Airsim

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Nowadays, several Flight Plans for drones are planned and managed taking advantages of Extensible Markup Language (XML). In the mean time, to test drones performances as well as their behavior, simulators usefulness has been increasingly growing. Hence, what it takes to make a simulator capable of receiving commands from an XML file is a dynamic interface. The main objectives of this master thesis are basically three. First of all, the handwriting of an XML flight plan (FP) compatible with the simulator environment chosen. Then, the creation of a dynamic interface that can read whatever XML FP and that will transmit commands to the drone. Finally, using the simulator, it will be possible to test both interface and flight plan. Moreover, a dynamic interface aimed at managing two or more drones in parallel has been built and implemented as extra objective of this master thesis. In addition, assuming that two drones will be used to test this interface, it is required the handwriting of two more FPs. In order to achieve all the goals of this project, it has been chosen AirSim as dronesimulator and Python as programming-language for the development of the dynamic interfaces. Python and AirSim can "talk" to each other thanks to the really good list of APIs (Application Programming Interface) provided by the AirSim library for Python. On the other hand, to write the XML FPs, I took advantages of the RAISE+ documentation (simulator for fixed and rotary wing aircrafts) for building a flight plan (see [10]). I implemented a total of six FPs: two FPs to test the interface for the single drone and four FPs to test the multiple-drones interface (two FPs for each drone). Each pair of FPs has the same path; one uses Geographical coordinates (latitude, longitude, altitude), the other one uses AirSim's NED coordinates (north, east, down). Since take off and landing are obtained through two Python APIs for AirSim, the flight plan will concern only the mission waypoints. In the end, I obtained two dynamic interfaces with a high degree of independence from any XML flight plan and AirSim environment chosen. The only requirement is that the FP waypoints have to be compatible with the simulator environment. Moreover, the FP has been created involving four out of all the possible legs that describe drone maneuvers and it has been planned for the Neighborhood AirSim environment. All the limitations will be further discussed in the "Recommendations" section (6.3). All the topics will be deeply analyzed and successively explained along the master thesis, highlighting the most important features and the problem-solving methodology carried on during the whole project.

The chapters in this book present the work of researchers, scientists, engineers, and teachers engaged with developing unified foundations, principles, and technologies for cyber-physical security. They adopt a multidisciplinary approach to solving related problems in next-generation systems, representing views from academia, government bodies, and industrial partners, and their contributions discuss current work on modeling, analyzing, and understanding cyber-physical systems.

Deep Learning for Robot Perception and Cognition introduces a broad range of topics and methods in deep learning for robot perception and cognition together with end-to-end methodologies. The book provides the conceptual and mathematical background needed for approaching a large number of robot perception and cognition tasks from an end-to-end learning point-of-view. The book is suitable for students, university and industry researchers and practitioners in Robotic Vision, Intelligent Control, Mechatronics, Deep Learning, Robotic Perception and Cognition tasks. Presents deep learning principles and methodologies Explains the principles of applying end-to-end learning in robotics applications Presents how to design and train deep learning models Shows how to apply deep learning in robot vision tasks such as object recognition, image classification, video analysis, and more Uses robotic simulation environments for training deep learning models Applies deep learning methods for different tasks ranging from planning and navigation to biosignal analysis

This on-screen interactive investigation of air quality in a virtual building leads students through the preparation of a written report. It includes onscreen reference material for guidance. Students can investigate the site, plant room, office space, and car park in a virtual reality simulation. Tasks involve interviewing workers, inspecting machinery, air intakes, and exhausts; and observing the outside environment and conditions through the course of a day. AirSIM will help students identify a range of inadequacies common in buildings and prescribe remedial action to alleviate the incidence of illness and discomfort arising from poor air quality.

This book is used at the graduate or advanced undergraduate level and many others. Manned and unmanned ground, aerial and marine vehicles enable many promising and revolutionary civilian and military applications that will change our life in the near future. These applications include, but are not limited to, surveillance, search and rescue, environment monitoring, infrastructure monitoring, self-driving cars, contactless last-mile delivery vehicles, autonomous ships, precision agriculture and transmission line inspection to name just a few. These vehicles will benefit from advances of deep learning as a subfield of machine learning able to endow these vehicles with different capability such as perception, situation awareness, planning and intelligent control. Deep learning models also have the ability to generate actionable insights into the complex structures of large data sets. In recent years, deep learning research has received an increasing amount of attention from researchers in academia, government laboratories and industry. These research activities have borne some fruit in tackling some of the challenging problems of manned and unmanned ground, aerial and marine vehicles that are still open. Moreover, deep learning methods have been recently actively developed in other areas of machine learning, including reinforcement training and transfer/meta-learning, whereas standard, deep learning methods such as recent neural network (RNN) and coevolutionary neural networks (CNN). The book is primarily meant for researchers from academia and industry, who are working on in the research areas such as engineering, control engineering, robotics, mechatronics, biomedical engineering, mechanical engineering and computer science. The book chapters deal with the recent research problems in the areas of reinforcement learning-based control of UAVs and deep learning for unmanned aerial systems (UAS) The book chapters present various techniques of deep learning for robotic applications. The book chapters contain a good literature survey with a long list of references. The book chapters are well written with a good exposition of the research problem, methodology, block diagrams and mathematical techniques. The book chapters are lucidly illustrated with numerical examples and simulations. The book chapters discuss details of applications and future research areas.

This book contains the proceedings of the 11th FSR (Field and Service Robotics), which is the leading single-track conference on applications of robotics in challenging environments. This conference was held in Zurich, Switzerland from 12-15 September 2017. The book contains 45 full-length, peer-reviewed papers organized into a variety of topics: Control, Computer Vision, Inspection, Machine Learning, Mapping, Navigation and Planning, and Systems and Tools. The goal of the book and the conference is to report and encourage the development and experimental evaluation of field and service robots, and to generate a vibrant exchange and discussion in the community. Field robots are non-factory robots, typically mobile, that operate in complex and dynamic environments: on the ground (Earth or other planets), under the ground, underwater, in the air or in space. Service robots are those that work closely with humans to help them with their lives. The first FSR was held in Canberra, Australia, in 1997. Since that first meeting, FSR has been held roughly every two years, cycling through Asia, Americas, and Europe.