10.20378/irb-56104

A Model for Parental Control Systems on Mobile Devices

Ibrahim R. Mbaya
University of South Africa
Pretoria, South Africa
36446106@mylife.unisa.ac.za

Abstract. With the prolific growth in usage of mobile devices by children and unique challenges in developing parental control systems for mobile devices, parents are looking for effective ways to control access to inappropriate contents by their children. Hence, this study investigates the existing models for parental control systems on mobile devices and assess their effectiveness. A model-building method will then be used to propose an effective model for parental control systems on mobile devices. This study will contribute by developing an effective model for parental control systems on mobile devices that integrates essential features derived from the established requirements of a parental control system to make parental control systems more convenient to users, i.e. both parents and children. A prototype will be developed to demonstrate a method of developing an effective model for parental control system on mobile devices.

1 Research problem

The existing parental control systems are weak to meet the expectations of most parents such as failures to filter harmful contents that was observed on Cyber Patrol, Cyber Sitter, Cyber Snoop, Net Nanny, and Surf Watch systems (Clayton, 2005; Keller & Verhulst, 2000). Parents want more transparency in their children's use of mobile devices (Yardi & Bruckman, 2011).

The main concern of parents is to strike a difficult balance between allowing their children to access information and communicate with their friends, while keeping them safe online (BAE Systems, 2012). Moreover, parents want more convenience on monitoring their children's internet activities so that they can monitor their children's internet activities while they are anywhere (Noor, Noor, Syed, & Zakaria, 2012).

The issue of effectiveness of parental control systems is an important component from a technical and fit for purpose point of view (Mielech, 2012). Researches on parental control systems show that existing parental control systems are not effective and have less user adoption rates (Hart Research Associates, 2011; Jigsaw Research, 2012; La Polla, Martinelli, & Sgandurra, 2013; Mielech, 2012).

2 Proposed research methods

The proposed approach for this study is referred as sequential exploratory strategy (Creswell, 2009), which is a mixed methods approach that involves a first phase of qualitative data collection and analysis through the literature survey, followed by a second phase of quantitative data collection and analysis through model-building study, in which effectiveness of existing parental control systems will be measured and an effective model for parental control systems on mobile devices will be developed.

Methods to deploy parental control systems on mobile devices will be extracted from the existing literature. A model-building study will be used to assess the effectiveness of existing methods and propose an effective method to deploy mobile services for parental control systems on mobile devices. Lastly a prototype will be used to develop a parental control system that uses the improved effective model for parental control systems on mobile devices. The prototype will be used with parents/children to validate is effectiveness and thus evaluate the research work.

3 Expected contributions

The main contribution from this study will be an effective model for parental control systems on mobile devices that integrates essential features of a parental control system. This will make parental control systems on mobile devices more convenient to users, i.e. both parents and children.

4 Statement of work to date and open issues

The work that have been done already includes the preliminary literature survey that justify the research problem and establishing the research methods to carry out the research.

4.1 Findings from preliminary literature survey

The preliminary literature survey indicated that existing parental controls features monitoring, filtering, alerting, and reporting of access to information and resources on mobile devices. Additional aspects of existing parental control systems are location-aware and context-aware. These features are summarised below.

Parental control model	Monitoring	Filtering	Alerting	Reporting	Location-aware	Context-aware
Debbabi et al. (2007)	✓	✓	✓			
Behrooz & Devlic (2012)	✓	✓				✓
Kuppusamy et al. (2013)	✓	✓	✓	✓	✓	
Noor et al. (2012)	✓	✓				
Costa et al. (2010)	✓	✓			✓	
Decker (2011)		✓			✓	
Thierer (2007)	✓	✓	✓	✓		
Fellenstein et al. (2007)	✓	✓		✓		
Gatz et al. (2002)	✓	✓				
Parker (2014)	✓	✓			✓	✓
Matthews et al. (2013)		✓	✓		✓	✓
Ackley (2007)	✓	✓		✓		

Table 1. Preliminary analysis of features of existing parental control models

From the analysis done on the literature it was found that the existing models of parental control systems on mobile devices does not integrate all these features.

