IMPLEMENTATION OF ANDROID BEAM (NFC) AS A METHOD OF PAYMENT AND INFORMATION SEARCH

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ABSTRACT

Coins is a medium for transactions which is currently used in Floating Market Lembang tourist attractions with existing coin value is 5.000 (yellow), 10.000 (blue), 20.000 (red), 50.000 (pink), 100.000 (orange). Based on research results payment by using a coin is inefficient because visitors are required to purchase more than one coin, although visitors buy one coin with the largest nominal when making purchases of food at the lowest price then still later these coins will be split into several coins as a result of change in one of the food stalls. To search information about tourist attractions such as a vehicle of information, exchange of drink tickets, information types and prices of food, visitors should inquire into information officer on the spot or around the tourist attractions while the area is quite extensive.

By utilizing a technology called Near Field Communication (NFC) based on the technology of Radio Frequency Identification (RFID) is expected visitors make payments only with one NFC coin tags and free content with nominal whatever aims to not carry more than one coin as it requires more storage space and by making use of Near Field Communication technology (NFC) mobile devices (smart phones) is expected to help visitors sights no difficulty in finding information about the sights with NFC Tag media without installing the application.

Based on test results Alpha and Beta that has been done, it can be concluded that the functional whole process on Android Beam Payments and Information Search based mobile by utilizing NFC technology has been running as expected and already can greatly aid Operator in conveying information supporting around and its tourist attractions for visitors and stall holders.

Keywords: Android Beam (NFC), Radio Frequency Identification (RFID), Coins, Information, Tourist Attractions, Android.

1. INTRODUCTION

Floating Market Lembang is a place of tourism objects new andalan located at Jl. Grand Hotel No. 33 E Lembang. This tourism object is one of the tourism destination which is known at this time to the family and the community around Bandung even outside the city though. Tourism Objects Floating Market Lembang is a tourism objects that the main sphere is presenting a market or trading place, where the vendors sell for your merchandise above the boat or commonly called the floating market. For the payment system that is done in the floating Market Lembang namely visitors must buy the first special coin that later became the payment of vehicle and buy food, the coin can be purchased standstill exchange with the value of a coin that is namely 5,000 (yellow), 10,000 (blue), 20,000 (red), 50,000 (pink), 100,000 (orange) only for a coin with increments of 50,000 and 100,000 visitors rarely to buy it because the visitors more buy a coin with increments of 5,000, 10,000 and 20,000 because the price in each of the booth of good eliminates the sphere and average culinary ranges from Rp10.000 - Rp open market rates, so it is likely that the visitors to buy more than 1 coin and require more storage space to store a coin - coin, to search for information about tourism information such as a vehicle, exchange, drink ticket type information and food prices, visitors must be asked to the information officer or around directly in the place of the tour while the tour planta tions wide enough.

Based on the result of observation of the visitors researchers found less effective source of information obtained by visitors to access the information needed and also less few if any indigenous payment system because the visitors are required to buy more than 1 coin although visitors buy 1 coin cell battery with the largest nominal if buying food with the lowest price and still later a coin will be broken down into several coin because the results of the subsequent relapse in one of the booth of the food and also can only during the time of the price to construct the booth of experiencing the changes with the value of the price is not fulfilled from each nominal value of a coin that is provided that allows the administrator must create a coin with New nominal.

This time the technology continues to experience the development in terms of delivery and payment information. One of them is near the Field Communication or NFC. Near the Field Communciation (NFC) namely wireless communication technology with the use of magnetic induction based on the technology of Radio Frequency Identification (RFID) in a distance of about 4 cm. NFC operates at the frequency of 13 MHz with the average transfer speed 106 Kbps until 424 Kbps.

With the development of technologies such as NFC is so easy in data communication such as the exchange of digital content good video, audio or image and also NFC as an instant payment solutions, the purchase ticket, purchase goods, up to become one of the digital wallet in addition to using credit card. The device has been using cip NFC, such as smart phone, will produce interactive service which is easier and comfortable to use for its consumers.

