Gamifying Cybersecurity Training Through a Mobile Application to Combat Phishing

College of Information Science and Technology

CONTRIBUTORS:

- Gareth Moodley
- Carlos Roque

Mentor: Dr. Sayonnha Mandal

Abstract

The rapidly evolving digital landscape has triggered a surge in cybersecurity threats, particularly phishing, which demands innovative and accessible countermeasures. This project presents "Cybersafe," a mobile application designed to empower users to identify and combat phishing attempts effectively. The transformative concept behind this initiative aims to reshape traditional cybersecurity training by introducing a gamified, user-friendly platform suitable for all age groups.

Introduction

The paper describes the Cybersafe application's functionality, revolving around interactive quizzes that assess users' ability to identify threats. Each question within the quiz holds a specific score and answering "yes" to a question indicates a potential vulnerability. Once the questionnaire is completed the app gives the user feedback on their behavior as well as an overall risk score.

Related Works

PhishFort

Figure 1: PhishFort Runs an educational blog, product protects business infrastructure

Gophish

Figure 2: Phishing Framework to test employees on awareness

Technologies

- Android Studio
- Apache Tomcat
- MySQL Database
- Java 8 SDK
- Servlets
- RESTful APIs in JSON

Java

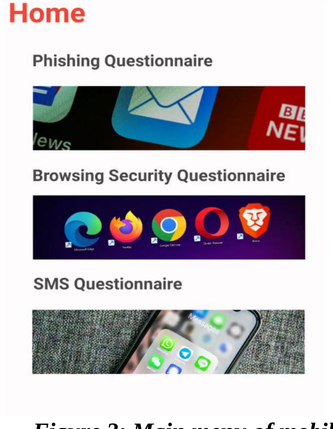
Apache Tomcat

REST API

MySQL

Methodology

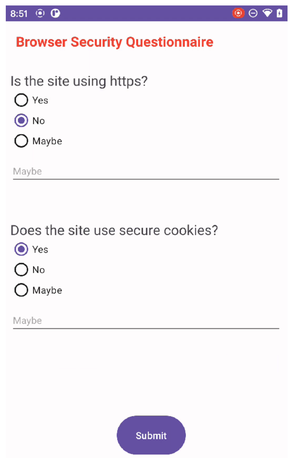
- Email Phishing, Browser Security, SMS Phishing and Network Security.
- Broad + Narrow questions
- Recommendations + Phishing score



- Cybersafe offers questionnaires

- These questionnaires are for:
  - Email Phishing
  - Browsing Security
  - SMS Phishing
  - And Network Security

Figure 3: Main menu of mobile application, to select type of questionnaire



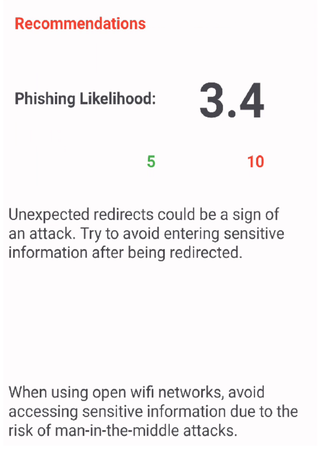
- Use is asked a series of questions.

- Answers may vary depending on the user

- Only “Yes”, “No” or “Maybe” can be answered.

- When user selects “Maybe”, he/she provides more context

Figure 4: Example questionnaire for Browser Security



- Answers determine the score

- The higher the score, the riskier the inquiry

- The app also provides recommendations

- Recommendations depend on answers with “Yes”

Figure 5: Example recommendations for Browser Security questions

Conclusion

Cybersafe is meant to serve as a diverse array of needs for the users no matter what platform or technology they are working with. Although we don't have any survey data now, we are working to test it with the public and get feedback on its effectiveness.

Acknowledgements

This work is supported by the National Science Foundation under grant award # 2308741. We would also like to thank the University of Nebraska Omaha for hosting this REU.

References

- R. Zieni, L. Massari and M. C. Calzarossa, "Phishing or Not Phishing? A Survey on the Detection of Phishing Websites," in *IEEE Access*, vol. 11, pp. 18499-18519, 2023, doi: 10.1109/ACCESS.2023.3247135.
- H. Abroshan, J. Devos, G. Poels and E. Laermans, "Phishing Happens Beyond Technology: The Effects of Human Behaviors and Demographics on Each Step of a Phishing Process," in *IEEE Access*, vol. 9, pp. 44928-44949, 2021, doi: 10.1109/ACCESS.2021.3066383.

Demo Video

NSF

University of Nebraska Omaha