Presentation Florian Müller

Keyword Based Security Awareness Warnings for Websites

LFE Media Informatics – Project Thesis
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Description of the Topic

General:

- Today's Browser often try to protect their uses with static indicators
- This technique causes a large number of false alarms
  - so the Users attention get lost

Task :

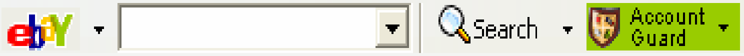
- Users should be warned in case they enter critical Data
- Browser should make this input more prominent
- Browser should provide additional help trusting a Website

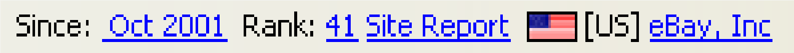
Related Work

Keyword Based Security Awareness

- Basic URL Obfuscation (Use of JPEG Images, HTML Redirection)
- Use of alternate encoding schemes
  - » J. Milletary et al. [1]
- A good Phishing Website can fool more than 90% of the Participants
  - » R. Dhamija et al. [2]
- Lock icon is often looked, but there is only few interaction with it
- Even experienced web users do not take any notice of the cues
- People tend to stop looking for security information after signing into a site
  - » T. Whalen et al. [3]

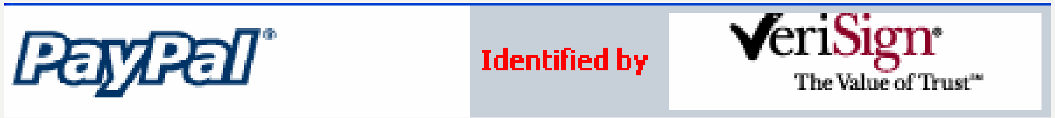
Keyword Based Security Awareness




Since: Oct 2001 Rank: 41 Site Report [US] eBay, Inc

You're on paypal.com

www.paypal.com


PayPal Identified by VeriSign The Value of Trust

- failed to prevent users from been spoofed by fraudulent Websites
    - » M. Wu et al. [4]

Implementation of the Browser Plugin

Plugin was developed for Mozilla Firefox

Used programming languages:

- XUL: XML User Interface Language
- Javascript (adjusted for XUL)

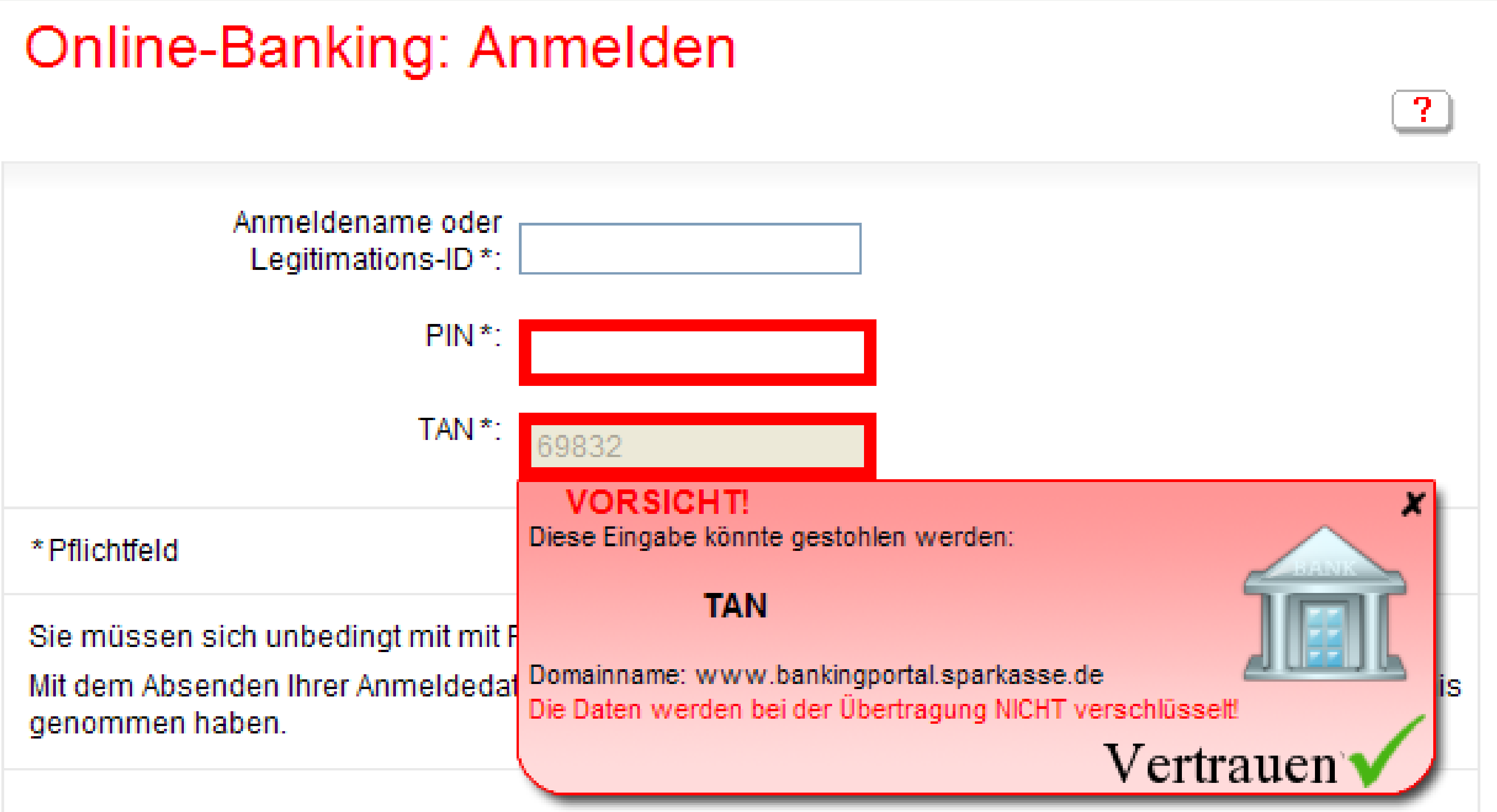
Used programming environement:

