

Tasks and User Performance Improvement for UUM

Online Payment Using Key Stroke Level Model

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Fulfillment of the requirement for the degree master

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University Utara Malaysia

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ABSTRACT

Online payment is one of the components in postgraduate website in University Utara Malaysia (UUM). Not a lot of Student prefers to use this task , this research will focus a weakness points in the current payment model interface and strength points in proposed new online payment model by using Keystroke-Level Model (KLM) technique and improve weakness points in the current payment model interface.. The study will be guided by a research question which was formulated as Follows. What is the efficiency problem of online payment that effect user to use the system? .How can the recommended online payment Model achieve efficiency of system and user aim? What is the user performance of current online payment Model to achieve the tasks? The population for this study will be the (undergraduate and postgraduate) students and staff in the University Utara Malaysia (UUM), The quantitative research approach was used since the researcher aimed to explore the important of(KLM) technique to enhance the current online payment model, and increases the acceptance level of the system

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CHAPTER ONE

INTRODUCTION

1.1. Introduction

This chapter provides a general idea about the background of the study, problem statement, objectives, expected scope, significance of the study, and structure of thesis.

Performance analysis of large-scale scientific applications poses the challenge of significant interpretation of a large amount of performance data. A glut of factors influence the performance of a parallel application, like the hardware platform, the system software, and the programming model. Poor performance will generally be suitable to a complex interaction of many components. This requires that many different metrics are calculated, attributed to different components and compared to each other. The type of metrics and components will depend on the compute system, the programming paradigm and even the type of application. This requires a high degree of flexibility within a performance analysis system to gather performance data, calculate metrics, and permit for mapping of these metrics onto specific entities, such as subroutine calls or program counters (Jost, Mazurov and Mey , 2008)

The contents of
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REFERENCES:

- Aaron Marcus. (2002), Return on Investment for Usable User-Interface Design: Examples and Statistics
- Abe Crystal and Beth Ellington.(2004) ,Task analysis and human-computer interaction: approaches, techniques, and levels of analysis Proceedings of the Tenth Americas Conference on Information Systems, New York, New York, August 2004
- Alan Dix, J.F., Gregory D. Abowd .(2004),Russell Beale.Human-Computer Interaction. in Hall, P.P. ed.,
- Annett, J. and Duncan, K. (1967), Task Analysis and Training Design. *Occupational Psychology 41*, 211-221.
- Annett, J., Duncan, K., Stammers, R. and Gray, M. .(1971), *Task analysis*. London: HMSO
- Annett, J., and Stanton, N., eds. (2000),*Task analysis*. London: Taylor & Francis.
- Bailey, R.W. (1982), Human performance engineering :A guide for system designers. Englewood Cliffs, NJ:Prentice-Hall.
- Blerim Rexha . (2005), Increasing User Privacy in Online Transactions with X.509 v3 Certificate Private Extensions and Smartcards Proceedings of the Seventh IEEE International Conference on E-Commerce Technology (CEC'05) 1530-1354/05 \$20.00 © 2005 IEE
- Bonebright, T.L., Nees, M.A., Connerley, T.T. and McCain, G.R.(2001), *Testing TheEffectiveness of Sonified Graphs For Education: A Programmatic Research Project*.Proceeding of the 2001 International Conference on Auditory Display,Finland
- Bonnie E. John & David E. Kieras .(1996), The GOMS Family of User Interface Analysis Techniques: Comparison and Contrast
- Cairns, P. HCI... not as it should be: inferential statistics in HCI research. In Proc. of HCI 2007, vol 1 BCS (2007), 195-201
- Card, S.K., Moran, T.P., and Newell, A.(1980), The Keystroke-Level Model for User Performance Time with Interactive Systems. *Communications of the ACM archive*, 396-410
- Card, S.K., Moran, T. P., Newell, A. (1983), *The Psychology of Human-Computer Interaction* Lawrence Erlbaum Associate, Publishers, London,.

