Time Complexity of BaichDo.com Web Application

Ali Haider[1] , Syed Aun M. Naqvi[2] , Hafiz Hasan Naqvi[3] , Hafiz M. Tayyab Khushi[4], Muhammad Adnan Khan[5] , Shazia Saqib[6]

Department of Computer Science Lahore Garrison University, Lahore, Pakistan
Department of Computer Science Lahore Garrison University, Lahore, Pakistan
Department of Computer Science Lahore Garrison University, Lahore, Pakistan
Department of Computer Science Lahore Garrison University, Lahore, Pakistan
Department of Computer Science Superior University, Lahore, Pakistan
Department of Computer Science Lahore Garrison University, Lahore, Pakistan

Abstract
In this modern world, as an increasing demand for products, people are buying more products these days. There are numerous applications that provide a platform to meet their desires by doing online shopping. It is proposed to create a platform between buyer and seller by using their geological location. So, they can easily connect with each other safely and concisely in a very short period of time. Now it will become easier for customers to search and have their desired products.
It is basically a web application that is used to synch buyer and seller, by saving their time and money as well. It automatically detects the location and checks if the product is available nearby. This application is also providing security for both buyers and sellers because they can easily connect with each other, not a third person is involved.

Keywords
(Web application, buyer, seller, Product, Map)

1. Introduction

As the population is growing day by day, the number of a consumer is also growing which has directly maximize the number of producers. In this way, development has become a continuous process. This is being done to provide more and more benefits to consumers, producers and the economy of the society. With the invention of the algorithm, technology has carved its imprints and speedup this whole process of production. With the blessing technology, we can get more benefits to form the developed product and show our interest in the latest technologies. [1]
To buy the product, the buyer visits the market, with a clear image of the product, he is looking for. A variety of products with varying qualities and prices are available in markets. In order to have a quality product with minimum cost, the customer has to wander a lot, and no one can exclude the efforts which are done behind the whole exercise. During this process of searching the buyer will lose two things. Firstly, his precious time and secondly his money.[1]
On the other hand, the seller has a lot of products in his store but due to some marketing issues, he is unable to sell most of them. So, his investments are not paying him back in an efficient manner. In order to deal with this issue, he has to use some marketing tricks like an advertisement.
Today, we are considered to be lived in a global village where everybody is connected by using Social Media (SM). Keeping in mind the usage of SM by a huge number of users, the trend of advertisement got changed and affiliated with SM. Now, SM is offering paid and unpaid advertisements to its customers that are effectively being used and it is causing an unbelievable result.[2]
Many websites are created with the purpose of selling and buying products. The user selects the product and buys it and he can opt for any payment method, either cash on delivery or card (PayPal, VISA, Master, etc.). As we all know, the whole process is virtual, and it can be scammed easily. For Example, sending/receiving a different quality product, the security of credentials (personal or banking info). Surely, it can harm the trust and security as well as the wastage of time and money. [3]
On the basis of previously explained issues, our website is overcoming all these problems. Firstly, to save Time of both parties, our website will provide a lot of options to choose a product with different parameters like quality, price, and geological range. Recently, many websites have implemented this feature, but our application uses a bidding feature to enhance productivity up to the user's satisfaction level. We've also added an advertisement feature to ensure versatility. [4]. Our main goal is to provide an easy and quick search of the desired product that is residing at the nearest location so that the time, money and efforts can be well utilized. [4].
This project is developed for the consumer who wants to buy any product by excluding the third party's profit, travel issues, and wastage of time. It also provides opportunities to sellers (businessmen) in terms of having an online market, customers and free advertising facility.

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2. Literature Review

With the improvement in technology, the world is going more modernized and improved day by day. Previously, the size of the computer was very large as it was based on tubes and transistors. Due to larger in size, it used to occupy more space and consume more energy. These giant computers were the only medium to get access to the internet[1]. Today, with the invention of integrated circuits (IC's) and the internet of things (IoT) we have transformed our large computers into smaller, faster and efficient devices. The most popular devices of the day are laptops, mobile phones, tablets, watches and many more. Now the access to the internet has become possible even through these hand gadget devices [6].

