang	
2	83c3caf6719dea13883a05WHw4H/8wCRcH+UVxFAt	18811021200	zhanghh	
3	5bf9419f40c6635b83b3d2Gxl7/gOf9rKdC1U7VJp6A	13302002000	ZHangh	

Figure 30

The screenshot shows a user interface for an e-commerce website. At the top, there is a navigation bar with links for HOME, Welcome to TMT, Zhang, EXIT, MY ORDERS, MY WISHLIST, and a shopping cart icon indicating 3 pieces. A search bar contains the text "sunglasses".

The main content area displays a shopping cart table with three items:

	Commodity information	Price	Amount	Sum	Operation
<input checked="" type="checkbox"/>	TMT 运动护膝 女士专用跑步健身半月板保护膝盖关节损伤【两只装】 M 【适合95-115斤】	¥106.00 ¥106.00	+ 1	¥ 105.00	DELETE
<input checked="" type="checkbox"/>	TMT 束腰带女乳胶材质收腹塑腰产后恢复健身运动护腰 25根钢骨支撑透气 L 【腰围72CM-78CM】	¥139.00 ¥123.00	- 1 +	¥ 123.00	DELETE
<input type="checkbox"/>	TMT PS01 束腰带收腹带调节延长加长排扣 【长度29厘米】 黑色	¥9.00 ¥9.00	- 2 +	¥ 18.00	DELETE

Below the cart, there are buttons for "Select ALL" and "BALANCE".

In the center, there is a circular seal with the word "GUARANTEED".

At the bottom, there are sections for "Shopping Guide", "Guarantee", "Terms of Payment", and "Merchant Service".

Contact info includes a location icon with "Lorem ipsum maecenas dapibus luctus euismod 133/2 New York City", a phone icon with "(+00)1344356-675", and an email icon with "support@themina.net".

Newsletter subscription fields include "Subscribe to be the first to know about Sales, Events, and Exclusive Offers!" and a "Subscribe" button.

Footer links include About us, Help center, Open platform, Talents wanted, Contact us, Website cooperation, Legal Notices, Intellectual property, and Integrity report.

Footer payment acceptance icons include VISA, MasterCard, and American Express.

Figure 31

An E-commerce Website Migration Software Tool for Small Businesses

HOME Welcome to TMT Zhang EXIT

MY ORDERS MY WISHLIST CART 2 piece

sunglasses Search

All orders Pending payment Pending ship Pending receipt Pending comment

Item	Price	Amount	Payment	Operation
2021-04-13 Order Code: 20210413021334641943 TMT 束腰带女乳胶材质收腹塑腰产后恢复健身运动护腰 2根钢骨支撑透气 L【腰围72CM-78CM】	¥ 139.00 ¥123.00	1	¥ 228.00 (Include f: ¥ 0.00)	Wait Delivery
2021-04-13 Order Code: 202104130145522472425 TMT 运动护膝 女士专用跑步健身半月板保护膝盖关节损伤【两只装】M【适合95-115斤】	¥ 105.00 ¥105.00	1	¥ 210.00 (Include f: ¥ 0.00)	
2021-04-12 Order Code: 202104121949356714156 TMT 运动护踝女升级加压款扭伤康复绑带篮球跑步【两只装】	¥ 79.00 ¥79.00	1	¥ 79.00 (Include f: ¥ 0.00)	
2021-04-12 Order Code: 202104121932574924433 TMT 助力带 男女举重引体向上硬拉健身训练 黑色 均码 (两只装)	¥ 49.00 ¥44.00	1	¥ 44.00 (Include f: ¥ 0.00)	Confirm receipt
2021-04-12 Order Code: 202104121630089981890 TMT 护腰带男女 运动腰间篮球跑步腰肌健身护具腰带腰封腰托 XL TMT 腰骨带 男女运动护膝跑步健身训练 黑色 XL (两只装)	¥ 68.00 ¥60.00	1	¥ 104.00 (Include f: ¥ 0.00)	Payment

