International Journal of Computer and Communication Technology

Volume 7 | Issue 1 Article 5

January 2016

E-CONVERSE AN AFFORDABLE TOUCH SCREEN SOLUTION TO INTRIGUE DINING EXPERIENCE

S. R. PATIL
Department Of Computer, Bharati Vidyapeeth"s College Of Engineering For Women, Katraj, Pune 411043 Maharashtra, India, srpatil44@gmail.com

SNEHAL SALUNKHE
Department Of Computer, Bharati Vidyapeeth"s College Of Engineering For Women, Katraj, Pune 411043 Maharashtra, India, snehalsalunkhe101@gmail.com

NIKITA KULKARNI
Department Of Computer, Bharati Vidyapeeth"s College Of Engineering For Women, Katraj, Pune 411043 Maharashtra, India, nikitakulkarni777@gmail.com

PRIYANKA SAVANT
Department Of Computer, Bharati Vidyapeeth"s College Of Engineering For Women, Katraj, Pune 411043 Maharashtra, India, savant.priya91@gmail.com

E-CONVERSE
AN AFFORDABLE TOUCH SCREEN SOLUTION TO INTRIGUE DINING EXPERIENCE

S. R. PATIL[1], SNEHAL SALUNKHE[2], NIKITA KULKARNI[3] & PRIYANKA SAVANT[4]

[1,2,3&4]Department Of Computer, Bharati Vidyapeeth"s College Of Engineering For Women, Katraj, Pune 411043 Maharashtra, India
E-mail: srpatil44@gmail.com, snehalsalunkhe101@gmail.com, nikitakulkarni777@gmail.com, savant.priya91@gmail.com

Abstract- ample efforts have been taken in restaurant sector to intrigue the dining experience. Several information and communication technologies have been adopted earlier such as PDA; wireless communication technologies etc.These technologies provide a simple but powerful infrastructure. This paper highlights the limitations of the existing technologies and proposed the E-CONVERSE, which focuses on low cost touch-screen development to enhance the dining experience. In this paper we discuss the design and implementation of a low cost, customizable touch screen. To ensure the security of the system some security strategies are discussed. Basic level testing reveals that proposed system has potential for practical implementation and can overcome several drawbacks of existing system.

Index Terms- *Security, E-restaurant, E-converse, IR Touch Screen, Affordable, Intrigue dining experience*

I. INTRODUCTION

The restaurant systems make the least use of the existing IT. Without using information and communication technology facilities, to order the food we require waiters to receive order from customers, get those orders to kitchen, deliver the ordered menu, and deliver the bill finally to customer. In this conventional food ordering system although the tasks sound simple, during busy hours the work load on waiters increases and they are very much prone to commit mistakes. The rapid development in Information and Communication technology (ICT) has led to automation of routine tasks. This provides end users enjoyment as well as efficient ways of communication. Wireless and handheld device such as PDA is used in restaurant system to reduce customer waiting time, manage the traffic flow efficiently and reduce the no. of errors. However the PDA has many drawbacks such as there is a need to train the attendants, small screen size etc.These problems can be overcome by E-Converse. The touch screen will be handled by customers and processing of order will be done by restaurant manager or admin of the system.

This paper describes the implementation of low cost, customizable touch screen solution for e-restaurants. The system provides interactive dining menu to the customers which can be selected using touch screen. The order will be immediately sent to centralized server in real time. To develop the touch screen we are going to use infrared technology. System will be provided with some games and songs for entertainment. The system to be developed will be an integration of LAN with low cost touch screen.(optional: use Wi-Fi or WLAN) The rest of the paper is organized as follows: Section II: A complete literature survey consisting of the existing systems, their drawbacks and touch screen technology in our case study. Section III: The descriptions of architecture and system design are presented. Section IV: Conclusions. Section V: References.

