Duong Cong Son

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Education

- **Hanoi University of Civil Engineering (HUCE)** Hanoi, Vietnam
  Engineering in Computer Science; GPA: 3.72/4.0 *Sep 2019 - Aug 2023 (Expected)*

Technical Skills

- **Programming Languages**: Python, Java, C++, C#, Java Script, PHP, Assembly
- **Libraries**: NumPy, Pandas, TensorFlow, Keras, PyTorch, Scikit-learn, Matplotlib, NLTK, OpenCV, Scikit-image, Pillow, Flask, SQL, React native
- **Tools**: Visual code, Jupyter, Kaggle, Git, Spark, MongoDB, Microsoft SQL server

Working Experiences

- **Hanoi University of Civil Engineering, Department of Computer Science** Hanoi, Vietnam
  Research Assistant
- **SDN Inter-domains network application for a heterogeneous and distribute SDN network**
  - Built an east-west interface to ensure data consistency between many heterogeneous SDN controllers.
  - Applied the quorum-based replication mechanism using the Q-Learning algorithm which could guarantee an acceptable consistency level while maintaining good network performance metrics, such as read delay, write delay and overhead.
  - Concretely, the three cases of read thresholds 10ms, 30ms, and 50ms had convergent mean values of 0.4, 0.11, and 0.3, respectively. And version staleness metric was always less than the fixed version staleness threshold (0.5).
- **LSTM-based approach for server and route selection in inter-SDN domains**
  - Proposed an LSTM-based link cost prediction for the server and route selection mechanism in a distributed and heterogenous SDN network to learn characteristics of non-linear nature and uncertainty of traffic flows.
  - Built the real dataset for 18 SDN domains within 38 hours with over 2.7 million of network data captured at the data link. They were fed into a distributed machine learning system where each SDN domain trains its own data.
  - Achieved 0.000018 MSE, and executed 15x faster than traditional centralized ML.
  - With 15% higher of link utilization, 10% lower of packet loss and servers' response time faster than benchmarks.
- **Transformer-based machine translation preference with a bilingual Chatbot**
  - Proposed transformer algorithm in machine translation with collected data and preprocessed datasets such as removing HTML tags, stop words, word separation, word embedding with over 120 thousand of sentences.
  - The BLEU score of the proposed method ranked in the first position at 19.1, followed by Seq2Seq with attention (16.4) and Seq2seq (4.3). Furthermore, training time was 2x faster than others methods.
  - Built and deployed an online bilingual chatbot with Flask and TensorFlow, allowing users to ask questions in English or Vietnamese, responded in the appropriate language.
- **Information Recognition on the University Test Paper**
  - Image Pre-processing using OpenCV cuts the time it takes to use the EAST technique in half while maintaining the same level of accuracy
  - Generate multi-digit numbers from the MNIST dataset with the right Data Augmentation methods to help increase the performance to 40%
  - The combination of CRNN-CTC Loss Model, Attention Layer, Lexicon Search improve the outcome significantly
  - Final accuracy of 97.14% on a class list of 245 students, inference time around 0.9–1s/image

Teaching Assistant

- **Machine learning**: Taught concepts and guided classes of 39 students to analyze and preprocess dataset before designing and evaluating the model.
- **Introduction To Programming**: Collaborated with instructor and 5 other teaching assistants to lead recitations grade coursework, and answer 60 students' questions.

Publications

- **Published Manuscript**:
  - Nam-Thang Hoang, **Cong-Son Duong**, Tran-Le-Tuan Nguyen, Van Tong, and Hai Anh Tran. 2022. Knowledge-defined Heterogeneous Network: Use-case of QoS-based Server and Route Selection in Large-scale Network. *International Symposium on Information and Communication Technology (SoICT 2022).*

- **Reviewed Manuscript**:
  - Nam-Thang Hoang, **Cong-Son Duong**, Tran-Le-Tuan Nguyen, Van Tong, and Hai Anh Tran. 2022. LSTM-based approach for server and route selection in inter-SDN domains*Journal of Computer Science and Cybernetics.*

Honors and Awards

- **CSC Award** top 10 excellent students selected by Hanoi University of Civil Engineering, 2022
- **Do Quoc Sam scholarship award** top 20 students with the highest GPA, 2022
- **Best Poster Award** The International Symposium on Information and Communication Technology, SoICT 2022
- **Second Prize, Scientific Research Competition for HUCE Students, 2022** Applying Machine Learning to Software-defined Network for intelligent routing.
- **Second Prize, Scientific Research Competition for HUCE Students, 2022** Transformer-based machine translation preference with a bilingual Chatbot.
- **First Prize, Scientific Research Competition for HUCE Students, 2021** Replication and consistency in heterogeneous and Distributed SDN networks.

VOLUNTEER SERVICES

- **X50 academic club** Hanoi, Vietnam
  Huce *2019 - Present*
  - Tutored Basic Informatics subject for around 150 university students to help them have a basic knowledge of the subject.
  - Organized the club's annual events.
- **International Student Exchange Program** Hanoi, Vietnam
  Delegate *2019*
  - Invited and Presented Vietnamese culture to the delegation of Japanese NIT, Maizuru College.

Reference

- Mr. Nam-Thang Hoang, Lecturer at Computer Science department, Director of Information and Data centre at Hanoi University of Civil Engineering, Phone: +84 912987567, E-mail: thanghn@huce.edu.vn.