

AI BASED MULTI-AGENT ONLINE SHOPPING SYSTEM

Priyanka Bingi¹, Ambika Guttikonda², Shweta Madgundi³, V.S. Patki⁴

¹⁻³U.G. Student, Department of Electronics Engineering, Walchand Institute of Technology, Solpaur, India

⁴Assistant Professor, Department of Electronics Engineering, Walchand Institute of Technology, Solapour, India

Abstract—First system can acquire the customer's current needs from System customer interactions. Then system combines expert knowledge and customer's current needs, and recommends optimal products based on multi-attribute decision method. If we want to maintain semantic conversation with sellers, commodity ontology is also utilized to support sharable information format and the representation. Agent methodology is-to support Ecommerce operations in the project like automating buying and selling process is promising and worth of success. The work process proposed in our paper aiming to present minimum solutions to increase and facilitate e-commerce transactions including automated price negotiations. It is a system, where users can assign their tasks to agents, which will do shopping job on their behalf and present them results.

It shows how these requirements are used to develop the multi agent-based simulation prototype of customer's shopping behavior in mall. Mainly the agents are assigned with special features and capabilities, this prototype can consider sufficiently believable and usable for end-users, mainly the mall managers. We show how shopping behavior simulator can support decision making process with respect to spatial configuration of shopping mall.

Keywords— PHP, multi-agent, client agent, controller agent, e-shopping

Introduction

An AI multi-agent shopping system have many product details. The system allows customer to register and add the details about a product. The system stores all the details provides by the user and checks for various products matching. The system shows a list of items as per user needs. The system also suggests other matching items that the user can like. The system suggests these items which are likely to be bought by the user based on his old searches.

There is a so many of systems those are developed to help computer users and mainly Internet users to deal with there daily activities in a easy and more reliable manner. E-commerce is a new field where it is important to process commercial activities with good accuracy, security, functionality and facility. It is really a poor and time-consuming process that customer go via the shopping on the Internet. The process may start with a search for a particular product from which several links to returned. Multi-agent technology which involves intelligent agents will help simplify e-commerce processes. It can be expected to have an

important economical impact, by bringing simplicity to businesses as well as benefiting end customer. Software agents are of good to use reduce work and extra information and provide high quality services to customers. With the help of AI, routine electronic transactions can be automated to a certain extent and therefore human involvement is reduced. However, we will also need to define our own dictionary and vocabulary for the content of the messages exchanged between the agents. After all needful information is collected, the buyer will then purchase the product using a any card as payment method. Multi-agent technology which involves intelligent agents must help to simplify e-commerce processes. The AI based Agents systems provide a platform for building such system where communication is not more the problem and communication is possible among components of the system independent of the platform, and can be distributed with huge success on the Internet. With the use of agent oriented middle ware, we can reach our main goal, which is making electronic commerce (E-commerce) so easier and more reliable. Software agents are useful to reduce work and information overload and provide high quality services to customers. With software agents, routine electronic transactions can be automated to a certain extent and hence human involvements reduced. To make it possible for those agents to communicate with each other, it is needful for them to have a same communication language and to follow common rules.

Literature Survey

We have undergone a detailed study about AI Based Projects and implementation. As a part of our circular activity we are making the project "AI Based Multi-agent Online Shopping System". There are many companies who have improved their business model, working hard in the logistics and overall functionality. The view of the customers has also changed, now customers don't like to visit the physical stores for buying rather they want to do the online shopping in their free time.[1] We introduce internet shopping mall stores and more specific search engine that is not depend on customer's separate ready-made response but analyzes the preference of customers after tracking and gathering enough purchasing pattern data. This allows the system to display product information of the users need. [2] There are many organization agents in our project: a user agent, an

information management agent, And a store agent. The organization agent is responsible for organizing the primitive contents and coordinating message delivery. [3] In Software agent technologies provide an scenario that is used to develop the new-generation e-commerce system, in which the most time-consuming stages of the customer's shopping process will be automated. More over there are now many different shopping sites on the Internet; however, most of these site slack a user-friendly interface design, which is essential for the success of online software. The interface of e-shopping systems must be good to view, easy to learn and easy to use. Otherwise, people in general will be likely become less interested in e-shopping applications.

