



Designing Mobile Transactional Based Restaurant Management

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ABSTRACT

In this modern era, everything has been facilitated with all transactions that can be done online, either through the website or mobile application. One of the things that are made more accessible is in the culinary business. Customers can order food online through a website or mobile app owned by the culinary owner. However, the system that has been designed at this time is still oriented to one scope, namely the customer or culinary owner. In this paper, we will discuss the development of integrated restaurant applications ranging from customers looking for restaurants, ordering food, order processing at restaurants to order payments made by customers. The concept of data storage applied is the Centralized Database. The platform used is Android Mobile by using Web Service for data communication that is built using the PHP programming language and MySQL database.

Keywords: *Culinary, Mobile Android, Integration Data, Centralized Database, Transaction.*

1. INTRODUCTION

The rapid development of information technology requires all business people to be smarter in using it. With the application of information technology, business owners will be provided with convenience in data processing, promotion, and revenue recapitulation. Generally, information technology will be applied to businesses related to transactions. One of them is a culinary business.

Culinary business is one of the business sectors that serves food and provides places to customers. Culinary business is one of the business sectors that serves food and offers places to customers. Culinary business is closely related to transactions and data. So that many applications are specifically designed to run a business culinary business process, such as ordering food online, point of sales at the cashier and others. However, currently, the application that is designed is still oriented to one scope, namely the customer or business owner. Therefore, data integration between the two different applications is needed.

Data integration is a combination of data that is in various sources to be integrated and then given to the user [1]. Data integration is needed for culinary efforts starting from incoming order data to customers making payments. Based on this problem, an integrated restaurant application was built by applying the concept of a centralized database. So that customer applications and business owner applications can be integrated with the same data. The application that is built contains features intended for customers and business owners. Features for customers include searching for restaurants or nearby menus, rating restaurants, ordering food, knowing, order progress, and getting restaurant promos. Features for culinary business owners are transaction recapitulation, restaurant information management, processing of promo orders, and vouchers. The platform used is Android mobile by using a web service for data communication. Web Service is built with the PHP programming language and MySQL database. With the construction of the integrated application, it is expected to create integrated data starting from the restaurant search process until the order is processed.

2. LITERATURE REVIEW

Literature is used as a reference for making integrated restaurant applications.

2.1 Related Works

Some studies that are used as references in making applications include:

The research conducted by Deni Utama in 2016 resulted in a local client-server-based food ordering application that uses wireless router assistance in its implementation [2].

Research conducted by Debbie Defrina in 2018 resulted in an online food ordering website based application at Tiga Saudara restaurant that requires a WLAN network to be able to enter the main page of the application [3].

Research conducted by Steven Yurie Frediyatma in 2014 produced a cloud-based Android mobile application that is only used for ordering food [4].

Research conducted by Jos Forman Tompoh Steven R. Sentinuwo and Alicia AE Sinsuw in 2016 in 2016 resulted in food and beverage ordering applications menu using a web service application on the customer side based on Android (client) can be integrated with web admin applications on the restaurant to arrange reservations (servers) without payment features [5].

The research conducted by Liliyany Candra in 2014 resulted in an Android mobile application ordering food that was only intended for waiters and integrated with the kitchen and cashier [6].

2.2 Android

Android is a mobile operating system based on the Linux kernel designed by Google and the first mobile operating system that is open for free. In other words, developers can easily create and install applications for free [7].

2.3 Data Integration

Data integration is the process of pooling data obtained from various sources to form one suitable data format [1]. Data integration must be done carefully to produce output that is following the needs, and inappropriate output will make it difficult for users in decision making. Data integration can be done using uniformizing the size of the data variable, making names of consistent variables and coding structures from the data. The advantage of data integration is that it simplifies analysis in decision making, the absence of duplicate data and sharing data between work environments.

2.4 Centralized Database

A centralized database is a database that runs on one computer system without any interaction with other computers [8]. In the operation of programs or applications, users will access only one database from various devices. The advantage of implementing a centralized database is data integrity because the source is only in one place, flexible for data changes and minimum duplication because it is only entered once.