4.2 Open questions/issues

From the preliminary literature survey, several questions/issues remained to be answered. The list of open issues includes:-

- What are the requirements of effective model for parental control systems on mobile device?
- How do we measure the effectiveness of a parental control system on mobile devices?

These open issues are expected to be resolved through the research methods proposed above.

References

[1] Ackley, J. (2007). Cell phone parental control. USA. http://www.google.com/patents/US7302272

[2] BAE Systems. (2012). Detica StreamShield Parental Controls. Sundby: Global Communications Solutions. www.baesystemsdetica.com/gcs

[3] Behrooz, A., & Devlic, A. (2012). A Context-Aware Privacy Policy Language for Controlling Access to Context Information. Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, 25–39.
[4] Clayton, R. (2005). Failures in a Hybrid Content Blocking System. In Privacy Enhancing Technologies (pp. 78–92). Cambridge: Springer Berlin Heidelberg. Retrieved from http://dx.doi.org/10.1007/11767831_6
[5] Costa, G., Torre, F. la, Martinelli, F., & Mori, P. (2010). Parental Control for Mobile Devices. European Research Consortium for Informatics And Mathematics, 82.
[6] Creswell, J. W. (2009). RESEARCH DESIGN: Qualitative, Quantitative, and Mixed method Approaches (Third Edit.). Lincoln: SAGE Publications.
[7] Debbabi, M., Saleh, M., Talhi, C., & Zhioua, S. (2007). Embedded Java Security: Security for Mobile Devices. Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki. London: Springer Science & Business Media.
[8] Decker, M. (2011). Modelling of Location-Aware Access Control Rules (pp. 912–929). IGI Global. doi:10.4018/978-1-60960-042-6.ch057
[9] Fellenstein, C. W., Gusler, carl P., Hamilton, R. A., & Schatz, H. (2007). Apparatus and method for monitoring and analyzing instant messaging account transcripts. USA.
[10] Gatz, S., Guggenheim, B., Lin, T., Robison, J., & Toth, A. (2002). Parental control system for use in connection with account-based internet access server. USA. http://www.google.com/patents/US20020049806
[11] Hart Research Associates. (2011). Who Needs Parental Controls? A Survey of Awareness, Attitudes, And use of Online Parental Controls. New directions for youth development (Vol. 2013, pp. 5–8). doi:10.1002/yd.20075
[12] Jigsaw Research. (2012). Parents' views on parental controls: Findings of qualitative research. http://stakeholders.ofcom.org.uk/binaries/research/media-literacy/oct2012/Annex_1.pdf
[13] Kuppusamy, K. S., Mary Francis, L., & Aghila, G. (2013). Report: A Model for Remote Parental Control System Using Smartphones. International Journal on Cybernetics & Informatics, 2(3), 25–36. doi:10.5121/ijci.2013.2303
[14] La Polla, M., Martinelli, F., & Sgandurra, D. (2013). A Survey on Security for Mobile Devices. IEEE COMMUNICATIONS SURVEY & TUTORIALS, 15(1), 446–471.
[15] Matthews, J. H., King, J. S., Schrader, J. A., Chen, T. T.-Y., & Sarin, R. K. (2013). Automatically quieting mobile devices. USA. http://www.google.com/patents/US20130225152

[16] Mielech, N. (2012). Benchmarking of parental control tools for the online protection of children SIP-Bench II. Safer Internet Programme. http://www.sipbench.eu/transfer/SIP_BENCHII_4th_cycle_report_FINAL.pdf

[17] Noor, R., Noor, S., Syed, S., & Zakaria, K. H. (2012). Parental Mobile Control System for Children' s Internet Use. International Conference on Information Society,511–513. http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6285036&isnumber=6284715

[18] Parker, S. B. (2014). Child/User mobile device manager. USA. http://www.google.com/patents/US20140171059

[19] Thierer, A. (2007). Parental Controls & Online Child Protection: A Survey of Tools and Methods. Washington, D.C.: The Progress & Freedom Foundation. www.ppf.org/parentalcontrols

[20] Yardi, S., & Bruckman, A. (2011). Social and Technical Challenges in Parenting Teens' Social Media Use. In CHI2011 (pp. 3237–3246). Vancouver: ACM. doi:978-1-4503-0267-8/11/05