Doctoral Thesis

WORD-METRIC-BASED GREEDY ROUTING FOR CAYLEY GRAPHS

DANIELA AGUIRRE GUERRERO

2018

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2018

Doctoral Program in Technology

Supervised by:
Dr. Pere Vilà Talleda and Dr. Lluís Fàbrega Soler

Thesis submitted to the University of Girona in fulfillment of the requirements for the degree of Doctor of Philosophy

CERTIFICAT DE DIRECCIÓ DE TESI

Dr. Pere Vilà Talleda and Dr. Lluís Fàbrega Soler, del Departament d'Arquitectura i Tecnologia de Computadors de la Universitat de Girona,

DECLAREM:

Que el treball titulat *Word-Metric-based Greedy Routing for Cayley Graphs*, que presenta Daniela Aguirre Guerrero per a l'obtenció del títol de doctor, ha estat realitzat sota la nostra direcció i que compleix els requisits per poder optar a Menció Internacional.

I, perquè així consti i tingui els efectes oportuns, signem aquest document.

Girona, Juliol 2018

Dr. Pere Vilà Talleda

Dr. Lluís Fàbrega Soler

ACKNOWLEDGMENTS

PUBLICATIONS

The work developed in this thesis led to the following publications:

JOURNAL ARTICLES

[1] **D. Aguirre-Guerrero**, M. Camelo, P. Vilà and Ll. Fàbrega, "WMGR: A Generic and Compact Routing Scheme for Data Center Networks," in *IEEE/ACM Transactions on Networking*, vol. 26, no. 1, pp. 356-369. Feb. 2018. DOI: 10.1109/TNET.2017.2779866

PEER-REVIEWED CONFERENCES AND WORKSHOPS

[1] **D. Aguirre-Guerrero**, M. Camelo, P. Vilà and Ll. Fàbrega, "Compact Greedy Routing in Large-scale Networks using Word-metric Spaces," *1st. International Workshop on Elastic Networks Design and Optimization*, Cartagena, Spain, 2016.

OTHER CONFERENCES AND WORKSHOPS

[1] **D. Aguirre-Guerrero**, P. Vilà and Ll. Fàbrega, "Encaminamiento de Información en Redes Comunicación de Gran Escala," *6to. Simposio de Becarios CONACyT en Europa*, Strasbourg, France 2017.

[2] **D. Aguirre-Guerrero**, P. Vilà and Ll. Fàbrega, "Greedy Geometric in Word Metric Spaces," *1st. Conference of Pre-doctorals Researches*, Girona, Spain, 2016. ISBN: 978-8-48458-502-2

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ACRONYMS

WMGR word-metric based greedy routing

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ABSTRACT

Since word-metric based greedy routing (WMGR) *a priori* (e.g., exploring confined natural environments like underwater caves). In these scenarios, WMGRs

RESUMEN

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Part I

PRELIMINARIES

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CAYLEY GRAPHS: APPLICATIONS AND ROUTING ALGORITHMS

Part II

WORD-METRIC-BASED GREEDY ROUTING

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PATH COMPUTATION IN CAYLEY GRAPHS

5 FAULT-TOLERANT ROUTING IN CAYLEY GRAPHS

6 PERFORMANCE EVALUATION

7 CONCLUSIONS

7.1 SUMMARY OF COMPLETED WORK

This thesis has addressed the problem of

7.2 REVIEW OF CONTRIBUTIONS

7.3 FUTURE WORK

APPENDIX