3. EXISTING SYSTEM

The existing system or application is still oriented to one scope; the intended range is the customer or the restaurant owner. The following is a discussion of the existing system.

3.1 Customer Application

Application developers have created many customer-oriented applications for restaurants. Easily downloaded on the play store and app store. However, as the goal is customer-oriented, of course, the app focuses on the satisfaction of prospective restaurant customers. Standard features found in customer-oriented applications are restaurant search, food menu search, table reservation, viewing available promos, restaurant vouchers, and recommendations that give customers many choices about existing restaurants. A general description of existing customer applications can be seen in Figure. 1.

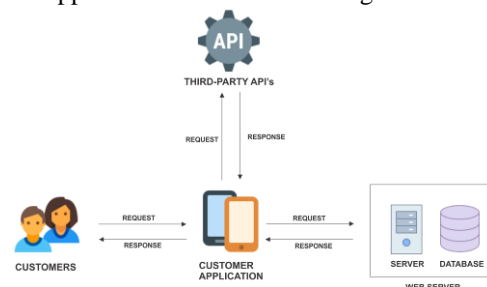


Fig. 1. Customer Application Existing

Users of customer-oriented applications are certainly restaurant customers. Customers access the app directly and get information from their respective application databases. For example, a customer searches for a restaurant closest to the current position, a request will be sent to the application server and returned from the server to the application to be displayed to the customer. Each application has its database and its stand. Several customer-oriented applications are using API's (Application Programming Interface) to support existing business processes, one example of which is to use maps to facilitate the search for route locations of restaurants or using online motorcycle taxis to help dispatch customer orders.

3.2 Restaurant Application

Restaurant-oriented applications are generally made specifically for specific restaurants. However, at this time began also developed a restaurant-oriented application that can be used for all restaurants. Restaurant-oriented applications that are widely used, namely POS (Point of Sales). POS users generally are cashiers, the waiter comes to the customer then records the order and is given to the cashier, or the customer goes directly to the cashier to make an order and then pays, and after the order, the waiter delivers the customer order. POS tends to be oriented to business owners and cashiers, so the role of servants and kitchens is still minimal in the application because they are still making orders manually.

Besides POS, there is also research that has been done designing a restaurant ordering application by utilizing the local network as a connection to access the application. There are also applications specifically designed for one place, so customers must install a particular app to place an order at the restaurant. A general description of restaurant-oriented applications can be seen in Figure. 2.

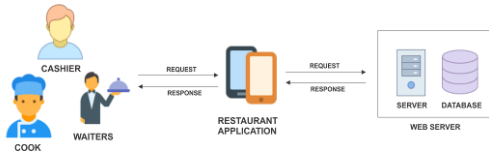


Fig. 2. Restaurant Application Existing

At Figure. 2, the servant, kitchen, and cashier are shown accessing the application directly and getting information directly from the application server. Figure. 2 shows that there is no customer role in the transaction process in the restaurant application. The restaurant does everything.

3.3 Customer Order

The most critical process in the restaurant business process is the order process. The order process can be done by the restaurant itself or the customer directly. But now the application that allows customers to order directly is still lacking. This matter is because the existing applications are still oriented to each party, both customers and restaurants. So, to integrate order data, it still cannot be done. Another reason is that each application has its storage area. There is research that designs ordering applications using local networks to be able to connect with applications. This situation is considered to make it difficult for customers in the order process, and also, the app is only addressed to certain restaurants. Besides that, information about the order process that has been carried out is also not informative, and customers must wait without clarity whether the order has been processed or not. This situation will reduce the service quality of the restaurant.

3.4 Integration between Waiters, Kitchens and Cashiers

The restaurant system is a complex system. Users of the restaurant system are generally restaurant owners, waiters, kitchens and cashiers. Restaurant applications in the market today are still oriented to restaurant owners and cashiers. The app used is usually POS (Point of Sales). Point of Sales in the order process only allows entering ordered orders. The waiter records the customer order manually and then gives it to the cashier to be entered into the system, or the customer goes directly to the cashier to

make an order and pay for it when the order is finished, it is delivered to the customer. Besides that, the existing POS has been equipped with restaurant management that helps restaurant owners to arrange their restaurants, such as table management, staff management, menu management, and recapitulation.

