PROTOTYPING OF BUKHARA CULINARY APPLICATION

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Abstract
    The purpose of this research is to build a prototype of Bukhara Culinary Application using informal prototyping method. The difference between this application and the existing ones is the availability of ingredients and history information. This application will also provide delivery service to the customers. Customers and drivers register to this application, so that their details will be recorded. This might not seem much different from the available applications, but this research is also conducted to portray the use of informal prototyping. It is used for the ease in accommodating changes and continuing to the next step of software development by using commonly used software such as Adobe Photoshop. This research resulted in a prototype that provide the described information for 17 dishes from 5 restaurants in Bukhara.

Keywords: Bukhara, culinary application, informal prototyping

INTRODUCTION

Bukhara, a city in Uzbekistan, is rich in cultural heritage, especially in its location in the path of the ancient Silk Road. Influences of many cultures affects not only the architecture of buildings, religion, and traditional arts, but also the city's cuisine. A lot of tourists visit Uzbekistan, and Bukhara in particular. They do not just visit the unique buildings, but also willing to taste the local food. For some tourists, food comes later after a day of exploring the city. For them, it is more convenient to order by a web-based or mobile-based application, and have the food delivered. Since most of them do not know the information about the dishes they want to order, it would be more convenient if the application provide it. Information about ingredients for the dishes is important for people who have limitation on what they eat, such as religion rules or allergic effects. Additional information such as the history of the food will make they traveling experience complete.

This research is based on the lack of complete culinary application that provide the added value mentioned above. On the other hand, developing an application takes a reasonable length of time if the whole steps of software development are conducted. Therefore, this research use rapid prototyping method to make a prototype of Bukhara culinary application.

Previous research of similar topics have been conducted by several authors. Alqatan and Alshirah develop a tentative design of Tourism M-commerce prototype. They build an application prototype that caters the needs of tourists, such as services

for hotels, restaurants, and special trips [1]. Musdar and Arfandy build prototype of an Android-based application for South Sulawesi Tourism information system. Their system provide information on tourist destinations, culinary tours, events, and photos of tourism objects [2]. Asri, Astawa, Sunaya, Yasa, Indrayana, and Setiawan use a prototyping method that is suitable for building smart village applications, which is evolutionary prototyping [3]. In their research, Huda, Awang, Raymond, and Raynaldi deliver the availability of a web-based database application that can fulfill the needs of users in the culinary field related to communication and recipe management [4].

Software prototyping seems to be the method chosen by software or application developers since users can see what they will get from it without waiting for the whole stages of software development to complete. On the other hand, it makes the task of software developers easier, because they find out about acceptable and unacceptable features beforehand. Rapid prototyping is needed to control cost and allowing the stakeholders to experiment with the prototype as soon as possible in the Software Development Life Cycle.

RESEARCH METHOD

Narang defined a prototype as an initial version of a software system that is used to demonstrate the concept, try out design options, know more about the specifications and find out possible solutions to the problems [5]. For prototype development, rapid and iterative construction is needed to control cost and allowing the stakeholders to experiment with the prototype as soon as possible in the Software Development Life Cycle. Meanwhile, Schmidt describe that rapid prototyping is creating a working model of various parts of the software product at a very early stage, after a relatively short investigation [6].

Schmidt further explained that rapid prototyping usually uses informal approach. The reason is that the most important factor is the speed of completion. The model becomes the starting point from which adjustments can be accommodated if users see the need. At the time the prototype is approved by its stakeholders, the model will be thrown away, and the system is formally developed [6].

Since this research does not conduct all stages of the System Development Life Cycle, but focuses on the prototyping stage in order for the stakeholders to see the output beforehand, then actually there is no need for complete design diagrams. This is supported by Narang's [5] and Schmidt's [6] researches that are mentioned before. A conceptual design in the form of use-case diagrams are provided. Use-Case diagrams are drawn for this application to show the application functions that are offered to the users. The users of this applications are the administrator, restaurants, customers, and drivers.

The next step is the collection of data. This prototype is planned to be developed to accommodate 2000 dishes from 39 restaurants. For the prototype, data is obtained from 5 restaurants for 17 dishes altogether. The following source provide the required data of the name of dishes, ingredients, and history, as well as price that come from restaurants:

- Bukhara Tourism data base
- Application Express24.uz
- https://centralasia-travel.com
- https://kalpak-travel.com
- https://lonelyplanet.com
- From restaurants menu
- Bukhara culinary archive

There are 4 objects in this system, which are Dish, Restaurant, Customer, and Drivers. The attributes for each objects are shown in Table 1.

