AGENT-BASED SOFTWARE ENGINEERING

Online Book Store

Phase-1

GROUP I

Online Book Store

1. Introduction

1.1 Description

The main objective of the project is to create an online bookstore that allows users to search and purchase a book online Because conventional bookshops' operating hours, address, and area are limited, the sorts of books and books to find are restricted. However, the online bookstore has disrupted the conventional bookstore's management model, you can buy the book anywhere, saving time and effort and effectively cutting the time of book selection link. The online bookshop system is built on the concept of providing customers with convenience and service.

1.2 Specification

- A Home page with product catalogue:
  The system has a home page which comprises of books with various categories. In order to view the catalogue of the books, the user needs to register herself/himself. Upon successful login the admin will direct users to their respective home pages. The guest home page will have product catalogue and it displays books of all categories.
- Search Option:
  User will have access to a Search option, which helps the user to search for a book based on Title, Author, Category and price range (basically filters). All the books which match the search criterion, and their total count will be displayed. From here the user can select a book and add to the shopping cart.
- Book Description:
  If the user would like to know details about a book, he/she can click on the title then description of the book will pop or will open in a tab.
- Book rating:
  The user can give rating to any book based on his interest and can rate them by giving a score out of 5.
- Shopping Cart:
  The user can manage a shopping cart which will include all the books he/she selected. The user can edit, delete and update the items in his shopping cart. A final shopping cart summary is displayed which includes all the items the user selected and the final total cost.
- Managing user accounts:
  Each user should have an account to access all the functionalities of website. User can login using login page and logout using the logout page.

- Supplier:
  Supplier will have access to add/delete book and modify book details.
- Admin:
  Admin will have access to add/delete user and modify user details.
- Payment module:
  User can make a payment for all or individual items in shopping cart. Payment options include paying via debit/credit cards.
- Delivery status:
  User can track the status of all the items for which he/she has made the payment.
- Feedback:
  User can add feedback of the book or delivery service after the purchase.

1.3 Methodology

We will develop the proposed topic by using GAIA agent-based methodology. GAIA is a methodology for agent-oriented analysis and design. It is a detailed analysis.

GAIA methodology is concerned with how a society of agents cooperate to realize the system level goals, and what is required of each individual agent to do this.

First, we will present the analysis part by defining Role Models by following the standard format of GAIA methodology.

2. Analysis

In this part, we will present our analysis of the project by following the GAIA methodologies to draw diagrams and schemas. This project can be analysed in different ways, but we tried to make it as well as possible to make it suitable for implementation by different agents, and it may be changed in the next phases to make it complete and more accurate.

2.1 Roles Model

For finding the roles model which are the key roles of the system, we investigated the requirements provided in the project specification to find roles. Then we will provide a short description. After that, we will look at their permissions, responsibility, and protocols and activities.

	Role Name	Registration	Authentication	Book Search

Roles Model	**Description**	Handles the process for signing up users	Handles the process for authenticating the users and detecting if user is admin, supplier or customer	Searching books by applying different filters
	Protocols and Activities	RegisterUser	AuthenticateUser, FindUserRole	SearchBooks
	Permissions	Read UserData, Write UserData	Read UserData, Authenticate UserData	Read BookData, Display BookData
Responsibilities	**Liveness**	Register= (Register, Client)	RequestAccess= (Request.Access, Client)	RequestBook= (Request.Book, Display)
	Safety	Create a profile in system	Grant system Access	Display list of books

Cart Handler	**Payment Handler**	**Delivery Checker**	**Feedback Handler**	**GUI**
Adds/Modifies/Deletes selected items in/from Cart	Handles process of payments	Handles the process of displaying delivery status	Handles the process for feedback by users	Handles intercation between users and multiple systems
AddtoCart, ModifyCart, DeletefromCart	MakePayment	DisplayStatus	Feedback	HandleUserInteraction
Add Book, ModifyQuant, Delete Book	Write Payment Data, Read Payment Data	Read and display delivery status data	Read feedbackdata, write feedback data	Get user interaction from device
ReqestCart = (Request.Cart, Add/Modify/ Delete)	RequestPayment = (Request.payment, Transaction)	RequestDelivery Status= (Request.DeliveryStatus, Display)	RequestFeedback= (Request.Feedback, Display)	RequestInteration=Request.Interaction)
Finalize the cart	Process the payment	Display the delivery status	Save and display feedback	User Interaction

2.1 Interaction Model

In this part, we will present the interaction model which shows the interaction between different roles in the system. In the figure below we will show the purpose, initiator role, responder role, and processing.

