

# APPLICATION DEVELOPMENT FOR MOBILE DEVICES

Tutor: Do Tien Thanh

## Contents

I.	Introduction .....	4
II.	Section 1: Checklist of features.....	5
III.	Section 2: Weakness .....	5
IV.	Section 3: Strength.....	5
V.	Section 4: Screenshots .....	6
1.	PhoneGap Screenshot.....	6
a.	Write Reviews screen.....	6
b.	Dashboard screen .....	8
c.	Update Review screen .....	9
d.	Search Reviews Screen.....	11
2.	Android Studio Screenshot .....	12
a.	Write Review screen .....	12
b.	Validation in Write Review screen.....	13
VI.	Section 5: Evaluation.....	15
1.	Human Computer Interaction.....	15
a.	General UI design principle.....	15
b.	Mobile Human Computer Interaction .....	17
2.	Security .....	17
3.	Maintainability .....	18
4.	Updates for the future .....	18
VII.	Conclusion.....	18
VIII.	References .....	19

Figure 1 PhoneGap: Write Review .....	6
Figure 2 Alert submit review .....	6
Figure 3 PhoneGap: error blank .....	7
Figure 4 PhoneGap: check error blank .....	7
Figure 5 PhoneGap: View review .....	8
Figure 6 PhoneGap: Update Screen .....	9
Figure 7 PhoneGap: alert check update .....	10
Figure 8 PhoneGap: alert check delete .....	10
Figure 9 PhoneGap: Search Screen .....	11
Figure 10 Android: Add Review .....	12
Figure 11 Android: Check validation .....	13
Figure 12 Android: View review screen .....	14
Figure 13 Consistency .....	15
Figure 14 Provide Feedback .....	15
Figure 15 Prevention (PhoneGap) .....	16
Figure 16 Prevention (Android) .....	16
Figure 17 Reversal .....	16

## I. Introduction

Information technology is a strongly developing industry in the world. Among them, the development of technology on smart phones has helped a lot for people's daily life. Strongest development can be said is Application based on Software Engineering. Appears on all smart phone devices that people are using. Application is the foundation to develop for many human-driven purposes such as Health, Entertainment, Work, and so on. And developing apps on smartphones is also a direction for many programmers.

This report will research and develop an application that works on the Android operating system. The goal of this study is to build an app that allows users to rate and rate restaurants. The app is called RateRestaurant. The application is developed on two platforms, Android Studio and PhoneGap.

## II. Section 1: Checklist of features

Feature	Description	Implementation
a)	Design app screen - Basic details input screen	Fully implemented
b)	Design app screen – Restaurant rating screen	Fully implemented
c)	Add, view and delete the basic details and check for duplicate input	Fully implemented
d)	Search	Fully implemented
e)	Add a note input screen	
f)	Features a and b will be deployed as a native Android application encoded in Java	Fully implemented
g)	Features c will be deployed as a native Android app encoded in Java	Fully implemented
h)	Add features to either PhoneGap or Android versions	Fully implemented

## III. Section 2: Weakness

Use the same interface: while users insert or update a review. It can be seen that the submit and update buttons are placed side by side. This is easy to confuse the user.

Interface error: Each review begins with a "NaN". The application is still experiencing a few bugs in the interface code

Unclear display: When a user updates or submits a review. The information of that review is not displayed well.

Limited database: Because the functionality in the app is still very simple. So, for now I am still using SQLite database created in browser.