With the passage of time, the internet has become the most essential entity of daily life. Experts from the IT industry started developing platforms (websites) of different purposes and objectives. The major objectives are: spreading information, communication, data/file management and many others [3].

In a fast progressing world, people have a very tight routine and don't have time in terms of bringing the basic necessities of life at home. It may include food, clothing, home appliances and other things of daily use. In order to deal with the issue and filling the gap, there comes an "e-commerce" website into existence to do online shopping [5]. Now, Amazon.com, Alibaba.com, ebay.com, and Daraz.pk [4] are the most common examples of it. They are offering their services so that the buyers select the given product and pay for it using card or opting cash on delivery option.

These websites are helping in many ways to buy and sell products [5]. On the other hand, side, this business is being affected by various issues. Firstly, providing different quality products than the described one. Secondly, the security of credentials (personal or banking info). Thirdly, the buyer has to wait for many days or weeks to receive his order. Surely, the above-mentioned factors can harm the trust, security, wastage of time and money.[4]

It is proposed to introduce a new smart system that can be handy in online shopping by eliminating all those factors which have destroyed this market. So that the users can easily meet up their desired goals with a non-measurable satisfaction level by eradicating the mistrust, security and time issues. In order to meet the objective, a direct bridge will be established between the buyer and the nearest seller. The user searches the product by applying the given filters of price, quality, brand, and other suitable. All the nearest sellers of that specific product will be shown on the map. As a result, a bridge will be established between them and the can sell or purchase without having any fear of the above-mentioned issues of the deployed applications [3]. As a result, the product costed no money for advertisement.

3. Proposed System Model For baichdoo.Com

Fig 1 shows the proposed BaichDoo.com with three main actors: user, seller, admin and core features.

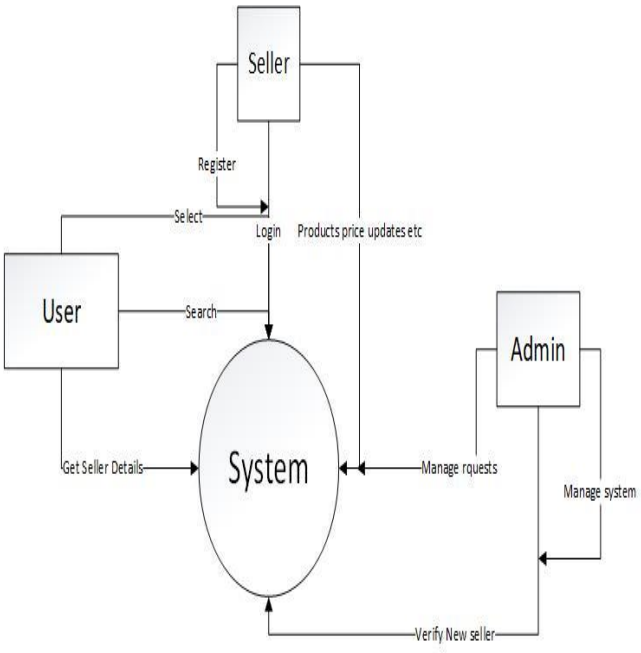

Fig. 1 Proposed BaichDoo.com System Model

3.1 Advanced Search: In Fig 1

Users can easily search for products in the area. So, the Advance search feature helps the user to find its required dream product.

3.2 Product Listing: In Fig 1.

The user searches the product and gets the details of the different sellers like the phone number and address of the seller.

3.3 Google Map for Product Shop: In Fig 1

Searched product shop address and details will be shown for ease of the user and google map API used for that purpose.

3.4 Admin: In Fig 1.

Admin can accept and reject the request of the seller and verify the seller. Admin can manage the data of sellers.

3.5 Information Management: Information: In Fig 1

About users is very crucial. So, we must secure it. The Application there will be a back-end database that will store the data in separate columns.