Shopping Guide
Register
Open Alipay
Recharge

Guarantee
Open Alipay
Open Alipay
Compensation

Terms of Payment
Alipay
Credit card
Apple pay
Cash on delivery

Merchant Service
Merchant settled
Merchant center
Logistics service
Operation service
Management service/a>

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PAYMENT ACCEPTED

Figure 32

An E-commerce Website Migration Software Tool for Small Businesses

The screenshot displays a user interface for an e-commerce website. At the top, there is a navigation bar with links for 'HOME', 'Welcome to TMT', 'Zhang', 'EXIT', 'MY ORDERS', 'MY WISHLIST', and a shopping cart icon labeled 'CART 4 piece'. The main search bar contains the text 'sunglasses' and a 'Search' button. Below the search bar, there is a section titled 'Input the shipping address' with fields for 'Detailed address' (Beijing, Haidian Province, BUPT), 'Postal code' (000000), 'Consignee name' (Zhang), and 'Phone number' (18800201000). A 'Confirm Order Information' section follows, showing two items from a shop: 'TMT 运动护膝 女士专用跑步健身半月板保护膝盖关节损伤【两只装】 M【适合95-115斤】' and 'TMT 束腰带女乳胶材质收腹塑腰产后恢复健身运动护腰 25根钢骨支撑透气 L【腰围72CM-78CM】'. The total payment amount is listed as 228.00. A 'Submit order' button is present. Below the order summary, there is a circular stamp with the word 'VERIFIED'.

Shopping Guide

- Register
- Open Alipay
- Recharge

Guarantee

- Open Alipay
- Open Alipay
- Compensation

Terms of Payment

- Alipay
- Credit card
- Apple pay
- Cash on delivery

Merchant Service

- Merchant settled
- Merchant center
- Logistics service
- Operation service
- Management service/a>

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Contact info

- Lorem ipsum maeconas dapibus luctus euismod 133/2 New York City
- (+00)1344356-675
- support@themina.net

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PAYMENT ACCEPT

Figure 33

An E-commerce Website Migration Software Tool for Small Businesses

HOME Welcome to TMT LOGIN REGISTER MY ORDERS MY WISHLIST CARTpiece



Default Price Sales Comment

 7.00 TMT 运动护腕 男女健身训练 黑色 (两只装)	 26.00 TMT BF29 运动护腕 男女健身训练 (两只装)	 40.00 TMT 舞蹈护膝运动女士跳舞专用儿童舞蹈男舞蹈护膝加厚【两只装】	 40.00 TMT 健身深蹲护膝男关节绷带运动护具护腿硬拉护膝绑腿 红色【两只装】
Sale 0 Comment 0	Sale 0 Comment 0	Sale 0 Comment 0	Sale 0 Comment 0
 40.00 TMT 健身手卷男女防滑半指运动手套男士筋膜训练半指护手腕 L	 44.00 TMT 骑骨带 男女运动护膝跑步健身训练 黑色 XL (两只装)	 46.00 TMT 运动护腕加压男女扭伤康复带篮球跑步 黑色 (两只装)	 49.00 TMT 健身手卷男女防滑半指运动手套筋膜训练半指护手腕 S (手围17厘米)
Sale 0 Comment 0	Sale 1 Comment 0	Sale 0 Comment 0	Sale 0 Comment 0
 52.00 TMT 骑骨带 夏季透气双层男女跑步运动护膝 【两只装】	 60.00 TMT 护膝男女 运动膝盖篮球运动护膝夏季双层封腰托 XL	 62.00 TMT 运动护膝男女 加压伸展支撑篮球羽毛球跑步登山半月板护膝 【两只装】 [L 适合体重100-1	 79.00 TMT 运动护腰升级加压扭伤康复带篮球跑步 【两只装】
Sale 1 Comment 0	Sale 1 Comment 0	Sale 0 Comment 0	Sale 2 Comment 1
 85.00 TMT 动力护膝男女运动护膝夏季双层拉力带引体向上防滑缠绕训练护具均码【加厚防滑】 [2只装]	 105.00 TMT 运动护膝 女士专用跑步健身半月板保护膝盖关节损伤 【两只装】 M [适合95-115斤]	 123.00 TMT 保暖女士胶质收腹塑腰产后恢复修身运动护腰 25根钢骨支撑透气 L [腰围72CM-78CM]	 131.00 TMT 深蹲腰带 牛皮加厚健身硬拉举重训练专业级运动护腰带 M [腰围2尺2-2尺9]
Sale 0 Comment 0	Sale 5 Comment 1	Sale 2 Comment 2	Sale 0 Comment 0
 132.00 TMT 束腰带 男女腹型健身运动护腰 乳胶材质 25根钢骨支撑透气 XXL [腰围90-95cm]	 192.00 TMT 束腰带 女收腹塑腰健身运动护腰 乳胶材质 25根钢骨透气 M [腰围67CM-73CM]		
Sale 1 Comment 2	Sale 0 Comment 0		