## IV. Section 3: Strength

Validation data: All information about the user's review is marked as required

Functions: All basic functions are deployed and have database to store

Design UI: Version on PhoneGap has been fixed to be better

## V. Section 4: Screenshots

1. PhoneGap Screenshot
  - a. Write Reviews screen

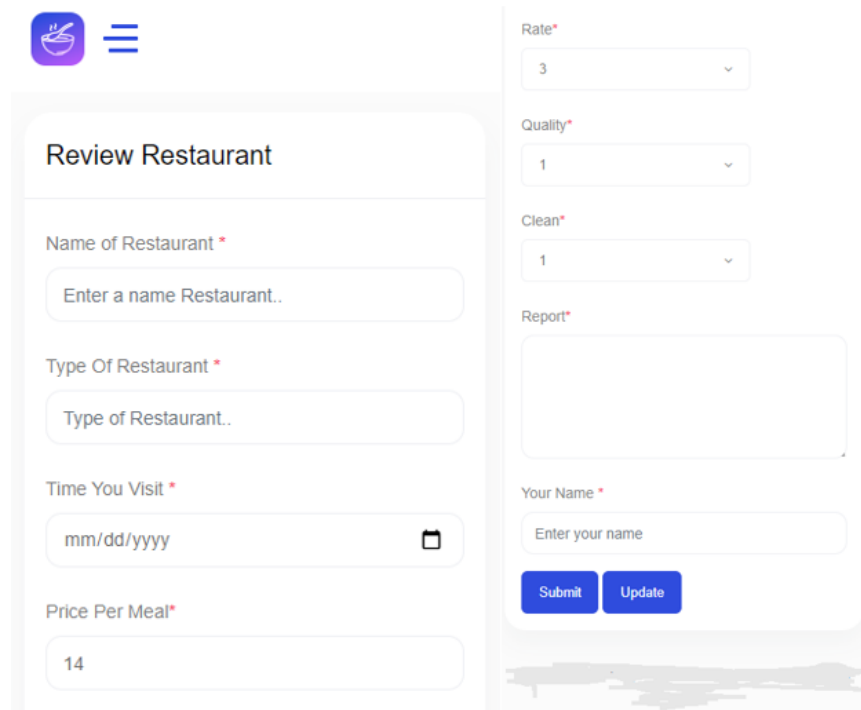


Figure 1 PhoneGap: Write Review

In this screen, all user input fields are clearly presented. Users can know which fields are required through an asterisk (\*). All the information needed for a single reviews post has been shown for user to use. Then the user can click on the Submit button to post

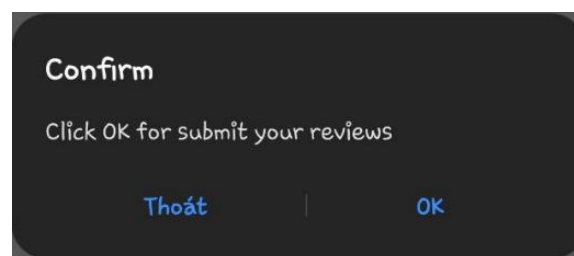


Figure 2 Alert submit review

When they click submit, the writer will get notified to make sure they want to submit the reviews.

Name of Restaurant \*

Enter a name Restaurant..

Please fill out this field

Figure 3 PhoneGap: error blank

In this case the writer does not enter the required fields. Then there will be an announcement at the correct school. Instead of red flags all fields are not entered by the user. They will see this message sequentially.

Name of Restaurant \*

Nguyễn Bật Khải

Type Of Restaurant \*

BBQ

Time You Visit \*

mm/dd/yyyy

Please fill out this field

Figure 4 PhoneGap: check error blank

Sequential notifications will save writers' time. It won't take me long to find all the fields they forgot to enter.

