CHAPTER 4

DEVELOPMENT OF ChoCD

4.1 OVERVIEW

This chapter includes the development of new hybrid scheme named as Choice-Click-Draw (ChoCD). This chapter also discusses on the system architecture, which clarify how the system works were followed by flowchart diagram, so that the user know and understand the flow of the system. The user interface design also include in this chapter. During system design the sub-system and major components are identified. The flowchart diagrams represent the functionalities of the system, the logic of an operation and the flow of the system, which are among the most important procedure to develop this system. The use case diagrams of the framework represent the functionality of the system from the user's perspective and identify the scope of the system.

4.2 THE DEVELOPMENT OF ChoCD

Motivated by the hybrid scheme, the graphical password authentication system named ChoCD is developed. The idea of ChoCD is to offer an experience to user to log into their accounts using username and graphical password with the enhancement in the usability and security aspects rather than using conventional text-based passwords that have limitations as discussed in Chapter 2, Section 2.4. It is intended not only for desktop use, but it can also be used in the mobile devices. ChoCD's generic conception comprises of three forms of authentication, starting from choice-based,

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followed by the click-based and finally, draw-based authentication. The flow is generally easy and uncomplicated to construct. Consequently, it can be used to guide the users to easily use and implement this scheme.

There are two steps in the whole process, password creation (registration) and authentication (login). For the basic prototype, a simple example can be used to describe both stages. This authentication is beneficial as only the correct user would remember the passwords (graphical images, position-for-click and pattern draw). In this light, as the users' memory can be triggered by images, this method is more memorable and secure as compared to other types of graphical password.

4.2.1 Prototype Development by Using Framework

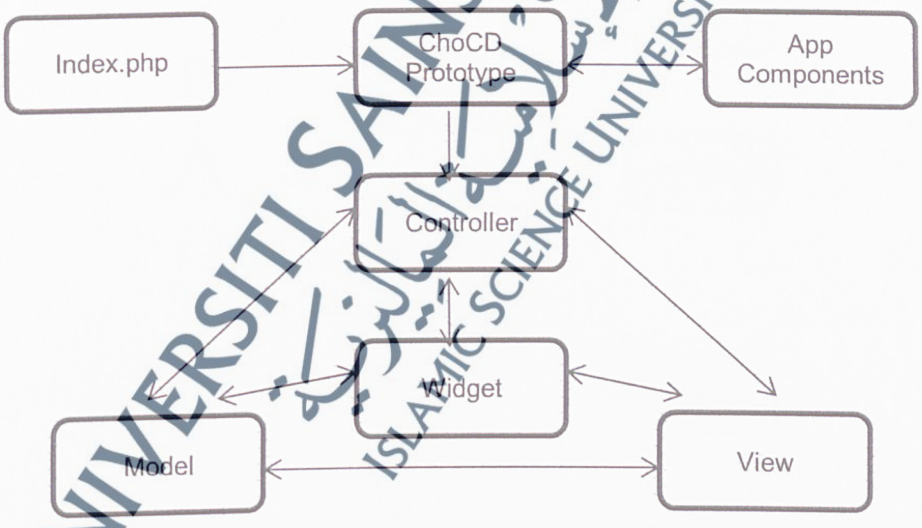

Figure 4.1: Static structure of framework application (Source: Yiiframework, 2016)

As illustrated in Figure 4.1, ChoCD was developed using the application framework in order to allow the system to be readily and easily accessed by user for testing and evaluation process from dispersed locations. The development of ChoCD used Yii

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framework because Yii implements the model-view-controller (MVC) design pattern, which is widely adopted in Web programming. MVC aims to separate business logic from user interface considerations, so that developers can more easily change each part without affecting the other. In MVC, the model represents the information (the data) and the business rules; the view contains elements of the user interface such as text, form inputs; and the controller manages the communication between the model and the view. Besides implementing MVC, Yii also introduces a front-controller, called Application, which encapsulates the execution context for the processing of a request. Application collects some information about a user request and then dispatches it to an appropriate controller for further handling as illustrated in Figure 4.2.