II. LITERATURE REVIEW

Conventional way of taking order using pen and paper was first replaced by a food restaurant in Taiwan. The cashier is provided with a touch-screen to satisfy customer"s needs. Waiters have an optical scanner to read the 2D barcode for order details. But, this is a passive service, because the waiter can serve only one table at a time, which is not feasible during peak hours. Secondly, it is difficult to modify the barcode. So a thought was given to wireless handheld device PDA (Personal Digital Assistant). Due to PDA the order could be directly sent to a centralized server. So, an instant communication is enabled. PDA can be used with conventional menu or with RFID based membership card.

 PDA with RFID based membership card
Basically, this technology made the system customer-centric. When the customer enters the restaurant, and is escorted to a table, the RFID card will be read using card reader.

The customer will be identified and its data and expenditure records can be obtained. The order will be shown by waiter on PDA for confirmation. Order is sent to server through WLAN. RFID has many advantages like large storage capacity, multiple RFID tags can be identified simultaneously, and tags are

rewritable, durable. But, as compared to barcode RFID tags are costlier. Huge infrastructure is needed like encoder, antenna etc. And, yet the need of a waiter has not been eliminated.

 PDA with conventional menu

The restaurant owner will have to keep a several number of PDAs to serve the customers during busy hours. In order to use the PDA continuously, its battery needs to be frequently charged. Only textual information and buttons are seen on PDA. So, the interface is not intrigue.

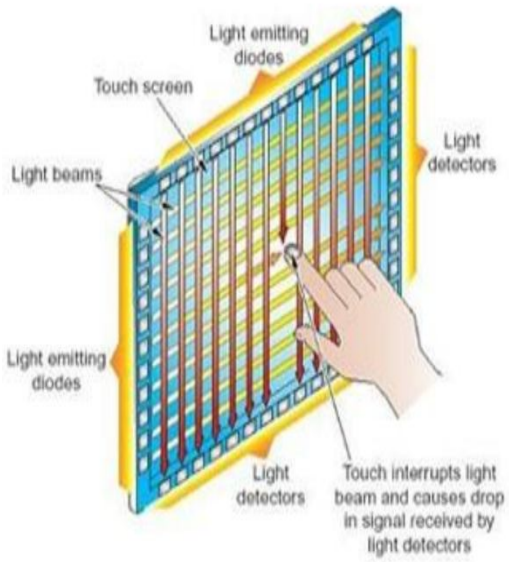
There is no real time communication between customer and restaurant owner. The customers keep on waiting for long until the food is served. It is difficult to update menu. Promotions, discounts need to be memorized by the waiter. So, a thought was given to smart phone xzechnology which customized the existing system, enabled real time communication between customer and restaurant owner, and eliminated the need of attendant. Here, a smartphone will be fitted on each table. Through the underlying network request will be sent to owner, kitchen etc. The customer can place an order from his workplace through internet. So, the he need not wait for the food to get ready when he checks-in to the restaurant. The complete existing system was automated. But, a huge initial investment is required, which at times can be unaffordable.

Considering cafes on a large scale and spacious dining area, multi-touch technology emerged. Here, multiple users will share a common display to place orders. The multi-touch table will be provided with a menu, which can be ordered by multiple customers simultaneously by touching table surface. An entertainment platform was also available to customers.

Hence, overall the dining experience was enhanced. But, developing a table-top with multiple touch points is a time taking, tedious and a costly task. Considering all the above drawbacks we propose the solution named „E-Converse". Cost-factor and dining experience are the two factors to which we have given a special attention. Basically, we are going to develop an add-on touch screen. Simply adding it to a PC"s monitor will turn it to a touch-screen.

Infrared Technology:

Infrared Technology is used to develop add-on screen. The infrared transmitters and receivers will be fitted on the screen. Light is constantly emitted by infrared transmitters. Naturally, when the screen is touched light waves are obstructed and the corresponding coordinates can be noted. In this way the touch can be sensed or detected.