Total searched: 18



Shopping Guide	Guarantee	Terms of Payment	Merchant Service
Register	Open Alipay	Alipay	Merchant settled
Open Alipay	Open Alipay	Credit card	Merchant center
Recharge	Compensation	Apple pay	Logistics service
		Cash on delivery	Operation service
			Management service/a>

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PAYMENT ACCEPT VISA MASTERCARD

Figure 34

An E-commerce Website Migration Software Tool for Small Businesses

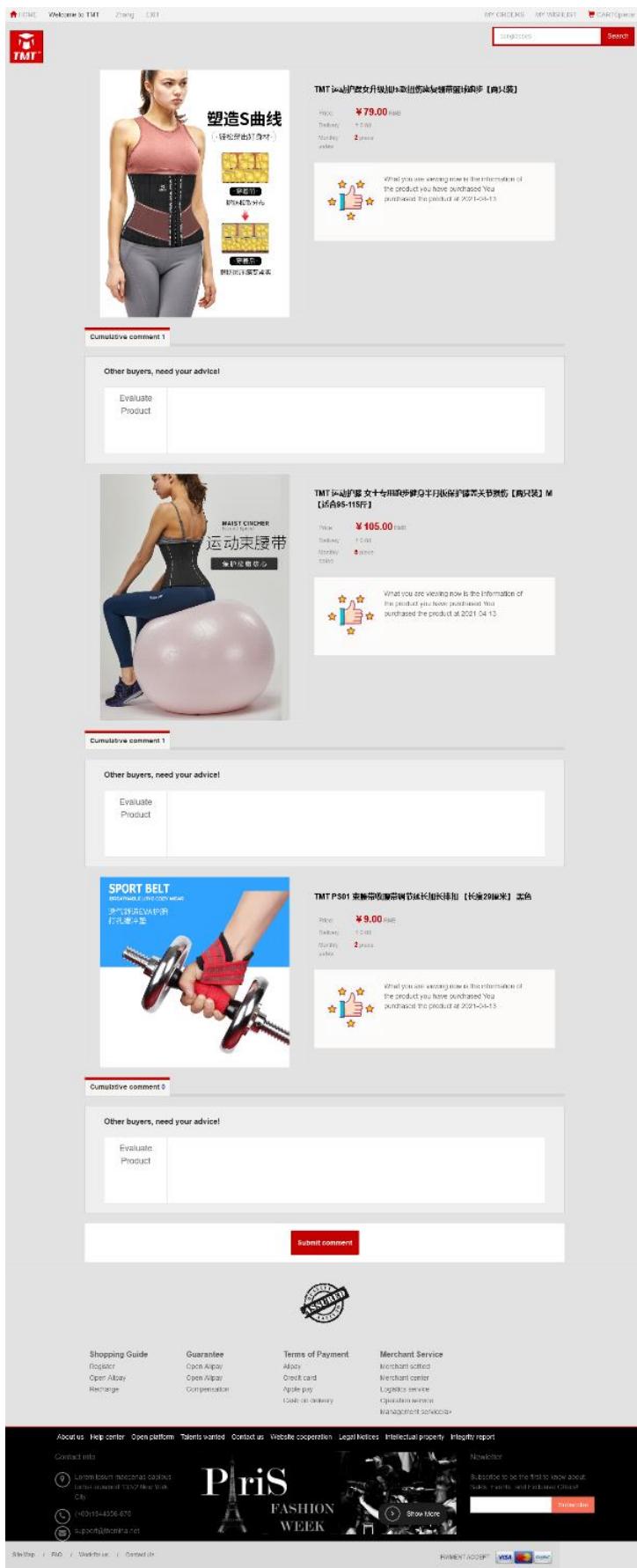


Figure 35

An E-commerce Website Migration Software Tool for Small Businesses

HOME Welcome to TMT Zhang EXIT

MY ORDERS MY WISHLIST CART 2 piece

sunglasses Search

TMT 束腰带女乳胶材质收腹塑腰产后恢复健身运动护腰 25根钢骨支撑透气 L【腰围72CM-78CM】

Price: ￥139.00 元
Delivery: f. 0.00
Monthly sales: 2 piece

What you are viewing now is the information of the product you have purchased You purchased the product at 2021-04-13

Cumulative comment 2

2021-04-13 02:16:20 This belt is very good, I like it very much. (anonymous)

2021-04-13 01:43:50 This belt is very useful. It can protect my waist and prevent back injuries. I now take it every day for training. It works very well and the price is very affordable. Friends, why are you still hesitating, hurry up and get one! (anonymous)

ASSURED

Shopping Guide
Register
Open Alipay
Recharge

Guarantee
Open Alipay
Open Alipay
Compensation

Terms of Payment
Alipay
Credit card
Apple pay
Cash on delivery

Merchant Service
Merchant settled
Merchant center
Logistics service
Operation service
Management service/a>

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PAYMENT ACCEPT VISA MASTERCARD PAYPAL

