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Android Based Groceries Shopping Application

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Abstract:
The purpose of this study is to design an Android-based application to facilitate customers in shopping for groceries. To support this research, we used a descriptive method. The approach method we used is an object-oriented systems approach, while for the system development approach, we used the prototype method. In developing this grocery shopping application, several stages have been designed as a requirement so that an application can be structurally and well prepared. These stages are software requirements analysis, design, testing, and maintenance. The results achieved are a design of an Android-based grocery shopping application with a user-friendly interface and features. With this application, it is hoped that it will be easier for people looking for groceries during this pandemic of Covid-19. The application that we built can facilitate and increase online grocery shopping activities during the Covid-19 pandemic because the systems are integrated and automated. From our perspective, many aspects can be developed from designing this application in the future.

Keywords: Application, Groceries Shopping Application, Prototype

INTRODUCTION

Covid-19 has affected many people in their daily activities. People's behaviour was forced to change as an attempt to break the chain of Covid-19 transmission. According to household consumption data in the United States, the expenses on public transit, grocery

shopping, air travel, and other categories have substantially changed during Covid-19 pandemic's early stage (Baker et al., 2020). In the 21st century, grocery shopping has transformed drastically. One of the various major elements of this change is initiated by the trend of online shopping (Peregrin, 2015). Online shopping become increasingly popular. However, grocery stands on one of the least prevalent e-commerce segments. In the last few years, online shopping has received much attention from Internet business applications. Online grocery shopping refers to an activity where customers order through the retailer's mobile applications or websites to browse, explore, and purchase grocery products (Alzubairi & Alrabghi, 2017). In the website or application, customers can add their desired items to a virtual cart that can be purchased via online payment. The retailer then delivered the order to the customer, except when the retailer or customer wanted to make it available for the customer's pick-up.

Considering the issues and challenges of online grocery shopping, this research aims at designing an Android-based application to facilitate customers in shopping for groceries. This research introduced an Android-based grocery shopping application targeting Indonesians within Jakarta metropolitan area in Indonesia. The approach method we used is an object-oriented systems approach, while for the system development approach, we used the prototype method. With this application, it is hoped that it will be easier for people looking for groceries during this pandemic of Covid-19. Thus far, in Indonesia, customer interest in using online stores (e-grocery) is still low.

A study done by Handayani aims to determine the factors that influence customers' intention to switch from conventional grocery shopping to online grocery shopping using the gender moderation effect. This study involved 522 respondents. Data analysis used the Covariance Based Structural Equation Modeling (CB-SEM) method with AMOS 21.0 software (Handayani et al., 2020). The previous studies have found that spatial attributes such as the relationship between residential areas and shopping locations are considerations for spending actors in choosing shopping locations. Shopping actors tend to choose locations that provide spatial convenience for themselves, both in terms of residence and the location of other activities. Besides, the characteristics of shopping locations, such as increasing attractiveness by providing various facilities, influence shopping locations (Muhamad & Joewono, 2019). The need for IoT-based shopping can make shopping easier. However, this experience can be improved by the ability to predict the demand for goods. A solution to this problem is not available until now, and that is why we propose a Smart Shopping System. This system classifies foodstuffs based on the number of stocks whose stock amounts result from estimated data time (Nastiti et al., 2019). E-Grocery is a term for the Online Grocery industry, where customers can order, select and pay for their shopping online. E-Grocery usually offers fresh food that is durable and the delivery process is different (Firmansyah & Prasetya, 2018). The emergence of modern markets did not only occur in urban areas but also rural areas. Modern markets bring changes in shopping behavior patterns due to differences in prices offered, spatial planning, and services. The existence of modern markets in rural areas is an object of interest to the community. This study aims to analyze shopping behavior patterns of rural communities. This research used a qualitative method by applying the rational choice theory by James Colleman. We have selected 10 women aged 22-65 years with various work types as informants in this study (Bella Ika Yunita, 2020).

RESEARCH METHOD

To support this research, we used descriptive methods, namely methods that were carried out by describing, explaining, and validating customers' problems regarding the shopping experience. The approach method we used is the object-oriented system approach

method as for tools used in object-oriented approach using UML (Unified Modeling Language), which aims to make it easier for humans or developers to understand the system to be made in graphical form. UML is a writing standard or blueprint, which includes a business process, writing classes in a specific language. Several UML diagrams are often used to develop a system such as Use case, Activity Diagram, and Sequence Diagram. UML is one of the most powerful tools in the world of object-oriented systems development (Soegoto et al., 2020).

Meanwhile, for the system development approach, we used the Prototype method, which is a method that allows repetition and improvement until the software we develop can truly meet the needs and desires of customers. The prototype method is a software development method, a physical model of the system's work and functions as an early version of the system (Soegoto & Ma'wa, 2020). With this method, the system will be produced as an intermediary for developers and users to interact in the process of software development activities. The paper mainly focuses on software development. The use of the prototype method is to collect as much information as possible from the user first to describe the interaction model that will be developed easily. The steps in the prototype method are shown in Figure 1.