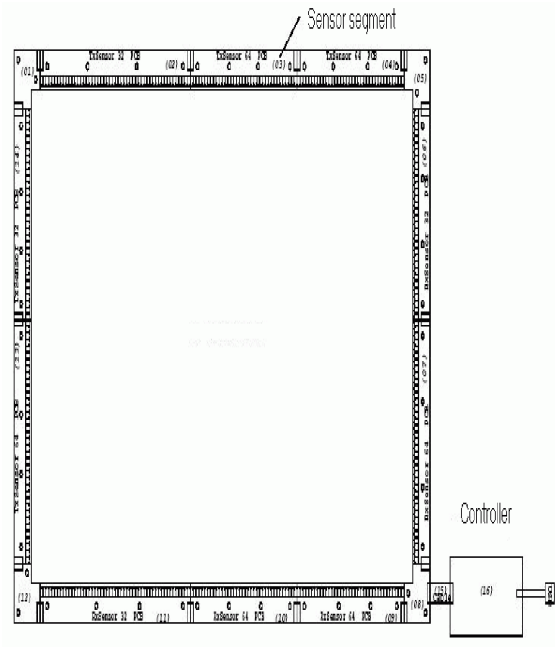


Fig.1: Screen Fitted With Sensors

Add-on Touch Screen:

The screen will be simply added to desktop. In order to minimize the cost a low configuration PC can also be used.

Once the add-on touch screen is fitted to desktop the need of mouse and a keyboard is eliminated. Each table will be fitted with one such set-up (add-on screen and desktop). A Rich Internet Application will be developed and installed on PC. Once the application is run, customer can order the menu simply by touching the screen. After placing order he can play different games, listen to songs etc. Thus, keeping the cost-factor in mind with the help of IR Touch Screen and eliminating the need of attendants; the dining experience has been enhanced.

III. SYSTEM ARCHITECTURE AND IMPLEMENTATION

A. Design of Add-on Touch Screen

Here we discuss how the add-on touch screen will be developed.

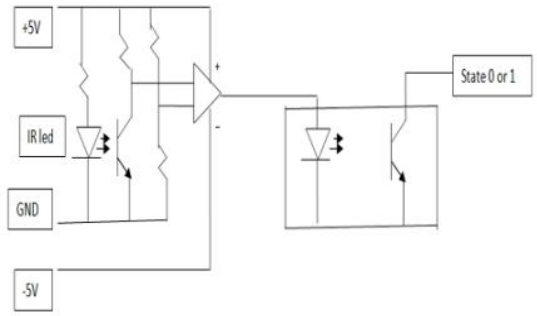


Fig.2: Sensor Circuit

The above circuit consists of infrared LED, photo transistor, and OPAMP as comparator. Basically OPAMP has been used because we don"t want our circuit to remain in tri-state. We want the status to be either 0 or 1. Case 1: The IR LED emits light on photo transistor thus providing forward bias. As per our circuitry the entire voltage will be ground. Due to further inverted logic, the final status will be 1, indicating that there was no touch.

Case 2: When the user touches the screen, naturally light is obstructed and the transistor is not forward biased. So, entire 5V will be forwarded. Now final status will be 0, and the required action can be taken.

Overall the hardware subsystem can be summarized as follows:

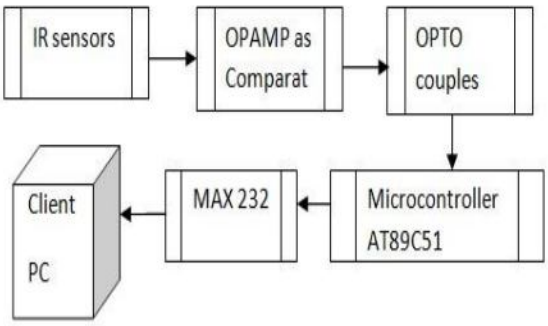


Fig.3: Hardware Sub-system

B. Design of Software

1. User Interface: User Interface will be developed using core java. AWT and Swing will be used for GUI design. AWT (Abstract Window Toolkit) is a heavy weight component while Swing is a light weight component.

2. Input-Output: We are going to use java.io package for input-output. The objects of classes are first converted into byte stream using Serialization. Then this byte stream is sent through network using Java API. Finally at receiver deserialization takes place.