Constance M. Johnson, Todd Johnson, and Jiajie Zhang .(1999), Increasing Productivity and Reducing Errors through Usability Analysis: A Case Study and Recommendations

Dave Bockus and, Ryan Wilson . (2008) , Visual Hierarchical Task Analysis Software with Imbedded KLM

David Kieras .(2001),Using the Keystroke-Level Model to Estimate Execution Times

David M. Hilbert And David F. Redmiles.(2001), Extracting Usability Information From User Interface Events

Grigori Goldman.(2007), Periodical Payment Model using Restricted Proxy Certificates Australian Computer Society, Inc. *Thirtieth Australasian Computer Science Conference (ACSC2007)*, Ballarat, Australia. Conferences in Research and Practice in Information Technology (CRIPT)

Hartson, H.R.(1998), Human-computer interaction: Interdisciplinary roots and trends, *The Journal of Systems and Software*, vol 43, pp.103-118

Haslina Mohd , & Sharifah-Masture Syed –Mohamad . (2006) , Electronic Medical Record Evaluation Using Task Analysis Technique .*Proceeding Of The 11th International Symposium On Health Information Management Research ' ISHIMR 2006* Halifax , Canada

Hollan, J., Hutchins, E. and Kirsh, D. (2000), Distributed cognition: Toward a new foundation for human--computer interaction research. *ACM Transactions on Computer-Human Interaction*, 7(2), 174-196

John, B.E. & Vera,(1992), A.H., A GOMS Analysis of a Graphic, Machine-Paced, Highly Interactive Task. In *Proceedings of ACM CHI'92 Conference on Human Factors in Computing Systems*, 1992, pp. 251-258

Jonassen,D H., Tessmer,M., & Hannum ,W.H.(1999).*Task analysis methods for instructional design*. Mahwah,NJ: Lawrence Erlbaum Associates.

Julie Schiller and Paul Cairns(2008) There's always one! Modeling outlying user performance

Kieras, D (2001). *Using the Keystroke-Level Model to Estimate Execution Times*,

KIERAS, D. E.(1996), A Guide to GOMS model usability evaluation using NGOMSL. In *The Handbook of Human-Computer Interaction*. 2nd ed. North-Holland, Amsterdam. To be Published

Lewis, R. And Stone, M., Ed,(1999), *Mac OS in a Nutshell*. O'Reilly and Associates

Liu ,f.(2008) . usability evaluation on websites.

Lu Luo and Bonnie E. John (2005). Predicting Task Execution Time on Handheld Devices Using the Keystroke-Level Model International Conference on Human Factors in Computing Systems

Martijn van Welie, Gerrit C. van der Veer and Anton Eliëns ,(1999) ,
Breaking down Usability

McCormic, E.J. (1976). *Job and task analysis*. In M.D. Dunnette (Ed.).
Handbook of Industrial and Organizational Psychology. Chicago, IL: Rand
McNally Publishing, pp. 651-696

N. Asokan, P. Janson, M. Steiner and M. Waidner,(1997),The State of the Art
in
Electronic Payment Systems, IEEE Computer, volume 30, number 9,
pp.28.

Nielson (2000). "Perceived Usefulness, Perceived Ease of Use, and User
Acceptance of Information Technology," International Journal of Human-
Computer Interaction, vol. 7, pp. 57-70

Nielsen, J. (1993). *Usability Engineering*. New Jersey: Academic Press.

Nielsen, J. (1998). International Standard, Ergonomic Requirements for Office
Work with Visual Display Terminals (VDTs). Switzerland: Int. Organization
for Standardization Geneva

Preece, J. (1993). *A Guide to Usability: human factors in computing*. Addison
Wesley, the Open University

Preece, J. (1994). *Human-computer interaction*. Harlow - UK, Addison-
Wesley

Richard C. Thomas , Amela Karahasanovic and Gregor E.,2005, Kennedy
Australasian Computing Education Conference 2005An Investigation into
Keystroke Latency Metrics as an Indicator of Programming Performance

Rubin, J. (1994). *Handbook of Usability Testing*. New York: John Wiley and
Sons.

Schulz S., Mau G., and Silberer G. (2007) "The Catalog Usability
Questionnaire – Adoption and Validation of a Usability Scale for Print-
Catalogs." *The Electronic Journal of Business Research Methods* Volume 5
Issue 2, pp 93 - 104, available online at www.ejbrm.com

Shepherd, A. (2001). *Hierarchical task analysis*. New York: Taylor & Francis

Smith, C. & T. Mayes (1996). *Telematics Applications for Education and Training: Usability Guide*. Commission of the European Communities, DGXIII Project

Van Cott, H.P. and Kinkade, R.G. (1972). *Human engineering guide to equipment design*. Washington: Government Printing Office.

Woodson, W.E. and Conover, E.W. (1966). *Human engineering guide for equipment designers*. Berkeley: University of California Press .

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