E-Commerce Analysis System User Manuals

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I. Overview of Software

1.1 Basic Introduction

E-Commerce Analysis System aims to provide a platform for trading companies which can help conduct commodity management, data mining on historical sales and intelligently provide suggestions about future marketing strategies. This system is a web application and staff in the trading company which are in different positions have different authorities to interact with the system. For example, sales manager can get access to add or update the information of commodities, but data analyst has no this permission. In general, E-Commerce Analysis System is a multi-user online platform which is designed for database management and data analysis.

1.2 Hardware Requirements and How to Install

There is no specified hardware requirements for E-Commerce Analysis System and users do not need to install the system. User only need one personal computer which can access to the Internet (web address will be shown in the pdf file which contains video link) and then he/she can access to the system through a browser with his/her account and corresponding password.

II. User Manuals

2.1 Index Page Introduction

The index page of the E-commerce Analysis System is shown below (Figure 1-1). There is a navigation bar at the top and there are three drop-down menus for users to choose. If user wants to know some basic information of this system or some instructions on how to log in, he/she can move the mouse pointer on **System Information** and then click the option he/she wants to access (One option **System Introduction** is shown in Figure 1-2). Also, user can click the option **Home** in the first drop-down menu to go back to the Index Page.

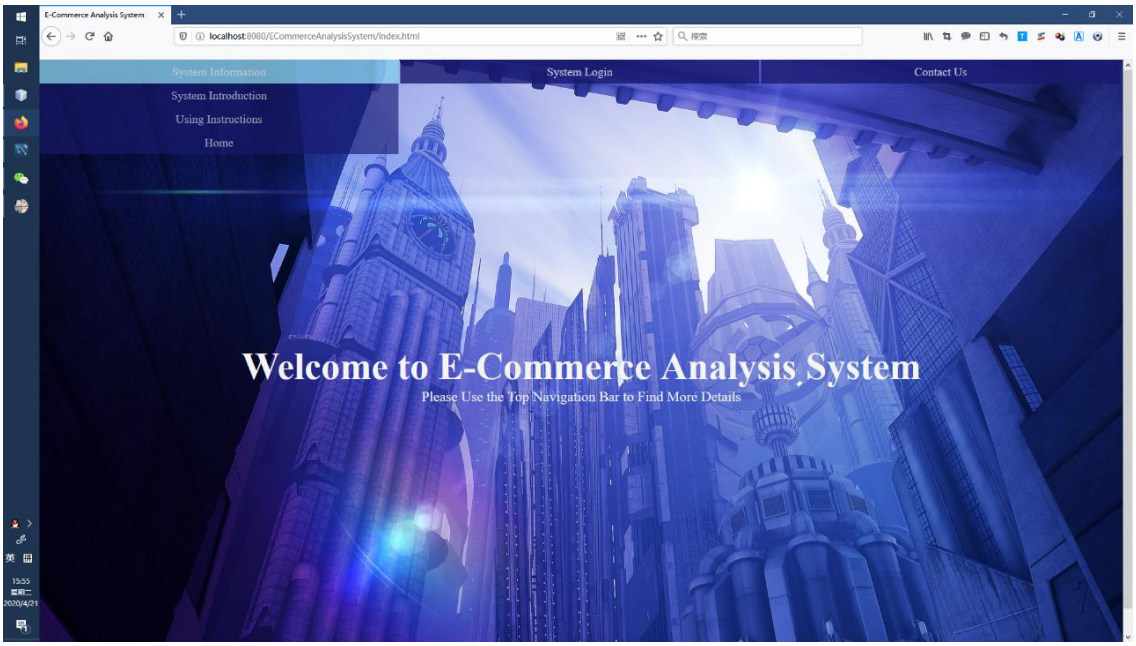


Figure 1-1: Index Page and the Drop-down Menu “System Information”

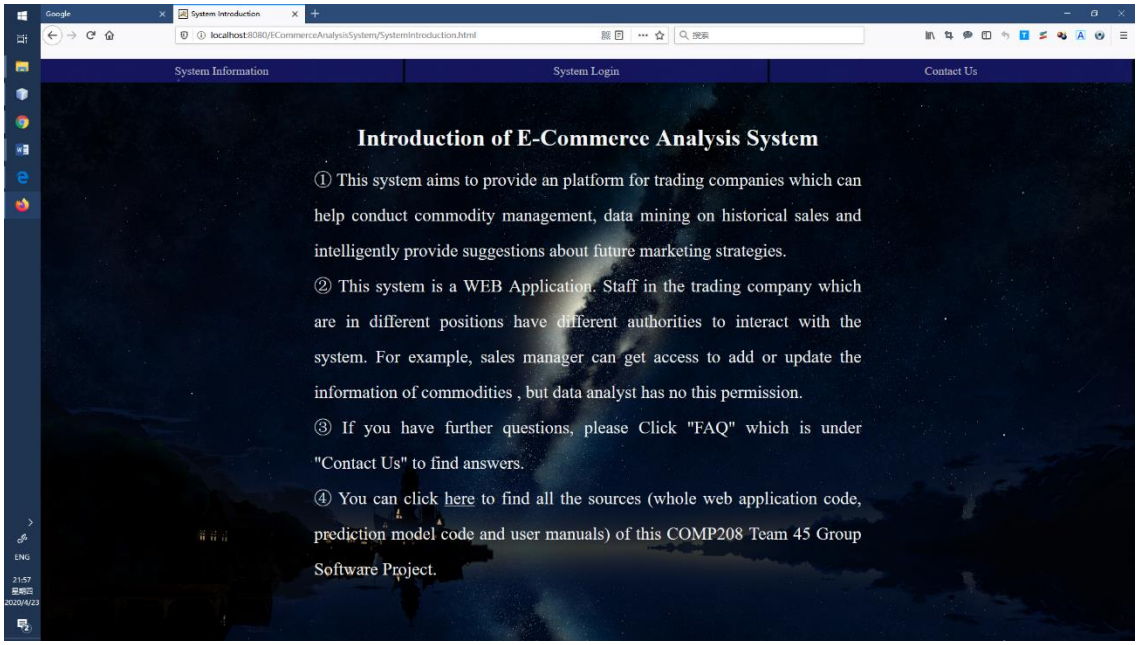


Figure 1-2: System Introduction Page

The second drop-down menu is designed for user to choose identity to login. User firstly needs to move the mouse pointer on “System Login” and then choose his/her identity to access to the correct login page. For example, if the user is sales manager, he/she need to click “Sales Manager” and then use his/her account and corresponding password to log in (User cannot access to the system with correct account and password but wrong login page). All these information are shown in Figure 1-3 and Figure 1-4.

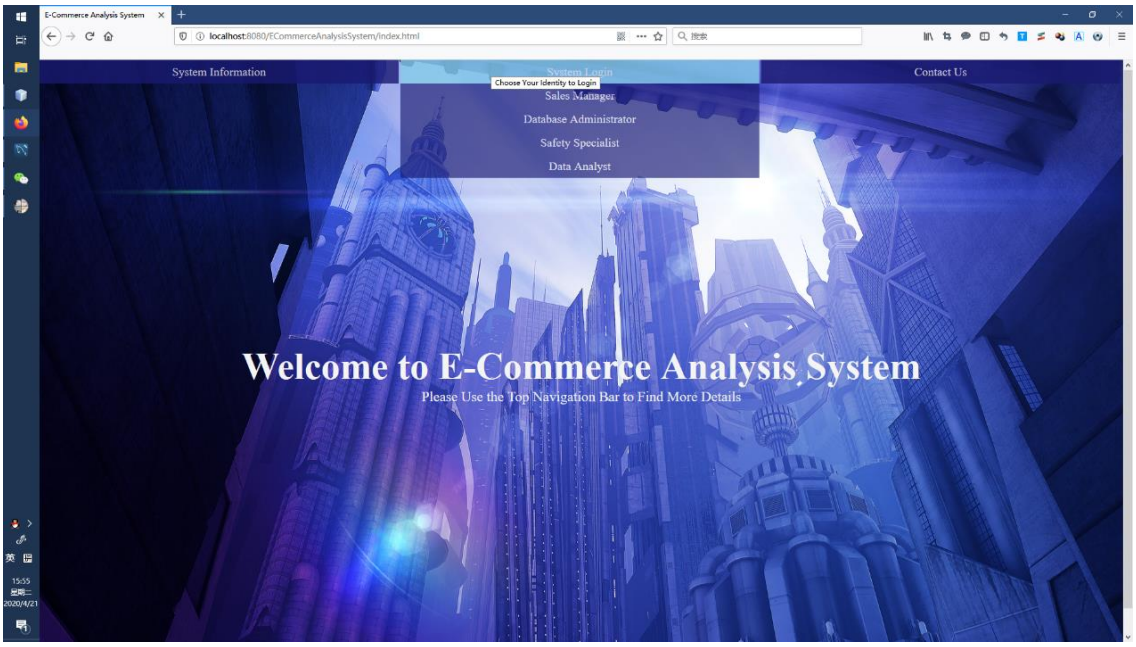


Figure 1-3: Drop-down Menu “System Login”

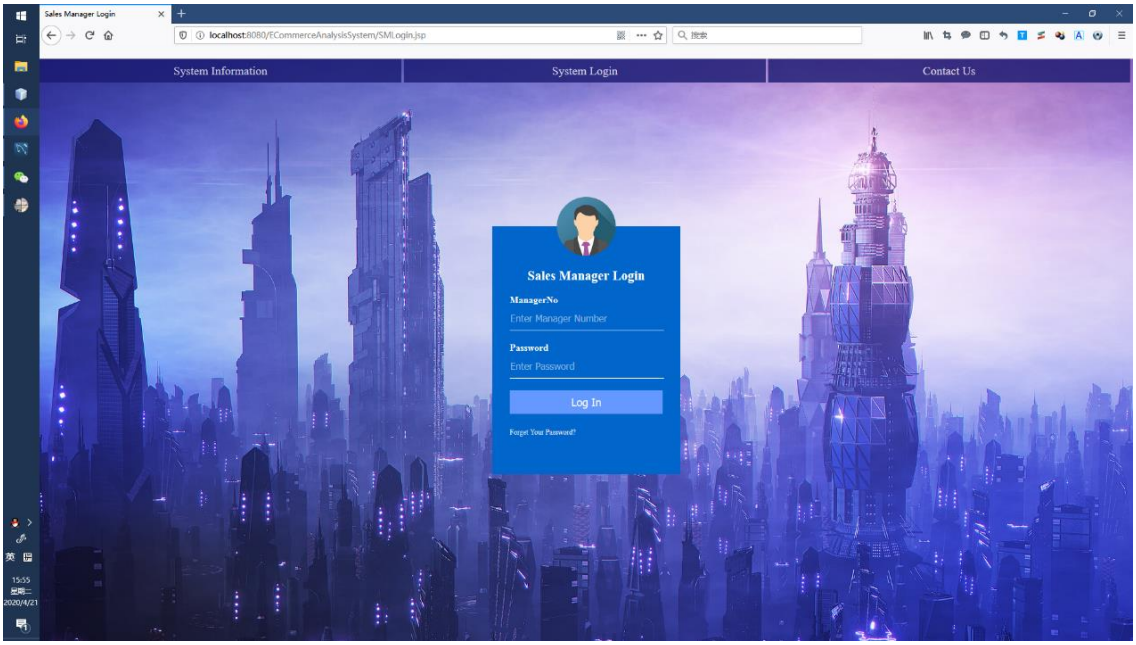


Figure 1-4: Sales Manager Login Page

The third drop-down menu “Contact Us” (Figure 1-5) is designed to help the user who encounters issues when using this System. “FAQ” page just gives solutions to some basic problems. If the user still has some further questions about this system, he/she can choose “Contact Information” (Figure 1-6) to find the email address of the developer and send an email to ask questions.

