

CHAPTER 6

CONCLUSIONS

6.1 OVERVIEW

This chapter discusses the achievement of this research in terms of contribution and originality of work. In addition to these, limitations are also included so that it can be improved for the future work.

6.2 ACHIEVEMENTS

This research managed to achieve all of the three objectives. In the first objective, the relation of current graphical password authentication within aspect of usability and security are explained. A method such as reviewing literatures and analysis of the methods and techniques was support in achieving the abovementioned objective. In an attempt to provide the initial idea of graphical authentication, some of the existing graphical schemes were identified. This study, classified the graphical schemes into three groups; recognition-based, pure recall-based and cued-recall based. From this group, the user actions; choice-based, click-based and draw-based were identified. Then, it found from the study that the latest trend of graphical authentication was into combining two or more graphical authentication into one scheme to improve its usability and security (producing a hybrid scheme, which served as a motivation for the next study of this thesis).

For the second objective, the research managed to design and develop alternative graphical authentication that uphold security, while maintaining usability by

introducing a new hybrid scheme named ChoCD. This prototype was developed combining three user actions; choice-based, click-based and draw-based, and it was tested to see its usability and security evaluations. The results suggest that this prototype was well accepted by the participants.

Finally, for the third objective, the evaluation on ChoCD prototype was conducted by evaluating the password entropy and making a comparison with other existing authentication schemes. Other than that, the researcher also distributed the questionnaire to participants after they tested the prototype. The feedback from participants was mostly positive. As a result, based on the empirical studies and analysis all of the data from questionnaire survey, ChoCD is said of having a potential to be implemented more widely in the future as an alternative for user authentication.

6.3 LIMITATIONS

As we know, this research has achieved the aforementioned objectives, but there are several limitations throughout. The first limitation comes from the aspect of prototype itself. The prototype was developed and designed with the purpose to achieve the objectives of each study, but not aimed to be fully functional systems. In addition, this prototype also not suitable in mobile version. It was because, to enable representative results and the ease of the innovative method itself, testing on different platforms should be conducted.

The next limitation was the number of participants. Majority of them were university students due to the fact that they were easy to recruit and well versed with technology. Broader participants could have produced a more significant result. In addition, the

numbers of gender participants were also not taken, with no statistical analysis undertaken to evaluate sample significance.

In addition, the thesis only used limited criteria to evaluate the usability and security of the proposed scheme. Some of the usability criteria were the number of attempts, timing, pattern, and user's feedback, and the security criteria were the password entropy, which resistances to security attacks. While there are other options for evaluating effectiveness and efficiency of the proposed scheme, it is predicted that the aforementioned criteria are fitting to be used.

6.4 FUTURE WORKS

For the future works, this research will continue in the hybrid scheme, with the combinations of three graphical authentications. In this research, the action flow of the authentication is starting by choice-based, click-based, and finally draw-based. It is anticipated that opportunity for future research and make other arrangement between those actions are also possible. Other than that, using latest algorithm to randomly selected images from different set of users' 'secret'. This can reduce the problem of guessing attacks. The problem of popular images can also be reduced as the user has many options to choose from. However, using this can result speed of access into ChoCD scheme. For click-based and draw-based session, the researcher suggests to enhance the space for users' to click and draw their 'secret' pattern on screen. Detail studies need to be conducted for effectiveness of aforementioned suggestion. Finally, future works should focus on the structure and the development in ChoCD authentication scheme, in order to balance the usability and security of hybrid scheme.

It is hoped that this research inspires and help other researchers to study hybrid authentication scheme deeply.

