



香港城市大學  
City University of Hong Kong

## Unmanned Aerial Vehicle Platform to Enhance the Learning of Artificial Intelligence

**Project Number:** 6000706

**Principal Investigator:** Dr. Linqi SONG

**Grant Type:** TSG

### **Abstract:**

With the wide-spread of information and communication techniques, such as mobile communications, edge computing, Internet of Things (IoT), big data, and artificial intelligence, students are eager to learn more advanced and hands-on abilities. New experiment platforms are expected to transform the conventional methods of “chalk and blackboard” teaching and learning methodology. With such platforms, the teaching and learning style will be improved from the “teaching”-centered conventional ways to “learning”-centered (or student-centered) self and active learning style, as well as improving the independent learning and self-motivated learning abilities of students. Unfortunately, the development and evolution of teaching and learning in classrooms fall significantly behind the development of technology, especially in the computer science domain, for example, in the area artificial intelligence, machine learning, and big data.

Artificial intelligence covers many topics, such as computer vision, natural language understanding, robotics, collective learning, crowdsourcing, recommendations, self-driving, etc. One particular area which is booming nowadays is the unmanned aerial vehicles (UAVs), or the drones, which involves control techniques, computer vision, reinforcement learning, wireless communications, etc. In this project, in order to enhance students’ understanding in related areas of UAVs, we plan to build a test and demonstration platform of UAVs for teaching. In this platform, see Fig. 2, we plan to have a central controller, several UAVs (5 - 10), various data collection (sensors, cameras, etc.), communication, and control units. We aim at building an experimental environment for students to test and understand how various machine learning algorithms are applied in UAVs, such as reinforcement learning, path planning algorithms, prediction algorithms, computer vision related algorithms, group learning algorithms.



香港城市大學  
City University of Hong Kong

Moreover, students can also learn and develop their own techniques using the platform. Therefore, such a platform of UAVs will enhance the interactive, self-motivated, and creative teaching and learning methodology in classroom and outside. Finally, in order to show the outcomes and impacts of our project, we plan to apply our designed platform in one or two CS courses, for example, to accommodate some course group projects and show how does it work in the practical teaching.

#### **Academic Publication:**

Tan, H., Shao, W., Wu, H., Yang, K., & Song, L. (2022). A sentence is worth 128 pseudo tokens: A semantic-aware contrastive learning framework for sentence embeddings. Annual Meeting of the Association for Computational Linguistics (ACL). <https://arxiv.org/pdf/2203.05877.pdf>

Wu, H., Xu, K., & Song, L. (2021). CSAGN: Conversational structure aware graph network for conversational semantic role labeling. Conference on Empirical Methods in Natural Language Processing (EMNLP). <https://arxiv.org/pdf/2109.11541.pdf>

Wu, H., Xu, K., Song, L., Jin, L., Zhang, H., & Song, L. (2021). Domain-adaptive pretraining methods for dialogue understanding. The Joint Conference of the 59th Annual Meeting of the Association for Computational Linguistics and the 11th International Joint Conference on Natural Language Processing (ACL-IJCNLP). <https://arxiv.org/pdf/2105.13665.pdf>