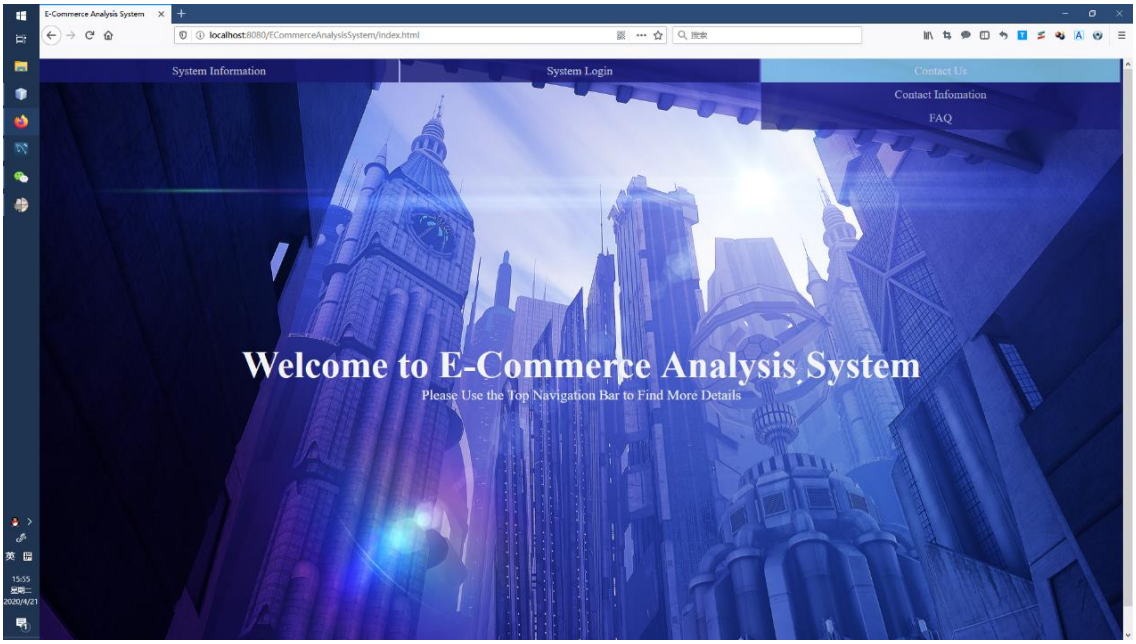


Figure 1-5: Drop-down Menu “Contact Us”

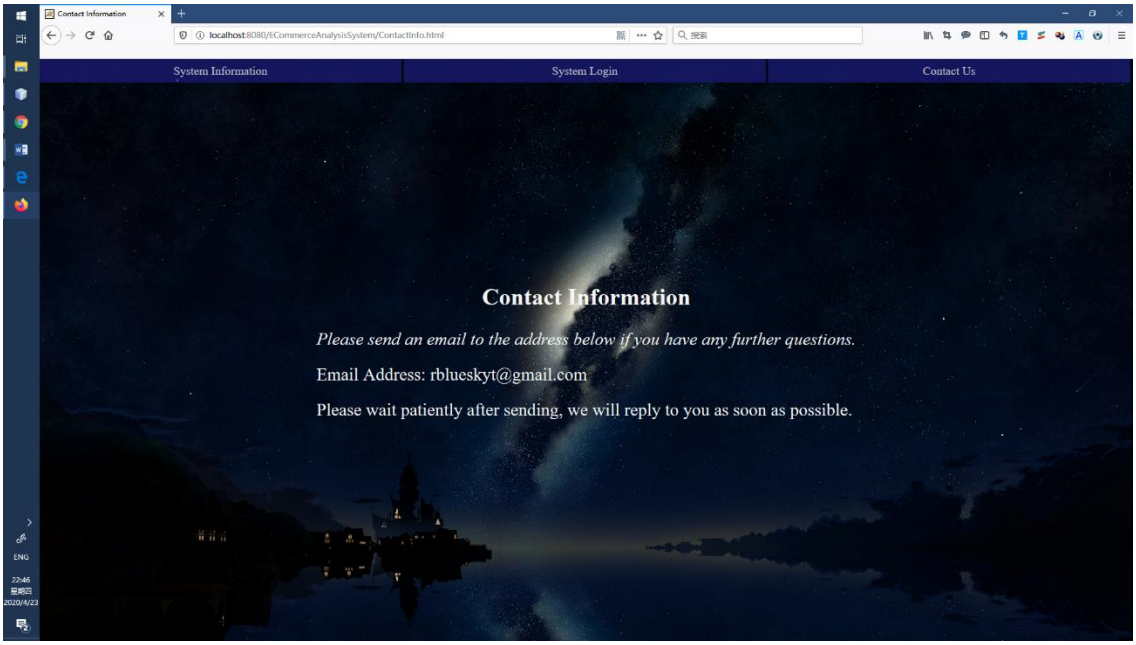


Figure 1-6: “Contact Information” Page

2.2 User Manual of Sales Manager

User will access into the home page below (Figure 2-1) after successfully logging in from the "Sales Manager Login" page. There are also three drop-down menus on the top navigation bar. The first one is **System Options** (Figure 2-1) which included **Sales Manager Home** option and **Logout** option.

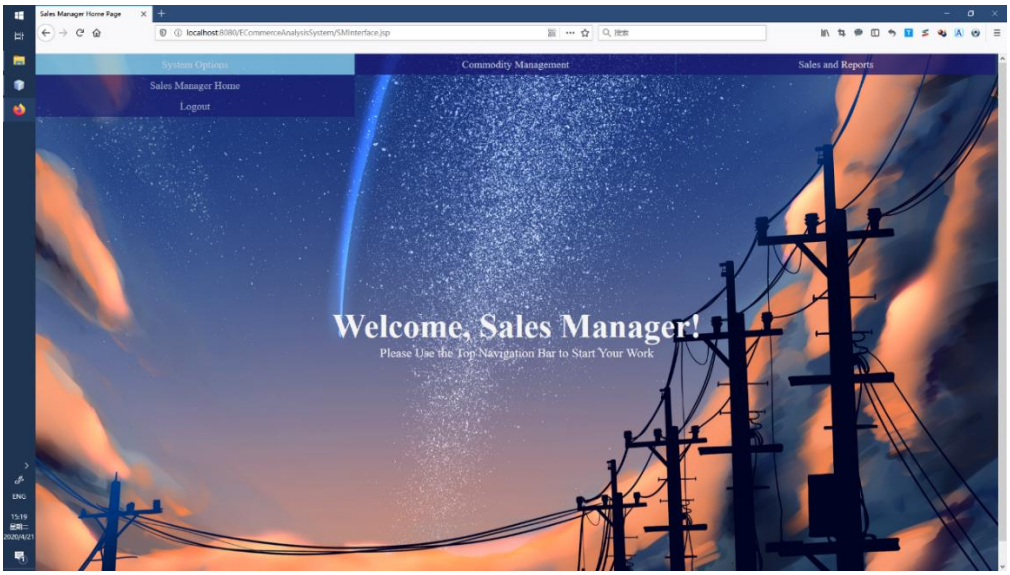


Figure 2-1: Sales Manager Home Page and Drop-down Menu "System Options"

The second drop-down menu **Commodity Management** only has one option (itself) which includes detailed functions of commodities management and the third drop-down menu is **Sales and Reports** (Figure 2-2) which has two choices **View Sales Records** and **View Sales Reports**.

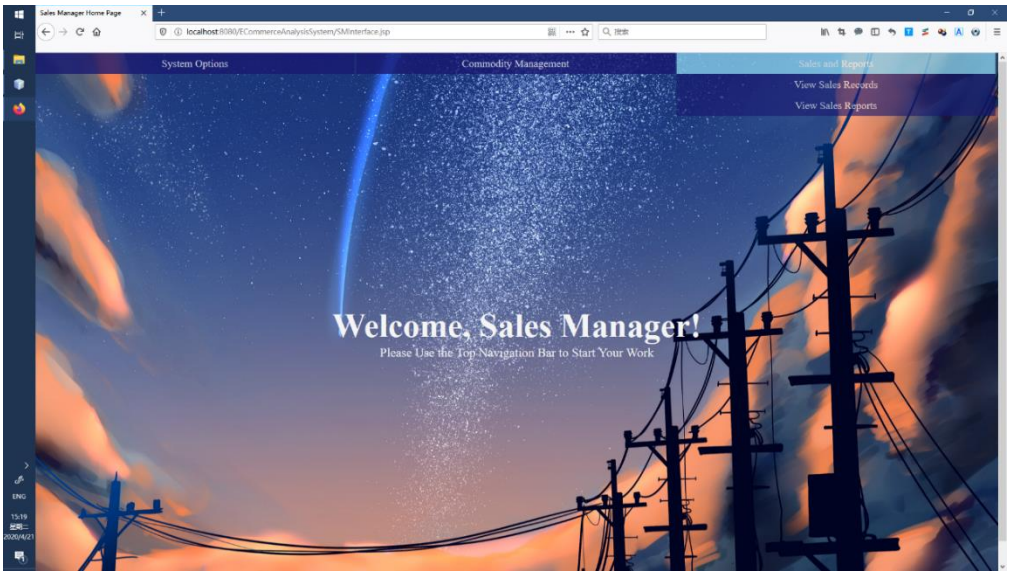


Figure 2-2: Drop-down Menu "Sales and Reports"

After clicking the option **Commodity Management**, now user accesses into the management page (Figure 2-3) and he/she can use some commodity management functions.

