

Application of Sign Language in Designing Restaurant's Menu for Deaf People

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Abstract: The food ordering applications are depending on the normal menu having no interaction between the customer and staff. This is because all meals are shown either by name as a text or by a picture added to the text. Normal people who can listen and talk will be able to explain their special request by talking to the restaurant staff but, what if the customer is deaf and can't talk or listen? In such a case, it requires the staff to be trained to use the sign language or to find a translator, otherwise the customer(deaf) will not be able to interact with the staff unless he / she knows the meal and tried it before and suits his / her favourites. The author in this research is looking forward to upgrading the food ordering menu by proposing an interactive computerized menu supporting sign language and English language. Thus, facilitating restaurants with an application which allows better interaction between deaf people and the way of ordering system.

Keywords: sign language, deaf people

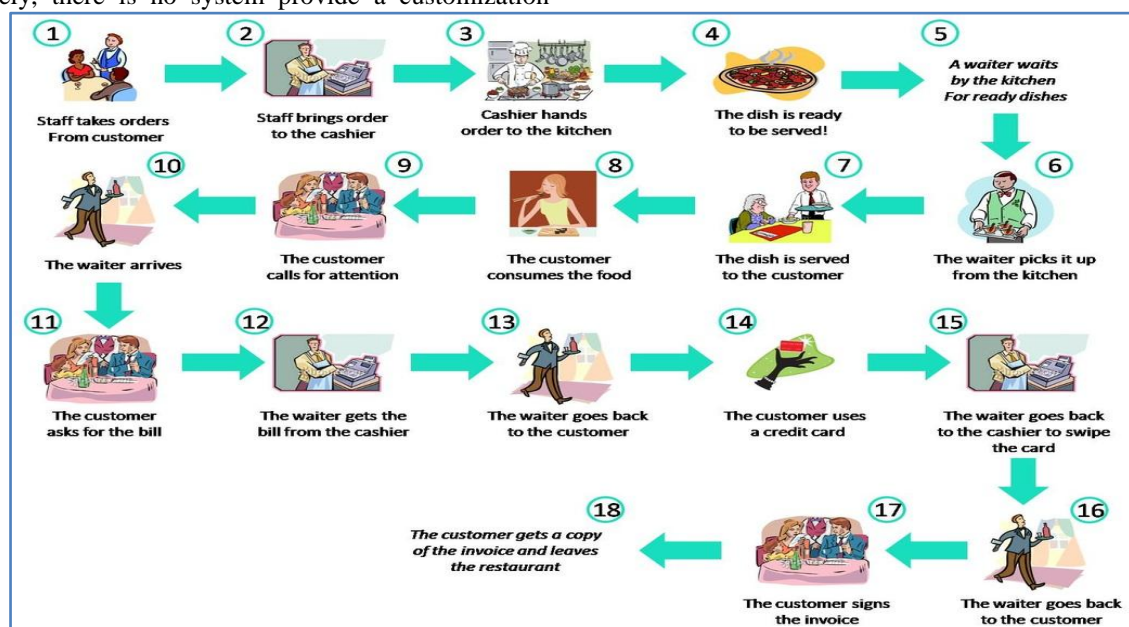
I. INTRODUCTION

With the advancement in technology many restaurants started using food ordering applications to make their life easier and accurate. Nowadays, most of the restaurants are using computerized system in some way, either for food ordering or to manage their staff jobs allocations or even for accounting and human resources purposes. Such systems are solving the problems of the restaurant management only. Unfortunately, there is no system provide a customization

option for the deaf people and that drives this sector of people to face problems while ordering food. Ordering food through an application relies on the normal menu where no communication is found between staff and customers. The reason could be the display where meals are displayed using textual or graphical form. These types of applications are easy to be used by normal people who can explain to the staff verbally if any changes required but it would be quite challenging for a deaf person to communicate and explain his order to staff. The author is planning to have a food ordering system known as Mediator, with an ability to customize each meal or drink ordered according to customer's flavor. Also, the author will provide a special keyboard to enable deaf people to customize their meals and drinks as well as full text of sign language to describe each meal and a drink. Based on a survey findings(Nicole Troxell, 2014), there is a 47% of the respondents in favor for ability to customize order.

A. Food and Beverage Business Workflow

The Food and Beverage service is a complex subject, which comprises a wide range of operations, activities and procedures. To better design the Mediator, the author will look into the traditional processes in the business. As figure below shown, 18 activities involved in the workflow from the moment a customer placing order to leaving the restaurant.



(Source: http://www.thesmartrestaurantproject.com/uploads/7/7/1/1/7711804/7616681_orig.jpg, 2016)

Revised Manuscript Received on January 19, 2019.

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The figure shows that different personnel are involved: waiter, cashier and the kitchen staffs. Orders and information are channeled and flown from one per to another, and all staffs are expected to handle various requests and demands from customers. Such an intensive process could increase problems and mistakes could occur. Therefore, a systematic workflow must be designed. Also, technology can be applied to manage and transmit orders among different departments in an organized flow. In this case, the author will investigate the available process automation solutions in the market.