This application will be managed by an administrator. End-users are restaurants, customers, and drivers. Their roles as actors are shown in use-cases diagrams in Figure 1 through 4.

Pictures for this prototype are processed by Adobe Photoshop and ACDSEE. Adobe Photoshop is a multifunctional graphic editor developed and distributed by Adobe Systems. ACDSee is a commercial (formerly shareware) program for viewing and managing an image collection, produced by ACD Systems.

Since this application will also provide food delivery service, a map is also added. In the prototype the map is obtained from Yandex maps. There is a search on the map, information about traffic jams, tracking urban transport, laying routes and street panoramas of large and other cities.

The prototype will be developed by first drawing a menu hierarchy, and then each component will be displayed by a sample output.

Table 1. Attributes of Bukhara Culinary Application objects

Objects	Dish	Restaurant	Customer	Driver
Attributes				
	Name	Name	Name	Name
	Price	Address	Phone number	Type of car
	Ingredients	Phone number	Passport number	ID number
	History	License	Email	Knowledge of languages
	Picture	Menu		

RESULT AND DISCUSSION

The first step before developing the prototype is drawing a use case diagram for each actor that has access to this application. First, the administrator creates, updates, and delete users depending on the need. He also edits menu's details, mainly for the ingredients and history of the dishes. The use-case diagram for the administrator is shown in Figure 1.

Restaurants edit, add, delete, and classify menu. Restaurants might also edit menu in ingredients and history attributes, the same as administrator. The use-case diagram for restaurants is shown in Figure 2.

Customers register as users, see the restaurants' details to make a choice, and order from the menu. They might consult a map if necessary, and order a driver to pick up their food. The use-case diagram for customers is shown in Figure 3.
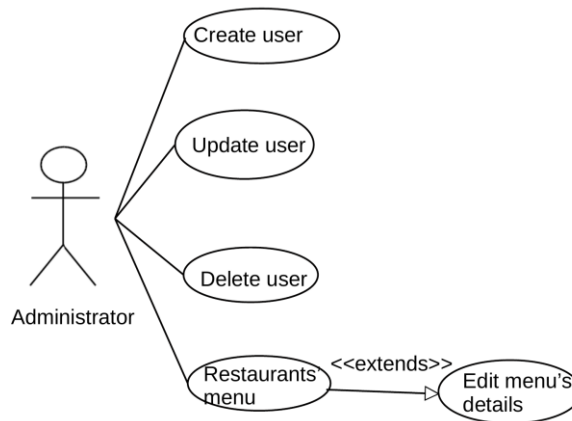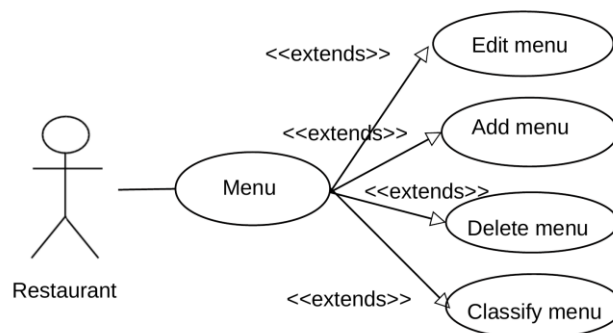

Figure 1. Use-case diagram of administrator

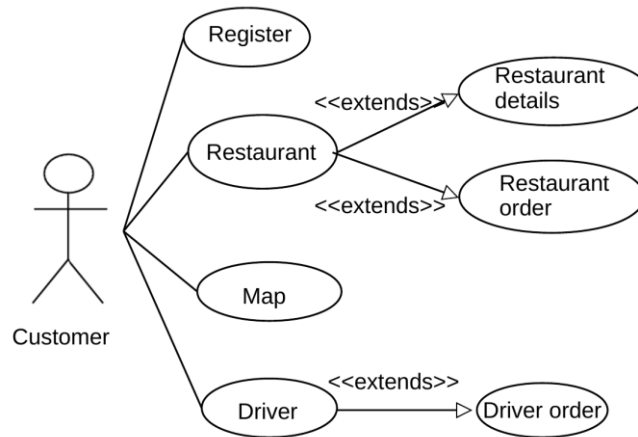Figure 2. Use-case diagram of restaurants
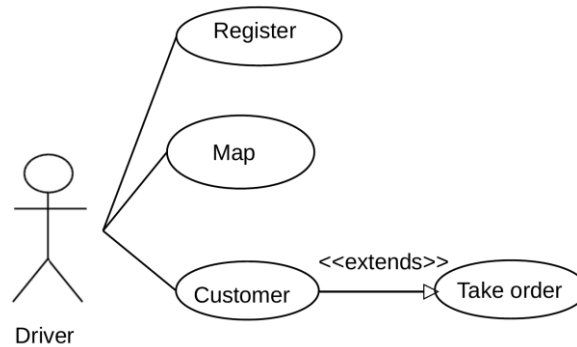
Figure 3. Use-case diagram of customers