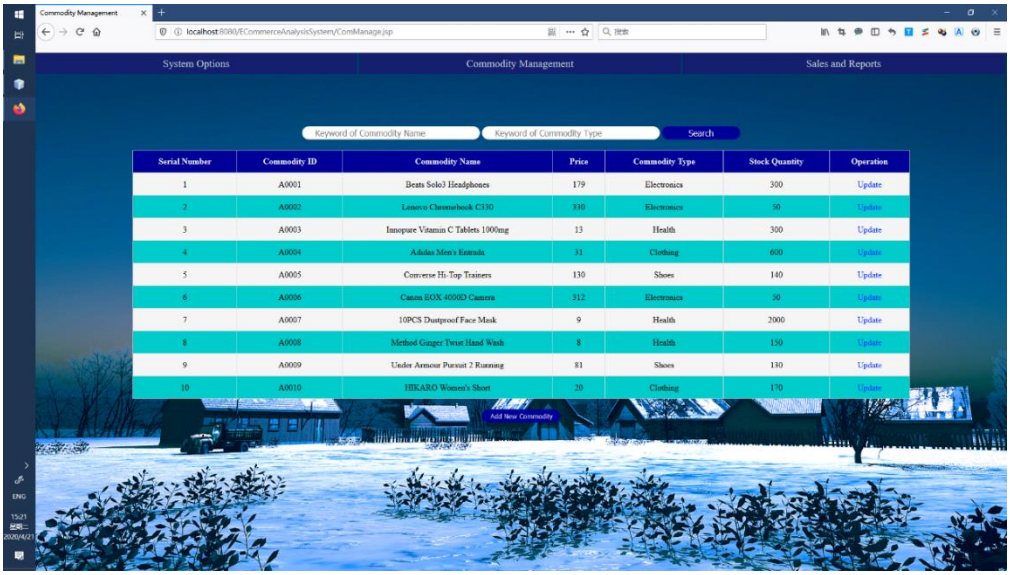


Figure 2-3: “Commodity Management” Page - Sales Manager

The first function is **Search**. User can search the commodity by the keyword of commodity name or keyword of commodity type or both of them. After user entering keywords and clicking “Search”, then the page will show the details of appropriate commodities which contains the keywords on corresponding attributes. In addition, this page will only show table heads if there is no such this commodity.

The second function is **Add New Commodity.** After user clicking this button (at the bottom of the table), he/she will access to a new page (Figure 2-4) which contains a form need user to fill.

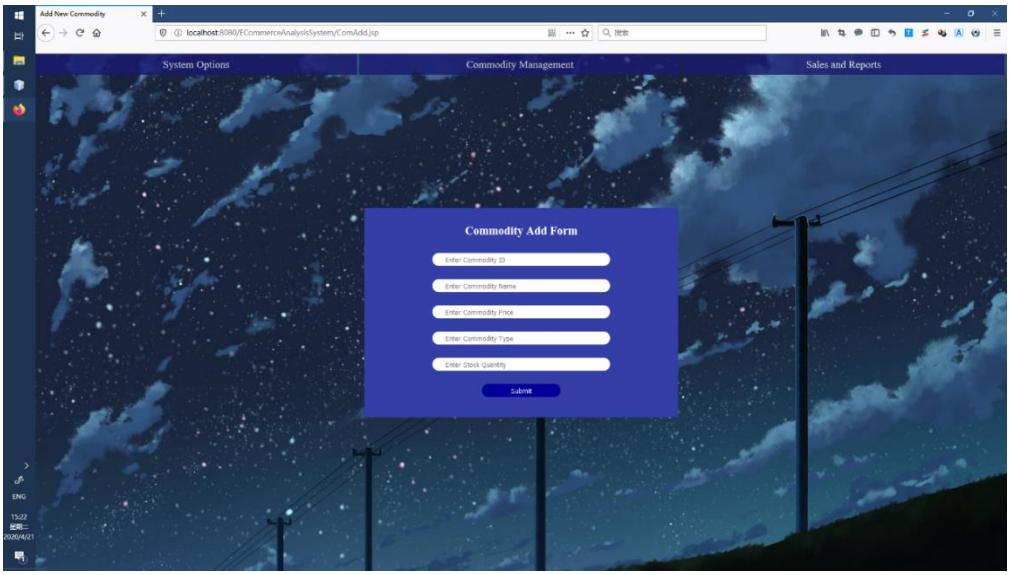


Figure 2-4: Commodity Add Form

There are five different attributes needs to be filled, the descriptions and constraints of these attributes are shown below:

- **Commodity ID**: A special identification number of the commodity. Only 5 characters and cannot be null or duplicate.
- **Commodity Name:** Name of the commodity. Cannot be null.
- **Commodity Price:** Unit price of the commodity. Only can be a positive integer.
- **Commodity Type:** Type of the commodity. Cannot be null.
- **Stock Quantity:** Quantity of the commodity in the warehouse. Only can be positive integer.

If the user do not follow these rules. The system will show the "Add Failed" information (Figure 2-5). Similarly, if the commodity add successfully, the system will show the "Add Successfully" information (Figure 2-6).

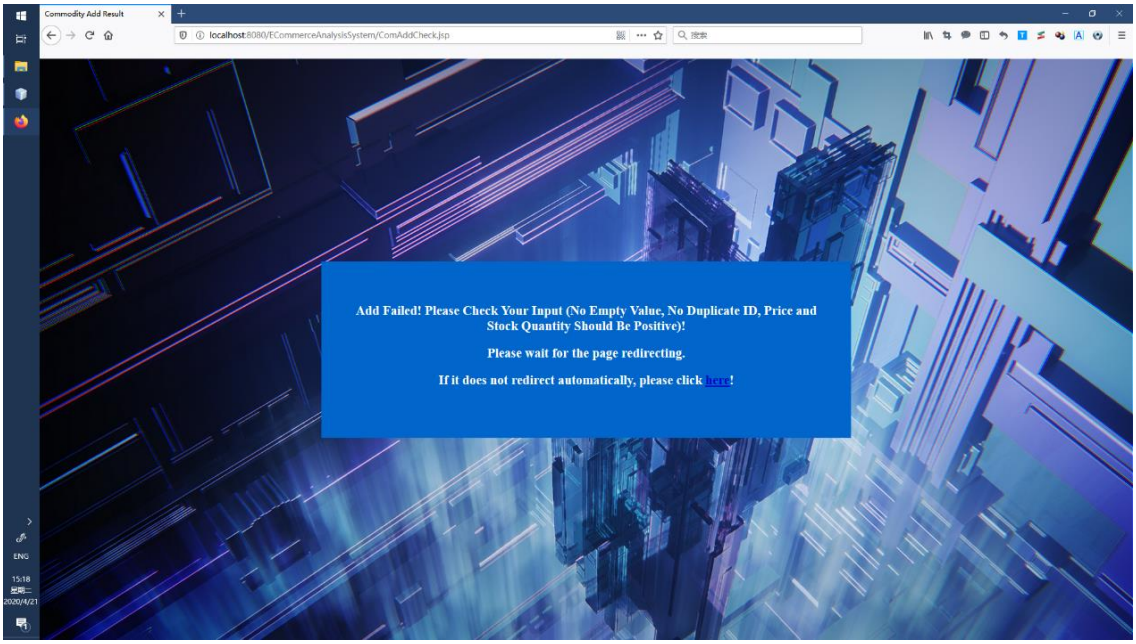


Figure 2-5: Commodity Add Failed

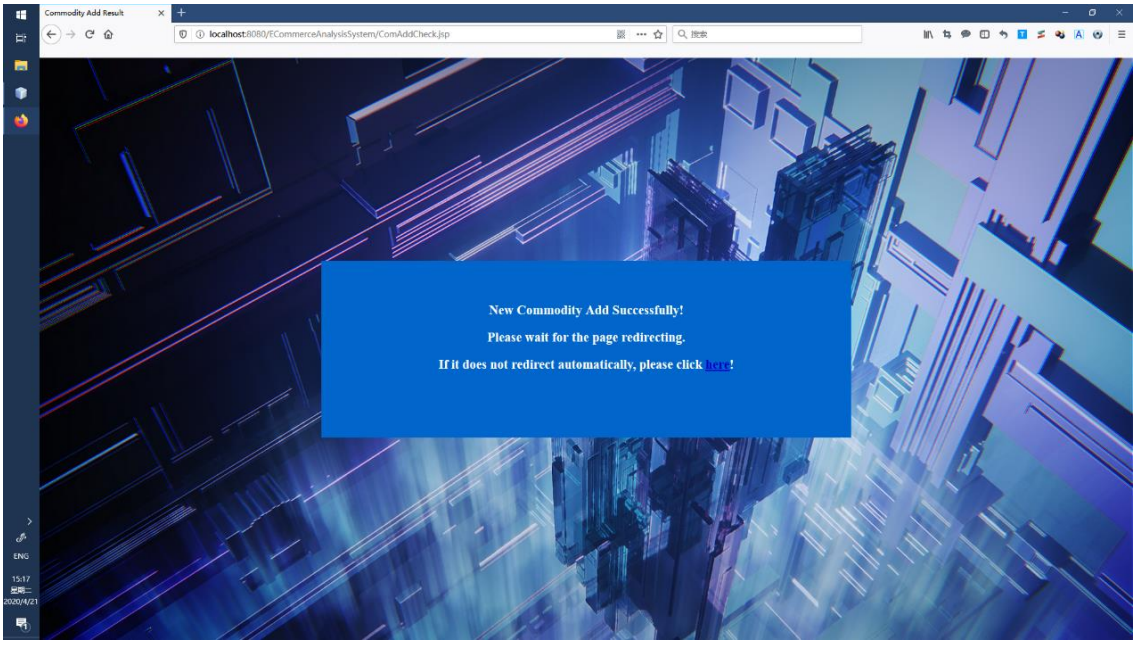


Figure 2-6: Commodity Add Successfully

The third function is **Update**. User can find the update option in the column which is named as "Operation". To update specified commodity, user just need to click the option "Update" which is following the commodity that he/she wants to choose. For about sales manager, he/she can only update the price and stock quantity of the commodity. Also, update should also need to follow the rules mentioned in function **Add New Commodity**. Commodity Update Form is shown in below (Figure 2-7).