4. Proposed Baichdo.Com Use Case

Analysis level use case diagram is the explanation of a high-level use case diagram. In this diagram, high-level use cases are expanded in a way that exhibits how high-level use cases will reach their functionality. The use case diagram is showing that which module interacts with which activity.

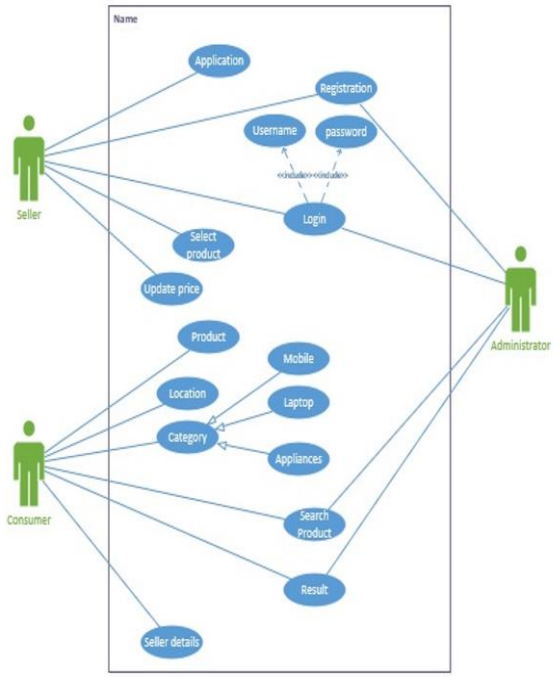

Fig. 2 Proposed BaichDoo.com Use Case

4.1 Seller: Registration: In Fig 2

This page is used to get information about the seller. It includes information like (Name, Shop name, Address, City, Email, and Get Your Location, etc.

4.2 Login page: In Fig 2

If the seller is already register than he would log in just simply putting the residential on the page.

4.3 Result page: In Fig 2

This page provides information on the specific product. You can see the product name price and its Specification. and, See the Shop Details and check the map location of the seller.

4.4 Location Map: In Fig 2

provide the location of the seller on the map. And easily see the shop they can visit and buy the product.

5. Time Complexity Of Proposed Baichdoo.Com Model

Time complexity is important for any application. There are numerous features and modules, but we will be discussing some of the core modules and finding their complexity. Complexity analysis is performed in various domains like MUD, Wireless communication etc. [7] [8] [9]. We've computed the time complexity of each module separately.

5.1 To Display adds on the index. Page

Algorithms
Post [] => (Array of all post)
Function () {
Loop for (i=0 → post. Length)
{
Name =post.name
Company =post. Company
Price =post. price
Model =post. model
}
}

Complexity:

$$\sum_{i=o}^{l}(1)$$

So, we can add the (1) in ∑

Equation (1)= l +1 [7]
Proposed the lower and upper bound of
l +1

$$C_1 g(n) \leq F(n) \leq C_2 g(n)$$

Now calculate the Lower bound of proposed

$$F(n) \geq C_1 g(n)$$

F (n)≥ $C1g(n)$

l +1≥ l

The value of lower bound $C_1 g(n) = l$

l=0 → n_0

Now calculate the Upper bound of proposed

$$F(n) \leq C_2 g(n)$$

F (n) ≤ $C2g(n)$

l +1≥ $2l - l$+1

The value of upper bound $C_2 g(n) = 2l$

$-l$ +1=0

l=1

l=1 → n_0

5.2 To find the complexity of display adds on the index page.

Post [] (array of all post)
Function (name) {
For (i=o → $post.lenght$)
{
If (post.name =name)
{Return. Post {}}
Break:
Else:
{No record found}
}
}[7]