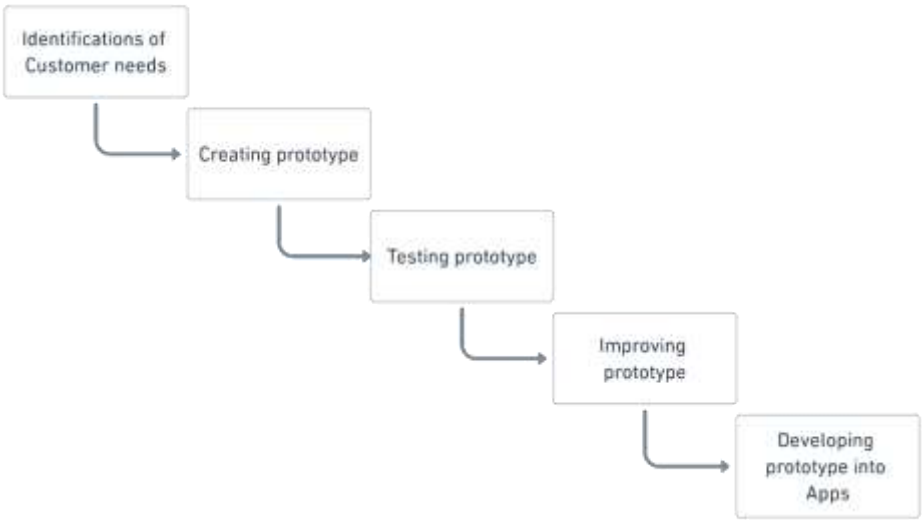

Figure 1. Prototype Development Method

1. Identifications of Customer needs

This identification of customer needs stage aims at determining customer complaints about shopping for groceries at supermarkets. In gathering needs, it will involve a meeting between developers and customers to determine this application's objectives and needs.

2. Creating prototype

We made a prototype to be designed so that later the designs made are tested on the customer. This design is in the form of a prototype such as an application interface design that has been made to be adapted to defined customer needs.

3. Testing prototype

In this stage, the prototype that has been built will be evaluated together with customers and developers to match the needs of the application to be developed. At this time, customers and developers will be clearer and more detailed in understanding what they need to do.

4. Improving prototype

Afterward, the researcher analyzes from the results of the test what information is produced, finds other problems and improves it again to find a solution that is really fit the desires of customers.

5. Developing prototype into software

At this stage, the prototype that has been finished and has been improved beforehand then begins to enter the development stage into an application to become a real product that customers can use.

RESEARCH RESULTS AND DISCUSSION

The development of this grocery shopping application uses Figma to create interface designs and is realized in Android Studio using the java and XML programming languages. For the database using the Firebase Real-time Database. This application involves two actors, namely Customer and Merchant. This system works on several activities, including register, update personal information, make a purchase, browse for groceries, give merchant reviews, top-up balance, withdraw balance, upload groceries availability, accept or reject orders, and log in to share application privileges with each actor as shown in Figure 2.