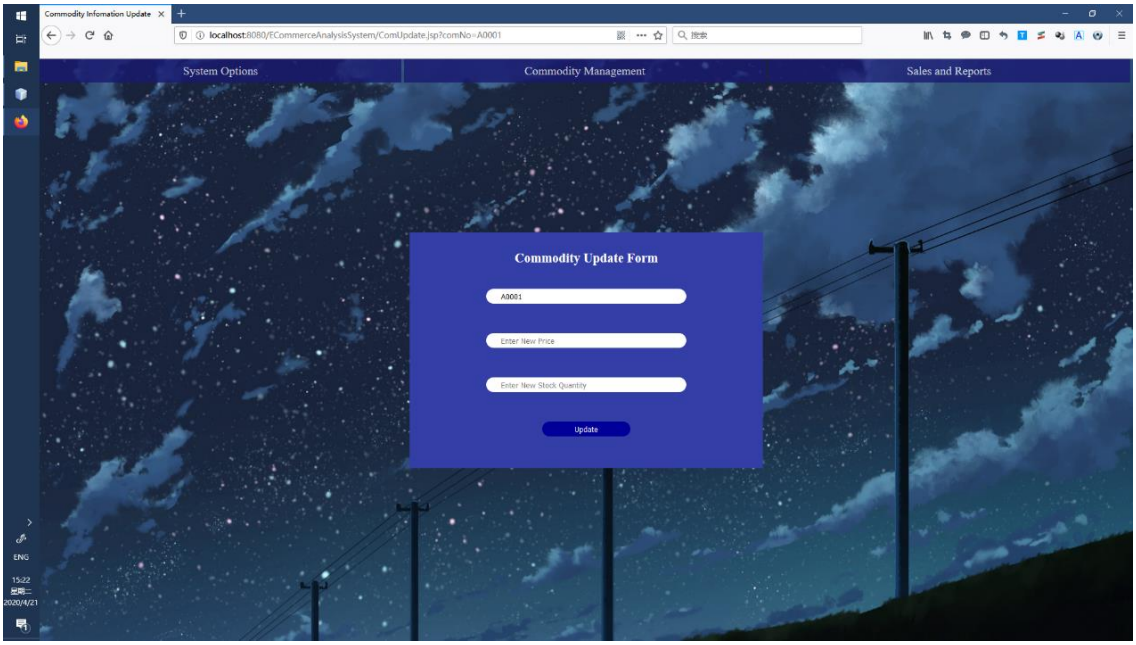


Figure 2-7: Commodity Update Form - Sales Manager

Now moves to the third drop-down menu **Sales and Reports**. After user clicking the option **View Sales Records**, user accesses into the records view page (Figure 2-8) and there is only one function for user to use.

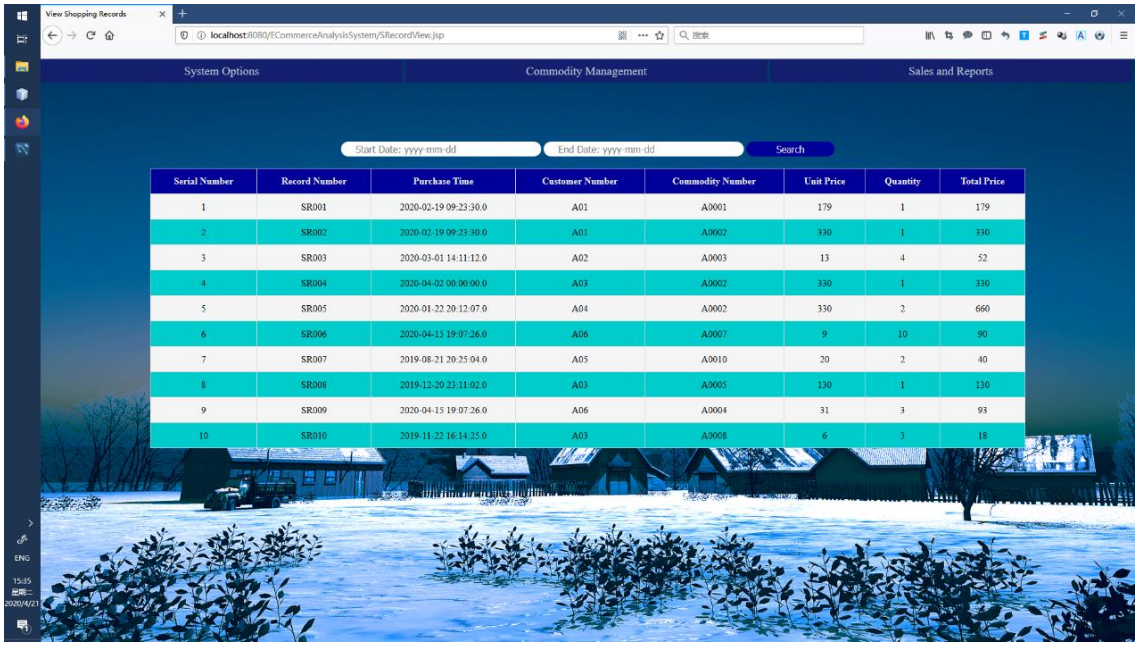


Figure 2-8: Records View Page

The only function is **Search**. User can search the sales records by setting the **Start Time** or the **End Time** or both of them. After user setting the time limit and clicking "Search", then the page will show the details of appropriate records which are in the time period set by the user. In addition, **Start Time** and **End Time** must follow this format: yyyy-mm-dd (For example: 2020-04-24).

View Sales Reports (Figure 2-9) is quite similar to **View Sales Records**. User can search the report by the keyword of report title, but if user wants to read the content of sales report, he/she has to click the button **View** which is in the column **Operation** to go to a new page to view the text (Figure 2-10).

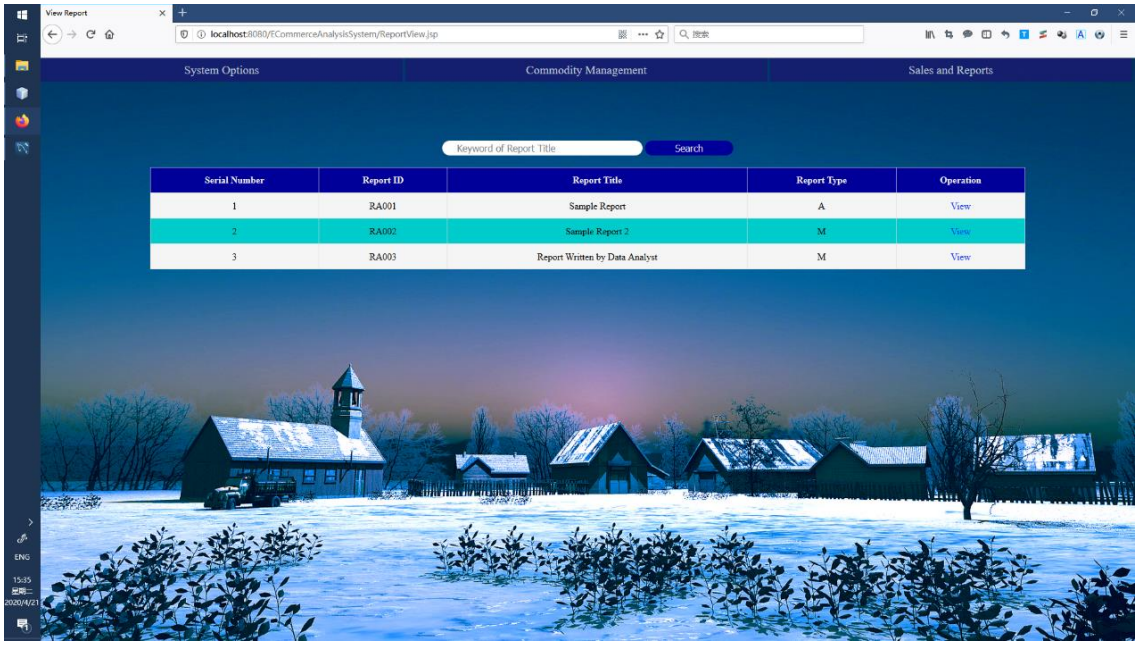


Figure 2-9: Sales Reports View Page

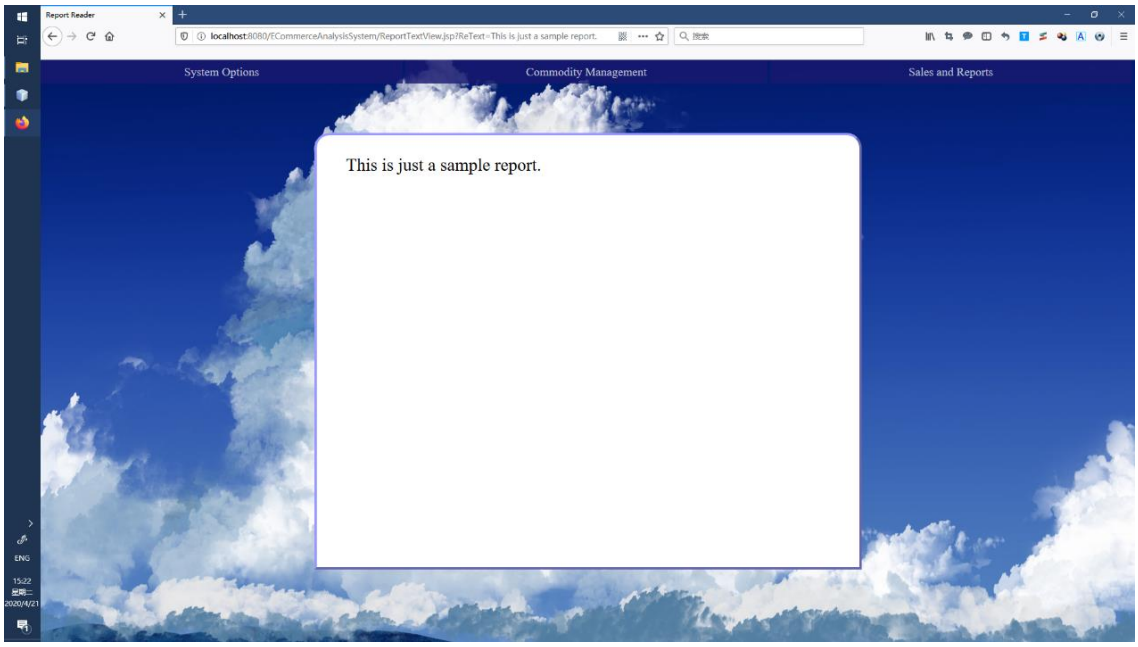


Figure 2-10: Report Text View Page

2.3 User Manual of Database Administrator

User will access into the home page below (Figure 3-1) after successfully logging in from the "Database Administrator Login" page. There are also three drop-down menus on the top navigation bar. The first one is **System Options** (Figure 3-1) which included **Database Administrator Home** option and **Logout** option.