- Normal text editor
- Netbeans IDE 6.5.1

Functionality:

- The plugin searches for inputs within the website and save them in an array
- If a Key is pressed the Plugin look for the inputfield in which is currently written
- If it detects one of the following critical Inputs, it generates the Warning:
  - Entry of a Password
  - Entry of Transaction Numbers
  - Entry of Creditcardnumbers

Keyword Based Security Awareness



Online-Banking: Anmelden

?

Anmeldename oder Legitimations-ID *:

PIN *:

TAN *: 69832

VORSICHT!

Diese Eingabe könnte gestohlen werden:

TAN

Domainname: www.bankingportal.sparkasse.de

Die Daten werden bei der Übertragung NICHT verschlüsselt!

Vertrauen ✓

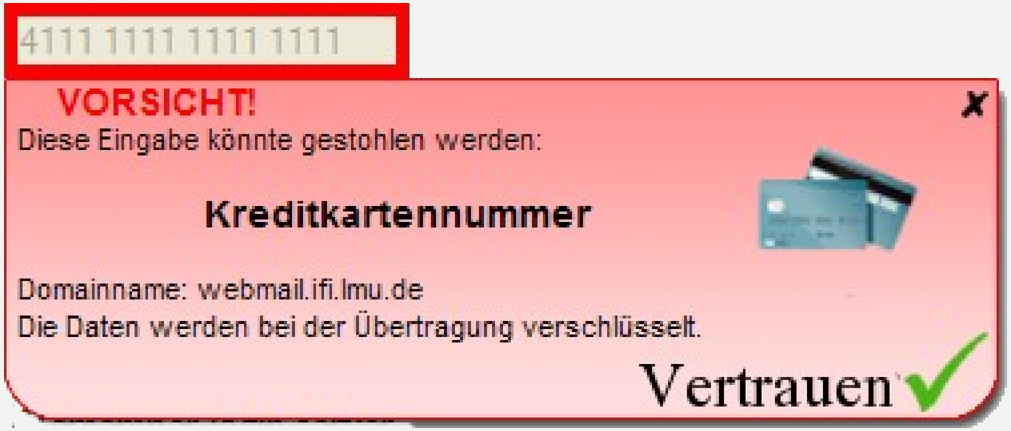
* Pflichtfeld

Sie müssen sich unbedingt mit mit F

Mit dem Absenden Ihrer Anmeldedat … is

genommen haben.

Keyword Based Security Awareness



4111 1111 1111 1111

VORSICHT!

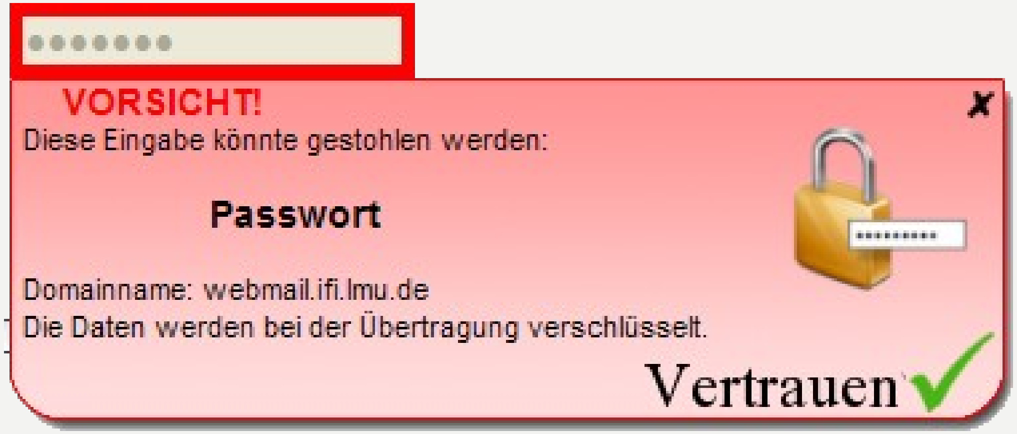
Diese Eingabe könnte gestohlen werden:

Kreditkartennummer

Domainname: webmail.ifi.lmu.de

Die Daten werden bei der Übertragung verschlüsselt.