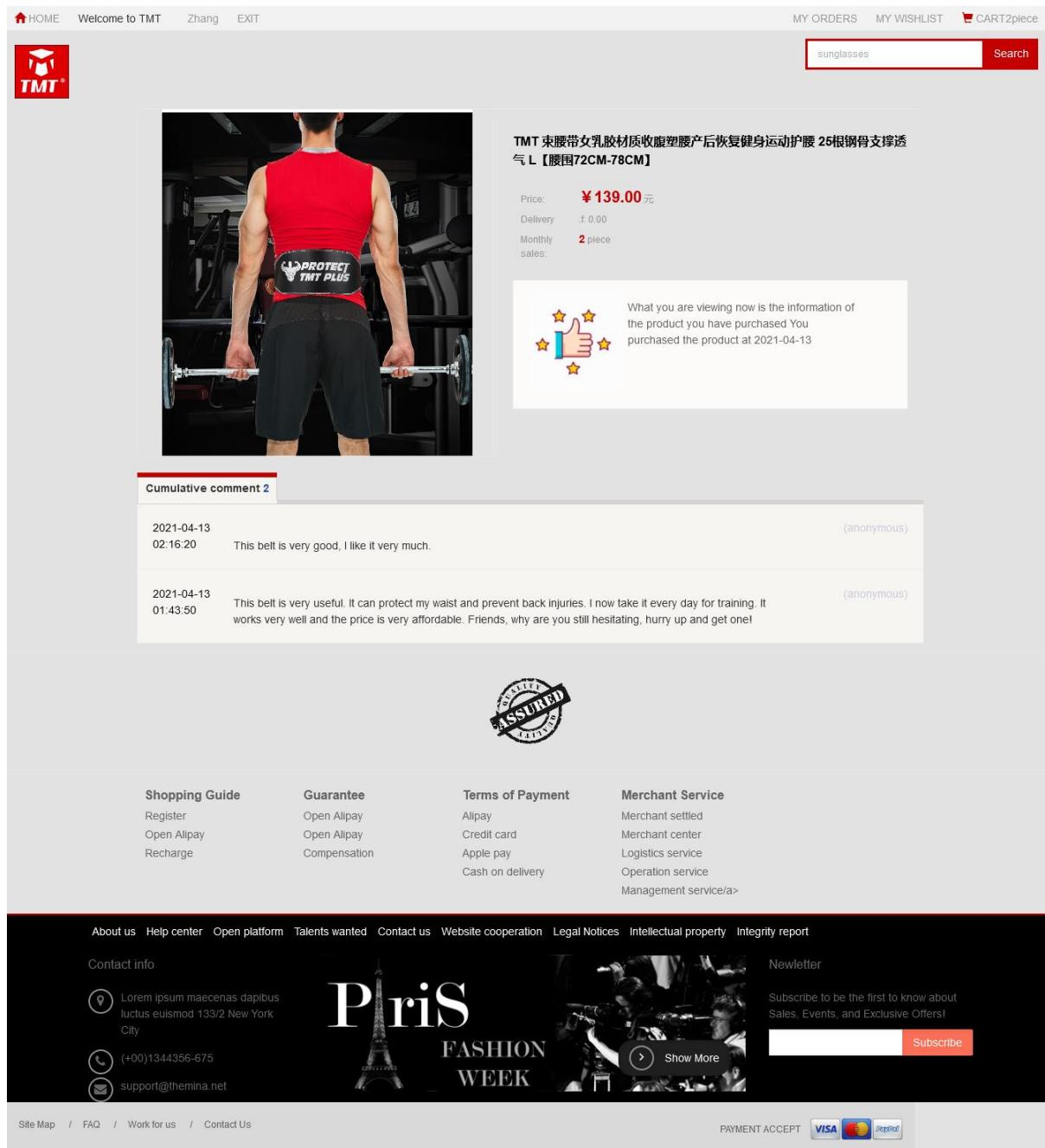


Figure 40

An E-commerce Website Migration Software Tool for Small Businesses

Back-end Management Category Management User Info Management Order Management

Category management

ID	Image	Category name	Property management	Product management	Edit	Delete
5		运动配件				
4		跑步护具				
3		健身护具				
2		减脂塑形				
1		篮球护具				

Add category

Category name:

Category Image: 未选择文件。

SUBMIT

Back-end Management Category Management User Info Management Order Management

All category / 健身护具 / Product Management

ID	Image	Product name	Subtitle	Original price	Promote price	Stock	Image management	Set property	Edit	Delete
19		TMT 舞蹈护膝运动女士跳舞专用儿童跪地防摔膝盖护漆薄款防撞瑜伽加厚【两只装】【成人款】	护膝	45	40	100				
18		TMT 健身深蹲护膝盖男关节绷带运动护具护腿硬拉绑膝盖红色【两条装】	护膝	45	40	100				
7		TMT 运动护腕 男女健身训练 黑色 (单只装)	运动护腕	7	7	500				
6		TMT 健身手套男女防滑半指运动手套男士耐磨器械训练半指护腕手套 L	健身手套	45	40	100				
5		TMT 深蹲腰带 牛皮加厚健身硬拉举重训练专业级运动护腰带 M【腰围2尺2-2尺9】	腰带	148	131	100				

Add product

Product name:

Product subtitle:

Original price:

Promote price:

Stock:

SUBMIT

Figure 36

An E-commerce Website Migration Software Tool for Small Businesses

The screenshot shows a web-based application for managing orders. At the top, there's a navigation bar with links for Back-end Management, Category Management, User Info Management, and Order Management. Below the navigation is a table titled "Order management". The table has columns for State, Price, Amount, Buyer, Creation time, Payment time, Delivery time, Confirm receipt time, and Operation. One row is highlighted in blue, showing details for a product: "TMT 束腰带女乳胶材质收腹塑腰产后恢复健身运动护腰 25根钢骨支撑透气 L【腰围72CM-78CM】" with a price of ¥123. Another row shows a product: "TMT 运动护膝 女士专用跑步健身半月板保护膝盖关节损伤【两只装】 M【适合95-115斤】" with a price of ¥105. At the bottom of the table, there are navigation arrows for pagination.