Complexity:

$$\sum_{i=o}^{l}(1)$$

So, we can add the (1) in ∑

$$= l + \mathbf{1}$$

Proposed the lower and upper bound of
l **+1**

$$C_1 g(n) \leq F(n) \leq C_2 g(n)$$

Now calculate the Lower bound of proposed

$$F(n) \geq C_1 g(n)$$
F (n)≥ $C1g(n)$
l +1≥ l

The value of lower bound $C_1 g(n) = l$
l=1 → n_0

Now calculate the Upper bound of proposed

$$F(n) \leq C_2 g(n)$$
F (n) ≤ $C2g(n)$
l +1≥ $2l - l$+1

The value of upper bound $C_2 g(n) = 2l$
$-l$ +1=0
l=1
l=1 → n_0

5.3 Display all posts. Of brand on the index. Page

Brands [] (array of register brand)
For (i=o → $brand.lenght$) {
Brand.name ()
Brand. Company ()
Brand location ()
For (i=o → $brand.post.lenght$) {
Post.name ()
Post. Price ()
Post. Model ()
Post. Pic ()
Post. Company ()
}
}[8]

Complexity:

$$\sum_{i=o}^{l}(1) \ \{ \sum_{j=o}^{i}(1) \}$$

$$\sum_{i=o}^{l} i + 1$$

$$\sum_{i=o}^{l} i + \sum_{i=o}^{l}(1)$$

$$\frac{l \quad (l+1)}{2} + l + 1$$

$$\frac{l^2 + l}{2} + l + 1$$

$$\frac{l^2 + l + 2l + 2}{2}$$

Equation(2)$\frac{l^2+3l+2}{2}$[8]

Proposed the lower and upper bound of $\frac{l^2+3l+2}{2}$
Now calculate the Lower bound of proposed

$$C_1 g(n) \leq F(n) \leq C_2 g(n)$$
$$C_1 g(n) \leq F(n)$$
$$F(n) \geq C_1 g(n)$$
$$\frac{l^2 + 3l + 2}{2} \geq \frac{l^2 + 2}{2}$$
$$\frac{l^2 + 3l + 2}{2} \geq \frac{2l^2 - l^2 + 2}{2}$$

The value of lower bound $C1g(n) = 2l^2$

$$\frac{-l^2 + 2}{2} = 0$$
$$-l^2 + 2 = 0$$
$$2 = l^2$$
$$\sqrt{2} = \sqrt{l^2}$$
1.4= $l \rightarrow n_0$

Now calculate the Upper bound of proposed

$$F(n) \leq C_2 g(n)$$

$$\frac{l^2 + 3l + 2}{2} \leq l^2 + 3l^2$$

The value of upper bound $C2g(n) = 4l^2$

$$3l \leq 3l^2$$

$$l = 1 \rightarrow n_0$$

6. Simulations & Result Of Proposed Complexity

In This Article Proposed Simulation of this BaichDo.com.pk Web Application is derived from time complexity from Use (5.1, 5.2, 5.3). All these Simulations are done by MATLAB software.

Figure 3 shown the time complexity of proposed BaichDoo.com system model with respect to number of cycles. Where the lower and upper bound of this Equation **(**1) **(**l **+1.)**. For lower bound $C_1 g(n) = l$ and l=1 $\rightarrow n_0$.

This figure shown the lower, tight and upper bound of the proposed BaichDoo.com respectively.

Fig.4 shows that the lower and upper bound of this Equation (2) (l2 +3l+2)/2 along with the x-axis and y-axis.

For lower bound$C1g(n) = 2l^2$, and the upper bound is C_2 $g(n) = 4l^2$ and tight bound is (l2 +3l+2)/2. The value of 1.4= $l \rightarrow n_0$

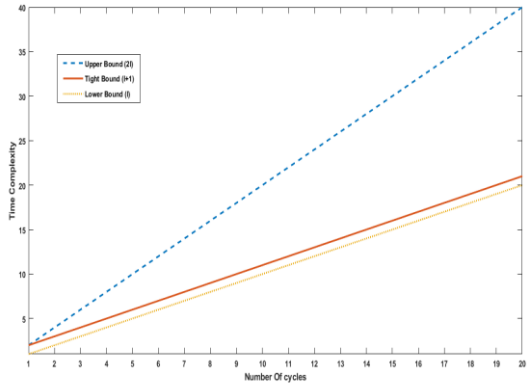

Fig. 3 Time Complexity of Proposed BaichDoo.com with respect to number of cycles (normal case)