So the author is interested to develop existing systems from both the payment system or information provider is using technology NFC (Near Field Communication) which is one of the distance communication that can be used as a quick access the process read and write information and technology also can be used as a tool of reliable payment transaction.

In the payment system in the floating Market Lembang, author will try to develop it using NFC technology pengkoinan system where the value of the coin will be in charge to NFC Tag, the advantages of using the system pengkoinan NFC Tag visitors only make payment with one NFC Tag only and is free to be filled with nominal whatever, if payment with NFC Tag then the balance or a coin which is in NFC Tag will be reduced in accordance with the value of the price of the purchased, this too can be as solution if there is the price of food with the value of the price is not fulfilled with nominal value construct coin and in the utilization of Near Field Communication Technology (NFC) expected visitors tourism place not difficulties in the search for information about tourism place Floating Market Lembang, where every visitor who brought the smart phone that already has the technology NFC can access information with only paste the smartphone to the NFC Tag is fully charged the information diletakan at certain points in tourism place, by using NFC technology is expected to be a supporting media operator tourism place in providing information. For that the author topic entitled " Beam Android Implementation (NFC) as a method of payment and Information Search in the floating Market Lembang".

Objectives to be achieved in the use of Near Field Communication technology (NFC) as a medium of payment and information retrieval is as follows:

1. As a supporter of the delivery of media information such as culinary information and the type of vehicle in the Floating Market Lembang so as to facilitate the task of the operator in conveying information.
2. To develop a payment system using Near Field Communication technology (NFC), where visitors make payments only with one NFC tag and is free to fill with whatever nominal thereby increasing the effectiveness of the exhibitors.
3. As a solution if there is value priced meals or rides prices do not correspond to the nominal value of each coin because with NFC technology will cut the balance in accordance with the value of the purchased price.

2. CONTENT OF RESEARCH

2.1 Basic Theory

2.1.1 *Near Field Communication* (NFC)

NFC (Near Field Communication) is a standard device that allows smartphones and other devices can communicate with each other while on hold. NFC works like RFID, but the NFC has a shorter range than RFID. NFC capabilities roughly about 4 inc.

Devices equipped with NFC to communicate with other NFC devices called NFC Tags. NFC tags are chips which do not have the power to draw power from a nearby smartphone or other NFC device. They do not need batteries or power source itself.

NFC (Near Field Communication) is the development of Radio Frequency Identification (RFID). The development of NFC is a combination between mobile phones equipped with NFC chipset. This phone will be able to change the payment system that exists today (credit card, debit card and cash payments) become more efficient payment using NFC. NFC has services such as payment transactions, the purchase of tickets, identity, and as a decision data.NFC regarded as one of the major technologies that can support many services, such as ticketing payment transactions, data retrieval, hospitality, property, and also as a means of communication. NFC have more power in a mobile phone, such as payment transactions with ease, by connecting between devices that have NFC, and does not need to be scrubbed (contactless), just stay attached when the transaction pemabayaran. NFC also make transactions pemabayaran better than the mobile phone technology (SMS).

2.1.2 NFC *Tag*

NFC tag is a media supporter of NFC technology. NFC tag is usually passive, thus requiring an initiator (NFC to be active) for the communication process. NFC tags can contain data with a small size. , Tag NFC currently has a memory ranging between 96 and 4,096 bytes. NFC tag is read-only backwardly but allows also be re-writeable.