Order management								
State	Price	Amount	Buyer	Creation time	Payment time	Delivery time	Confirm receipt time	Operation
待发	228	2		2021-04-13 02:13:35	2021-04-13 02:13:40			<button>See details</button> <button>Deliver</button>
删除	176	2		2021-04-13 02:05:26	2021-04-13 02:05:46	2021-04-13 02:08:03	2021-04-13 02:08:36	<button>See details</button>
完成	210	2		2021-04-13 01:45:52	2021-04-13 01:45:58	2021-04-13 01:46:21	2021-04-13 01:46:36	<button>See details</button>
删除	123	1		2021-04-12 23:49:18	2021-04-12 23:49:24	2021-04-13 00:58:16	2021-04-13 01:14:12	<button>See details</button>
完成	79	1		2021-04-12 19:49:36	2021-04-12 19:49:40	2021-04-12 20:56:05	2021-04-13 00:09:08	<button>See details</button>

Figure 37

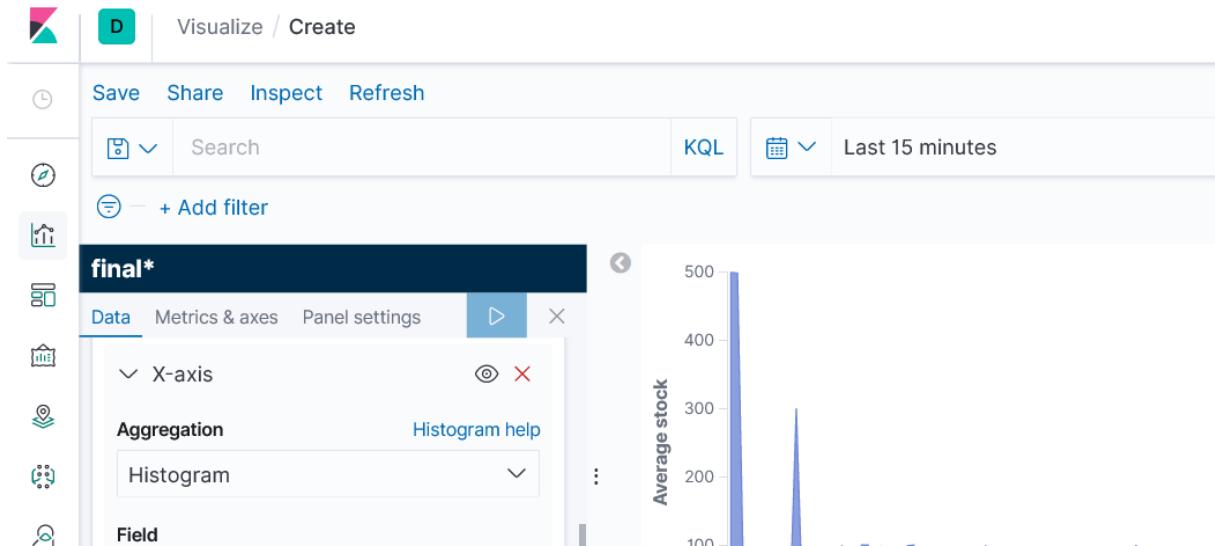
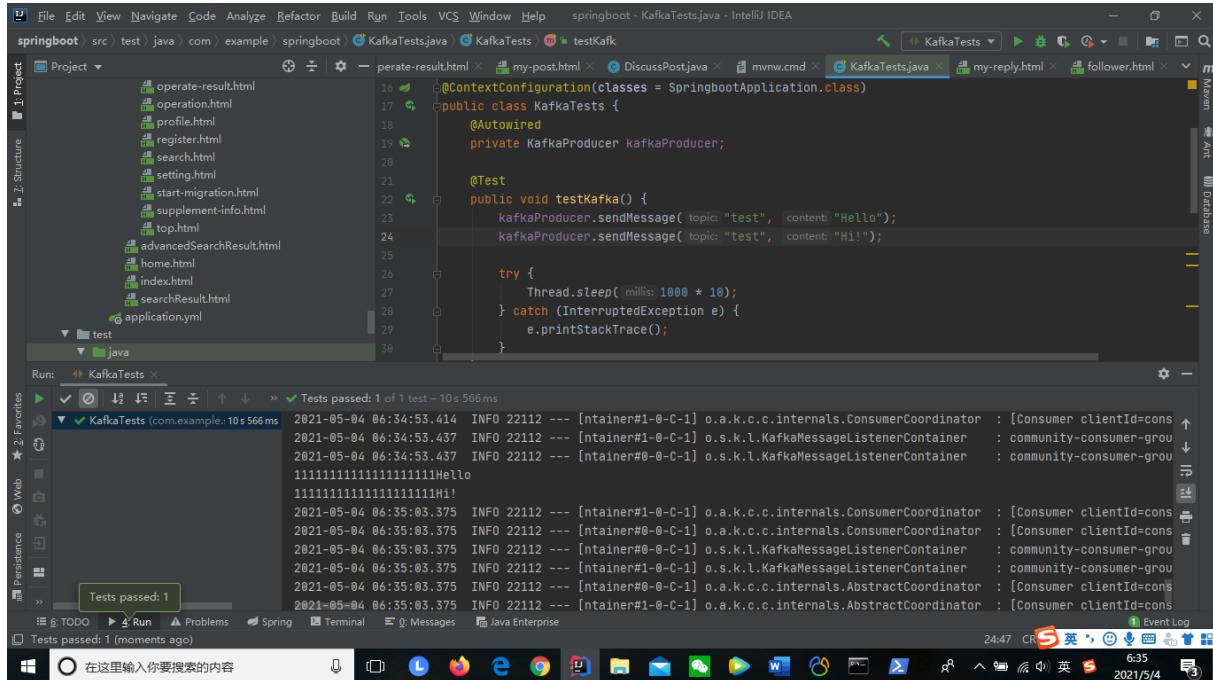