Previous research that had been done was about ordering restaurant-oriented food. The application has been integrated between the waiter and the kitchen but without the cashier. There is also a system that has been designed regarding restaurant reservations where the application has been integrated between the waiter, kitchen and cashier but there is no restaurant management service, and also the use designed is still intended for specific restaurants.

4. DISCUSSION

The discussion in this paper will describe the improvement of the restaurant transaction system. The following is an explanation of the development of the restaurant transaction system.

4.1 System Architecture Diagram

The general description of the system designed will combine all the elements contained in the restaurant, namely, the owner, customer, waiter, kitchen, and cashier. The general description of the system can be seen in Figure. 3.

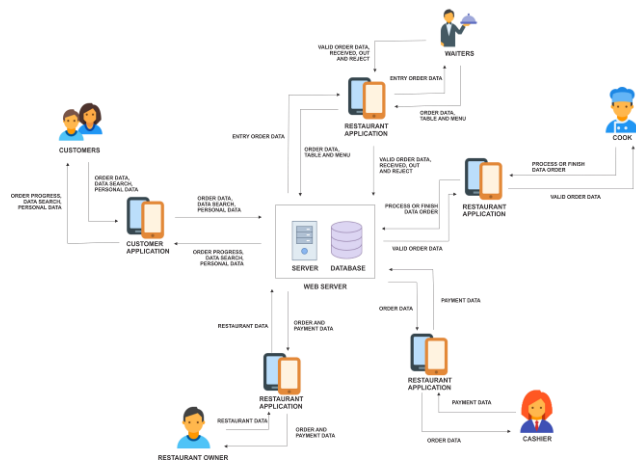


Fig. 3. System Architecture Diagram

The current problem is the application that stands between customers and restaurants. In the restaurant business process, the users involved our customers, owners, waiters, kitchens, and cashiers. To create an application that is connected to the five users, the application must access a centralized database. The purpose of using a

centralized database in addition to being able to connect multiple applications is that the change process that occurs, such as stock management and order can be flexible. The customer application and restaurant application will access the same data in the same database.

4.1 Ordering

A standard business process in restaurants is the order process. The ordering business process can be seen in Fig. 4.

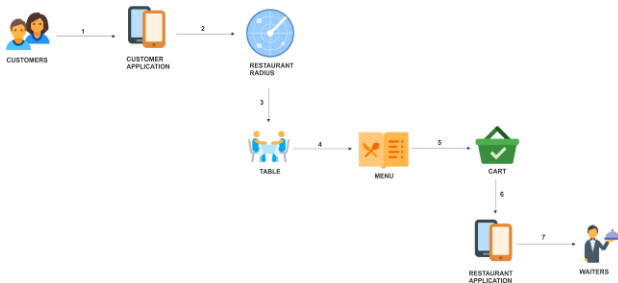


Fig. 4. Ordering Business Process

The business process offered is by applying the location of the restaurant user or customer to replace the role of the local network to enter the restaurant system. The following is an explanation of the flow of the business process of ordering orders by customers. (1) Users access the application. (2) Obtain user location and perform location validation within the restaurant radius. (3) Table selection. (4) Choice of food and beverage menus. (5) Orders entered into the basket. (6) Orders are sent to the restaurant application. (7) Waiters get notifications.

4.2 Order Progress

Information about the progress of customer orders will increase restaurant customer satisfaction. So that customers can find out their order and estimate their order will be received in the future. The business process of order progress can be seen in Figure. 5.