Figure 1. NFC Tag

Manufacturers of NFC has set the standards of NFC tags to be operated with NFC devices. Prescribed specifications are divided into 4 types. Four types of NFC tags is based on the product and commercial availability. Here are the types of NFC Tags:

1. Type 1: based on ISO / IEC 14443A. Tags are able to read and rewrite. Users can set the tag to be read-only. Available memory is 96 bytes and can be upgraded up to 2 Kbyte.
2. Type 2: based on ISO / IEC 14443A. Tags are able to read and rewrite. Users can set the tag to be read-only. Available memory is 48 bytes and can be upgraded up to 2 Kbyte.
3. Type 3: based on Japanese industry standard or Japanese Industrial Standard (JIS) X 6319-4, or called FeliCa. Tag is set at manufacture to support both the read and re-writable, or read-only. Memory can be changed theoretically the memory limit is 1 Mbyte per service.
4. Type 4: fully compatible with the ISO / IEC 14443 standard series, has 32 KB of memory and is faster than other types of tags, have protection against collision of data, communication can use NFC-A and NFC-B. Type 4 can be rewritten (rewritable) or read-only. But the setting is done while type 4 in the stage of manufacture. When it is completed, the settings can't be changed.

2.2 System Analysis

In the payment system that already exists in the floating Market Lembang, author will try to develop it using NFC technology pengkoinan system where the value of the coin will be in charge to NFC Tag, the advantages of using the system pengkoinan NFC Tag free visitors fill the amount of nominal value with one NFC Tag only not as payment system that already exists with visitors must buy a coin that nominally varies in each koinnya with one of the benefits of that through this technology visitors will not feel lost if doing transaction when the price of food in the bottom of the lowest nominal from each coin provided by the managers of because visitors will only pay in accordance with the price of the food. It also in the use of technology near the Field Communication (NFC) expected visitors tourism place not difficulties in the search for information about tourism place Floating Market Lembang, where every visitor who brought the smart phone that already has the technology NFC can access information with only paste the smartphone to the NFC Tag is fully charged the information diletakan at certain points in tourism place, by using NFC technology is expected to be a supporting media operator tourism place in providing information.

2.2.1 Purchasing Procedures Balance NFC Tag

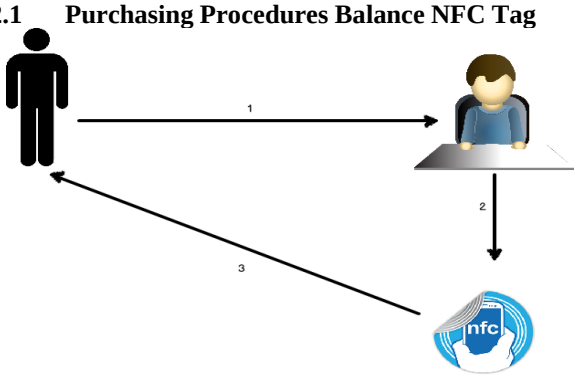


Figure 2. Purchasing Procedures Balance NFC Tag.

Caption 2 :
There are 2 actors from the NFC tag balance reservation system that will be built is the operator and visitors. Following the path from the system that will be built.

Description of the Figure 2 :

1. Visitors to buy the NFC tag is fully charged nominal balance that has been determined or visitors order NFC tag to the operator with nominal balance of appropriate desire, visitors can also do refill the balance in the operator.
2. Coin cell battery charging operators to balance menginputkan NFC tag for visitors who choose to refill the balance in accordance with the desire.
3. The NFC Tag is in charge of balance in provide to visitors or order NFC tag to process payment vehicle or buy food.

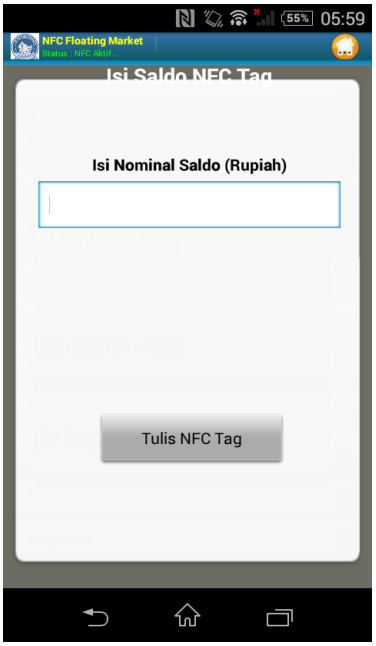


Figure 3. Fill balance to NFC Tag

Caption 3 :