b. Dashboard screen

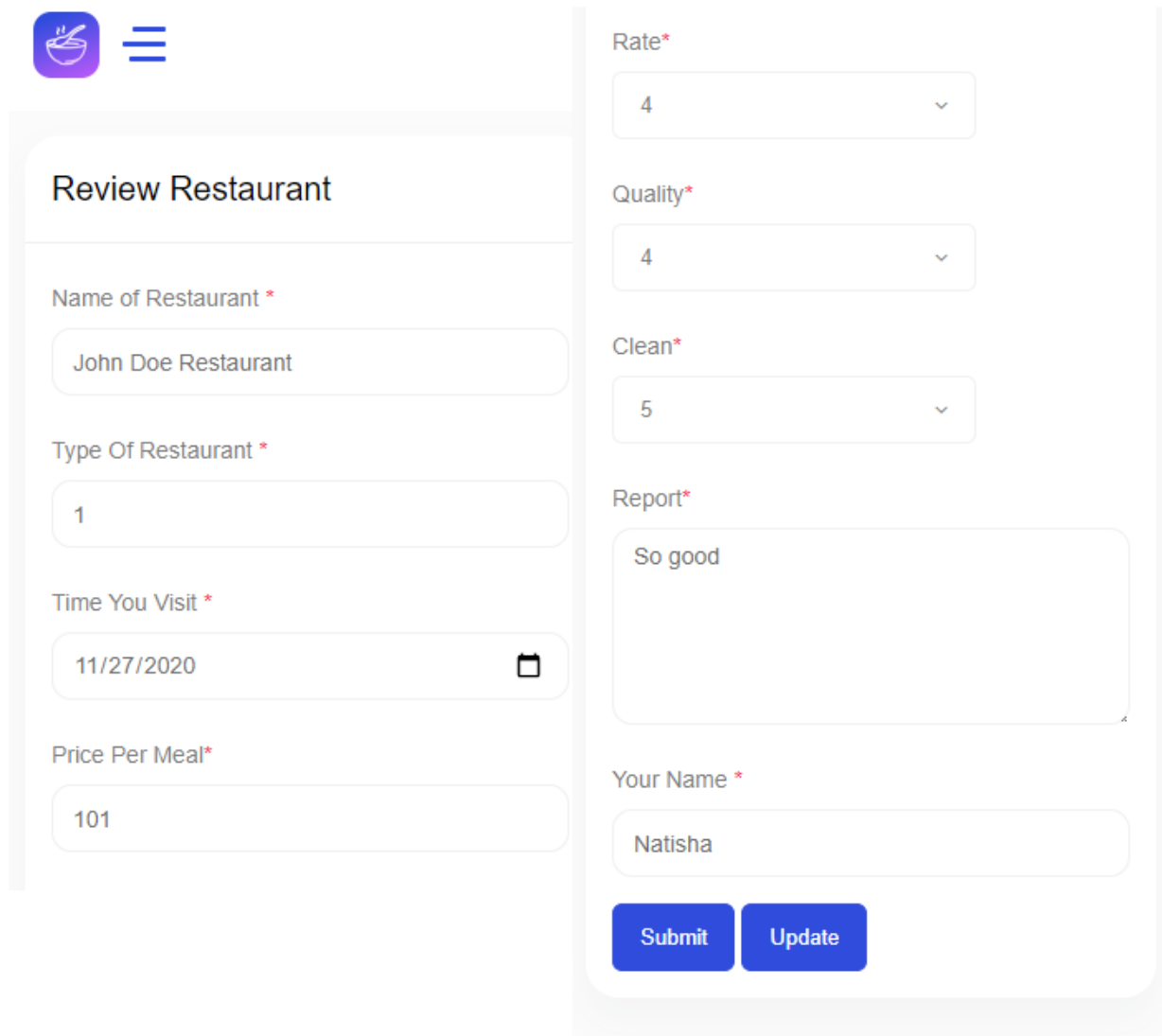


Figure 5 PhoneGap: View review

This screen will display all the reviews that the user has submitted. These reviews will show the number of stars for which the restaurant has been rated. The formula is calculated by the total number of stars that the writer wrote and then divided by three. This will make it easier for viewers to consider when choosing.



c. Update Review screen



The image shows a mobile application interface for updating a restaurant review. At the top left is a purple icon of a bowl with a spoon and a hamburger menu icon. The main title is "Review Restaurant". The form is divided into two columns. The left column contains fields for "Name of Restaurant \*" (John Doe Restaurant), "Type Of Restaurant \*" (1), "Time You Visit \*" (11/27/2020 with a calendar icon), and "Price Per Meal\*" (101). The right column contains fields for "Rate\*" (4), "Quality\*" (4), "Clean\*" (5), "Report\*" (So good), and "Your Name \*" (Natisha). At the bottom right are two blue buttons: "Submit" and "Update".

