Information on Doctoral thesis of Fellows Le Thi Kim Nga

1. Full name: Le Thi Kim Nga

2. Gender: Female

3. Date of birth: 02-03-1978

4. Place of birth: Quang Ngai

5. Admission decision number: No. 2389/SĐH dated 29/06/2007 of President of Vietnam National University, Hanoi.

6. Changes in academic process: No

7. Official thesis title: Study on Material Detection in Images

8. Major: Computer science

9. Code: 62 48 01 01

10. Supervisors: Assoc.Prof.Dr. Do Nang Toan and Dr. Dinh Manh Tuong

11. Summary of the **new findings** of the thesis:

- We have proposed an algorithm on detecting material in images based on the combination of local invariant features and locate vector technique in order to determine the position of materials in image. The algorithm has been implemented and tested with an accuracy of over 90% for the type of materials have highly surfaces structures.

- We also applied detecting material technique in findings forgery image with the improvement of Exact Match and Exact Match* algorithms. This can find the forgery region, which have been changed by scale or rotate, that other algorithms cannot solve. The experiment results show that most of copy/move forgery image, scaling and rotating areas in the image could be found.

- Another proposal is representating materials based on noised features and an algorithm to detect material based on noised features. The algorithm has been tested by experimention, and proved effective in case of images have material regions that have been changed in light. This is one of the challaenge in material researches on computer vision.

- Last but not least, the proposal of detecting materials base on Fractal. This proposal based on the relation between Fractal geometry and the properties self-similarity of materials by different scales.

12. Practical applicability, if any:

Techniques that proposed in dissertation can be applied in: detect and find object, detecting of forgery images, patterns recognition, high level image retrieval, intelligence robots. Further more, we can apply detecting material in the automatic surveillance systems such as: In/out observations, Fire detect and warning…

13. Further research directions, if any:

Research, improve and extand types of material patterns into type of object patterns based on representating objects by using a set of material assoociated for form an object. Research on techniques enhancing the quality of detecting material, overcome the factors of image acquisition environment. Continue the research to apply in practice.

14. Thesis-related publications:

- Do Nang Toan, Le Thi Kim Nga (2007), "A approach for breaking object detection", *in Proceedings of 10th National Conference on selected fields of Information and Communication Technology*, pp.175-181, (in Vietnamese).

- Do Nang Toan, Ha Xuan Truong, Pham Viet Binh, Le Thi Kim Nga, Ngo Duc Vinh (2008), "An improved algorithm for forgery image detection using Exact match", *in Proceedings of the fourth national sysposium, Fundamental and Applied IT Research FAIR07*, pp. 161-172, (in Vietnamese).

- Do Nang Toan, Le Thi Kim Nga, Nguyen Thi Hong Minh (2010), "A noised models and its application for detecting of image materials", *Journal of Science and Technology, VietNam Academy of Science and Technology* Vol. 48(3), pp. 1-10, (in Vietnamese).

- Le Thi Kim Nga, Do Nang Toan (2010), "Detecting copy/move Forgery Images Based on Invariant Features", *Journal of Computer Science and Cybernetics* Vol. 26(2), pp. 185-195, (in Vietnamese).

- Le Thi Kim Nga (2010), "Approach and Application Detecting of Materials", *Journal of Science and Technology, Thai Nguyen University* Vol. 69(7), pp. 25-31. (in Vietnamese).

Le Thi Kim Nga, Do Nang Toan (2010), "An approach for detecting materials", *in Proceedings of 13th National Conference on selected fields of Information and Communication Technology*, pp. 202-213, (in Vietnamese).

- Le Thi Kim Nga, Đinh Manh Tuong (2010), "Detection of material base on noises", *in Proceedings of the fourth national sysposium, Fundamental and Applied IT Research FAIR09*, pp. 207-214, (in Vietnamese).

- Do Nang Toan, Le Thi Kim Nga (2011), "Material Detection Based on Fractal Approach", *ACM Proceedings of the 9th International Conference on Advances in Mobile Computing &Multimedia (MoMM2011)*, pp. 281-284.