Vertrauen ✓



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VORSICHT!

Diese Eingabe könnte gestohlen werden:

Passwort

Domainname: webmail.ifi.lmu.de

Die Daten werden bei der Übertragung verschlüsselt.

Vertrauen ✓

Study – Design and Preparation

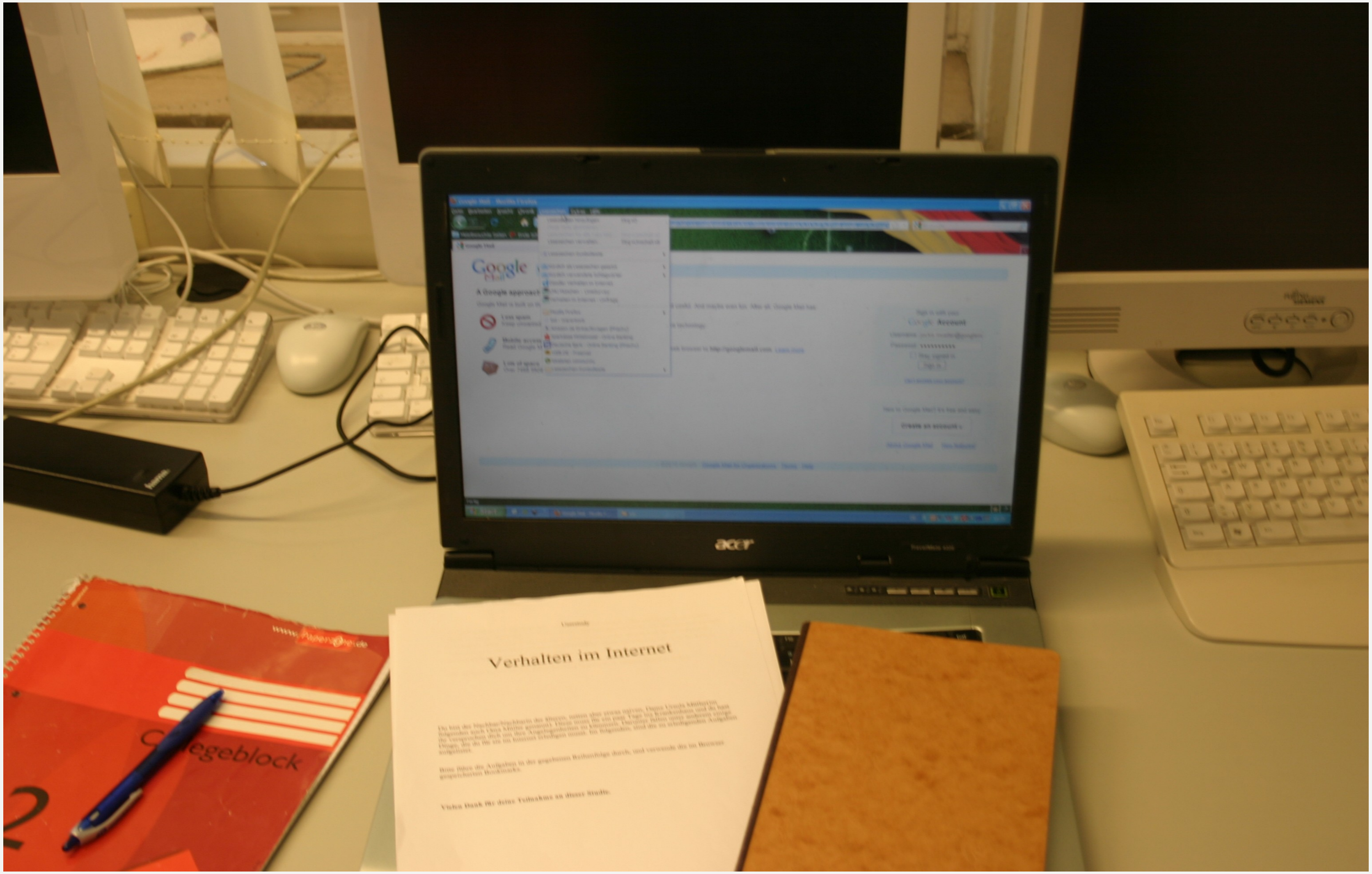
Design:

- Two Groups having each 12 participants
- Independent Variable: with Plugin/without Plugin
- Using a 6x6 Latin Square to shuffle the experiment's order
- All Participants should be computer/internet affine
- The participants should not know the real goals of the Study
- Real Goal: Can the Plugin support the Participants to recognize fraudulent Websites
- Qualitative questionnaire at the End of the Study

Hypothesis:

- The group with the Plugin is able to recognize more fraudulent Websites than the group without the Plugin.