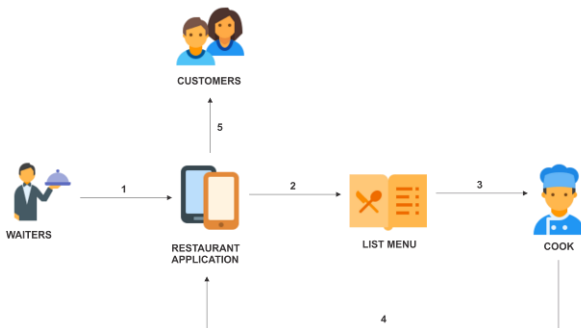


Fig. 5. Progress Order Business Process

With the progress of the order, to be able to find out the status of the customer's request, the customer does not need to ask the waiter, just by looking at the application. Customers quickly know the order has been completed in the kitchen or ready to be delivered by the waiter. The following is an explanation of the business process order progress. (1) Waiters access the application and get a list of incoming orders. (2) Validation of incoming orders. (3) Correct order data received by the chef/kitchen. (4) The chef gives the cooked order data. (5) Notification to customers that the order has been completed.

4.3 Payment

Payment in the restaurant ordering process is crucial because it relates to the income of the restaurant. The business process of order payment can be seen in Figure. 6.

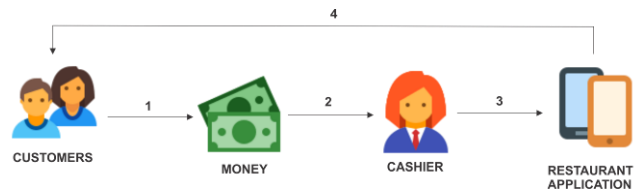


Fig. 6. Payment Order Business Process

In the order payment process, the application will record incoming payments and make an invoice for each transaction. The user who is authorized in the payment process is the cashier. The following is an explanation of order payments. (1) Customers make payments in the form of money. (2) The cashier receives the customer's payment. (3) The cashier enters customer payment data. (4) The customer receives an invoice.

4.4 Customer Order

The current problem regarding the restaurant system is that customers cannot order optimally independently. Applications that have been circulating a lot at this time no one can overcome direct orders by customers. With the implementation of integrated applications between customer applications and restaurant applications that utilize a centralized database, the order process directly by customers is very applicable, because the data accessed is located in a single database.



Fig. 7. Customer Order Directly

The order process directly does by customers connected to the restaurant application. The proposed order flow begins with (1) the customer accesses the customer application, in the customer application, there is a lot of information about the restaurant and menu that the customer wants. (2) In the order process directly by the customer, the customer must enter within the radius set by the restaurant, applying the range will facilitate the validation of the existence of the customer in the restaurant as a substitute for the local network in previous studies. The application of this radius uses the Google Maps API by using the geofence feature found on Google Maps. (3) When the customer is within the range of the restaurant, the customer can choose a table available at the restaurant. (4) Next, a menu selection is desired by the customer. (5) The selected menu will be temporarily stored in the Basket. (6) After completing the menu selection, the order data in the basket will be stored in the database. (7) The waiter will get a notification that there is a new order from the customer. (8) Authorized servants to validate or reject incoming orders. (9) Data order valid by the waiter will be received by the kitchen. (10) The kitchen will process a correct menu order and will provide order data that has been prepared to the waiter. (11) The waiter will give the complete order to the customer. (12) The customer has received orders and the order status will be changed to have been received by the customer. (13) Customers make payments in the amount of total expenditure made. (14) Payments will be collected and processed by the cashier. After payment is complete, the restaurant and customer will get an invoice that can be downloaded on the restaurant application and customer application. Besides being able to place orders directly, customers can also pre-order and order groups.

Pre-order services much support the satisfaction of restaurant services to customers. With pre-orders, customers can place orders in advance and without having to wait on the spot. Pre-order services are needed when the restaurant is crowded so that the waiter does not have to queue at the place, place an order via cellphone and wait for a notification if the order is ready to be taken. The business flow of restaurant pre-orders can be seen in Figure. 8.



