VIETNAM NATIONAL UNIVERSITY, HANOI **VNU UNIVERSITY OF ENGINEERING AND TECHNOLOGY** _____	**SOCIALIST REPUBLIC OF VIETNAM** **Independence – Freedom – Happiness** _____

INFORMATION ON DOCTORAL THESIS

1. Full name : Pham Tuan Dung....................... 2. Sex: Male

3. Date of birth: June 18th, 1982 .... 4. Place of birth: Yen Bai

5. Admission decision number 645 dated September 5th, 2016 of the Rector of the VNU University of Engineering and Technology.

6. Changes in academic process: *(List the forms of change and corresponding times)*

Change of main supervisor from Assoc. Prof. Nguyen Hai Chau to Assoc. Prof. Doan Minh Chung, according to the admission decision number 833 dated November 2nd, 2016 of the Rector of the VNU University of Engineering and Technology.

7. Official thesis title: "Research on urban classification and build urban cover data sets in Vietnam"

8. Major: Information systems 9. Code: 9480101.01

10. Supervisors: *(Full name, academic title and degree)*

   - Main supervisor: Dr. Doan Minh Chung, Associate Professor

   - Co-supervisor: Dr. Bui Quang Hung

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

   - Evaluating the impact of the resampling process on the quality of remote sensing images through MSE, PSNR, SSIM indices and the effects of the resampling process on the accuracy of the land cover classification method in Vietnam.

   - Improving the GLCNMO land cover classification method to build urban cover maps for Vietnam. The improvements include: (i) proposing a random sampling method based on global land cover datasets combined with high-resolution images, thereby creating training and testing sets; (ii) proposing an automatic threshold calculation method based on the histogram of the training set; (iii) proposing an urban cover classification method for Vietnam case study. The evaluation results show that adjusting input data and selecting appropriate threshold values to the parameters collected in Vietnam helps improve the accuracy of urban cover maps in Vietnam.

   - The thesis researched and processed remote sensing data to build Vietnam urban maps in 2004, 2008, 2012, and 2015, then applied to evaluate the impact of urban

expansion on particulate matter pollution in Vietnam. The thesis has achieved the following results: (i) Evaluate the urban expansion of Vietnam from 2004 to 2015; (ii) Evaluate the impact of urban expansion on particulate matter pollution in Vietnam from 2004 to 2015.

12. Practical applicability, if any: ....

13. Further research directions, if any:

   - To integrate high-resolution remote sensing data such as Landsat 8, Sentinel 2, radar, Lidar, UAV images, … to obtain urban cover maps with higher resolution and detail. To build larger training and testing datasets by combining expert knowledge and field trips to ensure data accuracy.

   - Further research on land cover classification methods using machine learning such as SVM, neural networks, random forests,… To research and apply post-processing methods in the urban cover classification problem.

   - To research and apply urban cover data sets in various interdisciplinary fields.

14. Thesis-related publications: *(List them in chronological order)*

   - P. T. Dung, M. D. Chuc, N. T. N. Thanh, B. Q. Hung, and D. M. Chung (2016), "Optimizing GLCNMO version 2 method to detect Vietnam's urban expansion," 2016 Eighth International Conference on Knowledge and Systems Engineering (KSE), pp. 309–314. (Scopus index).

   - P. T. Dung, M. D. Chuc, N. T. N. Thanh, B. Q. Hung, and D. M. Chung (2018), "Comparison of Resampling Methods on Different Remote Sensing Images for Vietnam's Urban Classification," Research and Development on Information and Communication Technology, vol E-2, number 15, pp. 8-20.

   - T. D. Pham, V. H. Pham, Q. T. Luu, X. T. Ngo, T. N. T. Nguyen, and Q. H. Bui (2019), "Analyzing the impacts of urban expansion on air pollution in Vietnam using the SEAP platform," IOP Conference Series: Earth and Environmental Science, vol. 266, p. 012008. (Scopus index).

   - Q. H. Bui, Q. T. Luu, D. van Ha, T. D. Pham, S. Praseuth, and D. Laffly (2020), "Spatial Data Infrastructure," in TORUS 2 – Toward an Open Resource Using Services, vol. 7, no. 6, pp. 247–261, Wiley. (Wiley publishing).