**Review Restaurant**

Name of Restaurant \*

John Doe Restaurant

Type Of Restaurant \*

1

Time You Visit \*

11/27/2020

Price Per Meal\*

101

Rate\*

4

Quality\*

4

Clean\*

5

Report\*

So good

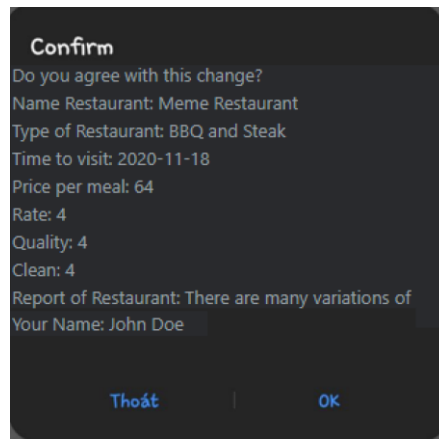
Your Name \*

Natisha

Submit Update

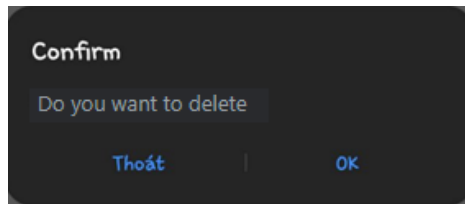
Figure 6 PhoneGap: Update Screen

In this screen, all information in the article they choose will be fully displayed so that the writer can edit it easily. All validation structures will still be kept for users to easily update.



*Figure 7 PhoneGap: alert check update*

After clicking the update button. There will be a prompt immediately for users to confirm the information they have modified. Users can click OK to update what they have fixed.



*Figure 8 PhoneGap: alert check delete*

Just like other announcements. When users want to delete certain reviews. They just need to click OK and the post is permanently deleted.

d. Search Reviews Screen



Figure 9 PhoneGap: Search Screen

To optimize every user action. They just need to enter whatever keyword they want. The screen will immediately show all the reviews related to what they entered. Include the restaurant name, restaurant model or reviewer name.

## 2. Android Studio Screenshot

### a. Write Review screen

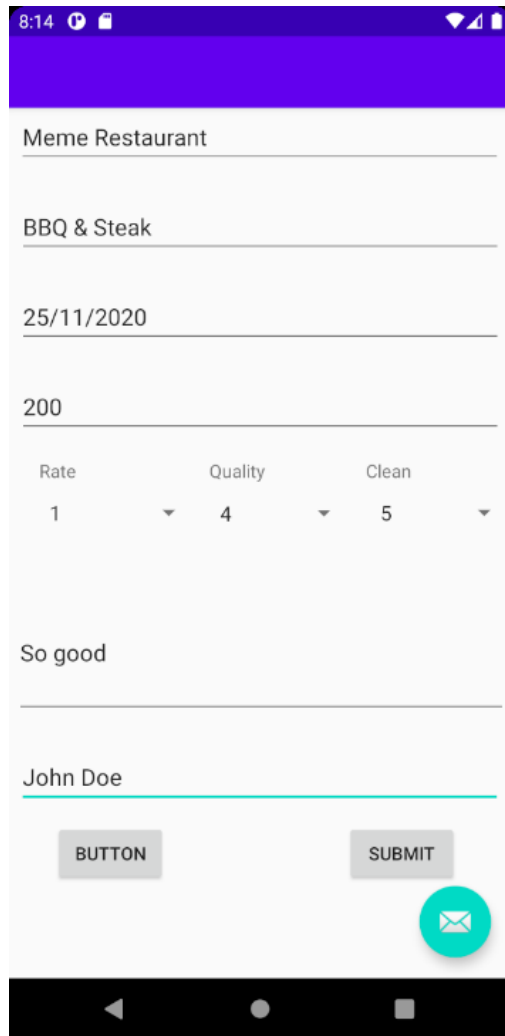


Figure 10 Android: Add Review

This is the review screen for users. Writers can enter all the information about the restaurant they want to review and press submit button to submit review data to the database.

b. Validation in Write Review screen

8:20

Name of Restaurant !