Figure 4. Use-case diagram of drivers

Drivers register as users who pick up and deliver the food. They take orders from the customers. They also consult a map to locate the customer and the restaurant, and then determine the route. The use-case diagram for customers is shown in Figure 4.

Updating data in the application is conducted either by the administrator or the restaurant. As the map is an external application, then updates to it are conducted by its own administrator.

After the use-case diagrams, the next step is developing the prototype that begins with a menu hierarchy. Figure 5 shows this menu hierarchy. There are basically two kinds of food, i.e. healthy food and fast food. Both can be categorized further as national food and discount food. The latter might change from time to time. Both customers and drivers can register to this application. This is accommodated to recognize old customers as well as drivers who has participated in delivering the food before. The Map will help customers and drivers to determine distance between the ordering point and the restaurant, and choose the best route for the drivers.
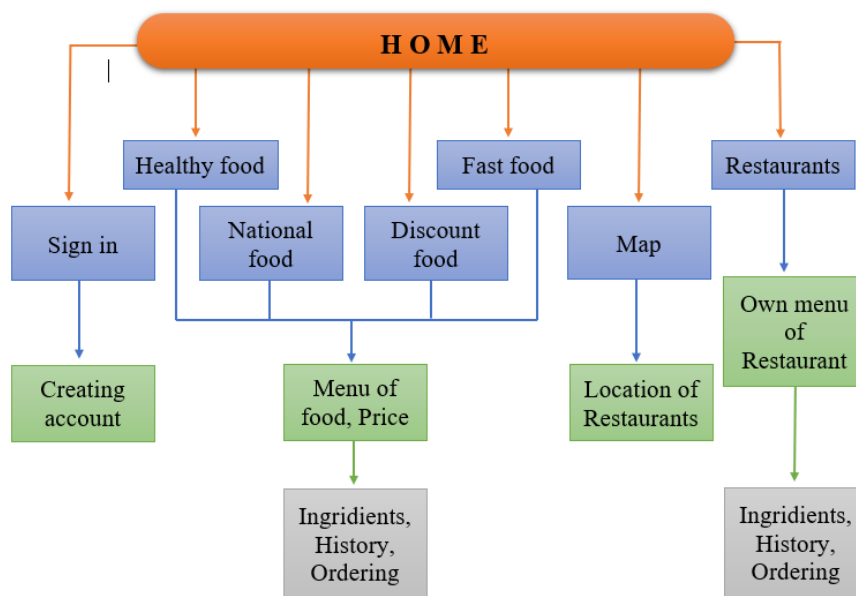
Figure 5. Menu hierarchy of the Bukhara Culinary Application

Figure 6. Display of customers' and drivers' registration form

The following display (Figure 6) is the registration form for customers and drivers. In this case, what is meant by drivers are Bukhara citizens who have a car to deliver food from the restaurants to the customers.