3. Web-Component:

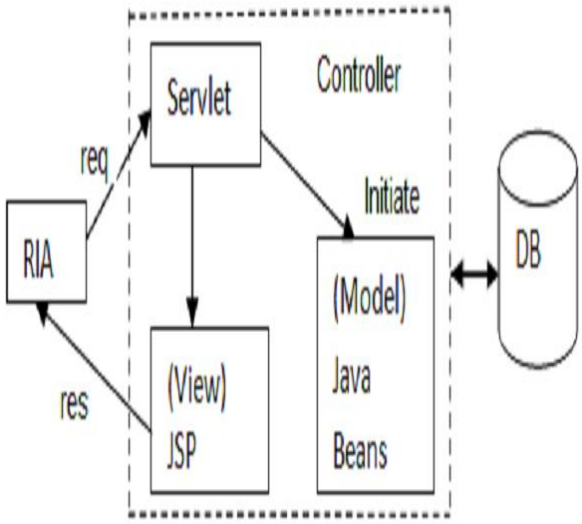


Fig.4: Model View Controller (MVC) Architecture

Servlet in J2EE (Java 2 Enterprise Edition) will take the control at server side. It interacts with back-end database. Database can be Oracle 10g, MySQL etc. An RIA (Rich Internet Application) will be developed at client side to send request and receive response.

4. JNI:

The Java Native Interface (JNI) is a programming framework that allows java code running in JVM to call and be called by native applications (programs specific to hardware) and libraries written in other languages such as C, C++, and assembly.

C. Security

MD5-MESSAGE DIGEST ALGORITHM
Designers- Ronald Rivest.
Series- MD2, MD4, MD5, MD6.

The MD5 Message-Digest Algorithm is a widely used cryptographic hash function that produces a128-bit (16-byte) hash value. Specified in RFC 1321, MD5 has been employed in a wide variety of security applications and is also commonly used to check data integrity. MD5 processes a variable-length message into a fixed-length output of 128 bit. So always the outputs will be 128 bit long (o/p-32 hex digit). MD5 ("The quick brown fox jumps over the lazy dog.") = e4d909c290d0fb1ca068ffaddf22cbd0, For security purpose and to handle requests from each table separately, we use this algorithm. Whenever a request is sent from a particular table its hash value will is calculated at server using MD5. The hash value for each table will be unique. Whenever request is sent from a particular table its corresponding hash value is checked. Hence, fake or concurrent requests can be identified and avoided accordingly.

D. Implementation

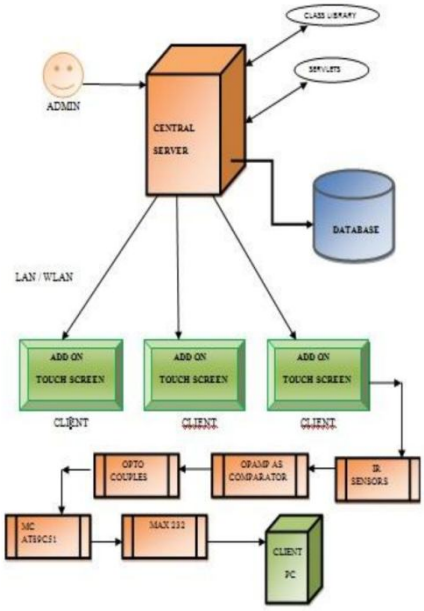


Fig.5: Architecture Diagram

As shown in above diagram, each table consists of a desktop with an Add-on touch screen. When customer enters the restaurant, the attendant at counter will check the latest status of each table to see if any dining table is available. If so the customer will be escorted to table. A digitalized menu will be provided to customer which is intrigue, easy to use. The customer can order food by simply touching the menu. The order will be transferred directly to restaurant server. From server the order will be sent to different modules like kitchen, cashier, and manager. Restaurant manager can easily update the menu. After placing the order the customer can play games, listen to songs.