Enter a valid name of Restaurant

Type of Restaurant !

Time to Visit !

Price per Meal !

Rate	Quality	Clean
1	3	5

Writing something about restaurant

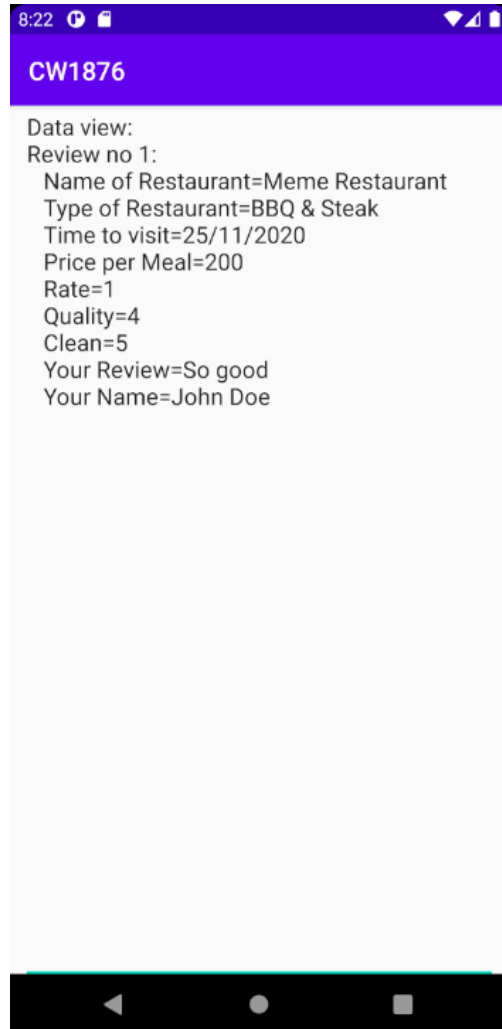
Your Name !

BUTTON SUBMIT

Envelope icon

Figure 11 Android: Check validation

The user needs to enter all available information correctly to be able to post it. If the name field is left blank, a message will be displayed so that it can be easily entered inside.



*Figure 12 Android: View review screen*

The submitted review screen is displayed after the user has submitted their reviews. The more posts the user can view.

## VI. Section 5: Evaluation

### 1. Human Computer Interaction

#### a. General UI design principle

Interaction with users based on mobile interfaces in general is covered in Schneiderman's 8 golden rules (Shneiderman, 2016), Nielsen's 10 Usability Heuristics (Nielsen, 1994) and Norman's 7 principles (Norman, 2002). The following will be an explanation of the application of those principles into Rate Restaurant:

**Consistency:** Design consistency is a must in every application. For example, choosing fonts for display on different devices, font color needs to match requirements. The left menu bar will support multiple monitors and users can use it to move between different monitors..

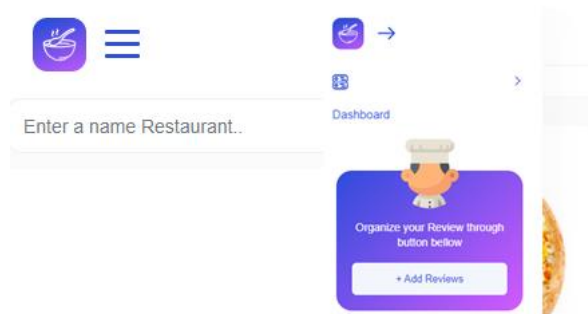


Figure 13 Consistency

**Provide feedback:** Providing feedback is for reviewers to know what they can do with their review. For example, when user open the dashboard, they can see all the reviews. Each review has two buttons, "Update" and "Delete". Click Delete will immediately display a popup to confirm the writer's action. Update will point to the "Update" page. After users Update, a window will be displayed with the changes that the writer has edited.