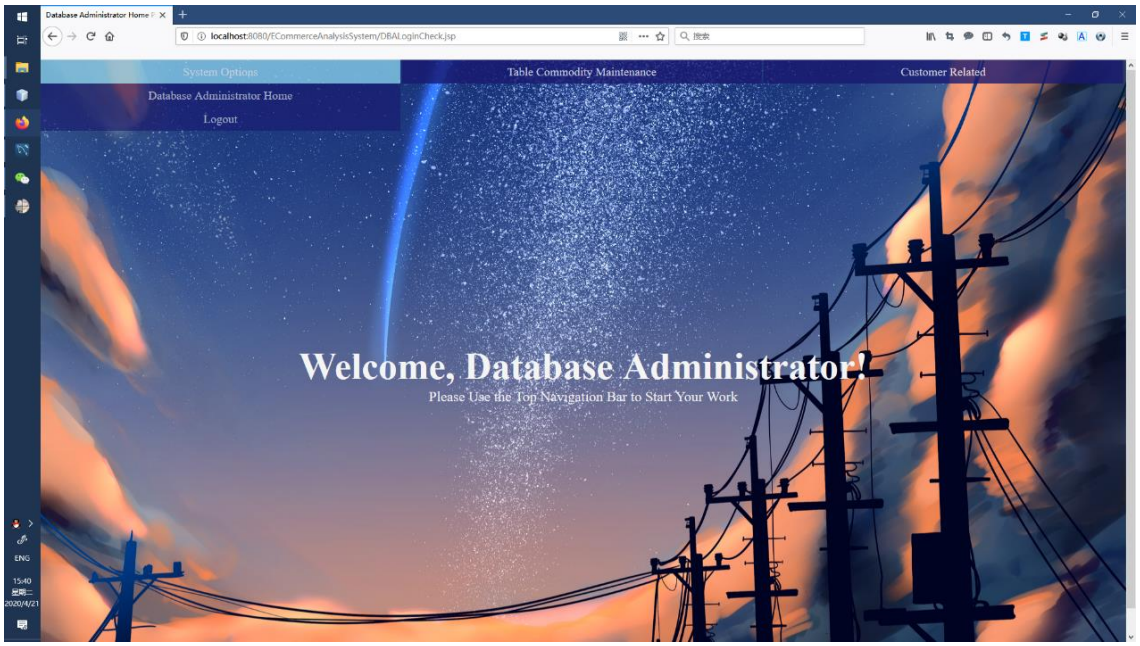


Figure 3-1: Database Administrator Home Page and Drop-down Menu "System Options"

The second drop-down menu **Table Commodity Maintenance** only has one option (itself) which includes detailed functions of commodities management and the third drop-down menu is **Customer Related** which has two choices **Table Customer** and **Table ShoppingRecord**.

After clicking the option **Table Commodity Maintenance**, now user accesses into the management page (Figure 3-2) and he/she can use some commodity management functions.

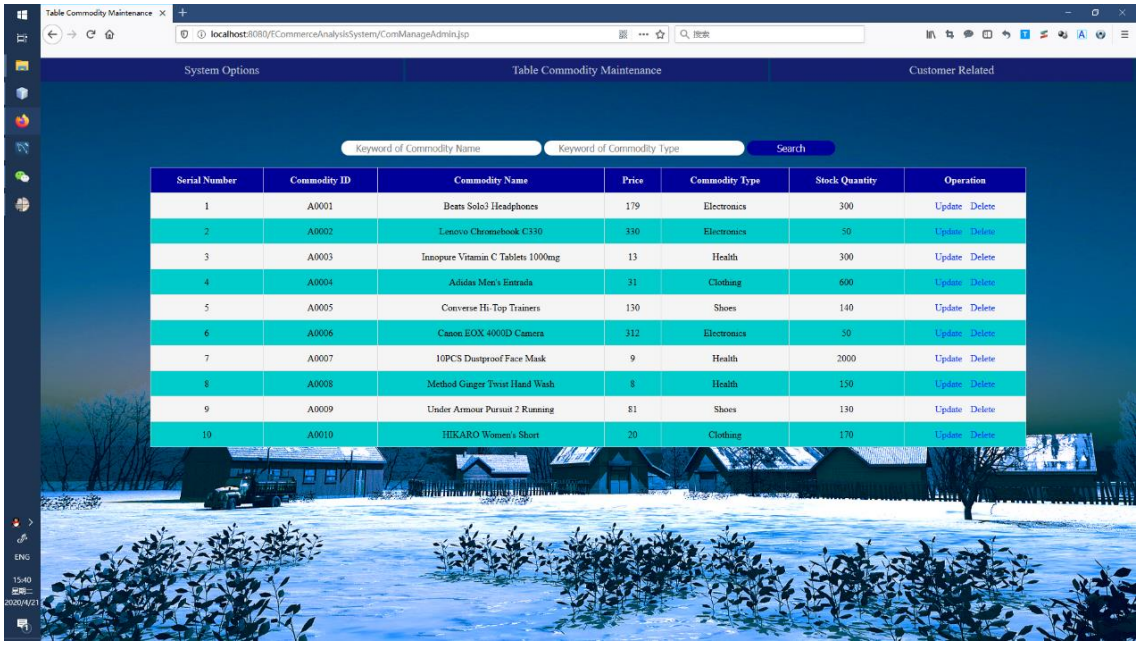


Figure 3-2: “Commodity Management” Page - Database Administrator

The first function is **Search**. User can search the commodity by the keyword of commodity name or keyword of commodity type or both of them. After user entering keywords and clicking “Search”, then the page will show the details of appropriate commodities which contains the keywords on corresponding attributes. In addition, this page will only show table heads if there is no such this commodity.

The second function is **Update**. User can find the update option in the column which is named as “Operation”. To update specified commodity, user just need to click the option “Update” which is following the commodity that he/she wants to choose. For about database administrator, he/she can update all the attributes of the commodity except “Commodity ID”. Also, update should also need to follow the rules mentioned in function **Add New Commodity** which is in the part of **User Manual of Sales Manager**. Commodity Update Form is shown in below (Figure 3-3).

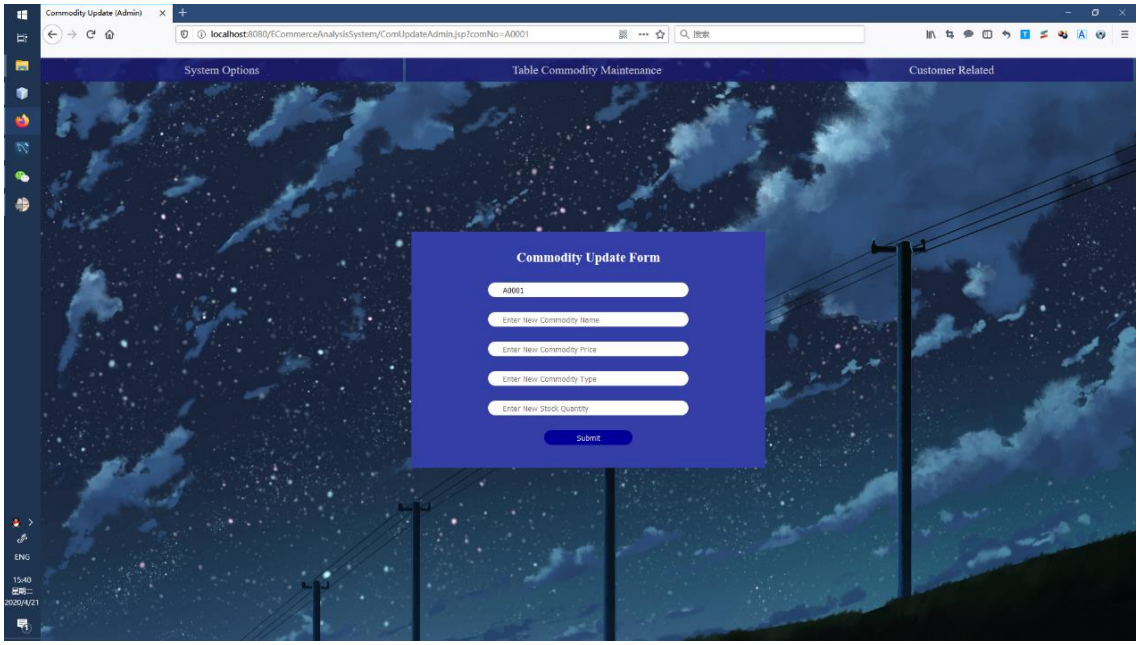


Figure 3-3: Commodity Update Form - Database Administrator

The third function is **Delete**. User can find the delete option in the column which is named as "Operation". To delete specified commodity, user needs to click the option "Delete" which is following the commodity that he/she wants to choose. After clicking the option, user needs to confirm he/she really wants to delete this entry to avoid wrong clicking (Figure 3-4). If the user choose **Yes,** the commodity will be successfully deleted.

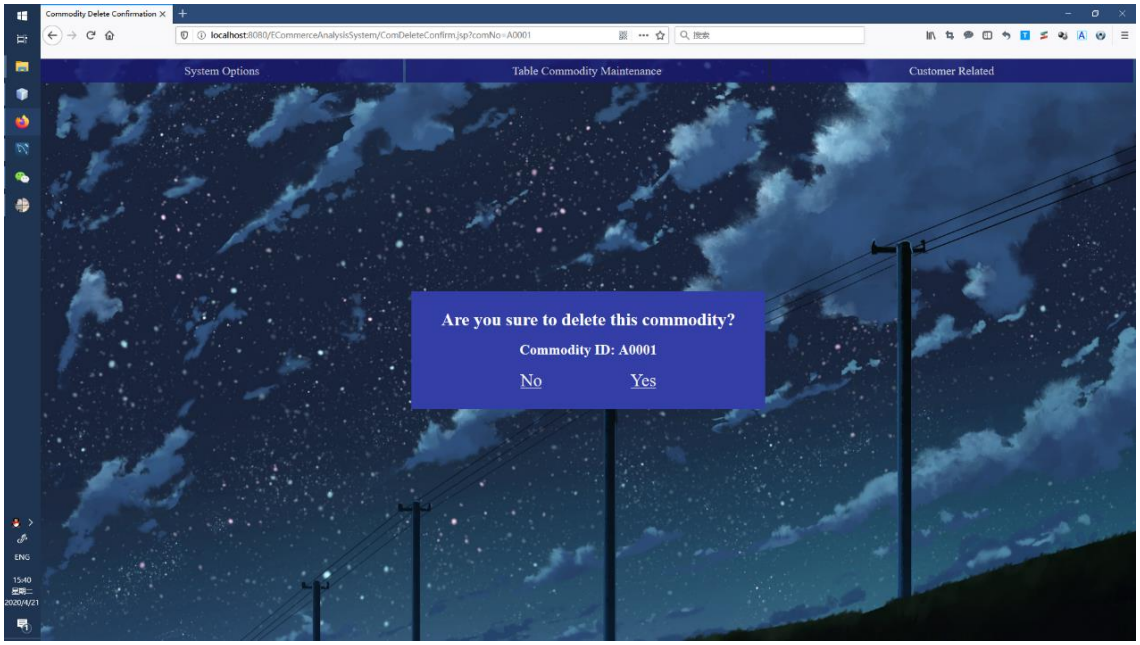


Figure 3-4: Delete Confirm Page

Now moves to the third drop-down menu **Customer Related**. After user clicking the option **Table Customer**, user accesses into the customers view page (Figure 3-5) and there is only one function for user to use.