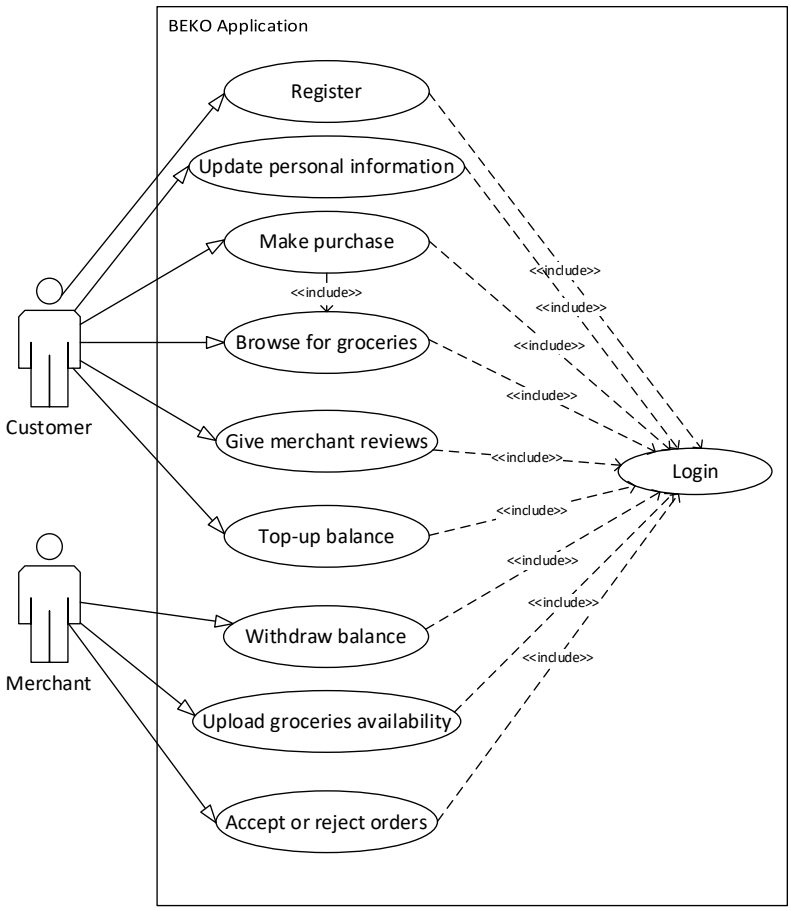

Figure 2. Use case Diagram

Initially, users will be redirected to the login menu for authentication and the authorization process is based on username and password. In the login session, users can only access the shopping feature according to their account authority as shown in Figure 3.

By default, customers will be directed to the main page of the application after logging in in the main menu. There is a BottomNavigation consisting of Shop, Order, Inbox, Chat, and Account on the main page. The shop is the main feature of the application for shopping (Mulyana et al., 2021). On the Shop page, there are several choices for the Groceries category, such as cookies, dairy, dessert, meat, veggies, etc. The category is Cardview, which contains

the most popular items for this month, this week, and today. At the top, we can enter the delivery address for "groceries" which will later be integrated with the Google Maps APIs. Right below it is a Searchbar to make it easier for customers to find the "groceries" they want. There is also an e-wallet balance display, which functions to do a "top-up balance" from the customer side and "withdraw balance" from the Merchant side as shown in Figure 4.

After introducing the interface, the researcher also performed a system test built to see how the application looks on the customer's main page (Figure 3) and the extent of the features the customer's application has. Testing is carried out from the customer's point of view. First of all, Customers choose the "groceries" desired. Then the customer can click the “Cart” button to put the product in your shopping cart and continue searching for other products. Or you can just click Buy to fill in the purchase details (item quantity, note for the seller, and delivery address) and proceed to the payment method as shown in Figure 5.