Figure 38

An E-commerce Website Migration Software Tool for Small Businesses



The screenshot shows the IntelliJ IDEA IDE interface. The top menu bar includes File, Edit, View, Navigate, Code, Analyze, Refactor, Build, Run, Tools, VCS, Window, Help, and springboot - KafkaTests.java - IntelliJ IDEA. The left sidebar shows a project structure with a 'Project' view containing files like operate-result.html, operation.html, profile.html, register.html, search.html, start-migration.html, supplement-info.html, top.html, advancedSearchResult.html, home.html, index.html, searchResult.html, and application.yml. Below it is a 'test' view containing a 'java' folder with a file named KafkaTests.java. The main editor window displays the following Java code:

```
16    @ContextConfiguration(classes = SpringbootApplication.class)
17    public class KafkaTests {
18        @Autowired
19        private KafkaProducer kafkaProducer;
20
21        @Test
22        public void testKafka() {
23            kafkaProducer.sendMessage(topic: "test", content: "Hello");
24            kafkaProducer.sendMessage(topic: "test", content: "Hi!");
25
26            try {
27                Thread.sleep( millis: 1000 * 10);
28            } catch (InterruptedException e) {
29                e.printStackTrace();
30            }
31        }
32    }
```

The 'Run' tool bar at the bottom has a 'KafkaTests' button highlighted. The status bar at the bottom right shows 'Tests passed: 1 of 1 test - 10s 566ms' and the date '2021-05-04'. The system tray icons include a Windows logo, a search bar, taskbar icons for various applications like File Explorer, Mail, and Task Manager, and system status icons.

Figure 39

Risk and environmental impact assessment

Risks	R = L•C	Measurements
Risks that may cause potential financial loss to the project or other individuals or organisations	L=4 C=3 R=12	UNCITRAL logo is put on the website.
Copyright issues about code	L=3 C=2 R=6	Important code is not open to outsiders. Apply for patent. The main code of the website is sent to the customer after encapsulation and encryption.
Risks that may prevent the successful completion of the project	L=1 C=3 R=3	Through reading, watching videos, watching tutorials, watching use cases to learn the relevant content.
Technical problems and bugs related to programming	L=4 C=3 R=12	Search on the search engine. Read and study error information, and post online to ask others.
Flaws in the way it was designed	L=1 C=2 R=2	Read relevant design materials and consult the instructor.
Risks that may cause law breach	L=3 C=4 R=12	Request the permission of the platform before the crawler. Or use the existing crawler software to crawl.
Risks that may cause potential harm to people and animals	L=0 C=0 R=0	Null
Risks that may cause potential harm to	L=0 C=0	Null

An E-commerce Website Migration Software Tool for Small Businesses

environment	R=0	
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