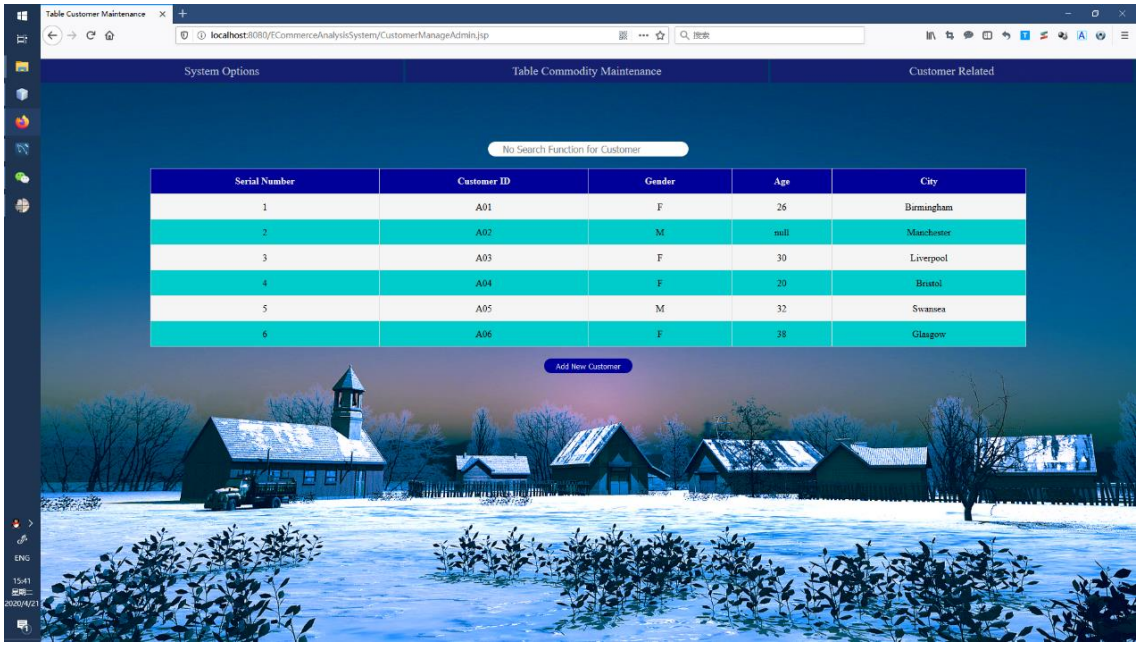


Figure 3-5: Customers View Page

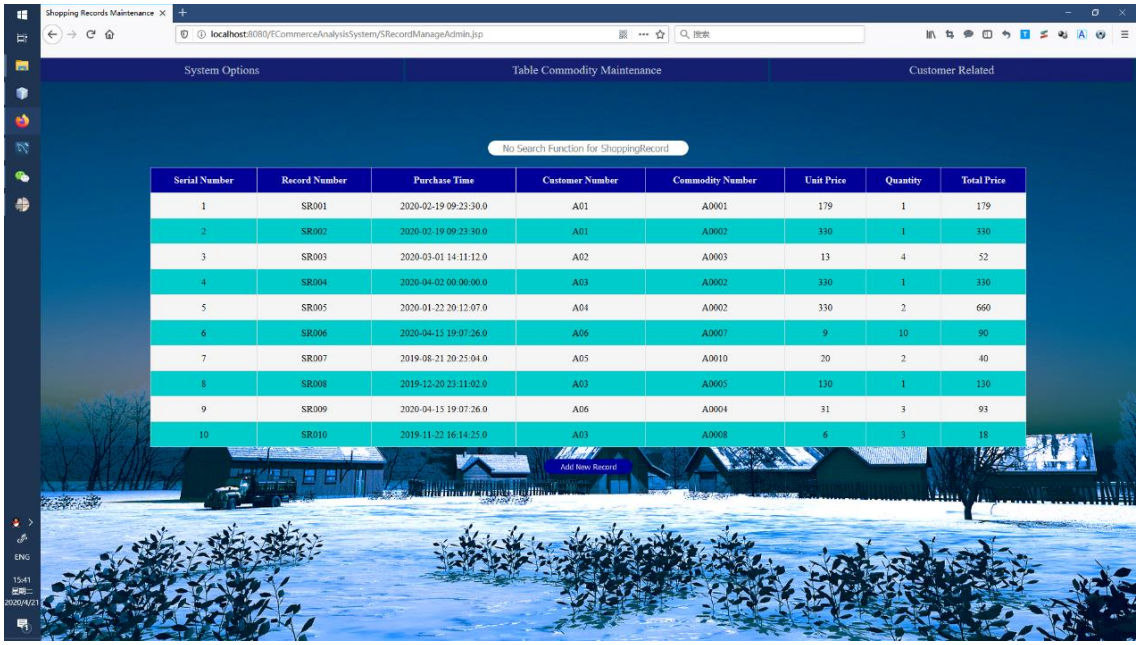
This only function is **Add New Customer**. After user clicking this button (at the bottom of the table), he/she will access to a new page which contains a form needs user to fill.

There are four different attributes need to be filled, the descriptions and constraints of these attributes are shown below:

- **Customer ID**: A special identification number of the customer. At most 10 characters and cannot be null or duplicate.
- **Gender:** Gender of the customer. Only can be ‘M’ or ‘F’.
- **Age:** Age of the customer. Only can be a positive integer or null.
- **City:** City of the customer. Cannot be null.

If the user do not follow these rules. The system will show the “Add Failed” information. Similarly, if the commodity add successfully, the system will show the “Add Successfully” information.

Table ShoppingRecord (Figure 3-6) is quite similar to **Table Customer**. There is also only one function for user, **Add New Record**. Similarly, after user clicking this button (at the bottom of the table), he/she will access to a new page which contains a form needs user to fill.



Serial Number	Record Number	Purchase Time	Customer Number	Commodity Number	Unit Price	Quantity	Total Price
1	SR001	2020-02-19 09:23:30.0	A01	A0001	179	1	179
2	SR002	2020-02-19 09:23:30.0	A01	A0002	330	1	330
3	SR003	2020-03-01 14:11:12.0	A02	A0003	13	4	52
4	SR004	2020-04-02 00:00:00.0	A03	A0002	330	1	330
5	SR005	2020-01-22 20:12:07.0	A04	A0002	330	2	660
6	SR006	2020-04-15 19:07:26.0	A06	A0007	9	10	90
7	SR007	2019-08-21 20:25:04.0	A05	A0010	20	2	40
8	SR008	2019-12-20 23:11:02.0	A03	A0005	130	1	130
9	SR009	2020-04-15 19:07:26.0	A06	A0004	31	3	93
10	SR010	2019-11-22 16:14:25.0	A03	A0008	6	3	18

Figure 3-6: Shopping Records View Page

There are seven different attributes need to be filled, the descriptions and constraints of these attributes are shown below:

- **Record ID**: A special identification number of the shopping record. At most 10 characters and cannot be null or duplicate.
- **Purchase Time:** Purchase time of customer. Need to follow this format: yyyy-MM-dd HH:mm:ss (For example, 2020-04-23 18:20:12).
- **Customer ID:** Customer ID of the customer who is related to this shopping record. It should be the same as in Table Customer
- **Commodity ID:** Commodity ID of the commodity which is related to this shopping record. It should be the same as in Table Commodity.
- **Unit Price:** Unit prick of the commodity. It can be inconsistent with the "Price" in Table Commodity and it must be positive integer.
- **Purchase Quantity:** The number of the commodity purchased by the user. It must be positive integer.
- **Total Price:** Total price of the commodity, must be equal to **Unit Price** × **Purchase Quantity**.

If the user do not follow these rules. The system will show the "Add Failed" information. Similarly, if the commodity add successfully, the system will show the "Add Successfully" information.

2.4 User Manual of Safety Specialist

User will access into the home page below (Figure 4-1) after successfully logging in from the "Safety Specialist Login" page. There are also three drop-down menus on the top navigation bar. The first one is **System Options** (Figure 4-1) which included **Safety Specialist Home** option and **Logout** option.

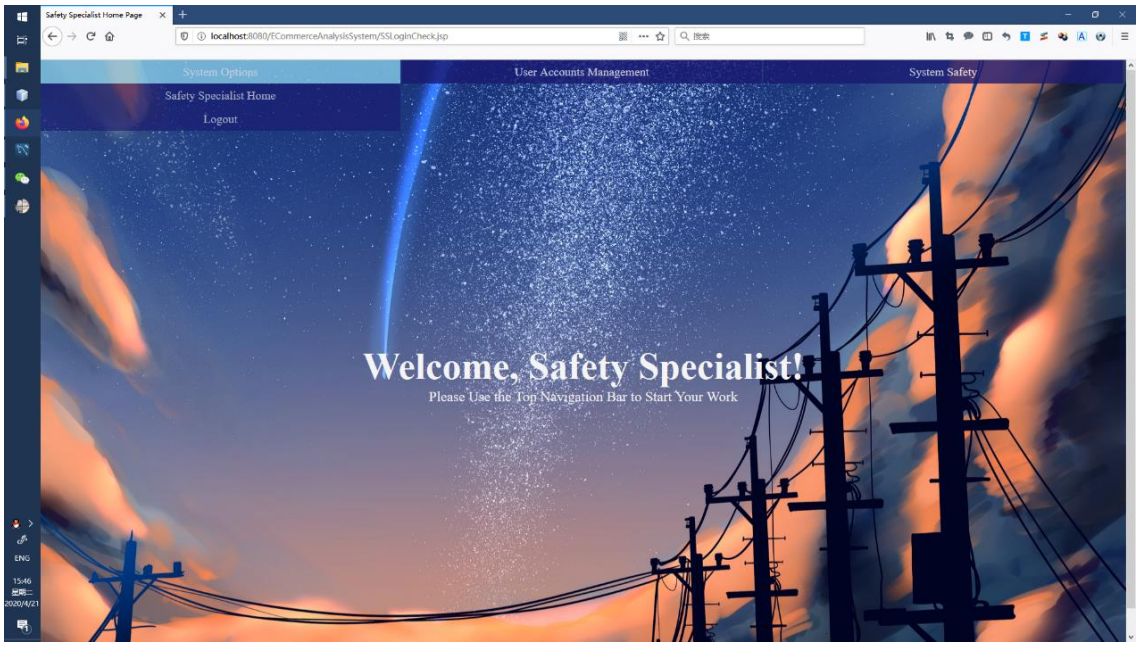


Figure 4-1: Safety Specialist Home Page and Drop-down Menu "System Options"

The second drop-down menu **User Accounts Management** only has one option (itself) which includes detailed functions of accounts and password management and the third drop-down menu is **System Safety** which has three choices **Database Monitor, Server Monitor** and **Report Security Vulnerabilities**.