Figure 7 shows the Home page or main screen in the design phase with ACDSee. The design follows the menu hierarchy in Figure 5.
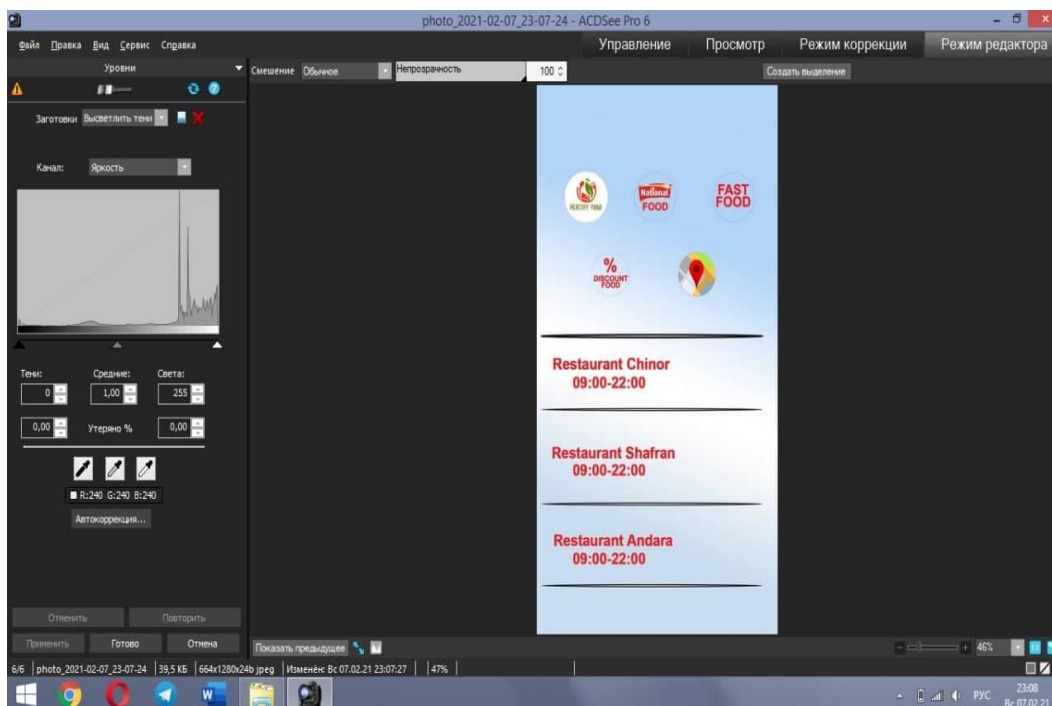
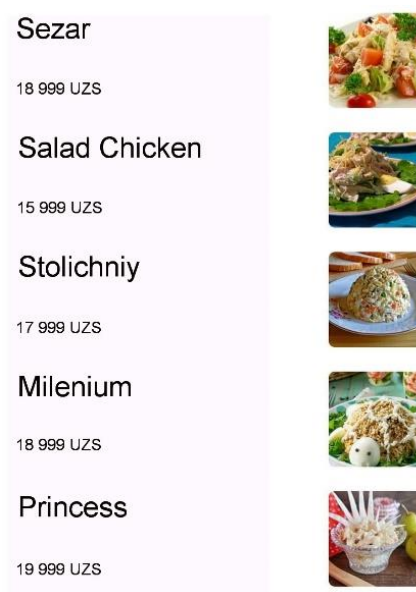Figure 7. Home page of the application in the design phase with ACDSee

Figure 8. Display of several dishes with prices and pictures

The next layer of the hierarchy is the dishes, which are still in a list or menu display. This is shown in Figure 8. This display shows the name of the dishes, their prices, and pictures.

The main subject for this research, which is adding information of ingredients and history for each dish is shown in Figure 9. This display appears if one of the dishes in Figure 8 is clicked.

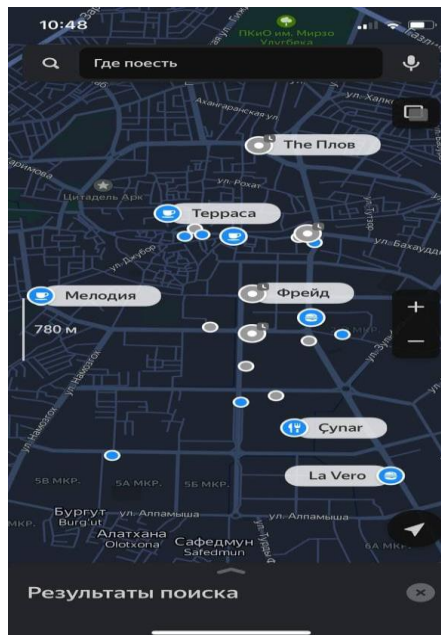Figure 9. Information of ingredients and history for a dish

Figure 10. Display of the Map feature

Figure 10 shows the Map display that will appear for a restaurant location or the present location of the user.

The result of this research proves that a prototype can function, not only to model the actual application, but also to be used as a

users' requirements elicitation tool. User requirement elicitation phase is at the beginning of the Software Development Life Cycle. This prototype can then be used at the early stage or at the almost final stage when the application is not ready yet. That is also the reason why a complete design diagrams are not drawn in this research.