1. The Operator to populate the balance or nominal in application to inputted into NFC tag and paste nfc tag to the back of the smartphone.
2. The balance of the data will be saved to the database server and to the nfc tag.
3. Each balance charge will produce tag id automatically based on the combination of the month and year, date and 5 digit random number.
4. The data is entered into the id tagnya nfc tag only only that later as nfc initialization tag for in the execution by reader merchants.
5. The type of data that is inputted into the NFC tag i.e. Type Name Format (TNF) including into the type Text .The following example image from the input data contents of balance to the NFC tag :

Dec20151228104829

Figure balance input content data to the NFC tag

2.2.2 Payment Procedure With NFC Tag

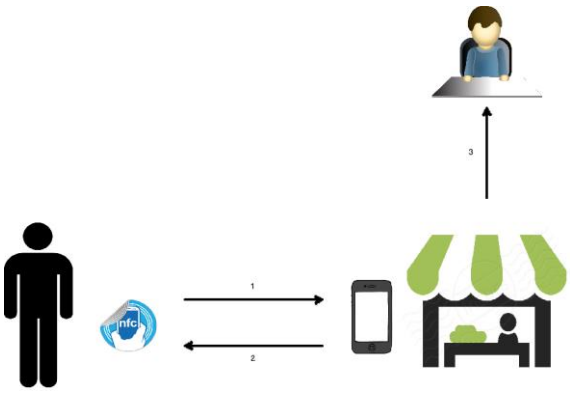


Figure 4. Payment Procedure With NFC tag.

Caption 4 :

1. Visitors order food to the keepers of the booth, then the guards the booth fill any item ordered by visitors in the reader the guards the booth , after charging items done then the keepers of the booth of tightening the reader to NFC tag visitors to do transaction, after those nearest the balance in the NFC tag visitors will be truncated automatically according to the number of the price of the selected item or book visitors. The results of the transaction is later will be in the update to the database.
2. After the transaction is complete and the keepers of the kiosk will give back NFC tag to visitors.
3. The guards kiosk exchanging the balance of a coin from the results of the cutting of the balance of the visitors to the operator conversion, here operator will see the first id guards with kiosks in fishponds number of applications that will be built.

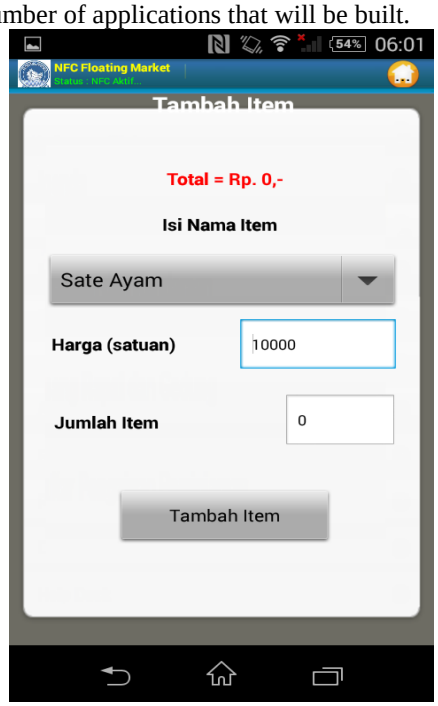


Figure 5. Select Item

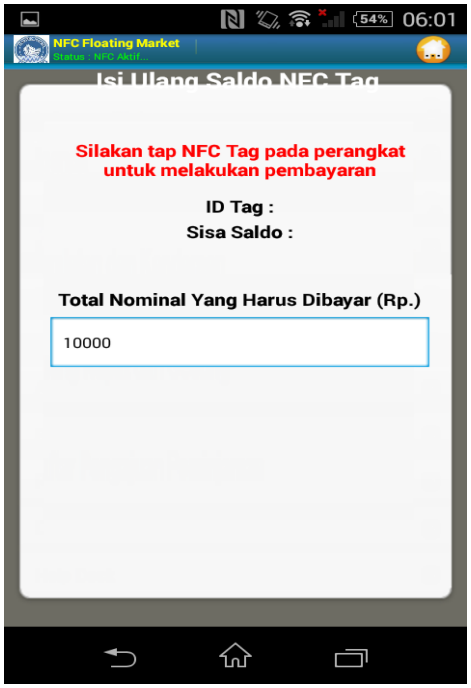


Figure 6. Pay Item

Caption 5 and Caption 6 :

