

Automated Bus Ticket Reservation System for Ethiopian Bus Transport System

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Abstract: This research addresses the development of Online Bus Ticket Reservation System to enables customers to purchase bus tickets online and increase company's efficiency. In the existing system, ticket purchase has been over the counter in bus terminals. Problems such as wasting of time and money to purchase bus ticket, to prepare ticket sell report and ticket frauds are common. The Online Bus Ticket reservation System provides solutions for above mentioned problems. The System enables the company to manage its ticket related operations more efficiently. The System also enables customers to check availability of bus ticket, buy bus ticket and pay for bus ticket online through prepaid card based on the passenger's sources and destination. This makes the customers easy to get bus ticket online instead of queue up to buy the bus ticket. The software development methodology used for this system was Object Oriented approach, and for security considerations MD-5(Message Digest) algorithm is used.

Key Words: Bus Ticket Reservation System, Internet, Time Efficiency, Security, MD-5

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I. Introduction

Ethiopia is one of the largest countries in Africa having a population of above 85 million and a land of distributed cities. As transportation is one of the most common needs for citizens, people use buses as their main type of transportation means. In most cases; the transport companies has problems with its ticketing and scheduling process. Currently, staffs at the bus ticket counter are using manual system to sell ticket. Customers are unable to buy bus ticket online at this moment and have to go to the counter to buy bus ticket. Sometimes, customers need to queue up a long queue to buy bus ticket and ask for information. The automated Bus Ticketing System enable customers to book ticket make payment, to check bus ticket availability and view information online. This research aims to automate the existing manual based ticketing system to provide better customers service. This system is a new system for Ethiopia because it does not exist in other bus companies or any other private companies.

1.1 Statement of Problem

In this business competitive era, Information and Communication Technology is placed on a platform by many organizations as their key indicator for success. Online data handling and automation service have been a major tool to provide better customers service.

By adapting ICT as a tool to provide the bus transport management, it will not only improve operations efficiency, gaining competitive advantages, delivering higher-quality services, but it will also lead an organization to superior control over the booking process which will allow customers to choose service from other competitors. Upon the introduction of Internet technology, the transportation industries are strongly affected by electronic commerce. [2]

In the country context sells ticket when customers directly come to the counter, as result there is waste of time and money for customers. Furthermore, due to the increasing number of human traffic; purchasing a bus ticket has been an uphill task.

In the existing system, the company's record keeping activities and its daily operations such as scheduling buses, selling ticket, and preparing ticket sale report are done manually, which is inefficient and difficult. Customers are not easily gained more information about the bus company and the trip provided by the company.

There are no online payment methods that allow customers to buy ticket. If customers want to buy ticket, they have to go to the ticket office and buy ticket on cash from the counter. Such occasions create good opportunity for those who cheat customers by selling illegal tickets. Customers are also expected to keep their paper ticket all the time until reach to their desired destination. Customers' will pay again if they loss their

ticket. Finally, the ticketing service is always made within fixed working hours, so that they cannot get the bus ticket at any time.

1.2 Feasibility Study

1.2.1 Technical Feasibility

The system needs to setup the facility of computers and the technology used for this new system are already existed and easily affordable. The technical skills to develop this system are also available.

1.2.2 Operational Feasibility

This system is operationally feasible as it solves the inefficient bus ticketing service, very easy for the end users to operate, can be used effectively after it has been developed and allow the company to perform its operation efficiently. Therefore, the new system increases the performance of the company as it satisfies customers' needs through timely and efficient service delivery.

1.2.3 Economical Feasibility

This system is economically feasible as it eliminates the time and money spent for booking ticket, reduces the consumption of paper and increases customers' satisfaction. The cost of this system is development cost which is related to purchasing of computers and developer salary, which is less than the benefit to be obtained after the system is deployed.

II. Literature Review

2.1.1 Impact of ICT in transportation sector

Information and communication Technology has major potential influences on the mobility of people and goods. It is also taken as an important enablers of changes in social and organizational practices, thus affecting the demand for transport in spatial and temporal terms. Technological trends will meet the demand for comfort, safety and speed through advances in ICT in terms of travel information and booking system, traffic and transport management system and vehicle guidance system.