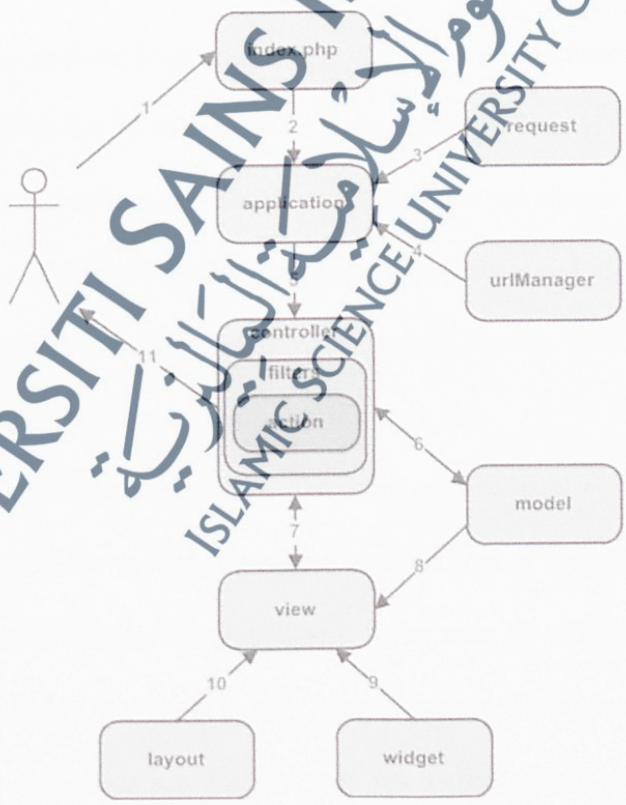

Figure 4.2: Typical workflow of a framework application

(Source: Yiiframework, 2016)

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4.2.2 Working of Proposed Authentication Scheme

The proposed system comprises of four main steps out of which steps 1-3 are registration steps as illustrated in Figure 4.3 and step 4 is the authentication step as illustrated in Figure 4.4.

ChoCD scheme offers benefits of security and usability for the users. The operational framework of the design process was discussed in two different stages: password creation step (registration) and authentication step (login) as explained below:

i. The first step is to enter the user ID that would be stored in the database. During authentication the user has to provide specific user ID that selected during registration phase in order to log in.

ii. In this second step random images are displayed to the user and selects only two images from the 25 of images in 5x5 grid form. This is done by using the recognition-based schemes. Examples of grid form are shown in Figure 4.5.

iii. The two selected images are then appearing on screen and user must click two points on selected image and draw a pattern on it, which are stored as password in the database with the specific user ID.

iv. During the authentication phase, the user enters user ID and the system displays 5x5 grids form that containing random type of images. After that, user chooses the two-selected images. Then, if the user ID exists and the selected images matched, the two-selected images would be appearing behind the pattern-draw authentication. Finally, user must click points on image and draw a pattern on it.