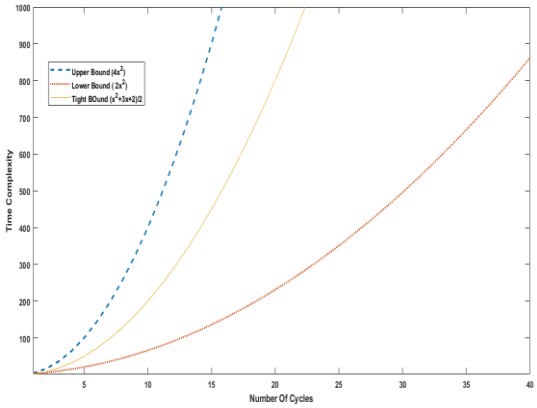

Fig. 4 Time Complexity of proposed BaichDoo.com

7. Conclusion

The purpose of this paper is to address the problems of the deployed e-commerce applications which has played an important role in a continuous decrement in the number of online shopping users. Major factors behind the scene are trust, security and waiting time in-order delivery. It is proposed to establish a direct connection between the buyer and the nearest sellers to avoid all such issues.

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Mr. Ali Haider is doing M.Phil. from the Department of Computer Science, Lahore Garrison University, Lahore, Pakistan. He completed his Bachelor of Computer Sciences from the Department of Computer Science, University of Gujrat, Pakistan. Ali's research interest is in Data Sciences.

Mr. Syed Aun M. Naqvi is doing M.Phil. from the Department of Computer Science, Lahore Garrison University, Lahore, Pakistan. He completed his Bachelor of Computer Sciences from the Department of Computer Science, Govt. College University Lahore, Pakistan. Currently Working as a software developer in "ActivityKey Solution" (pvt) Ltd. Aun's research interest is in Data Sciences.

Mr. Hafiz Hasan Naqvi is doing M.Phil. from the Department of Computer Science, Lahore Garrison University, Lahore, Pakistan. He completed his Bachelor of Computer Sciences from the Department of Computer Science, Govt. College University, Lahore, Pakistan. Hasan's research interest is in Data Sciences.

Mrs. Hafiz M. Tayyab Khushi is doing M.Phil. from the Department of Computer Science, Superior University Lahore, Pakistan. He completed his Bachelor of Computer Sciences from the Department of Computer Science, Bahauddin zakariya university Multan, Pakistan. Tayyab's research interest is in Data Sciences.

Dr. Muhammad Adnan Khan is currently working as an Assistant Professor at the Department of Computer Science, Lahore Garrison University, Lahore, Pakistan. He completed his Ph.D. from ISRA University, Pakistan by obtaining scholarship award from the Higher Education Commission, Islamabad, Pakistan. He also completed his M.Phil. & BS degrees from the International Islamic University, Islamabad, Pakistan by obtaining scholarship award from the Punjab Information & Technology Board, Govt of Punjab, Pakistan. Prior to joining the Lahore Garrison University, Khan has worked in various academic and industrial roles in Pakistan. He has been teaching graduate and undergraduate students in computer science and engineering for the past 11 years. Presently, he is guiding 04 Ph.D. scholars and 04 M.Phil. Scholars. He has published about 130 research articles in International Journals as well as reputed International Conferences. Khan's research interests primarily include MUD, Image Processing & Medical Diagnosis, Channel Estimation in Multi-Carrier Communication Systems Using Soft computing with various publications in journals and conferences of international repute.

Dr. Shazia Saqib is currently working as Dean at the Faculty of Computer Science, Lahore Garrison University, Lahore, Pakistan. She completed her Ph.D. & M.Phil. from the Department of Computer Science, Government College University, Lahore, Pakistan. She completed her Master of Computer Sciences from the Department of Computer Science, Quaid-i-Azam University, Islamabad, Pakistan. Shazia's research interests primarily include Image Processing, Deep Learning, Machine Learning etc.