INFORMATION ON DOCTORAL THESIS

1. Full name: Nguyen Van Tu ....2. Sex: Male

3. Date of birth: 21/10/1982 ....4. Place of birth: Thai Binh

5. Admission decision number: 642/QĐ-CTSV, dated 15/09/2014

6. Changes in academic process: ....

7. Official thesis title: Automated Question Answering Using Multiple Knowledge Resources

8. Major: Information System ....9. Code: 9480104.01

10. Supervisors: Assoc. Prof. Nguyen Ha Nam, Assoc. Prof. Le Anh Cuong

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

The thesis has considered different types of features and integrated them into the statistical learning model to finding and ranking questions in the database related to new questions. The experimental results achieve the best accuracy (at the time of publication) when compared to related studies.

The thesis has proposed to use external resources to evaluate the reliability of the answers in the cQA. Wikipedia - the open encyclopedia is used as the most trusted external resource for additional information for verifying the reliability of responses. Experimental results show that our proposal to use external resources yields better results than just using traditional features.

The thesis has researched and improved deep learning models CNN, LSTM and BERT for the problem of measuring the similarity between questions. The research has integrated external knowledge sources into deep learning models to solve the problem of sparse data with little data, which is inherent in deep learning models.

12. Practical applicability, if any: The research results can be applied to build community question answering systems.

13. Further research directions, if any: Thoroughly study the model of using multiple information sources in combination with text representation models to calculate the relevance between questions and question-answer information in the database.

14. Thesis-related publications:

1. Nguyễn Văn Tú, Lê Anh Cường, Nguyễn Hà Nam. (2015). Phân loại câu hỏi sử dụng sự kết hợp của nhiều đặc trưng. *Tạp chí Khoa học và Kỹ thuật - Học viện KTQS*, Số 172, trang 5-14.

2. Van-Tu Nguyen, Anh-Cuong Le. (2016). Improving Question Classification by Feature Extraction and Selection. *Indian Journal of Science and Technology*, Vol 9(17), DOI: 10.17485/ijst/2016/v9i17/93160. Scopus.

3. Van-Tu Nguyen, Anh-Cuong Le. (2016). Answer Validation For Question Answering Systems By Using External Resources. *Proc. of International Symposium on Intergrated Uncertainty in Knowledge Modelling and Decision Making (IUKM)*, pages 305-316. Scopus, DBLP.

4. Nguyễn Văn Tú, Lê Anh Cường, Nguyễn Hà Nam. (2017). Xây dựng các cặp câu hỏi-câu trả lời chất lượng cao từ các trang web hỏi đáp cộng đồng. *Tạp chí khoa học công nghệ thông tin và truyền thông, học viện Công nghệ BCVT*, số 3-4, trang 25-33.

5. Van-Tu Nguyen, Anh-Cuong Le, Dinh-Hong Vu. (2017). An Efficient Model for Finding and Ranking Related Questions in community Question Answering Systems. *Proc. of 4th International conference on Information system Design and Intelligent Applications (INDIA - 2017)*, pages 776-786. Scopus.

6. Van-Tu Nguyen, Anh-Cuong Le. (2018). Deep Neural Network-based Models for Ranking Question - Answering Pairs in Community Question Answering Systems. *Proc. of International Symposium on Intergrated Uncertainty in Knowledge Modelling and Decision Making (IUKM)*, pages 179-190. Scopus, DBLP.

7. Van-Tu Nguyen, Anh-Cuong Le, Ha-Nam Nguyen. (2021). A Model of Convolutional Neural Network Combined with External Knowledge to Measure the Question Similarity for Community Question Answering Systems. *International Journal of Machine Learning and Computing,* Vol. 11, No. 3, pages 194-201. DOI: 10.18178/ijmlc.2021.11.3.1035

8. Van-Tu Nguyen, Anh-Cuong Le. (2021). A Deep Learning Model of Mul- tiple Knowledge Sources Integration for Community Question Answering. VNU Journal of Science: Computer Science and Communication Engineer- ing, Vol. 37, No. 1, DOI: https://doi.org/10.25073/2588-1086/vnucsce.295