Phuc’s LOR Draft | Dr/Prof. Y

1. Overview

Full Name: Phuc Nguyen Duc Anh
Role of Phuc:

First name:
Last name:
Organization:
Duration of Working Together:
Position/Title:
Relationship:
Phone Number:
Email Address:

Collaboration context:

2. Research Ability

Project 1: *Open-Vocabulary 3D Instance Segmentation*

Project Description: This project focused on developing algorithms to solve the problem of Open-Vocabulary 3D Instance Segmentation (OV-3DIS). The motivation was to propose a model capable of recognizing small, rare, and uncommon objects, which serves as a foundation for solving real-world automation problems and paves the way for future research.

Phuc's Contribution:

- **Role & Responsibilities:** Phuc was the lead researcher on this project, proposing the algorithm, implementing it, comparing and evaluating it with other methods across multiple datasets, and writing the paper.
- **Achievements:** The project resulted in one paper accepted at CVPR 2024, runner-up at ICCV 2023 workshop, and winner at CVPR 2024 workshop.

Project 2: *Open-Ended 3D Instance Segmentation*

Project Description: This project introduced the new problem Open-Ended 3D Instance Segmentation and the evaluation metrics, while also developing a method to solve it based on previous approaches. The motivation was to help computers interact with the real world without language constraints by leveraging Multimodal-LLM 3D tokens aggregation. The goal was to propose a scalable approach and utilize Open3DIS as a baseline method; this work paves the way for future studies.

Phuc's Contribution:

- **Role & Responsibilities:** Phuc served as the main researcher, proposing and implementing the algorithm, as well as conducting comparisons and evaluations across different datasets, paper writing.
- **Achievements:** One paper under-reviewed at a top-tier conference.

Project 3: *Class-Agnostic 3D Instance Segmentation*

Project Description: This project aimed to develop algorithms for solving Class-Agnostic 3D Instance Segmentation. Current methods require exhaustively segmenting every 2D video frame and unsupervised merging, which is both time-consuming and inaccurate. The proposed method used SAM2, resulting in 30% better segmentation accuracy compared to Open3DIS and a speed 10x faster than previous methods, providing a reliable mask segmenter for future work.

Phuc's Contribution:

- **Role & Responsibilities:** Phuc was the lead researcher, proposing and implementing the algorithm, evaluating it against other methods, and finalizing the paper.
- **Achievements:** One paper under-reviewed at a top-tier conference.

3. Motivation and Passion for Research

Deep Interest in Research: Upon joining VinAI Research, Phuc set a personal goal to have a paper accepted at a top-tier conference as the first author within one year. For Phuc, achieving acceptance at a prestigious conference is proof of his ability to conduct independent research and contribute meaningfully to the research community. His dedication is evident as, within his first year at VinAI Research, he had a paper accepted at CVPR2024, was a runner-up at an ICCV2023 workshop and winner at CVPR2024 workshop.

Ability to Self-Learn and Explore: At VinAI Research, Phuc was given the freedom to choose his research direction. He selected Open-Vocabulary 3D Scene Understanding because he recognized that for machines to interact optimally with humans and objects, they must comprehend the fundamental knowledge of surrounding entities, much like humans do. Building a model capable of recognizing everything around it using natural language is a crucial step toward this goal. Phuc took the initiative to research this emerging field, which had limited studies at the time. He diligently studied existing papers, evaluated proposed technologies, identified strengths and weaknesses of prior methods, and proposed improved solutions. Leading this project, Phuc proactively reported his findings to the team everyday, demonstrating his excellent self-learning ability and strong determination to see the project to completion.

4. Creativity and Flexibility

Creative Problem-Solving: Phuc showcased creativity in method development. In the OV-3DIS project, he proposed using superpoints during the proposal aggregation process

upon realizing that superpoints represent regions with similar geometric coherence. His innovative approach led to an accepted paper and laid the groundwork for future research.

Flexibility in Addressing Challenges: Phuc exhibited great flexibility in research, particularly in the Open-Ended 3D Point Cloud Instance Segmentation project. When the ScanNet++ dataset was newly proposed and still raw, he proactively and adaptively handled the preprocessing of this vast dataset. He developed methods to benchmark on this large-scale data to demonstrate the superiority of his proposed method.

5. Perseverance

Overcoming Research Challenges: Phuc displayed remarkable perseverance during the OV-3DIS project. Facing numerous difficulties as it was his first top-tier paper and with concurrent works being published daily, he consistently updated his knowledge and conducted daily literature reviews while developing his method and writing the paper.

Long-Term Commitment to Goals: Phuc set a goal to complete the project promptly to submit his paper to CVPR2024. He not only achieved this but also secured a workshop runner-up and a workshop winner for the project. Beyond the paper's contributions, he improved the Open3DIS method to adapt to more datasets, aiming to make significant contributions to the 3D scene understanding research community. Furthermore, Phuc identified the limitations in current research and sought to overcome these challenges through his project on class-agnostic 3DIS. By introducing a novel tracking strategy and aggregation method, he achieved significantly improved results, demonstrating his dedication to advancing the field of 3D scene understanding.

6. Suggestions for Dr/Prof. Y

Key Points to Emphasize:

- Highlight Phuc's characteristics, motivation, attitude, and research qualities, as demonstrated through his projects and achievements.
- Emphasize his ability to self-learn and explore, showcasing his potential to become an independent researcher.
- Underline his commitment to the projects and problems he tackles, noting his recognition of the motivation and significant contributions each problem offers to the research community.

7. Supplementary Materials

[1] Statement of Purpose (SOP)

[2] Curriculum Vitae (CV)

[3] PhD Application Information Table for SOPs