System description

We studied traditional process of shopping generally done by people. This work basically focuses on developing a system capable of AI based automated and simplified shopping of different categories of products in order to be widely used in different areas. These e-commerce tasks will be handled by software agents on the rather than users.

Modules Included

- **User Registration:** Use can do registration and get account details
- **User Login:** User can login and check the details of various products
- **AI Agent Support:** The AI based agent guides the user and supports user to do his entire shopping and sort out products as per user need.
- **View Product:** The various products are arranged and can be viewed in categories.
- **Cart:** Users can add products to cart.
- **Product Search Engine:** User can do a product search. Server takes user requirements and show products matching it.

- **Related products:** System shows related products which user can like to buy.
- **Finalizing Products:** The AI agent fetch products as per user needs but leaves the final decision at user end to select and payment process.
- **Buy without registration:** System may be tempted to gather customer data.. However, the registration process is so lengthy and time consuming. Thus allow customers to buy without registering or keep the registration in simplified manner. Only ask for information that is needful. Save the users time by ignoring not required data at that point of time.
- **Build Customer Confidence in the Purchase Process:** If you are an trusted brand such as flipcart.com, customers may not worry about paying on your site. For the others, it can be a challenge to build trust with customers to pay online. Here are three simple measures to boost customer confidence.
- **Recover the Incomplete Cart:** Despite your best attempts, some customers will abandon the shopping cart. Immediately upon cart adding the system can mail to customer to complete their incomplete procedure and complete the purchase. If the customer is not registered, system has to store the data of shopping cart products in cookies on the customer's browser. Next time when customer visit we can prompt to complete the process.
- **Up-Sell After the Sale:** The temptation to sell more to the customers is understandable. However, persistent up-selling heightens the risk of losing a customer.
- **Checkout Process:** When customer complete his buying process the system has to navigate to checkout process then the customer ends the shopping process by entering further details like delivery address, contact info etc.
- **Display a Summary of the Customer's Purchase:**
Many customers will do so many tasks at a time. They may forget what they purchase and added to their cart.

- **Show a Progress Bar:** A progress bar can make assurance to customers that each step in the purchase process is taking them close to ending of the process.
- **End Customer Process:** May be there are three simple things that can positively influence customers process.
- **Giving Checkout Button:** So many customers do the more stuffing and browsing, and some pay right away. If a customer is ready to pay, its our duty to provide them a facility and must ensure to do not delay the collection of that payment.
- **The Buy Now Button:** The most important button in the process is checkout button after checkout the button. Their should be a "buy now" button, if the customer has not added goods to the shopping cart. Make sure that the button is prominently visual to customer and must be at highlighted place.
- **Minimize the Number of Clicks:** Show the a single checkout form. If that is not possible, reduce the number of clicks required to check out. The more number of clicks you thrust upon a customer, the higher the likelihood of shopping cartin completion.