After clicking the option **User Accounts Management**, now user accesses into the management page (Figure 4-2) and he/she can use some accounts management functions.

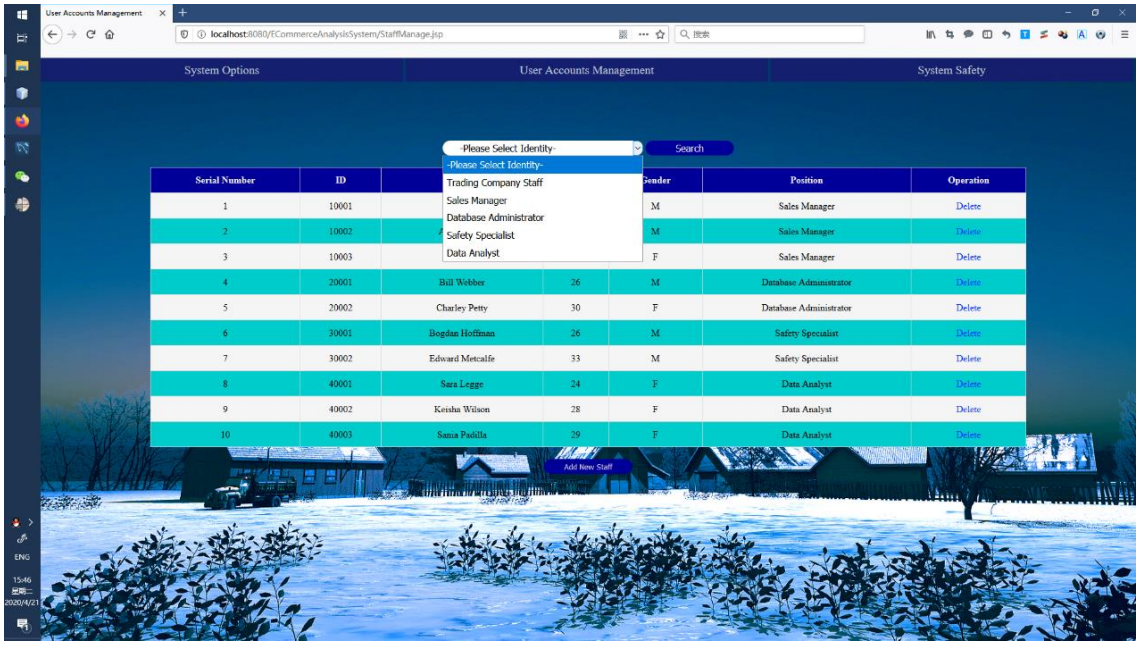


Figure 4-2: Accounts Management Page

The first function is **Create New Account**. This function is a sequence of operation and the steps will be shown below:

① Step 1: Select Table **Trading Company Staff** from the drop-down menu shown in Figure 4-2 and then click **Search**.

② Step 2: Click **Add New Staff** which is at the bottom of the table and then user will access to a new page which contains a form needs user to fill (Figure 4-3).

There are five different attributes need to be filled, the descriptions and constraints of these attributes are shown below:

- **Staff ID:** A special identification number of the staff. Only can be 5 characters and cannot be null or duplicate.
- **Staff Name:** Name of the staff. Cannot be null.
- **Staff Age:** Age of the Staff. Only can be integer equal to or bigger than 18.
- **Gender:** Gender of the Staff. Must be selected from the drop-down menu (‘M’ or ‘F’).
- **Position:** Position of the Staff. Must be selected from the drop-down menu (For example, Sales Manager).

③ Step 3: Choose the corresponding table and create a new account for the staff. For example, if the position of new staff is “Data Analyst”, then user needs to select and search Table Data Analyst and finally click **Add New Data Analyst** to go to a new page which contains a form needs user to fill (Figure 4-4).

There are four different attributes need to be filled, the descriptions and constraints of these attributes are shown below:

- **Analyst ID:** (In this example is Analyst ID) A special identification number of the data analyst. Only can be 5 characters and cannot be null or duplicate.
- **Staff ID:** Same as in step 2.
- **Staff Name:** Same as in step 2.
- **Password:** New password for this staff. Cannot be null.

If the user do not follow these rules. The system will show the “Add Failed” information. Similarly, if the commodity add successfully, the system will show the “Add Successfully” information.

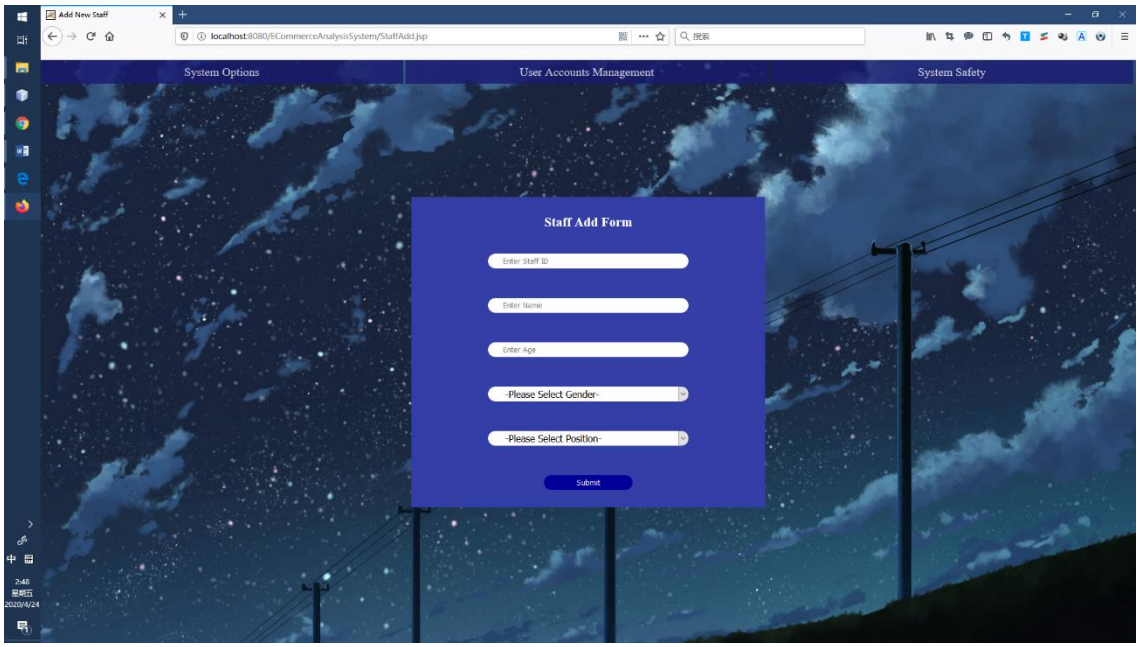


Figure 4-3: Staff Add Form

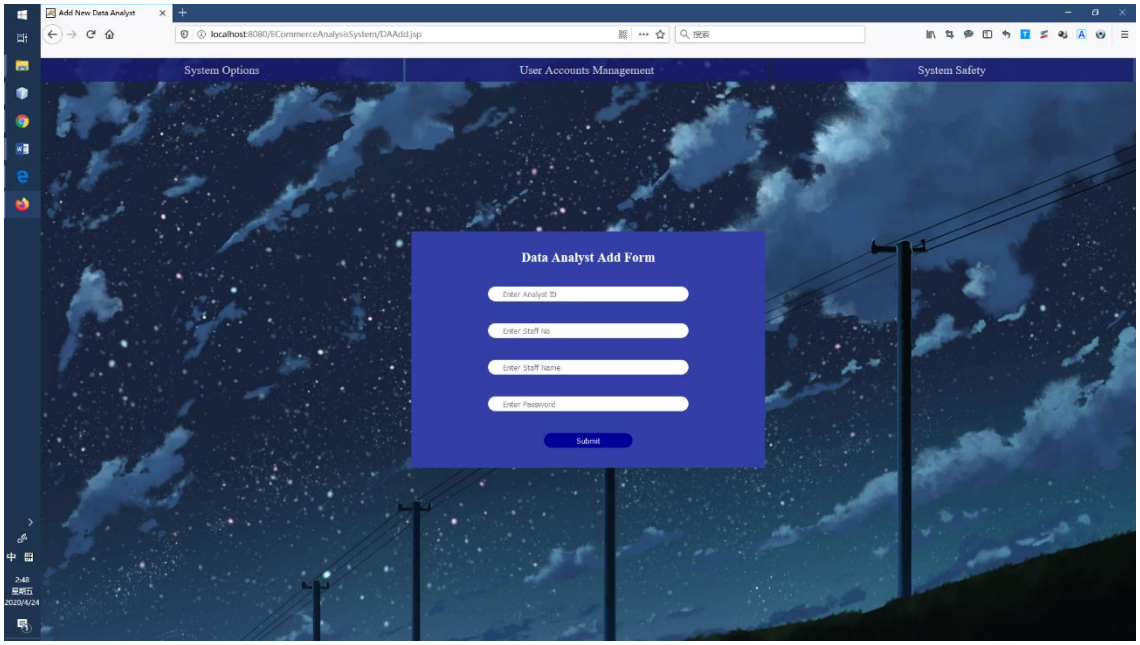


Figure 4-4: Data Analyst Add Form

The second function is **Update**. For about safety specialist, he/she can only update the password for staff. User can find the update option in the column which is named as "Operation" of classified tables. To update password for specified staff, user just need to click the option "Update" which is following the staff that he/she wants to choose.

The third function is **Delete**. User can find the delete option in the column which is named as "Operation" in table **Trading Company Staff**. To delete specified staff, user need to click the option "Delete" which is following the staff that he/she wants to choose. After clicking the option, user need to confirm he/she really wants to delete this entry to avoid wrong clicking. If the user choose **Yes,** the staff will be successfully deleted. In addition, the corresponding entry in the classified table will also be deleted automatically.

Now moves to the third drop-down menu **System Safety**. Because it is quite difficult for team members to develop the whole security mechanism, only main ideas are shown in following web pages: **Database Monitor**, **Server Monitor** and **Report Security Vulnerabilities**.

Database Monitor. Based on the knowledge of course COMP232 Cyber Security, Database Monitor could use some intrusion detection techniques to protect the database. For example, Rule-based and signature techniques could be used to protect the database. Because of there are some rules on user authentication and data operations in this system, we can design the database monitor based on these rules and then we can detect unauthorized

operations which are violating the rules. Logging of database operation can be very important in Database Monitor. Every user's operation on the database will be classified and displayed on Database Monitor in real time, then safety specialist can make responses based on the information displayed on Database Monitor and his/her own knowledge.