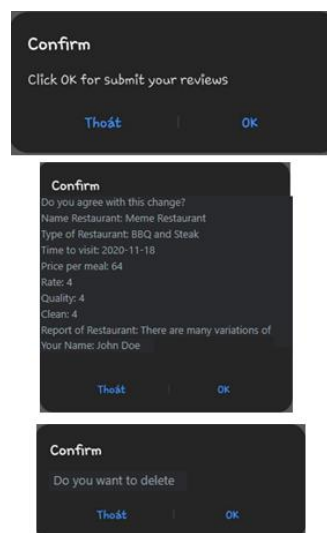
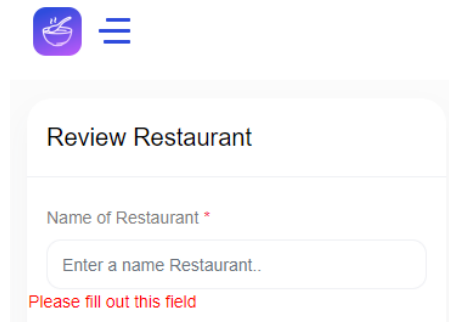


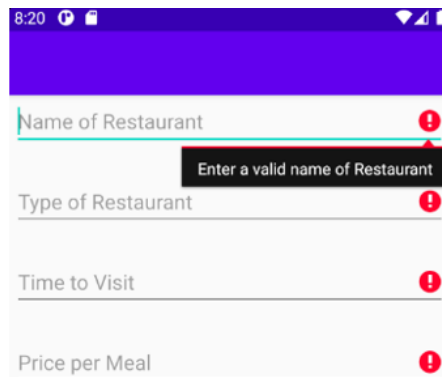
Figure 14 Provide Feedback

**Prevention is better than cure:** When writers enter information, they are not allowed to leave required information blank. Then, there will be a small notice at each school so that the writer knows what information they are missing.



The image shows a web browser interface with a purple header bar containing a bowl icon and a hamburger menu icon. Below the header is a form titled "Review Restaurant". The form has a label "Name of Restaurant \*" and a text input field with the placeholder text "Enter a name Restaurant..". Below the input field, a red error message reads "Please fill out this field".

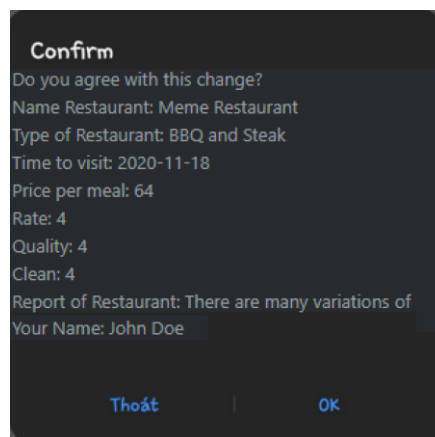
Figure 15 Prevention (PhoneGap)



The image shows an Android app interface with a purple header bar. Below the header is a form with four fields: "Name of Restaurant", "Type of Restaurant", "Time to Visit", and "Price per Meal". Each field has a red exclamation mark icon to its right, indicating a validation error. A black tooltip with the text "Enter a valid name of Restaurant" is visible over the "Name of Restaurant" field.

Figure 16 Prevention (Android)

**Easy reversal of actions:** Allow the writer to check and reverse the actions they have taken. In the application, when the writer wants to update their post such as changing some information, a dialog box pops up to confirm the user's changes.



The image shows a "Confirm" dialog box with a dark background. The text inside the dialog box reads: "Do you agree with this change?", "Name Restaurant: Meme Restaurant", "Type of Restaurant: BBQ and Steak", "Time to visit: 2020-11-18", "Price per meal: 64", "Rate: 4", "Quality: 4", "Clean: 4", "Report of Restaurant: There are many variations of", and "Your Name: John Doe". At the bottom of the dialog box, there are two buttons: "Thoát" (Exit) and "OK".