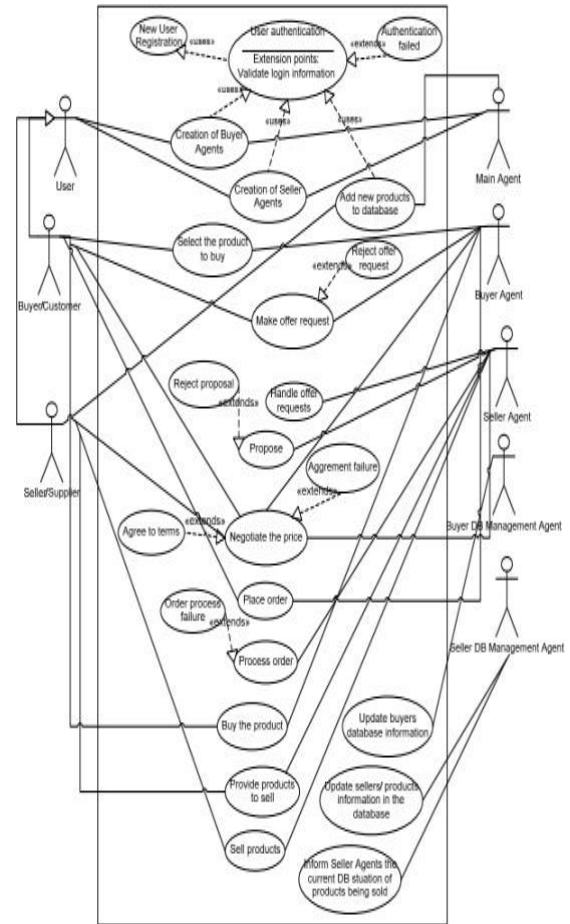


Fig. 1 MAISS System Behaviour Model/ Use case

Objectives

- **Automated Shopping:** We has to achieve automated shopping in the project which means robot should do shopping from the site behalf of customer in which all the parameter has to consider like price, color, quality etc.
- **Match Users Need:** The system has to match all the user need from the based on their previous shopping like what he likes what's his budget, which brand he likes, what is his favorite products etc.
- **Notify Customer About Shopping:** When system completes the shopping behalf of the user the system has to notify user that what it purchased so the user can maintain the track and change his decision if he wan.

Technology

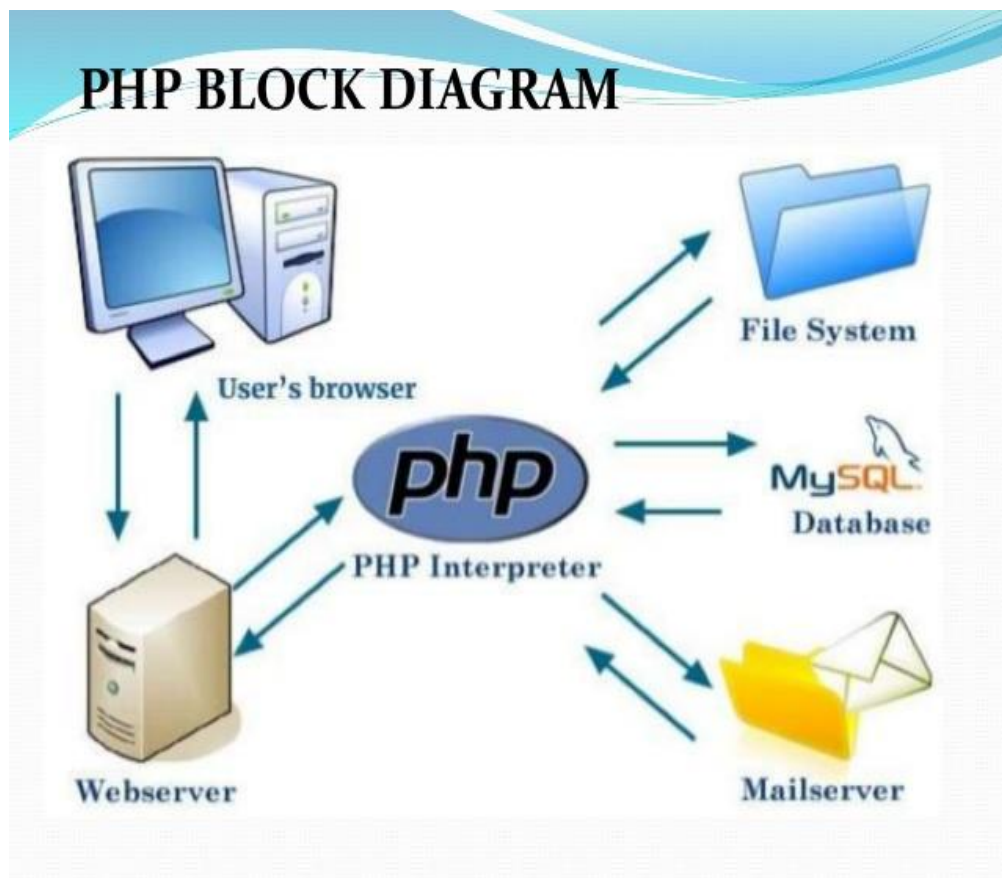
The system is completely developed as a web application so we used following technologies to develop the system.