Keyword Based Security Awareness



Results of the Study

Main Findings:

- With Plugin: 20 of 36 fraudulent Websites were found -> 55,55 %
- Without Plugin: 5 of 36 fraudulent Websites were found -> 13,89 %
- The statistical Significance was considered by an independent T-Test
- The Effect Size amounts r = .62 which implies a large effect

Proved Hypothesis:

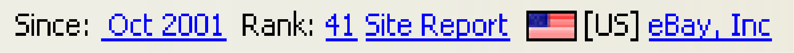
- On average, the group with the Plugin is able to recognize (very) significantly more fraudulent Websites than the group without the Plugin.

  T (18) = 3,425, p = .003, r = .62

Important qualitative findings:

- Possible advantages of the Plugin
- Possible disadvantages of the Plugin
- Additional Informations for the Plugin and the generated Warning

Thank you for your Attention !



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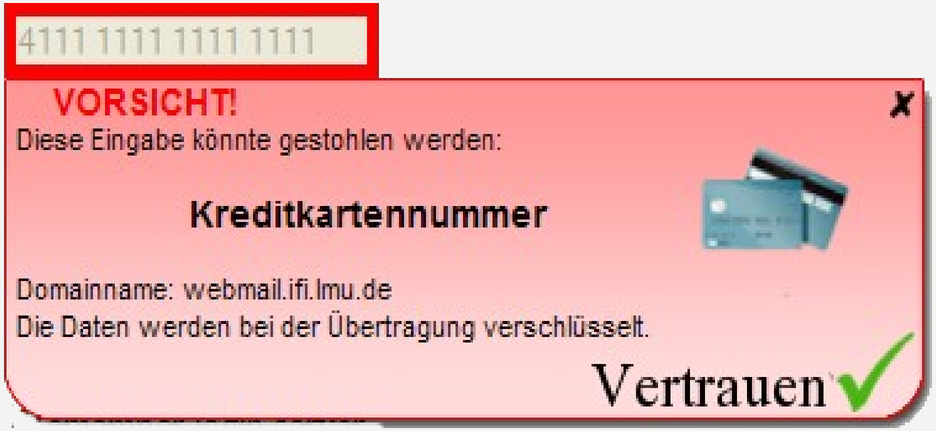

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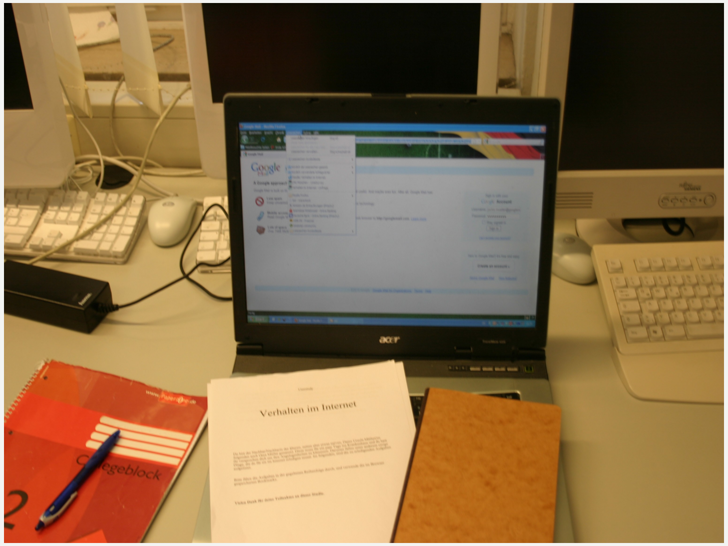

Sources:

- [1] J. Milletary, C.C. Center. Technical Trends in Phishing Attacks. December, 2005.
- [2] R. Dhamija, J.D. Tygar, M. Hearst. Why Phishing Works. In Proceedings of the SIGCHI conference on Human Factors in computing systems, 2006
- [3] T. Whalen, K.M. Inkpen. Gathering Evidence: Use of Visual Cues in Web Browsers. In Proceedings of Graphics Interface , 2005
- [4] M. Wu, R.C. Miller, S.L. Garfinkel. Do Security Toolbars Actually Prevent Phishing Attacks?. In Proceedings of the SIGCHI conference on Human Factors in computing systems, 2006