

ROBOTICS AND INTERNET OF THINGS UNIT

The Official Newsletter



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WHAT IS RIOTU?

ONE BOOK, THREE JOURNALS, TWO CONFERENCES, AND ONE BOOK CHAPTER IN THE FIRST QUARTER OF 2017

RIOTU ORGANIZES ITS FIRST DRONE TRAINING

NEW FLIGHT TESTS WITH DRONES

RIOTU ORGANIZES ITS FIRST DRONE TRAINING SESSION



The Robotics and Internet of Things Unit, a research unit of the Center of Excellence in Prince Sultan University, organized its first drone training session from Tuesday to Thursday March 28-30, 2017. The event is technically sponsored by ACM.

The training was given by Dr. Anis Koubaa. Nine participants registered to this first session where six were from Prince Sultan University, and three from King Saud University.

The objective of the program was to give an introduction to the basics of building a drone, and controlling and monitoring it using a Ground Station.

In the first day, the trainer provided a comprehensive overview of the hardware used to build a drone. The second day was dedicated to presenting software and protocols used to control the drone. The third day consisted of hands-on activities, and flight test and field experiments.

Overall, the participants were truly satisfied of the training program and get the skills and ability to build and run their first drone. More sessions are planned.



Lab facilities and resources of RIOTU

What is RIOTU?

The Robotics and Internet of Things Unit (RIOTU) is a research unit established under the umbrella of the Center of Excellence at Prince Sultan University. RIOTU is lead by Dr. Anis Koubaa. The objective of RIOTU is to conduct research and attract external fund related to robotics and Internet of Things area, to contribute to the 2020 National Transformation Plan, and the 2030 Vision.

Vision

To be an internationally recognized centre in robotics and internet of things

Mission

To promote applied research on Robotics and Internet of Things in Prince Sultan University through international collaboration with industrial and academic partners

To develop robotics and IoT solutions for real applications to sustain the economic and social development in Saudi Arabia inline with 2030 vision.

Objectives

Establish a professional research environment in PSU in the robotics and IoT research.

Attract external funds and grants to PSU.

Provide a consultation service to the industry both locally and internationally.

Develop robotics and IoT solution's for the Saudi Market in collaboration with international companies.

Providing training services to communities in the field of robotics and IoT.

Contribute to the involvement of undergraduate and graduate students in professional research and promote their intellectual and learning skills.

Establish international collaboration with reputed research groups and institutions in robotics and IoT.

Contribute to the enrichment of computer science and engineering programs in the field of robotics and IoT



The RIOTU research unit is grateful to Dr. Ahmed Yamani, for his confidence and support to the Robotics and Internet of Things Unit, to Dr. Saad Al-Rwaita for his continuous financial support, and to Dr. Abdelhafeez Feda.

Furthermore, RIOTU would like to give a special thank and recognition to Dr. Khaled Almustafa for his tremendous efforts in making this event successful.

Research Team

Dr. Anis Koubaa (Leader)

Robotic Software Engineering, Internet-of-Things, Wireless Sensor Networks, Cloud Robotics, Robot Operating System (ROS)

Dr. Dhafer Almakles (Senior Researcher)

Control Theory, Non-Linear Control, Networked, Event-triggered and Quantized Control Systems, Design Nonlinear Control System

Ms. Maram Alajlan (Researcher)

Robot Operating System (ROS), Robotics Path Planning, Internet-of-Things, Cloud Robotics

Dr. Basit Qureshi (Senior Researcher)

Cloud Computing, Distributed Systems, Data Mining, Cyber-Security, Big data frameworks, Trust Management, Mobile Computing, Mobile Social Networks

Mr. Yasir Javed (Researcher)

Mobile Robots, Robot Operating System (ROS), 5G Networks, Data Mining

Mr. Mohaled Almustafa (Coop-Student)

Network Engineering, Mobile Robots, Drone Application

Research Collaboration

The Robotics and Internet of Things promotes international collaboration with both academia and industry.

RIOTU has strong collaboration with Gaitech Robotics, a world-reputed robotic company located in China. A research collaboration agreement was signed between the Center of Excellence in Prince Sultan University and Gaitech Robotics, and PSU received an external fund of 4000 USD from Gaitech to support research and development of RIOTU. On the other hand, RIOTU maintain research collaboration with CISTER research center, a top-ranked center in Portugal and specialized in real-time and embedded systems.



