Information on Doctoral thesis of Fellows Dang Quyet Thang

1. Full name: Dang Quyet Thang

2. Sex: male

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6. Changes in academic process:

- Official dispatch extension N^{o}. 3343/QĐ-CTSV, 17/12/2009 from the Hanoi University of Science;

- Official dispatch permission of academic suspension No. 3584/QĐ-SĐH, 8/12/2010 from Vietnam National University, Hanoi;

- Official dispatch for PhD continue study No. 3467/ĐHQGHN-ĐT, 15/10/2012 from Vietnam National University, Hanoi.

7. Official thesis title: Some theoretical and application issues of some models of advanced automata

8. Major: Mathematical foundation for computers and computing systems

9. Code: 62 46 35 01

10. Supervisors: - Assoc.Prof. Dr. Phan Trung Huy

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11. Summary of the new findings of the thesis

- Determine the longest common subsequence (LCS) and the set of LCS of two finite languages

recognized by two corresponding automata by one algorithm which has the time complexity of $\square(hl)$, where h, l are the size of the two input finite automata respectively.

- Determine the restricted Damerau-Levenshtein edit-distance of the two languages recognized by two corresponding input finite automata by one algorithm which has the time complexity $\square(hl)$.

- Two algorithms for testing ω-codes and Z-codes which have the time complexities $\square(n^3)$ if the input is a deterministic finite automaton and has the time complexities $\square(n^5)$ if the input is a non-deterministic finite automaton, where n is the number of states of the input automaton.

- Determine the unambiguities of languages by one algorithm which has the time complexity $\square(n^4)$ if the input is a non-deterministic finite automaton, has the time complextiy $\square(n^2 \log n)$ if the input is a deterministic finite automaton, where n is the number of states of the input automaton. For application, it is possible to use a language that is not a code but its unambiguity is large enough to encoding security information.

- Determine the deciphering delay of codes with the input are the finite automata which accepte these codes by one algorithm having the time complexity $\square(h^3)$, where h are the size of the input finite automata. This permits us to increase the time efficiency and eliminate backtracking in the decoding process.

12. Paratical applicability, if any:

These findings can be applied to:

- Searching information, computing, restricting informtion, processing signals and recognizing;

- Coding when the message is a left or right or bi- infinite word;

- Using a language that is not a code, but the unambiguity is big enough to code the secret information;

- Increasing the time efficiency and eliminate the reversed operation in the decoding process.

13. Further research directions, if any

- Research and develop the problems of searching on data code;

- Determine the approximate measurement for the problem of pattern matching using the weighted automata;

- Build the quantitative algorithm for the language that is not a code but can be used to code information basing on automaton technique.

14. Thesis-related publications:

[1] Nguyen Dinh Han, Dang Quyet Thang, Ho Ngoc Vinh (2010), “Computing the deciphering delay of a language by automata”, *National Conference Proceeding XIII – Some selected issues of Information and Communication Technology ,* Hung Yen, date 19-20 August, 2010*,* Science and Technology Publisher, pp. 321-332.

[2] Dang Quyet Thang, Phan Trung Huy (2010), “Determining restricted Damerau-Levenshtein edit-distance of two languages by extended automata”, *Proceedings of the 2010 IEEE-RIVF International Conference on Computing and Communication Technologies*, Hanoi, Vietnam, November 1-4, 2010, Institute of Electrical and Electronic Engineers (IEEE), pp. 53-58.

[3] Dang Quyet Thang (2011), “Algorithm to Determine Longest Common Subsequences of Two Finite Languages”, *New Challenges for Intelligent Information and Database Systems*, Studies in Computational Intelligence, Daegu, Korea, April 20-22, 2011, Springer –Verlag Berlin Heidelberg, 351, pp. 3-12.

[4] Ho Ngoc Vinh, Nguyen Dinh Han, Dang Quyet Thang, Phan Trung Huy (2011), “The unambiguity of a ◊-language and its application”, *National Conference Proceeding XIV – Some selected issues of Information and Communication Technology*, Can Tho, date 07-08 October, 2011, Science and Technology Publisher, pp. 95-108.

[5] Nguyen Dinh Han, Ho Ngoc Vinh, Dang Quyet Thang, Phan Trung Huy (2012), “Algorithms for testing of codes and ◊-Codes”, *Proceedings of the 2012 IEEE-RIVF International Conference on Computing and Communication Technologies-Research*, *Innovation and Vision for the Future*, Ho Chi Minh City, Vietnam, February 27 – March 01, 2012, Institute of Electrical and Electronic Engineers (IEEE), pp. 45-50.

[6] Nguyen Dinh Han, Phan Trung Huy, Dang Quyet Thang (2012), “A Quadratic Algorithm for Testing of Omega-Codes”, *Intelligent Information and Database Systems,* Lecture Notes in Artificial Intelligence, 4th Asian Conference*,* ACIIDS 2012, Kaohsiung, Taiwan, March 19-21, 2012, Proceedings, Part I, Springer –Verlag Berlin Heidelberg, 7196, pp. 338-347.

[7] Nguyen Dinh Han, Dang Quyet Thang, Ho Ngoc Vinh, Phan Trung Huy (2012) “The unambiguity of a language and its application”. *Information and Communication Technology Journal,* Research on development and application of Information and Communication Technology V-1, 7(27), pp. 82-89.

[8] Dang Quyet Thang, Nguyen Dinh Han, Phan Trung Huy (2012), “Algorithms Based on Finite Automata for Testing of Omega-Codes”, *Future Information Technology, Application, and Service* - Lecture Notes in Electrical Engineering, Vancouver, Canada, June 26-28, 2012, Springer Science+ Business Media Dordrecht, 164, pp. 271-279.

[9] Dang Quyet Thang, Nguyen Dinh Han, Phan Trung Huy (2012), “Determining unambiguous degree of regular languages by automata”, *Journal of Computer Science and Cybernetics*, 28(1), pp. 52-63.

[10] Dang Quyet Thang, Nguyen Dinh Han, Phan Trung Huy (2012), “Algorithms Based on Finite Automata for Testing of Z-codes”, *Proceedings of the 9th IFIP International Conference on Network and Parallel Computing* (NPC 2012), Lecture Notes in Computer Science (LNCS), Gwangju, Korea, Septemper 6-8, 2012, 7513, pp. 631-641.

[11] Dang Quyet Thang, Nguyen Dinh Han, Phan Trung Huy (2012), “A new algorithm for determining deciphering delay of regular language”, *Journal of Computer Science and Cybernetics*, 28(2), pp. 141-152.

[12] Nguyen Dinh Han, Dang Quyet Thang, Phan Trung Huy (2013), “A Quadratic Algorithm for Testing of Z-Codes”, *Intelligent Information and Database Systems,* Lecture Notes in Artificial Intelligence, 5th Asian Conference, ACIIDS 2013, Kuala Lumpur, Malaysia, March 18-20, 2013, Proceedings, Part I, Springer –Verlag Berlin Heidelberg, 7802, pp. 455-464.