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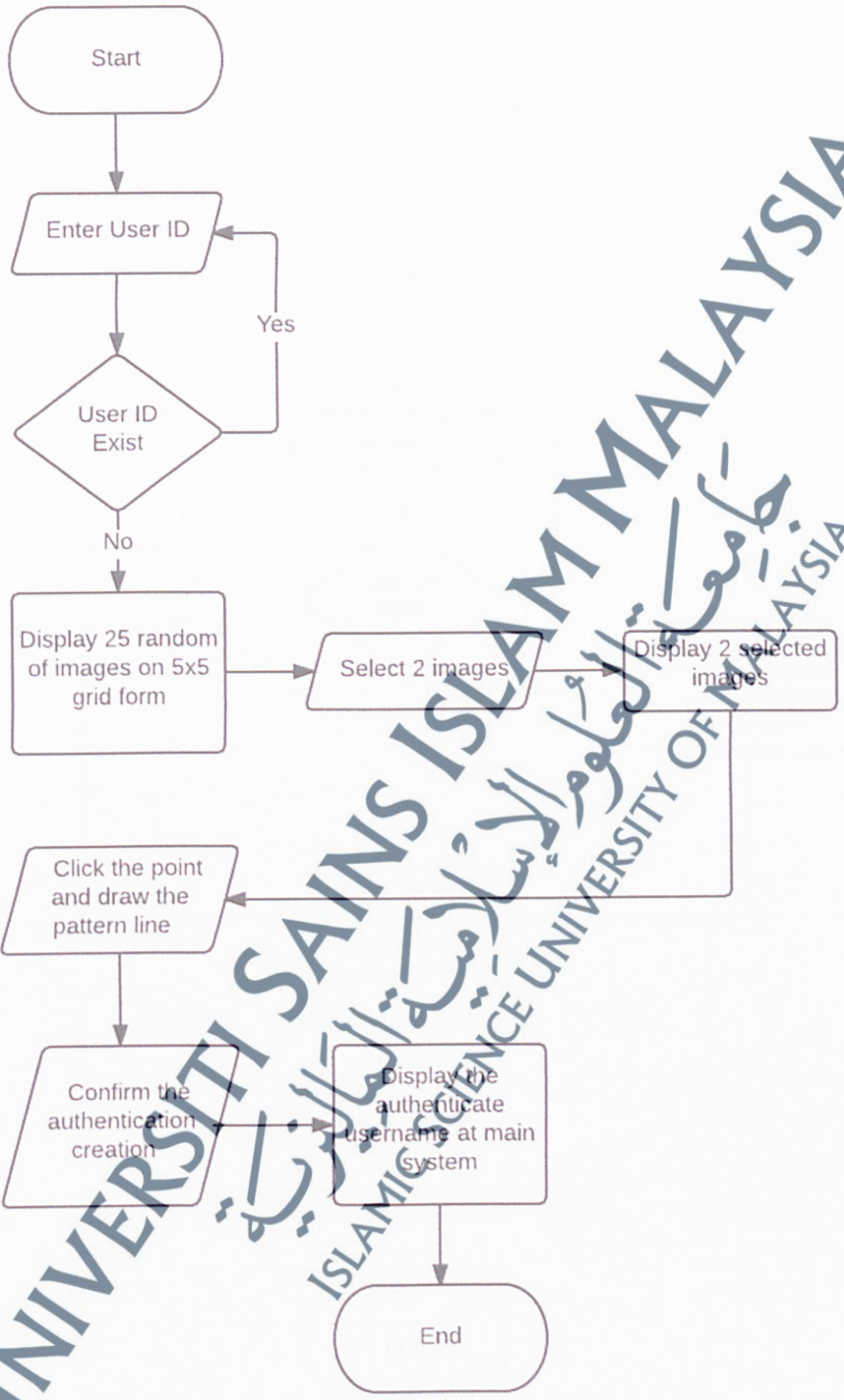

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Figure 4.3: Flowchart of password creation step