B. Food Ordering Process Automation

The author has explored different food ordering process solution in the market, and found the self-serve kiosks (by Titbit Inc.) provide a similar idea as the proposed

system. This solution helps to manage a large number of orders in the USA, it is recognized as time saving, efficient by the F&B industry and their customers. In fact, this system is widely used in food courts, high-volume F&B business, even airports and theme parks.

While the author is confident to promote the self-serve food ordering in the proposed Mediator system, a survey result reveals an interesting finding. In USA, 54% of the 1,900 adult expressed their willingness to use self-serve technology (Titbit, 2014). To further study how self-serve food ordering will work, the author looked into the end-to-end process as figure below shown. It is important to see how the existing process is serving the customers, and evaluate and effectiveness and efficiency.

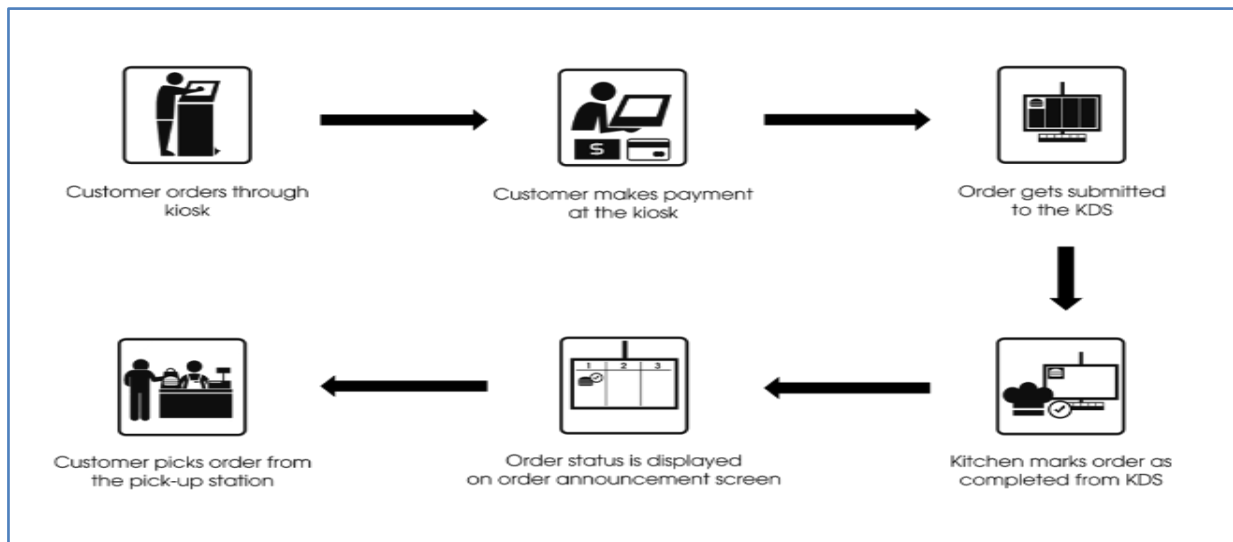


Figure 1: Self-Serve Kiosks in F&B and hospitality industry.

(Source: <http://www.titbitinc.com/self-serve-kiosks-are-changing-the-way-people-order-pay-for-their-food/>, 2016)

C. Sign Language for Smart Language Keyboard

As sign language will be applied in the smart language keyboard, the author is excited to conduct a study regarding this topic. Sign language is used by the deaf communities, which employs signs made by moving the hands combined with facial expressions and postures of the body. It is a complex language. The author first looked into the American Sign Language (ASL), one of the most commonly used which interprets English letter of alphabet.

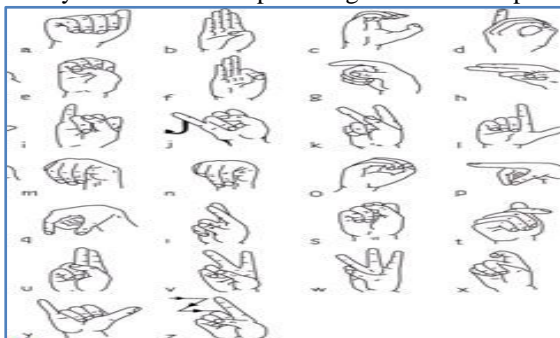


Figure 2: The letters of the alphabet in American Sign Language.

(Source: <http://www.nidcd.nih.gov/staticresources/images/NIDCD-ASL-hands-2014.jpg>, 2014)

Learning the sign language will never be easy. However, by imagining how many deaf people could be benefited by the proposed system, it is motivating the author to strive hard for success. Throughout the researches, it is found that just like the verbal language, there is different sign language from different countries in the world. While some countries even have one or more sign languages (World Federation of the Deaf, 2nd). For example, there are American Sign Language (ASL) and British Sign Language (BSL) and both of them support English. Also, there are plenty of other languages that support different region as figure below shown.



Figure 3: Sign languages in different countries.