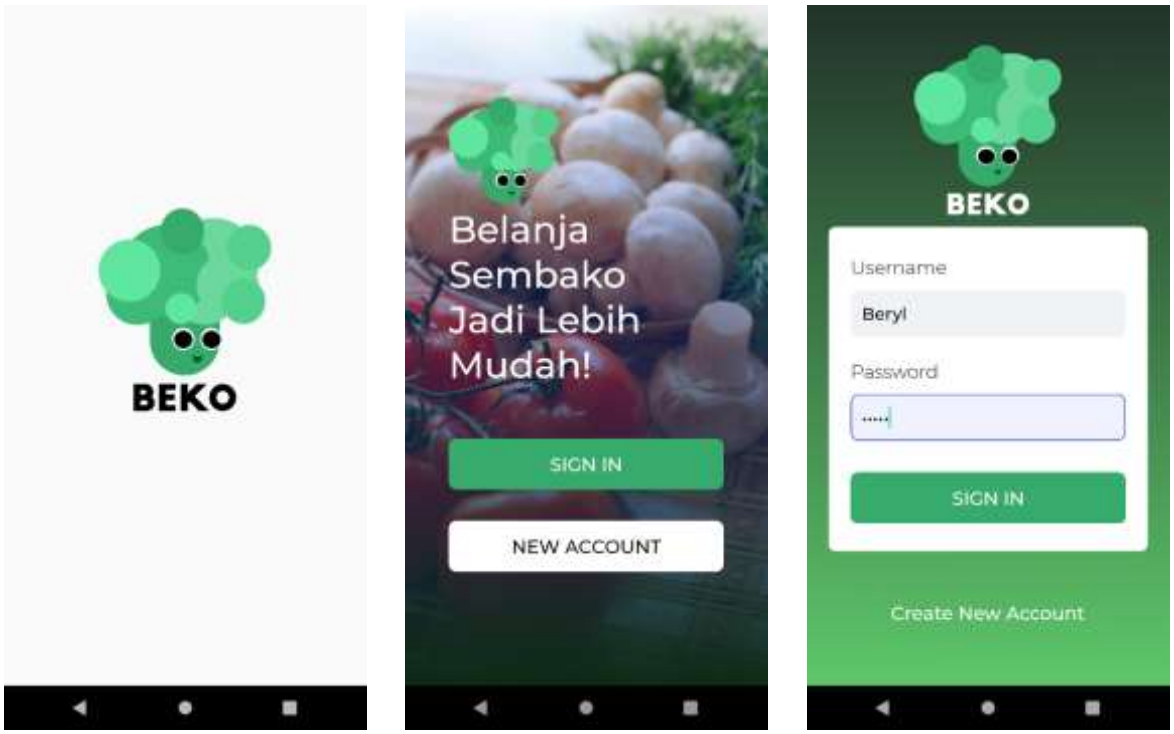

Figure 3. A series of login activities

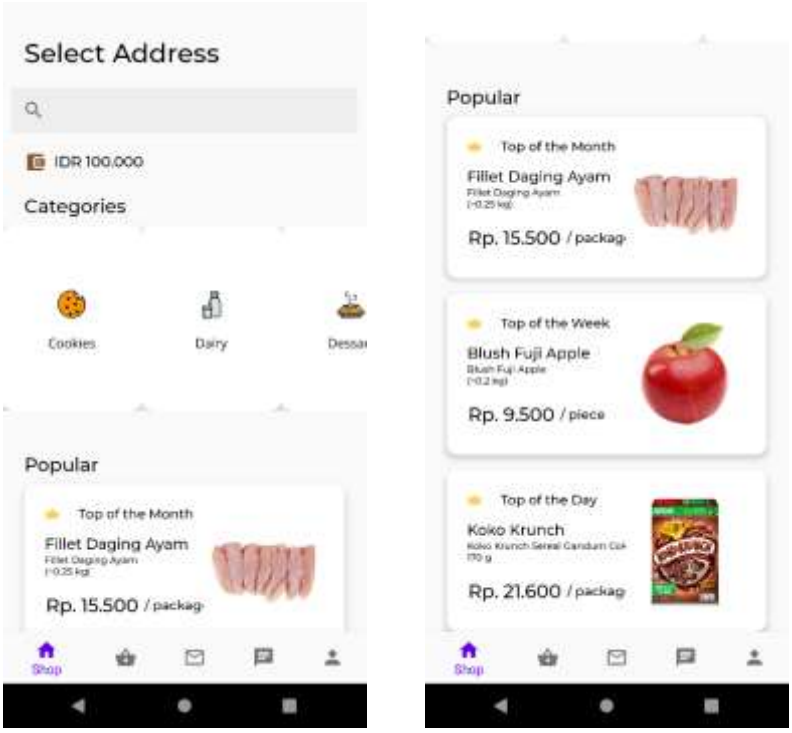

Figure 4. Shop page

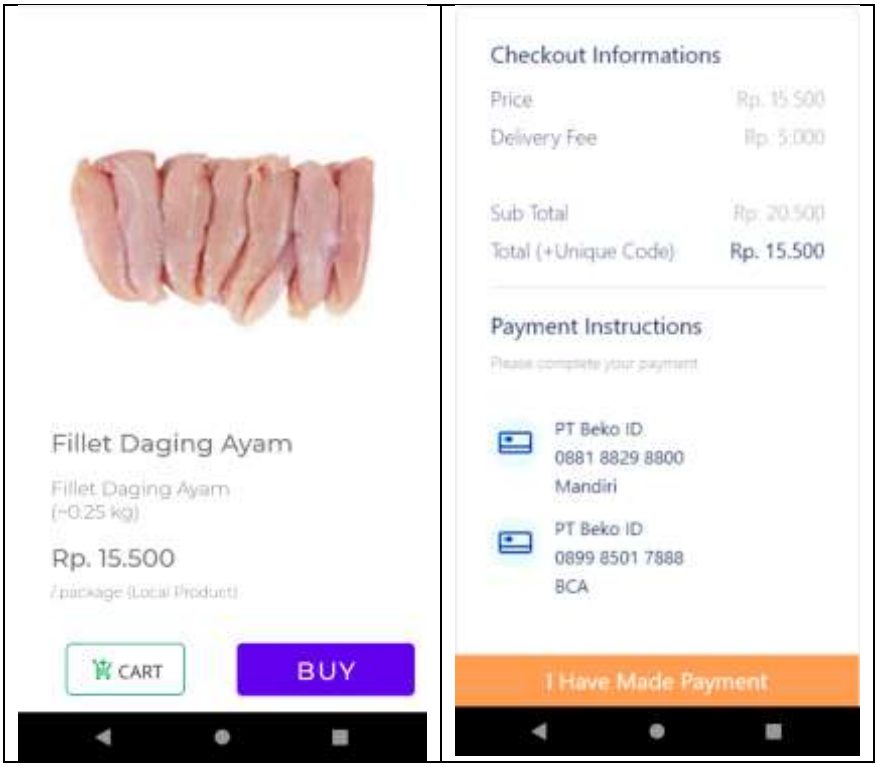

Figure 5. The shopping flow of Beko app

CONCLUSION

Based on the results, it can be concluded that the application that the researchers built can facilitate and increase the effectiveness of online grocery shopping activities during the Covid-19 pandemic. It is because all systems can be integrated and automated. From our

perspective, many aspects can be developed from designing this application in the future.

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