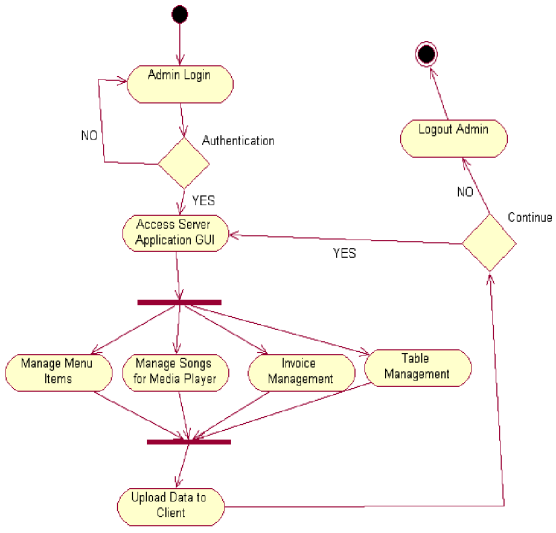


Fig.6: Administrator Functions

As shown in above diagram after required authentication the administrator will access server application GUI and manage all activities.

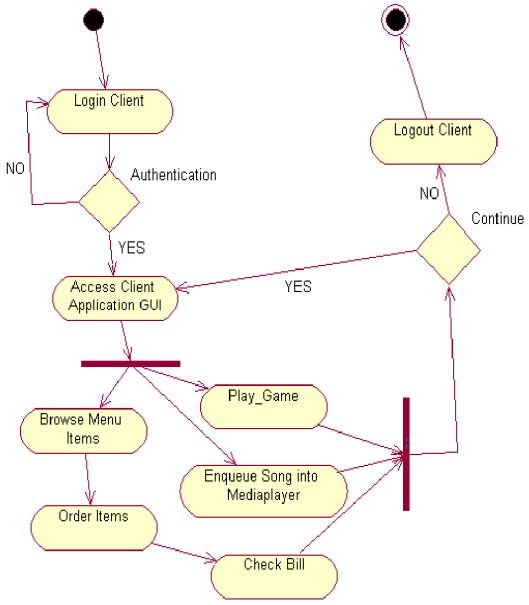


Fig.7: Client Functions

As shown in above diagram after authentication the customer will access client application GUI and enjoy the intrigue dining experience.

IV. CONCLUSIONS

Keeping cost-factor in mind, the E-Converse provides intrigue dining experience to customers. Several drawbacks of existing systems will be overcome by E-Converse. All the restaurant operations are digital and managed systematically. In short, if system is implemented properly the customers dining experience will be enhanced with low capital providing better quality of services and all new experience. Future work can be as follows,

- There can be low cost electronic bulletin board to make announcement of offers.
- Online ordering system, so that customer can place order from any place with low infrastructure.
- Using distributed computing, we can enable this facility at all the other chains of same restaurant across the globe.

V. ACKNOWLEDGEMENT

We would like to express our sincere thanks towards our project Guide Prof.Dr.S.R.Patil for his invaluable technical guidance. We would also like to express our appreciation to our co-Guide Prof.Kanchan Warke who assisted us throughout our work.

REFERENCES

[1] H. Xu, B. Tang, and W. Song, “Wireless food ordering system based on web services,” in Proceedings of Second International Conference on Intelligent Computation

Technology and Automation, Washington, USA,pp. 475–478, 2009.

[2] C. Chen, and Y, Guan, “Experience design of the theme restaurant, make the dining be a memorable experience,” in Proceedings of 9th International Conference on Computer-Aided Industrial Design and Conceptual Design, Shanghai,China, pp. 982–985, November 2008.

[3] IEEE 802.11TM WIRELESS LOCAL AREA NETWORKS. IEEE Working Group (WG), http://www.ieee802.org/11.

[4] K. J. Patel, et al., "PDA-based Wireless Food Ordering System for Hospitality Industry - A Case Study of Box Hill Institute," in Wireless Telecommunications Symposium 2007, Pomona, CA, 2007, pp. 1-8.

[5] Y. Xiang, W. Zhou, and M. U. Chowdhury, “Toward pervasive computing in restaurant,” in Proceedings of 1st International Conference on E-Business and Telecommunication Networks, Setubal, Portugal, pp. 312–317, August 2004.

◈◈◈