Protocol	Registration Request	Authentication Request	Search	Shopping cart Request
Purpose/ Parameter	To register Username, Password, logintype	To authenticate user and login user	Search by Keyword and different filters	List of ordered books
Initiator(s)	Customer, login page	Customer, login page	Customer, Home page	Customer, Home page
Receiver(s)	Registration	Authentication	Book search	Cart handler
Processing	Creates a new user	Validates username, validates password and checks if the user exists in the system	Searches by keyword and filters like author name, publisher and provides with the matching results	Order list in the cart

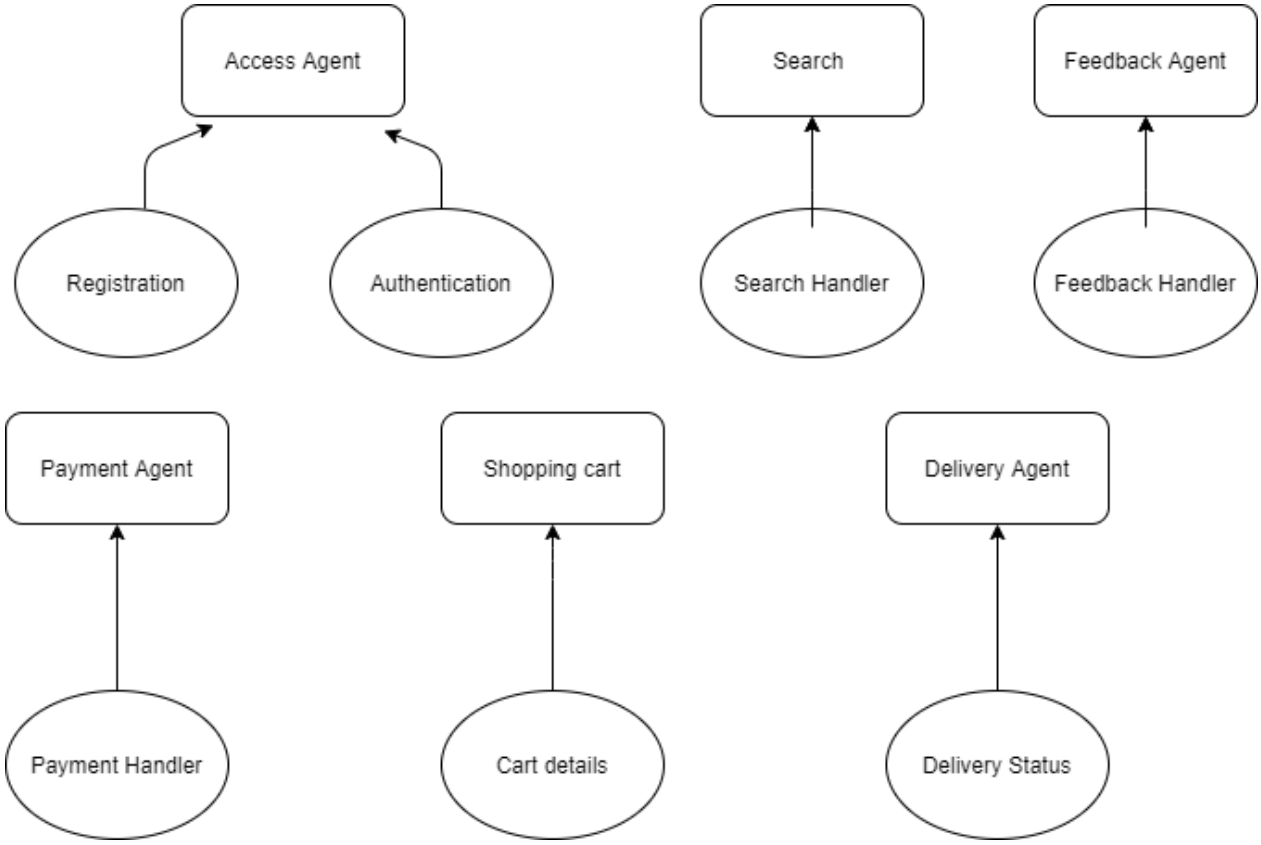
Submit Payment	Delivery Request	Submit Feedback
Price, Cart total	Delivery status	Customer feedback, book rating
Customer	Customer	Customer
Payment Handler	Delivery Checker	Feedback Handler
Payment transaction from the customer's account takes place and bill is created	The order is set to be delivered, and the delivery status can be checked.	Feedback is created for the application or rating has been submitted for the book by the user.

3. Design

In this part, we will present a detailed analysis of the project by following the GAIA methodologies to draw diagrams and schemas.

3.1 Agent Model

For finding the agents we look at roles and then group them if it is possible to make agents.