The emergence of low-cost computers, widespread cellular network coverage, declining costs of mobile phone hardware; and increasing Internet access have resulted in unprecedented opportunities to support transport services in developing countries. Nowadays, computers become the most important device to accomplish task easily. With wide use of internet, a lot of online shopping, online business, and online booking website are developing to ease the user to do their work. User just need to use few finger click then can buy all the things their need to. With this few finger click user not need to queue up for a long time to pay for the goods at the cashier [2].

2.1.2 E-Commerce

E-Commerce stands for Electronic Commerce. E-Commerce is often thought as buying and selling using the internet. It involves more than mediated financial transactions between organizations and customers. E-commerce is the sharing of business information, maintaining business relationships, and conducting business transactions by means of telecommunications networks. In today's business environment, where the operational boundaries between firms have become fluid, it is often both pragmatically and analytically unfruitful to separate inter-organizational and intra-organizational business processes. Therefore, E-commerce includes the sell-buy relationships and transactions between companies, as well as the corporate processes that support the commerce within individual companies. Rapid developments in information technology and telecommunications have set the pace for an electronic revolution of E-Com.

2.1.3 E-ticket

Electronic tickets, or e-tickets, are mostly offered by airlines and allow customers to travel without a paper ticket, eliminating the worry of leaving tickets behind. An e-ticket confirms ticket purchase without requiring a paper record; the only record of an e-ticket sale is filling the electronic form. When customers buy e-tickets, they can receive a confirmation of their purchase.

An electronic ticket is an electronic version of a regular paper ticket (regardless by air or by train). However, an electronic ticket differs from a paper ticket, in that an e-ticket automatically is recorded in several computer databases when a booking is confirmed.

The inadequacies of paper tickets is all the required information is printed onto a blank form including all the travel information, the passenger's personal data, the price, the number and places of connections, any returns or changes and so forth to the original booking . This proves to be cumbersome and can cause headache when trying to make changes or cancellations [3].

2.1.4 Web Based Application

In software engineering, a web based application-sometimes called a webapp and much less frequently a web application-is an application that is accessed with a web browser over a network such as the internet or intranet. The ability to update and maintain web applications without distributing and installing software on potentially thousands of client computers is a key reason for their popularity. Web applications are used to implement web mail, online retail sales, online auctions, wikis, discussion boards, web logs, video logging and perform many other functions.

Though many variations are possible, a web application is commonly structured as a three-tiered application. In its most common form, a web browser is the first tier, an engine using some dynamic web content technology (e.g. PHP, Java servlets or Active Server Pages) is the middle tier, and a database is the third tier. The web browser sends requests to the middle tier, which services them by making queries and updates against the database and generating a user interface. [5]

2.1.5 Security

Security concern has become one of the main reasons for not transacting online because as soon as a user accesses the Internet, anyone from anywhere around the world has access to the information being sent. The risk of data theft, corruption of data, and viruses becomes a reality. The lack of security, reliability and accountability make the internet online transaction too risky for many users (T. Ramayah et al., 2011). Devising the Internet security policy can be complex because a rational policy requires an organization to access the value of information. The policy must apply to information stored in computers as well as to information travelling through a network. The internet security policy is complex as primary complexity arises because of the internet security cannot separate from the security policy for the computer policy for computer systems attached to the internet. In particular, defining a policy for data that travels through the internet does not guarantee that data will be secure.

The implementation of technology now, offers new forms of payment choices and higher security to the public. There are various modes of payment through the internet, namely, Credit cards, Electronic Money, Mobile Payments and E- Checks.

Users have some legitimate fears about giving their card number out over the Internet. Because of these fears, hosting the WWW site on a secure server are being developed to make purchasing product online more secure. A secure server uses a protocol such as Secure Socket Layer (SSL) or Secure Hypertext Transfer Protocol (S-HTTP) to transmit data between the browser and the server. These protocols encrypt the data being transmitted, so when the users submit their credit card number through their WWW form it travels to the server encrypted [5].

III. Proposed System

To develop the online ticketing system for transport office; the requirements are gathered using interview, observation and questionnaire. With that, it is recommended to implement system solutions that attempts to rectify existing problems in the current bus ticketing system and propose an innovative way to enhance the ticketing services provided by the company. The proposed system enables customers to check the availability of bus tickets, booking bus ticket with prepaid card payment mode and viewing trip information online. The system handles bus ticketing activities efficiently, which can function as a catalyst in the competitive business environment regardless of the geographic barricades.

3.1 Functional Requirements

Listed below are the functional requirements for transport office.