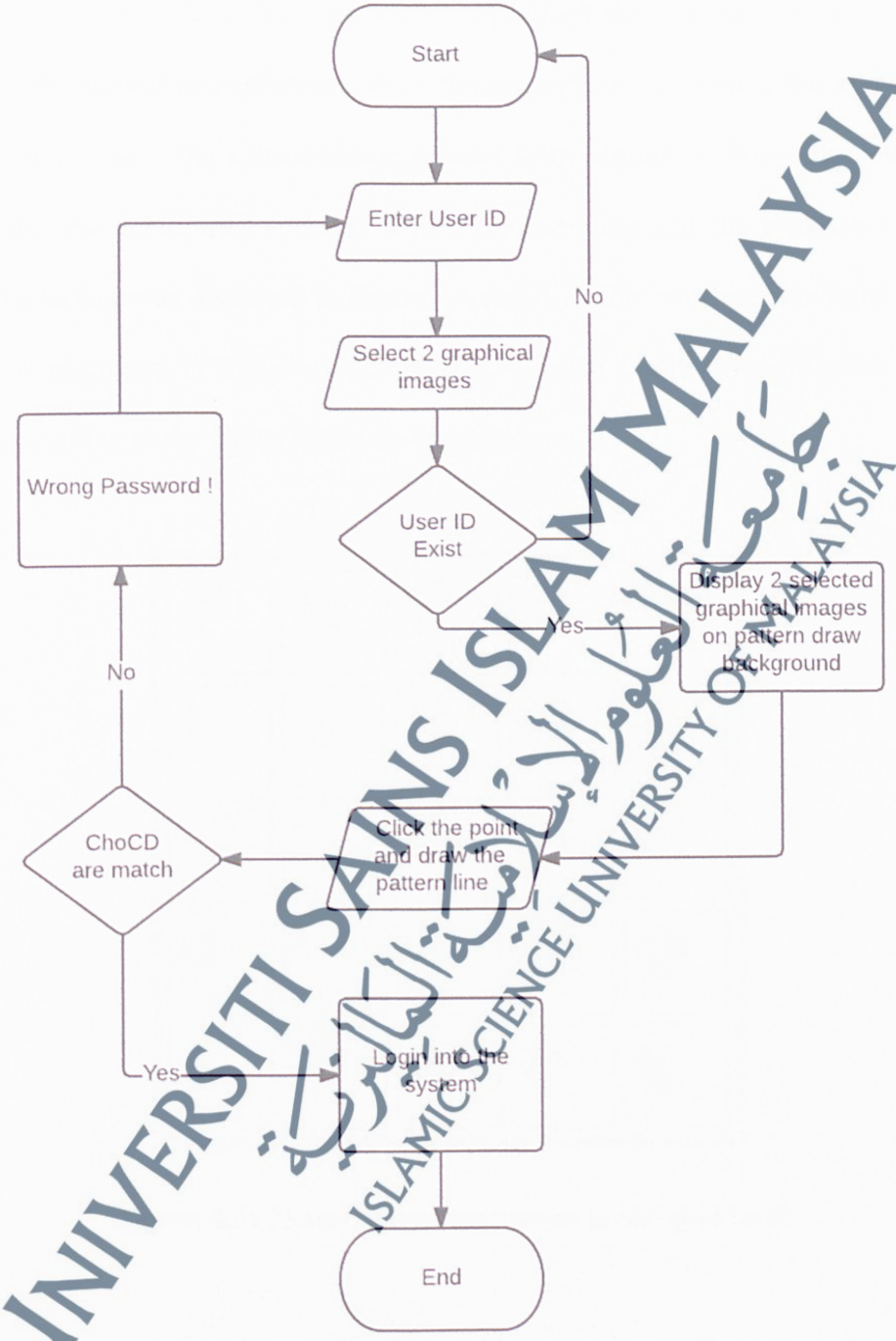

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Figure 4.4: Flowchart of authentication step

In the step four, during the first authentication, if they failed to attempt a graphical password more than three times, the system will block the user for a several minutes, while in the second authentication, once the attempt failed to pass, the system will guide user to restart the authentication process from beginning. From the flowcharts above, the researcher then converts it into programming and the screenshot of the ChoCD interface was displayed in Figure 4.6 and 4.7. This interface was followed the design as discussed in Chapter 3, Section 3.4.1 with a minor modification of the design according to the ability of the system used.

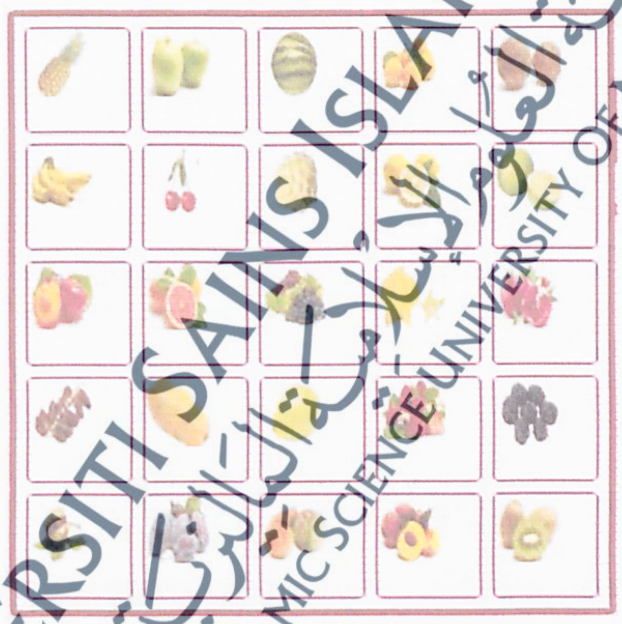

Figure 4.5: 25 sets of random images in 5x5 grid form

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Figure 4.6: Screenshot of the password creation step

Figure 4.7: Screenshot of the authentication step

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4.3 SUMMARY

This chapter discussed on the development of an alternative graphical authentication scheme, named as ChoCD. This scheme combined three graphical password authentication; choice-based, click-based, and draw-based. From this combination, it promised to provide a better graphical authentication in both aspects of usability and security perspectives. For the evaluations of this scheme based on users' performances and feedback, it will be discussed further in next chapter. The next chapter presents the studies conducted to assess the practicability of ChoCD. Each study involves the explanation of its procedure, results and findings, and discussion.

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