1. In the transactions menu selling the guards the booth select items and the number of items ordered by visitors.
2. The booth of the guards do the cutting of the balance of the appropriate NFC tag visitors from the total price of the items taken.
3. The cutting of the balance done with NFC tag closer visitors to the reader the guards the booth.

2.2.3 Information Search System Procedures

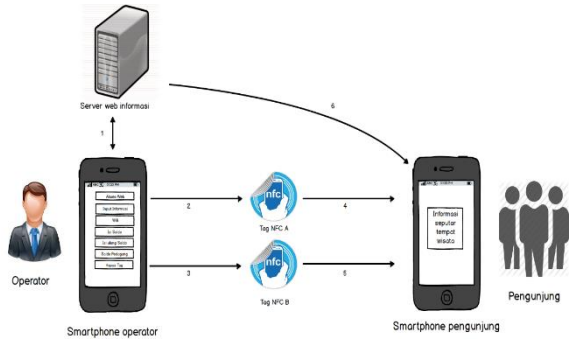


Figure 7. Information Search System Procedures

Caption 7 :

1. The Operator to update the information about the surrounding tourism place if there is information that should be in the update.
2. The Operator upgrading inputkan wifi access data in the form of the name SSID, type the SSID and password SSID to nfc tag.
3. Upgrading the data inputkan operator in the form of the URL of the website floating market lembang to nfc tag with the application will be on the rise.
4. The nfc tag is fully charged wifi access data is placed to be pushed - a specific location such as in front of the gate or the parking area and then accessed by visitors who already have a smart phone tech nfc with how smart phone visitors affixed to the nfc tag, wifi aims to provide internet access to smartphone visitors.
5. The nfc tag is fully charged website url floating market lembang will be accessed by visitors in the same manner as on the previous stages, at this stage aims to execute or open the web page of information on the web to Floating Market Lembang.
6. Smart Phone visitors will display a view of the information about tourism places in the web browser, so visitors do not need to install the application again because by simply using the built-in browser from the smartphone.

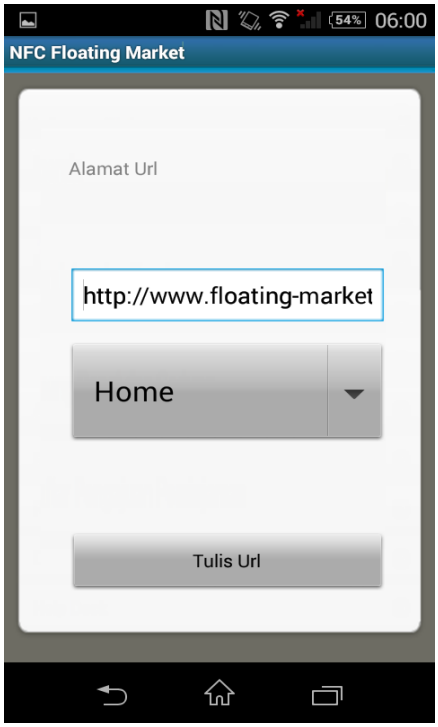


Figure 8. Input Url

Caption 8 :

1. Operator input the website URL Floating Market Lembang in applications for NFC tags and their input to the NFC tag attach to the back of the smartphone.
2. Data is entered into the NFC tag that is http://www.floating-market-bandung.com/