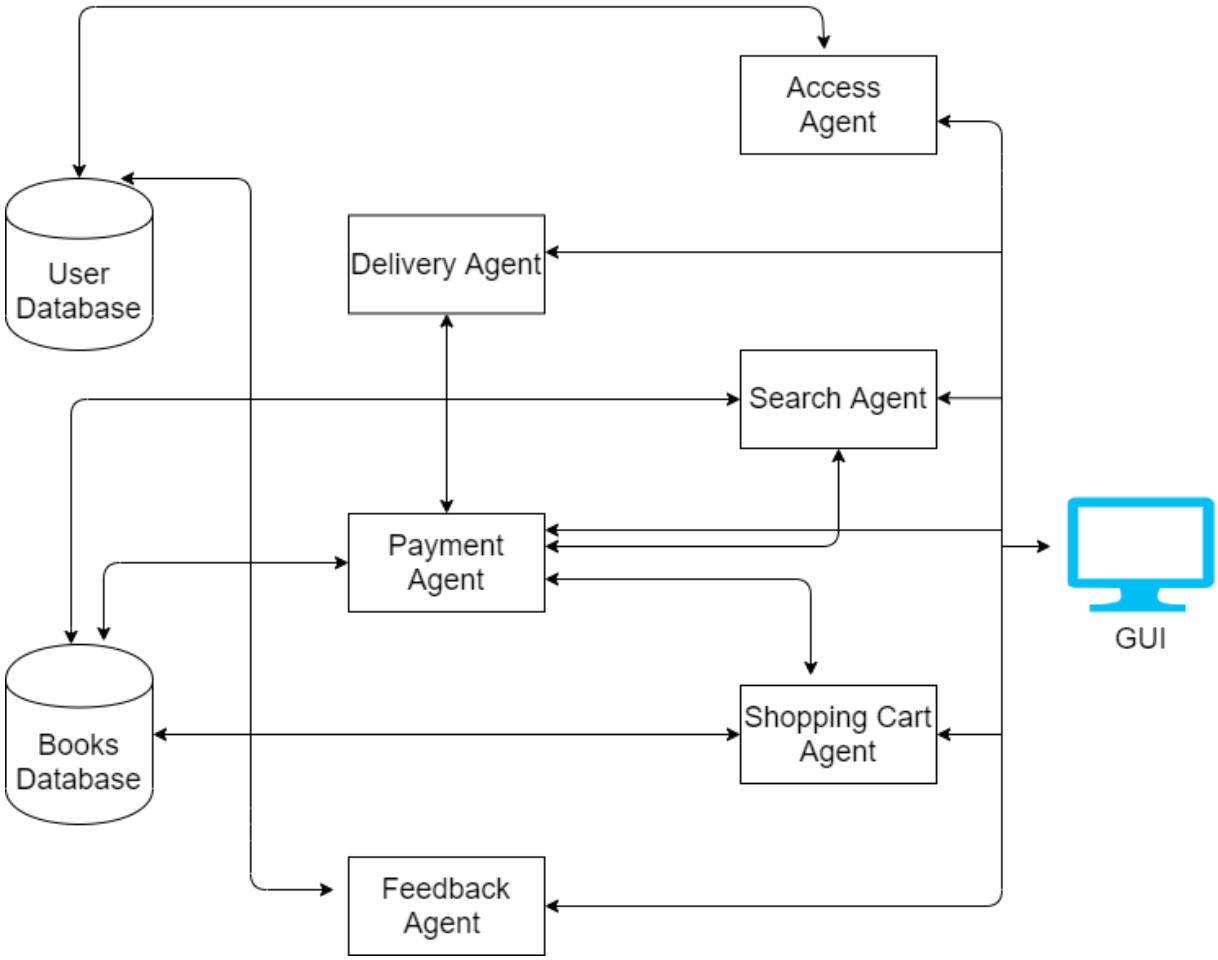
3.2 Service Model

In this part, we will present a service model that shows the services assigned to each agent role. In the figure below, we will show inputs, outputs, pre-conditions, and post-conditions.

Service	Access	Search	Cart	Payment	Feedback
Inputs	Customer details, Username, Password	Keywords, Book name, Author name	Book ordered list	Purchase details	Customer's feedback or rating a book
Output	Allow/Deny access	Serach results	List of books, price	Payment approved/denied	View rating to a book or comments
Pre-conditions	Launch the access GUI	Launch the search GUI	Launch the shopping cart GUI	Launch the payment gateway page	Launch the Feedback GUI
Post conditions	Secured customer DB access a store the client data in client DB or fetch the data from DB.	Secured customer access to DB and show the search result	View the ordered shopping list and price.	Secured connection to DB and update the purchase in client DB	Store the feedback in DB and update the feedback.

3.2 Acquaintance Model

For displaying the acquaintance model, we should define the communication links between agent types to identify potential bottlenecks to prevent problems later at runtime.



4. References

1. Cernuzzi L., Juan T., Sterling L., Zambonelli F. (2004) The Gaia Methodology. In: Bergenti F., Gleizes MP., Zambonelli F. (eds) Methodologies and Software Engineering for Agent Systems. Multiagent Systems, Artificial Societies, and Simulated Organizations (International Book Series), vol 11. Springer, Boston, MA. https://doi.org/10.1007/1-4020-8058-1_6

2. Boufedji D., Guessoum Z., Brandão A., Ziadi T., Mokhtari A. (2018) Towards a MAS Product Line Engineering Approach. In: El Fallah-Seghrouchni A., Ricci A., Son T. (eds) Engineering Multi-Agent Systems. EMAS 2017. Lecture Notes in Computer Science, vol 10738. Springer, Cham. https://doi.org/10.1007/978-3-319-91899-0_10

3. Sahiti Kappagantula, "How To Create Library Management System Project in Java? " September, 2021. [Online]. Available: https://www.edureka.co/blog/library-management-system-project-in-java

4. OSSpk/Library-Management-System-JAVA , GitHub repository, https://github.com/OSSpk/Library-Management-System-JAVA