- **HTML:** HTML is the Hyper Text Markup Language which is designed to display the context on the web browser. It is also called as front end language.
- **CSS:** CSS stands for Cascading Style Sheet. It is basically used for presenting the browser elements in a better manner. By using this we can make the style of the element as we want.
- **JavaScript:** JavaScript is high-level, often just-in-time compiled, and multi-paradigm. It has curly-bracket syntax, dynamic typing, prototype-based object-orientation, and first-class functions.
- **PHP:** Php is a sever side general-purpose scripting language especially suited to web development. It is easy to use and Fast,

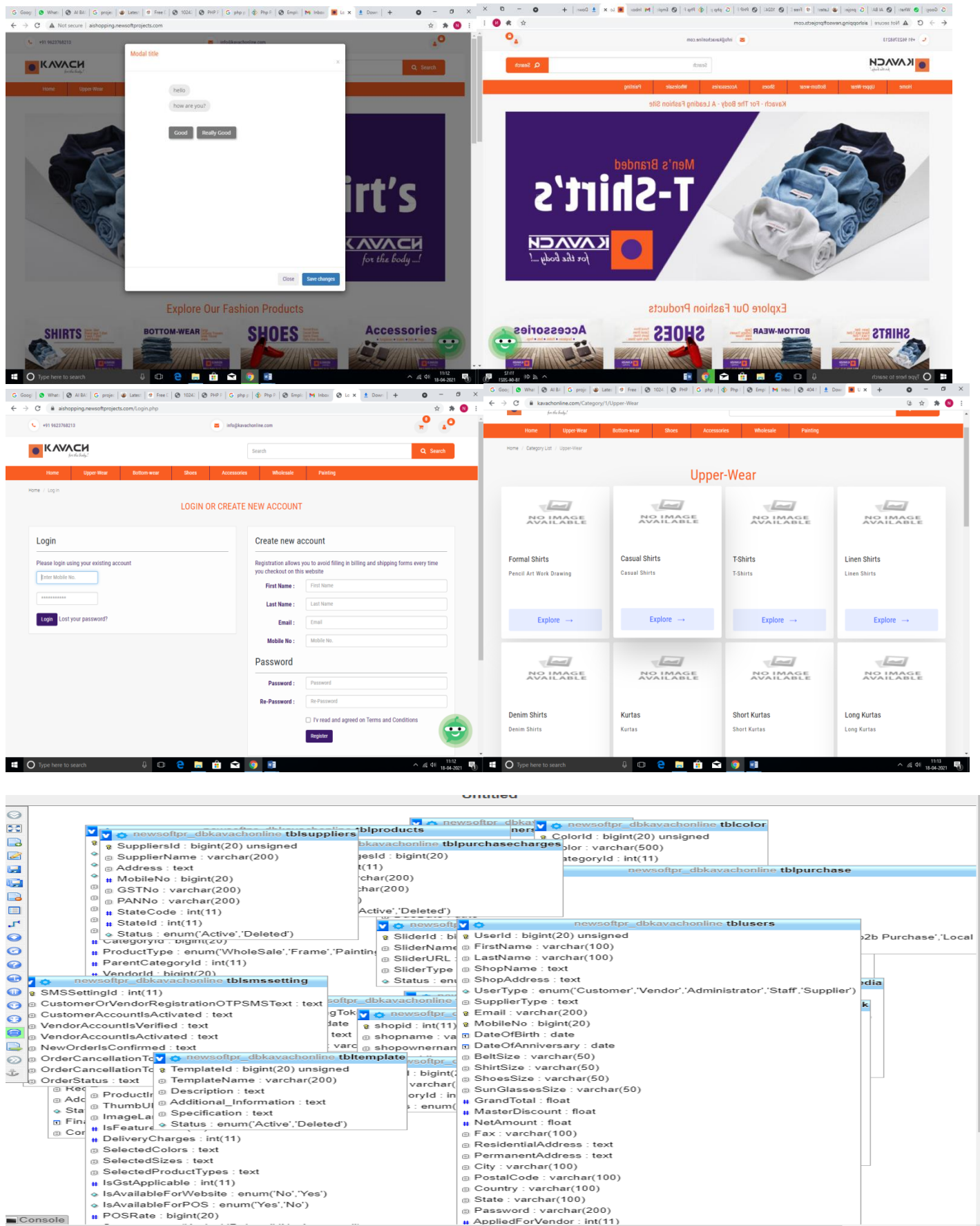
- flexible and pragmatic than other language. It is basically used to perform all the server side operations.
- **MySQL:** Show the single checkout form. If that is not possible, reduce the number of clicks required to check out. The more number of clicks you thrust upon a customer, the higher the likelihood of shopping cartin completion.