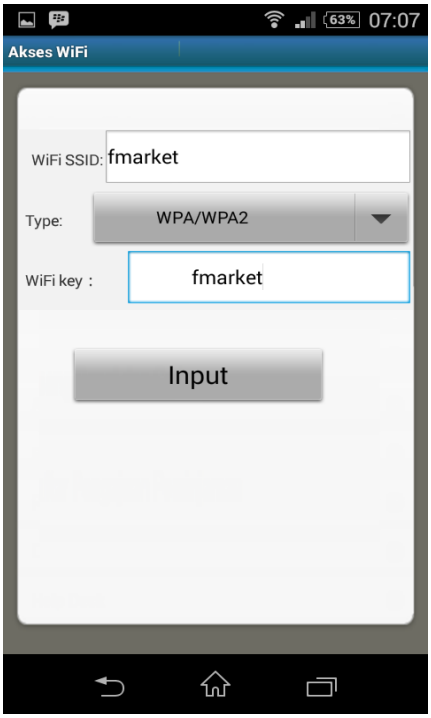


Figure 9. Input Setting Wifi

Caption 9 :

1. Operator input the SSID Name, Type SSID and Password in applications for the operator fed into a paste along with the NFC tag NFC tag to the back of the smartphone.
2. Suppose with SSID name "Gmarket" tissue type "WPA / WPA2" and password "fmarket".
3. The data type input to the NFC tag that Type Name Format (TNF) are included in this type of Text.