Fig. 8. Pre-Order

The flow of the pre-order process is (1) The customer accesses the customer application then selects the desired restaurant. (2) To validate pre-orders, customers must become members of the restaurant in question. The ordering process is the same as the ordering process directly, and the difference is that it doesn't only use a radius and doesn't have to be in place. (3) Customers choose the desired menu. (4) The selected menu will be stored temporarily in the basket. (5) In the pre-order process, it will determine the time to take the order. (6) Order data that has been submitted will be sent to the database, and later, the waiter will get a notification that there is a new pre-order. The order process flow process will be the same as the order process flow directly, which also involves the kitchen. (7) When the kitchen has processed the order, the customer will get a notification that the order can be taken. (8) When an order has been accepted, the customer must process the payment to the restaurant cashier. (9) The cashier will receive payment data from customers, and customers can post invoices through the application. Another problem is that each account can only handle one transaction. Group orders are a workable solution.

Group orders are a solution that can be used when a group of people or groups want to place a booking together without having to wait for other friends to gather first. Requirements to be able to do group orders, enough for one friend to be at a restaurant based on a radius and place an order, then a friend who is already at the location will invite friends who may still be on the road or at home to join one transaction. Invited friends can choose the available menu, and I enter the transaction of the friend who invited him. The flow of group orders can be seen in Figure. 9.

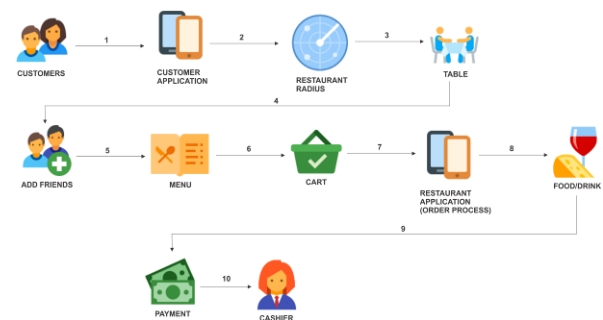


Fig. 9. Group Order

Group orders will make it easier for group or group orders to be entered in the same transaction. Group orders can only be made when making reservations directly at the restaurant. (1) Order the group at the beginning by accessing the customer's application. (2) Customers must enter within the radius of the restaurant, as in direct bookings. (3) Customers choose available tables. (4) When going to group messages, customers must add friends to the friend's list or add new friends using the username. (5) When finished selecting friends to be invited, invited friends will receive a notification to accept or reject the invitation. When the invitation is received, the accepting friend can choose the desired menu. The selected menu will be entered in one transaction that invites group messages. (6) Orders will be stored temporarily in the basket. (7) When the order is considered sufficient, the order data will be stored in the database, and the waiter will get a notification to process the incoming order like the previous order process flow. (8) The orders were completed, then the waiter will deliver orders to the customer's table. (9) Next, the customer will make a payment to the cashier. (10) The cashier will receive payment data, and the customer can download the invoice on the customer's application. In addition to ordering business processes, the role of order status is essential for monitoring orders that have been processed or not.

Order progress is the appearance of the order status that has been processed or not by the waiter and kitchen. With the advancement of orders, customers do not have to worry about orders that have been ordered, just by looking at the application to find out their order. Order progress will improve restaurant customer satisfaction for the better.

4.5 Integration between Waiters, Kitchens and Cashiers

With the integration between the waiter, the kitchen, and the cashier, it will facilitate the ordering process carried out by the customer. Besides orders can be done independently by customers, the waiter can also order customers. Grooved data from the waiter to the kitchen and at the end of the cashier will make data changes flexible. The solution that can be done is by designing an application that can be used by the owner, waiter, kitchen, and cashier simultaneously. The difference is that the access rights for each user will be different, such as the kitchen when the login to the application is directed to the kitchen page only. By designing special applications for restaurants, the business process will be centralized. Data storage for restaurant applications will be the same as customer application data storage, so the data obtained will be the same.

5. CONCLUSIONS

Previous applications have features that make it easier for users. However, customer applications with restaurant applications are still independent. By designing a new transaction form by integrating the two customer applications with restaurant applications that utilize centralized data storage will provide a complete business process from the ordering process to the completion of orders or payments. Centralized data storage will make data flexible to changes, such as stock changes or others. Customers are also greatly facilitated by being able to choose a menu that will be ordered independently and be able to know the progress of orders made.

The weakness of this design is that it must be connected to the internet because it is cloud-based.

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