### SCALING GEOMETRIC MONITORING OVER DISTRIBUTED STREAMS

by

Alexandros D. Keros

A thesis submitted in partial fulfillment of the requirements for the degree

of

BACHELOR

in

Electronic and Computer Engineering

Approved:	
Dr. Vasilis Samoladas	first reader
Major Professor	Committee Member
second reader Committee Member	dean

Technical University of Crete Chania, Crete, Greece

2015

Copyright © Alexandros D. Keros 2015

All Rights Reserved

#### Contents

	I	Page
Lis	st of Tables	iv
Lis	st of Figures	v
I	INTRODUCTION AND BACKGROUND	1
1	Introduction	2
2	Theoretical Background	3
II	PROBLEM DEFINITION AND IMPLEMENTATION	4
3	Problem Statement	5
4	Implementation	6
II	I RESULTS AND CONCLUSIONS	7
5	Experimental Results	8
6	Conclusions	9
7	Future Work	10
R	oferences	11

#### List of Tables

Table Page

### List of Figures

Figure Page

#### Part I

# INTRODUCTION AND BACKGROUND

# Chapter 1 Introduction

### Chapter 2

### Theoretical Background

#### Part II

# PROBLEM DEFINITION AND IMPLEMENTATION

### Chapter 3 Problem Statement

# Chapter 4 Implementation

#### Part III

### RESULTS AND CONCLUSIONS

Chapter 5
Experimental Results

Chapter 6

Conclusions

# Chapter 7 Future Work

#### References

- [1] I. Hickson and D. Hyatt, "HTML5: A vocabulary and associated APIs for HTML and XHTML," W3C Working Draft, vol. 19, 2010.
- [2] G. Lawton, "New ways to build rich internet applications," *Computer*, vol. 41, no. 8, pp. 10–12, 2008.
- [3] S. J. Vaughan-Nichols, "Will HTML 5 Restandardize the Web," *Computer*, vol. 43, p. 13, 2010.
- [4] L. Paulson, "Building rich web applications with Ajax," *Computer*, vol. 38, no. 10, pp. 14–17, 2005.
- [5] J. Falkner, J. Timney, and B. Galbraith, Beginning JSP web development. Wrox Press Ltd., 2001.
- [6] H. Williams and D. Lane, Web database applications with PHP & MySQL. O'Reilly & Associates, Inc., 2004.
- [7] T. Berners-Lee, J. Mogul, L. Masinter, P. Leach, R. Fielding, H. Frystyk, and J. Gettys, "Hypertext Transfer Protocol-HTTP/1.1," http://www.ietf.org/rfc/rfc2616.txt, 1999, [Online; accessed June 8, 2012].
- [8] D. Kuhn, D. Wallace, and J. AM Gallo, "Software fault interactions and implications for software testing," Software Engineering, IEEE Transactions on, vol. 30, no. 6, pp. 418–421, 2004.
- [9] D. Kuhn and M. Reilly, "An investigation of the applicability of design of experiments to software testing," in Software Engineering Workshop, 2002. Proceedings. 27th Annual NASA Goddard/IEEE. IEEE, 2002, pp. 91–95.

- [10] C. Colbourn, "Combinatorial aspects of covering arrays," Le Matematiche (Catania), vol. 59, pp. 125–172, 2004.
- [11] R. Bryce and A. Memon, "Test suite prioritization by interaction coverage," in Workshop on Domain specific approaches to software test automation: in conjunction with the 6th ES-EC/FSE joint meeting. ACM, 2007, pp. 1–7.
- [12] R. Bryce, S. Sampath, and A. Memon, "Developing a single model and test prioritization strategies for event-driven software," *Software Engineering, IEEE Transactions on*, no. 37, pp. 48–64, 2011.
- [13] S. Sampath, R. Bryce, G. Viswanath, V. Kandimalla, and A. Koru, "Prioritizing user-session-based test cases for web applications testing," in Software Testing, Verification, and Validation, 2008 1st International Conference on. IEEE, 2008, pp. 141–150.
- [14] T. Berners-Lee, L. Masinter, M. McCahill *et al.*, "Uniform resource locators (URL)," http://www.ietf.org/rfc/rfc1738.txt, 1994, [Online; accessed June 8, 2012].
- [15] T. Burners-Lee, "Cool URIs don't change," W3C, 2008.
- [16] A. Gleyzer, M. Denisyuk, A. Rimmer, and Y. Salingar, "A fast recursive GIS algorithm for computing strahler stream order in braided and nonbraided networks," *JAWRA Journal of* the American Water Resources Association, vol. 40, no. 4, pp. 937–946, 2004.
- [17] S. Sampath, S. Sprenkle, E. Gibson, L. Pollock, and A. Greenwald, "Applying concept analysis to user-session-based testing of web applications," *Software Engineering, IEEE Transactions* on, vol. 33, no. 10, pp. 643–658, 2007.
- [18] Y. Guo and S. Sampath, "Web application fault classification-an exploratory study," in Proceedings of the Second ACM-IEEE international symposium on Empirical software engineering and measurement. ACM, 2008, pp. 303–305.
- [19] F. Ocariza Jr, K. Pattabiraman, and B. Zorn, "JavaScript errors in the wild: An empirical study," in Software Reliability Engineering (ISSRE), 2011 IEEE 22nd International Symposium on. IEEE, 2011, pp. 100–109.

- [20] Mozilla, "Mozilla Developer Network, Error Object Reference," https://developer.mozilla.org/en/JavaScript/Reference/Global\_Objects/Error, 2011, [Online; accessed June 8, 2012].
- [21] I. Herman, G. Melançon, and M. Marshall, "Graph visualization and navigation in information visualization: A survey," Visualization and Computer Graphics, IEEE Transactions on, vol. 6, no. 1, pp. 24–43, 2000.
- [22] W. Wang, Y. Lei, S. Sampath, R. Kacker, R. Kuhn, and J. Lawrence, "A combinatorial approach to building navigation graphs for dynamic web applications," in *Software Maintenance*, 2009. ICSM 2009. IEEE International Conference on. IEEE, 2009, pp. 211–220.
- [23] J. Czerwonka, "Pairwise testing in the real world: Practical extensions to test-case scenarios," http://msdn.microsoft.com/en-us/library/cc150619.aspx, 2008, [Online; accessed June 8, 2012].
- [24] M. Grochtmann, J. Wegener, and K. Grimm, "Test case design using classification trees and the classification-tree editor CTE," in *Proceedings of Quality Week*, vol. 95, 1995, p. 30.
- [25] D. Kuhn, R. Kacker, and Y. Lei, "Practical combinatorial testing," NIST Special Publication, vol. 800, p. 142, 2010.