- Booking and cancelling ticket
- Extending booked ticket
- Generating ticket sales report
- Generating prepaid card
- Maintaining price of the ticket
- Maintaining user accounts
- Register trip and bus information
- Schedule buses for trip
- Maintain Passengers' list
- Maintaining bus status report that are ready and not ready for schedule

3.2 Non Functional Requirements

Listed below are the non functional requirements for online bus ticketing system of transport office.

- User interface and human factors

- Documentation
- Hardware consideration
- Performance
- Error handling and extreme conditions

3.3 Proposed Architecture

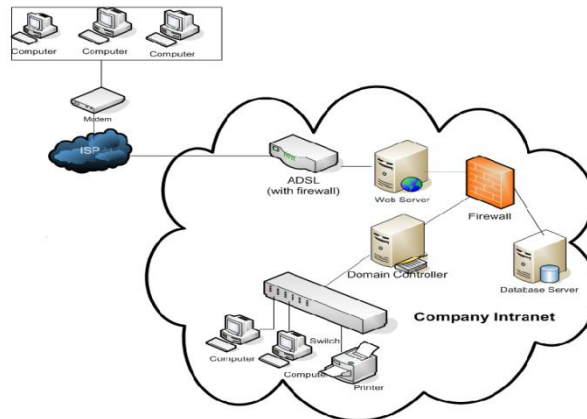


Figure 3.1 Proposed Architecture

IV. Implementation

4.1 Programming Tool

The development of the web pages can be made possible using the different technology of preference. PHP is chosen as web scripting language for this system. PHP was chosen because it can independently ran on a server, and doesn't matter what type of Operating system you are using, it is likely to run in UNIX, a lot of people use it (widely used, and open source), Integrates with HTML, CSS, javascript, ajax, jquery very well, updated regularly (security etc, solid platform), and Database communication is excellent;



Figure 4.1 Login Page

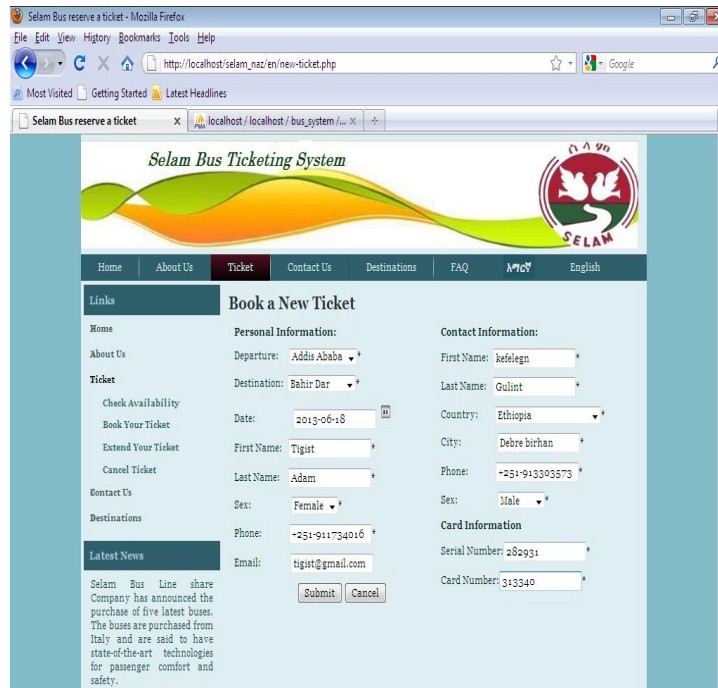


Figure 4.2 English Language Form



Figure 4.3 Amharic Language Form

V. Conclusion

Online Bus Ticket reservation System is useful for both the transport office and customers. In depth study and implementation of an Online Bus Ticket reservation System has been conducted. An investigation of the existing ticketing operation of the transport office has been conducted to identify the relevant features of various components and methods needed for developing an Online Bus Ticketing. Currently the company has no existing online bus ticket reservation systems. Developing of this Online Bus Ticketing system creates convenience to customers to get ticket 24/7 and the company can perform its ticket service more efficiently. The Prepaid card payment system also easy and convenient for both transport office and passengers. The use of this online bus ticketing system can bring benefits including the ability to book ticket anywhere internet connection is available.

Overall, Online Bus Ticket reservation System has been successfully built and has achieved and fulfilled the objectives and requirements that are stated in the first chapter.

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