2.2.4 Functional Requirements Analysis

2.2.4.1 *Use Case* Diagram

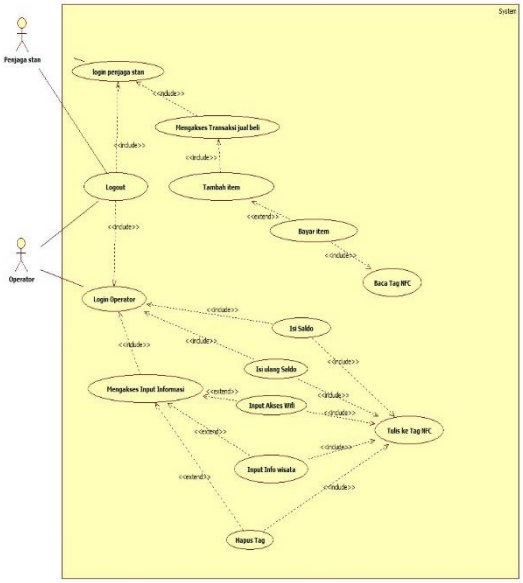


Figure 10. *Use Case* Diagram

2.2.4.2 *Activity* Diagram

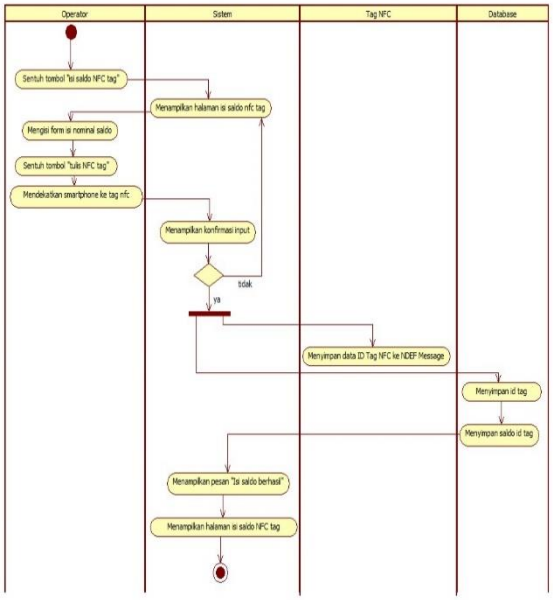


Figure 11. *Activity* Diagram Contents Balance NFC Tag

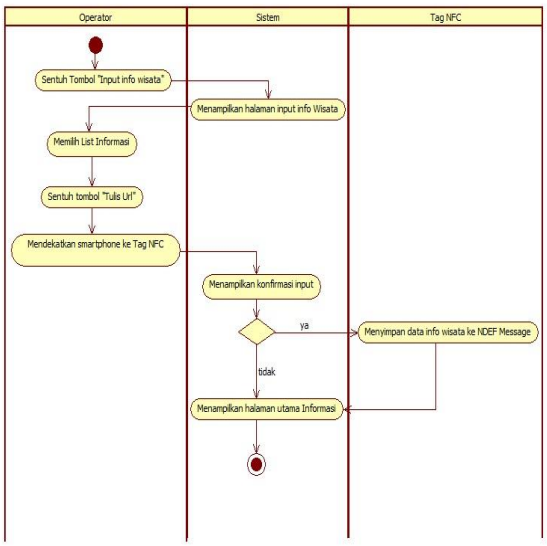


Figure 12. *Activity* Diagram Input Url

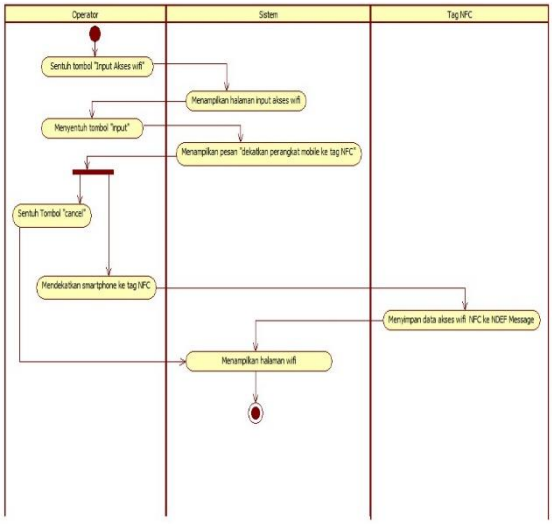


Figure 13. *Activity* Input Setting Wifi

2.2.4.3 *Sequence* Diagram

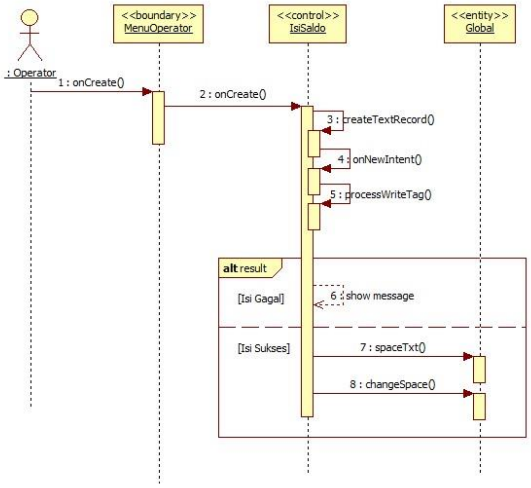


Figure 14. *Sequence* Diagram Contents Balance NFC Tag

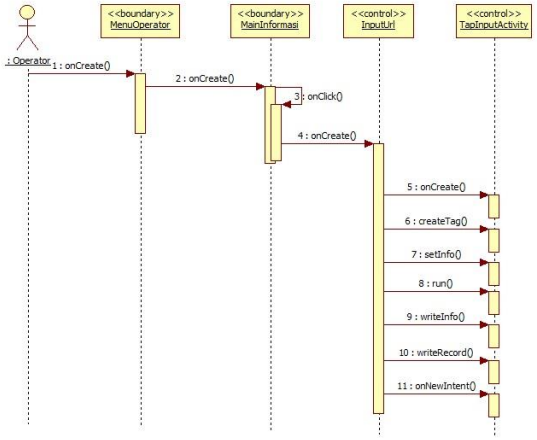


Figure 15. *Sequence* Diagram Input Url

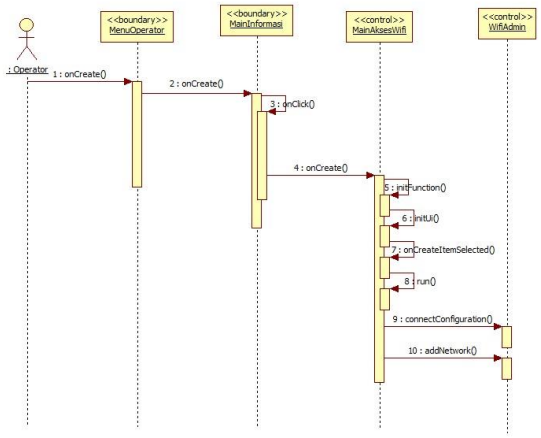


Figure 16. *Sequence* Input Setting Wifi

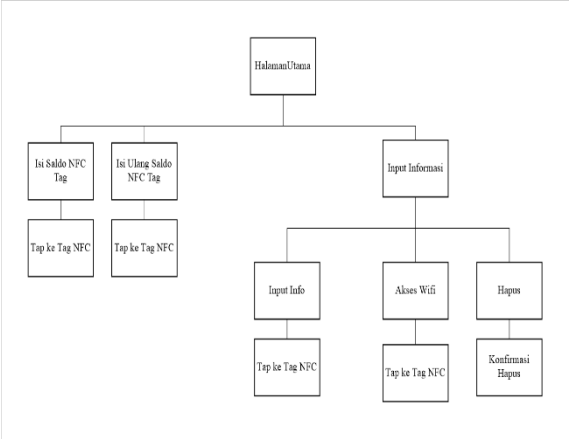


Figure 17. Applications Menu Structure Operator

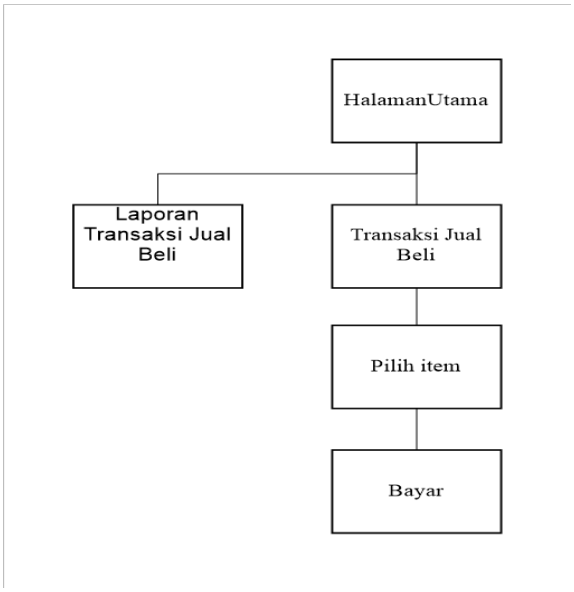


Figure 18. Applications Menu Structure Guard Stan

3 CLOSING

Based on the results of the tests performed on the use of technology near the Field Communication (NFC) as payment media and information search in the floating Market Lembang, it can be concluded that:

1. The information supporting information about tourism place provided on the NFC Tag media has been able to describe with the good of the realm of the vehicle that was found in the floating Market Lembang.
2. Using the built-in application operator tourism place can easily provide supporting information about tourism places to be served to visitors.
3. Transaction process between the visitors and the keepers of the booth to become more easily and efficiently because of the visitors only enough bring one NFC tag is charged with nominal balance of appropriate balance desire.

3.2 Suggestions

For application development in the next period of time, there are some suggestions that can be done, among others:

1. The information supporting information provided is not only the information about the vehicle and the booth of food only but information about a map of the location where the tour such as the layout of the Moslems, toilet, and others.
2. In addition to transactions between the visitors and the guards the booth using the Near Field Communication NFC Tag is expected to be developed again where visitors who bring smart phone that already deployed NFC can be charged nominal balance of which will later be to do transaction with the guards the booth.
3. When NFC Tag experiencing the development in the aspect of the memory size, then I wish using NFC Tag so that visitors do not need a connection to the internet to access information and support information about tourism place because it can only disisipkannya an application information that is more innovative and at the same time to save the nominal balance later to do transaction.
4. Develop a platform that can be supported by the software as currently only support Android platform.

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