The result also shows that this kind of application is for the use of at least three groups, that is the customers, drivers, and restaurants. Other people or institution who are not directly connected to this application but might take benefit from it are the related ministries, travel agents, tourist guides, and other kind of food industries, such as the catering business.

It is also shown in this research that rapid prototyping, especially an informal one, using ready or easy to use software tools like these, is convenient when time and resource is of the essence. Stakeholders can see the actual display of output can contribute to make adjustments if needed.

To complete this application, a benchmarking is conducted by comparing it with Google Map. Figure 11 shows the Google map result by keywords "Bukhara Uzbekistan restaurants Chinor". It shows the location of the restaurant as well as the interior and menu photograph, opening hours, address and telephone number, popular time, and reviews. As a standard Google map service, it also provides direction to the restaurant from the user's location or any other place.
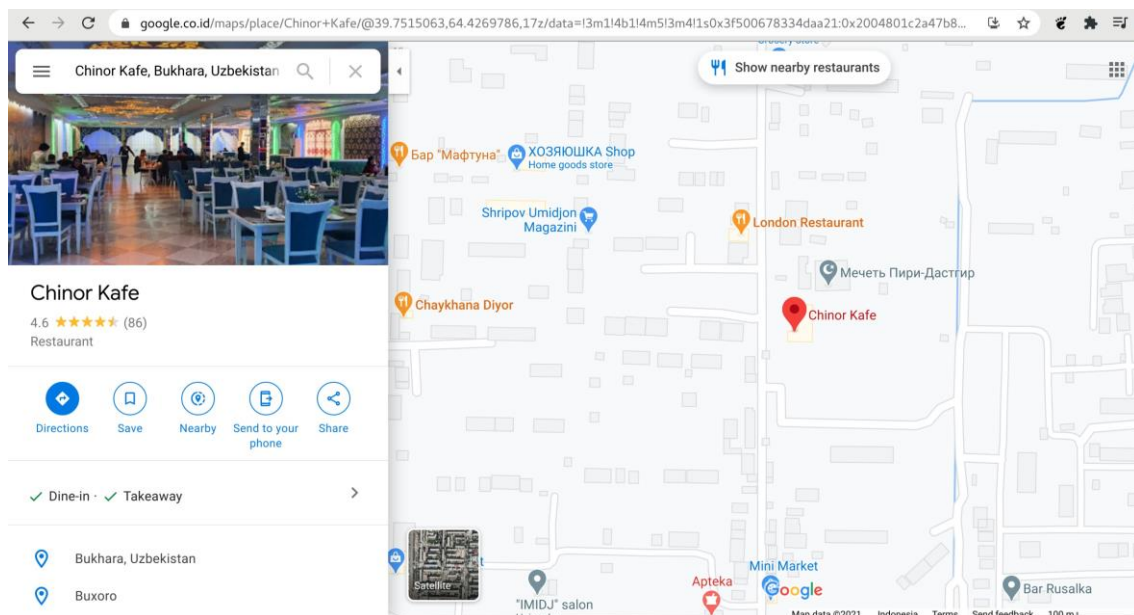

Figure 11. Google map result of the Chinor Restaurant

Table 2. Comparison of features between Google map and Bukhara Culinary application

No.	Feature	Google Map	Bukhara Culinary Application
1	Location	√	√
2	Address and phone number	√	√
3	Direction	√	√
4	Review	√	-
5	Popular time	√	-
6	Photograph of menu	√	√
7	Photograph of individual dish	√	√
8	Price of every dish	√	√
9	Ingredients of every dish	-	√
10	History of every dish	-	√

Compared to this Google application, the Bukara Culinary application does not provide popular time and reviews. Table 2 shows comparison of features between Google map and Bukhara Culinary application. That is the reason for the suggestion that this application can be integrated to existing ones, so the information would be complete. In the case of Google map, there is an "Add website" for "missing information" that can be used for link attachment.

CONCLUSION AND RECOMMENDATION

The objective of this research, that is to make the prototype of Bukhara Culinary Application prototype available is achieved. The use of rapid prototyping is convenient in the case of this kind application, that is, an application with easily predicted function and output. However, since a software develop-ment might take quite an effort, a prototype is proved to be benefitable.

It is recommended that this result is used to realize the actual application. If similar application already exists, then the idea of providing information on ingredients and history might be used to complete it. Furthermore, it can also be used not only for the city of Bukhara, but for Uzbekistan as a nation.

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