Server Monitor. Based on the knowledge of course COMP232 Cyber Security, Server Monitor could also use some intrusion detection techniques to develop an Intrusion Detection System (IDS) to protect the company servers. Basic mechanism of Server Monitor is quite similar to Database Monitor, but there are also some differences between them. Server Monitor is more concentrating on the pattern matching and state-transition of users. Because normal users has some fixed patterns on accessing server and reaching goals. Therefore, Server Monitor can detect unauthorized accessing based on the analysis of patterns of user behavior.

Report Security Vulnerabilities. This function is designed to help safety specialist to report potential security vulnerabilities and then collaborates with other specialists to make security patches and update them to the security mechanism of this system.

2.5 User Manual of Data Analyst

User will access into the home page below (Figure 5-1) after successfully logging in from the "Data Analyst Login" page. There are also three drop-down menus on the top navigation bar. The first one is **System Options** (Figure 5-1) which included **Data Analyst Home** option and **Logout** option.

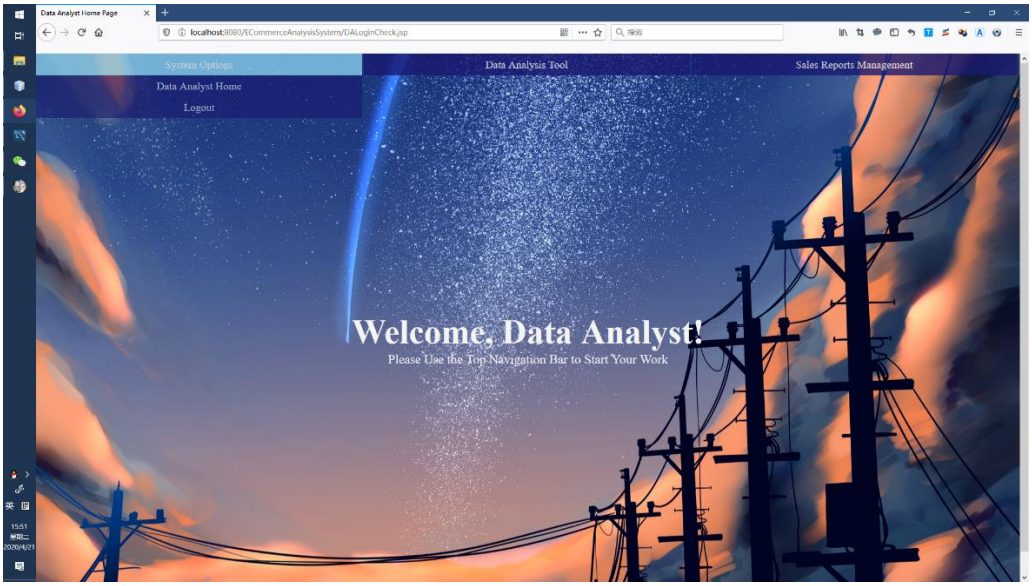


Figure 5-1: Data Analyst Home Page and Drop-down Menu "System Options"

The second drop-down menu **Data Analysis Tool** only has one option (itself) and the third drop-down menu is **Sales Report Management** which also only has one option (itself).

Data Analysis Tool has not been implemented because our team members developed a prediction model with python but we don't know how to combine Java WEB Application with python. Therefore, only main ideas are shown in that web page.

Data Analysis Tool. The main idea of data analysis tool is to give some prediction charts of commodity sales or even automatically generate some sales analysis reports for data analyst after they setting some constraints. The prediction model developed by our team members is based on this idea. Our team members implemented the prediction model through three steps. Firstly, create a new MySQL database and then create two tables, one is "record" and the other is "estimate". Table "record" is used to store the daily sales of a commodity over a historical period and table "estimate" is used to store the predictions of sales trend of in at least the next seven days (results are shown as predictions of daily sales in next few days). Secondly, create a python file named as "dataGenerator" to generate some simulated data and write into Table "record". Because we can't find massive sales data to train the prediction model, we can only simulate it. Finally, create a python file named as "dataAnalyst" which is a neural network (very simple one, only has four layers). This is our prediction model and we trained it with simulated data and then let this model write predictions into Table "estimate", also we let it plot a trend chart.

Now moves to the third drop-down menu **Sales Report Management**. After clicking the option **Sales Report Management**, now user accesses into the management page (Figure 5-2) and he/she can use some reports management functions.

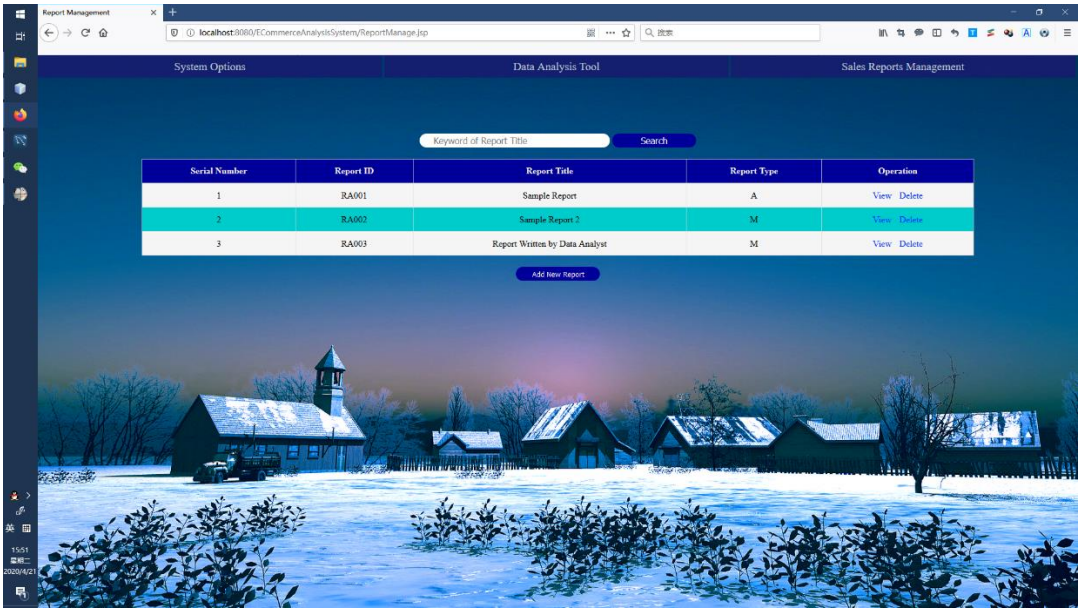


Figure 5-2: Reports Management Page

The first function is **Search**. User can search the report by the keyword of report title. After user entering keywords and clicking "Search", then the page will show the details of appropriate reports which contains the keyword of title.

The second function is **Add New Report**. After clicking the **Add New Report** button, user can choose Auto or Manual to add new report (Figure 5-3). If user chooses "Auto", then he/she can set some constraints to let the system generate a report automatically (Not been implemented). If user chooses Manual, then he/she can write the report by him/herself.

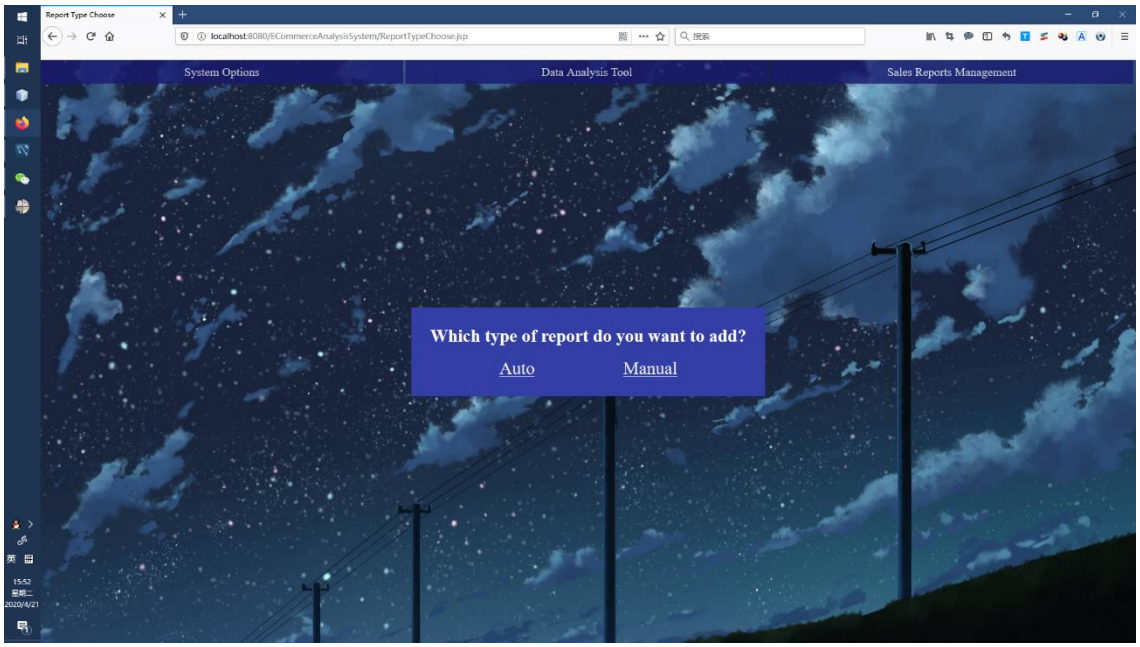


Figure 5-3: Report Type Choices

To write a new report, there are three different attributes need to be filled, the descriptions and constraints of these attributes are shown below:

- **Report ID:** A special identification number of the report. Only can be 5 characters and cannot be null or duplicate.
- **Report Title:** Title of the Report. Cannot be null.
- **Report Text:** Content of Report. Cannot be null.

If the user do not follow these rules. The system will show the "Add Failed" information. Similarly, if the commodity add successfully, the system will show the "Add Successfully" information.

The third function is **View**. This function is the same as **View Sales Reports** of **Sales Manager.** You can go the User Manual of Sales Manager to find more details.

The fouth function is **Delete**. User can find the delete option in the column which is named as "Operation". To delete specified report, user needs to click the option "Delete" which is following the report that he/she wants to choose. After clicking the option, user needs to confirm he/she really wants to delete this entry to avoid wrong clicking. If the user choose **Yes,** the report will be successfully deleted.

III. Additional Information

1. To logging in the system with different identities, you may need the accounts below:

- **Sales Manager**: Account: SM001 Password: SMvb12345
- **Database Administrator**: Account: DBA01 Password: DBAbw12345
- **Safety Specialist**: Account: SS001 Password: SSbh12345
- **Data Analyst**: Account: DA001 Password: DAsl12345

2. Recommend to use Chrome to access to the website. Must use personal computer to access to the website. If you are firstly accessing the system, it may take a long time to load background image, but functions won't be affected.

3. If the navigation bar is not on the correct location, please adjust the page zoom ratio to solve the problem.