Figure 17 Reversal



## b. Mobile Human Computer Interaction

Interaction on smartphone devices has special aspects that need attention. Interactive design needs to increase the user experience for every mobile device. Here are a few important principles that every designer should pay attention to: (Ali, 2013)

- **Design Smart:** This is really difficult to explain when the application built on the PhoneGap platform is a lot easier to adapt than the Android Studio platform. But for the most part, the layout has been clearly divided.
- **Place menus in a position of ease of use:** Increasingly, applications need a menu to create a general path for the user. For maximum convenience for users. The menu will be placed on the left side of the application. Users can use the open and close buttons to avoid sliding on the screen from affecting the experience.
- **Textual input:** the application uses a lot of user manipulation on the phone's keyboard. For the most user convenience. The date time fields, the user just needs to select. The text will be the entire keyboard. Number will be the numeric keypad only.
- **Design for different screen sizes:** The app's layout is designed to be able to run on a variety of phone sizes. That includes desktop browsers, smartphones, and tablets as well.
- **Existing functions:** All internal functions are minimal. Users only need through touch operation to be able to use. Save time for learning how to use it

## 2. Security

Security is a key element in an application. However, this application is being deployed in early versions. In other words, this application is no different than a prototype. For the time being, this app is only for basic functions and personal storage. Therefore, there is still no reasonable security factor.

In the next versions, security methods such as login required, using some hardware on the phone such as fingerprint scanning, iris to authenticate.

In addition, for security on the system itself. The next release requires enhanced elements such as setting a password for the application itself. In case of retrieving the password, it is necessary to have phone number authentication and OTP integration.

To maximize protection against attacks from Trojans, viruses and malware. This application can fully use Trend Smart Surfing to minimize the risk of attack.

### 3. Maintainability

When the application is popularized by users. Maintenance is the period needed to respond to error correction requests from user experience. This helps the application greatly improve performance.

For convenience in maintenance in the following versions. During application development, every file is named according to the convention about the page they serve. The functions are also explicitly written like `addReview()` which is used to add user posts to the database. Similar to `updateReview()` and `deleteReview()`. In future versions, development of other functions will be done in the same way.

Each time that maintenance is applied, the application needs to be patched with the version of technology, plugin, and package that the application is using. This will prevent the application from crashing when the technologies, plugins, packages are outdated and also helps the application not to conflict between packages, plugins.

### 4. Updates for the future

In the future, the application will add functions such as authenticating posts, sharing articles with other users, users can set their own private or public mode for other users to use. use. This will create a large restaurant review community.

The goal of this app is to review restaurants, so users can fully connect to popular social networks like Facebook, Twitter, and so on. This will expand the prevalence of the application.

In addition, maintenance is essential. In order for the application to meet many user requirements, the application needs to be revised in terms of interface. On the review page, it is recommended to revise the input field titles, reposition some rating options so that the browser does not have to swipe the screen repeatedly.

One feature that comes with user posts is that they can attach pictures of the restaurant they are writing to. When they submit a review, the system will automatically attach the address of that restaurant and ask the user to verify that address.

## VII. Conclusion

This report covers what was learned using Mobile App Development. The report includes application development on PhoneGap with full of basic functions and part of functions on Android. The Android version is still not fully functional. However, both versions have their own database and are stable.

To be able to develop in the hands of users, this application still needs to improve and add more features in the future. And one of the best ways to improve is to get a lot of user feedback. From these feedbacks, the application will gain popularity and enhance the value of the application itself.

Although still on the level of simplicity compared to other apps in the world. In the future, by updating according to user trends and modifications. The application can completely become popular as a community of restaurant reviewers

## VIII. References

Ali, A. E. (2013). *Minimal MobileHuman Computer Interaction*. Amsterdam Living Lab.

Nielsen, J. (1994). *10 Usability Heuristics for User Interface Design*.

Norman, D. A. (2002). *The Design of Everyday Things*.

Shneiderman. (2016). *Designing the User Interface: Strategies for Effective Human-Computer Interaction*. University of Maryland.