Software Used To Run

- **XAMPP:** XAMPP is the most popular PHP development environment XAMPP is a completely free, easy to install Apache distribution containing MySQL, PHP, and Perl. The XAMPP open source package has been set up to be incredibly easy to install and to use. This simple and lightweight solution works on Windows, Linux, and Mac.



Screen Shots



Implementation

To implement proposed system, different important things are considered as we focus on reaching our main goal to system which is to bring an added facility to e-commerce through multi-agent technology.

- a) There should be them AI agent from which buyer agents and seller agents that should be created.
- b) Main agents, buyer and seller agents must be associated with a Graphic User Interface (GUI) for better interaction with the users.
- c) Seller and buyer agents should be able to negotiate on behalf of user. Such negotiations should being a good co-ordination and conflict resolution, where the conflict is understood broadly as any form of goal disparity

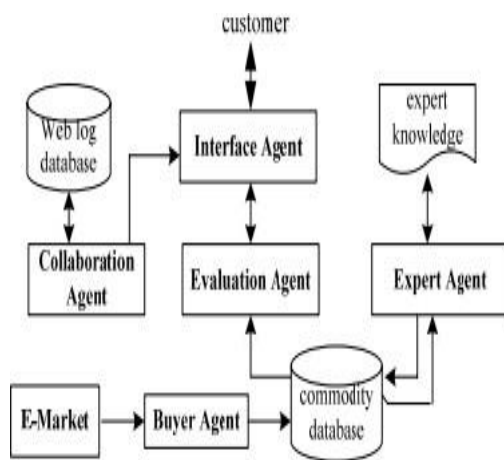


Figure 1. The architecture of the shopping system

Results

When System starts, main agent called (MAISS) is loaded. This agent automatically opens connection with the mysql database. They are not associated with a GUI, their roles is to just control database flow of information and doing the other activities requested by the buyer and seller agents which will be created by users.

The seller can login and create seller agents, register new products to the inventory. If he is not recognized, he must need to register in our case, seller with username (alice) has already logged in, and created two seller agents (SELLER_AGENT1, SELLER_AGENT2).

In this system, the buyer agent price is a reserved price above which it can't buy the product. In the case it can't get all desired quantity from one seller agent, it has a possibility of buying other from different sellers

Each time it buys, for example, it is to buy quantity Q of product P, and if it gets some quantity $Q_i \leq Q$; there is a decrement in the quantity by Q_i , and the remaining quantity to buy is $Q - Q_i$, where $Q - Q_i > 0$.

Conclusion and future work

We have proposed the agent based system to automate shopping process. We identified different scenarios through which, proposed system will be much more helpful. The success of system will be able to help people save time and effort in dealing with buying and selling operations. In this paper, we have been analyzed and shown some functionalities of Multi-Agent Intelligent Shopping System. We have also given the sample implementation. We have also presented the background information on the working of this system by software agents and automatic negotiations. More is to be done and we hope to address following developments in subsequent papers. We will systematically extend system in future to fully answer to all expectations of users. In future, an intelligent shopping system will be developed for the user by using a multi-agent system to provide shopping service for the products that a consumer does not buy frequently.

References

- [1] Bhavna Galhotra (2019) "Evolution of E-commerce in India", IEEE Xplore, <http://ieeexplore.ieee.org/document>
- [2] Eui-Seok Hwang (2001) "Intelligent Shopping mall agent based on user's preference", IEEE Xplore, <https://ieeexplore.ieee.org/document>
- [3] Kwang HyounJoo (2000) "Agent-based grocery shopping system based on user's preference", IEEE Xplore, <https://ieeexplore.ieee.org/document/>