(Source: <http://www.start-american-sign-language.com/languages-of-the-world.html>, 2016)

According to a research done (Kwamikagami, 2015), the most commonly used sign language in the world is ASL. Refer figure below where region highlighted in pink and light pink are ASL families around the world (Note: Grey and light grey are unclassified or unknown). While English is still the most widely spoken language in the world, usage of ASL is also spread across most of the corners in the world.

II. METHOD & MATERIALS

Spiral model is an ideal choice for this project. This methodology not only fulfilled the key criteria, but it is suitable for the author who has little experience in managing software development project. The developers expect frequent changes to the requirements. This is because the project is to produce an innovative product, new ideas and invention could be coming during any stage in the project. Thus, a prototype of Mediator will be developed and frequent enhancements are expected. In this case, Spiral model is suitable where small prototypes are developed, and it can be enhanced to make complex system (Anu Gupta, 2014). In short, the author chose Spiral model over waterfall model on the capability to accommodate changes. Besides, the size of project has been taken into account. This project will be on-going for a long time (one year estimated) and it will not be small. Therefore, Waterfall model which is more suitable for small projects might not be an ideal choice for Mediator. In contrast, Spiral model which focuses to deliver result faster will allow users to see the product sooner. Although that might not be the end result, the system could be evaluated by the customers and users early. Lastly, the importance of documentation is very much recognized by the author. Spiral model can be very helpful to produce proper documentation after each version of the system. This methodology offers strong approval and documentation control (ISTQB Exam Certification, 2016).

Spiral Model

It is one type of an incremental model but, it places more of emphasis risk analysis. The spiral model has four phases. These phases are getting iterated during the life cycle of the project. The foundational cycle starts from

planning phase then, requirements are collected and risk is assessed partially. The four phases of spiral are:

Planning Phase: where collection of requirements getting a place. During this phase, Business Requirement Specifications (BRS) and System Requirement specifications (SRS) are highlighted.

Risk Analysis: It is the time when the risks and alternative solutions must be identified, and then a prototype has to be produced after this stage. If any risk is found during the risk analysis then alternate solutions has to be suggested and implemented.

Engineering Phase: In this phase software is getting developed. At the end of this phase, testing of the software has to get-in-place.

Evaluation phase: This is where customer evaluates the project and checks the output. If any changes, the next spiral will start.

These phases will remain rotating till the project satisfied by the customer than submitted.

Questionnaire data collection method is most suitable way to gather data directly form users and to understand their needs and recommendations. There are two sets of questionnaires designed, Set A: For the Customer Respondent and Set B: For the Food and Beverage Industry. 30 questionnaires of each set were distributed and 29 people responded from set A whereas 26 people responded from set B. This is because the people working in the restaurants and cafes are busy even when the developer told them to take their time and selected a suitable period of time but, still there was a problem with filling the questionnaire in their working environment. Also, the working environment is not suitable always for people to deal with papers. On the other hand, such systems will increase the attention of the kitchen staff since they have to customise the set meals. In case of translating the questions of set A to the deaf people, there was a requirement to get help from someone who speaks the sign language (Translator) and that was well arranged by the developer in advance.

III. RESULTS AND DISCUSSION

The questionnaire was distributed among 46% Waiter, 12% Managers, 27 KitchenStaff. It was found through a survey that 65% restaurants manually take orders and 35% use computerised system for handling customers' order. The proposed system can work as a computerized system that can be replaced by the manual way of taking orders. 88% of the companies encountered customer with disability of deaf or hearing loss and had difficulty during communicating with them in taking their orders and only 12% of the companies had not faced this problem. The developer's system will provide a solution that will be convenient for this kind of problem. 58% of the participants rarely have few mistakes made during orders, 35% admitted that sometimes mistakes were made during orders and 8% of the employees said there were never any mistakes made. The proposed system will reduce it from 10 to 1. 20 potential users are involved in user acceptance testing. In conclusion, the system has been fully tested and delivered an assuring result. The Mediator is running smoothly, and all the functionalities are ensured to be reliable. Generally, the potential users whole involved in the user acceptance testing are giving positive feedbacks. Thus, the system will be released for actual use, and the author is confident that the Mediator will be well appreciated by the users.

IV. CONCLUSION

Deaf people always face problem while ordering or customizing meals from restaurants. They cannot explain their needs easily such as less salt, extra sugar and to request for non-spicy food. In few years ago, the term "Computerized Restaurant Menu" was not widely available. It was started with the fast food restaurants where they have an application to order meals from a list but, still the customization is limited to order side dishes or extra up-sized meals and drinks. A food ordering system is proposed that uses a special keyboard to enable deaf people to customize their meals and drinks as well as full text of sign language to describe each meal and a drink. The core function is to support dine-in operations are flawless, which orders are flowing smoothly to the kitchen and be delivered efficiently. Besides, the Mediator also opened up a new channel for businesses who yet to have delivery services. This creates new opportunity for the business and smaller players. The future enhancement could be analysing the orders history of the customers, to determine the customers' favourite food. Then, system can always suggest the customers for his or her favourite food or even give them as free gift.

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