GaiTech International

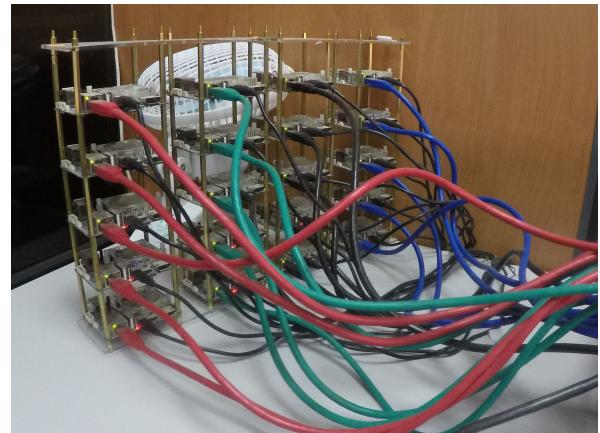


CISTER
Research Centre in
Real-Time & Embedded
Computing Systems

Resources and Facilities



Different drones platforms: RIOTU has a large variety of drones ranging from custom home-built drones to commercial drones with different capabilities. RIOTU has produced a leading research in what concerns the integration of drones/robots with the Internet of Things and the Cloud.



RIOTU Cloud Computing

Platform: RIOTU deployed several cloud clusters using single board computers (i.e. Raspberry PI and Odroid XU4), and also commodity desktop computers.



IoT devices and sensors: RIOTU has several types of sensor devices for developing Internet of Things apps.

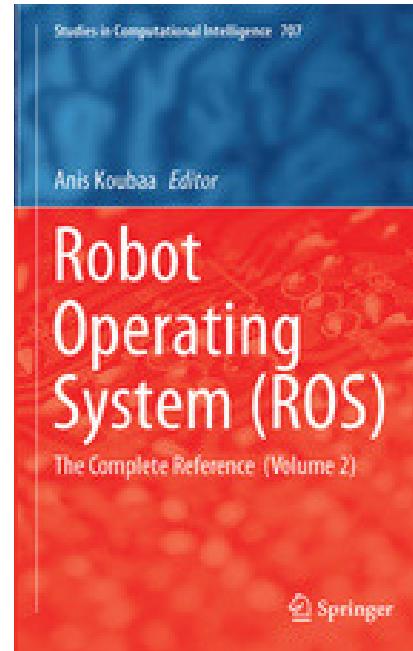


Recent Publications

Publications since January 2017

BOOKS

Anis Koubaa (Editor), **Robot Operating System (ROS), The Complete Reference (Volume 2)**, Springer, May 2017.



JOURNALS

Oussama Karoui, Mohamed Khalgui, Anis Koubaa, Emna Guerfala, Zhiwu Li, Eduardo Tovard, **Dual Mode for Vehicular Platoon Safety: Simulation and Formal Verification**, *Information Sciences (Elsevier)*, 2017, , impact factor: 3.364, (ISI)

Imen Chaari, Anis Koubaa, Hachemi Bennaceur, Adel Ammar, Maram Alajlan, Habib Youssef, **Design and performance analysis of global path planning techniques for autonomous mobile robots in grid environments**, International Journal of Advanced Robotic Systems, Vol.(14), Issue (2), April 2017 (ISI)

Anis Koubaa, Mohamed-Foued Sriti, Yasir Javed, Maram Alajlan, Basit Qureshi, Fatma Ellouze, Abdelrahman Mahmoud, **MyBot: Cloud-Based Service Robot using Service-Oriented Architecture** Robotic Journal, to appear, 2017

CONFERENCES

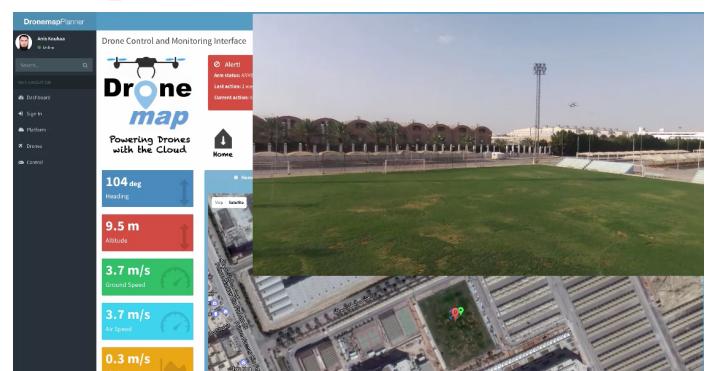
Anis Koubaa, Basit Qureshi, Mohamed-Foued Sriti, Yasir Javed, Eduardo Tovar, **A Service-Oriented Cloud-Based Management System for the Internet-of-Drones**, 17th IEEE International Conference on Autonomous Robot Systems and Competitions (ICARSC 2017), April 2017

Basit Qureshi, Sultan Alwehaibi, Anis Koubaa, **On Power Consumption Profiles for Data Intensive Workloads in Virtualized Hadoop Clusters**, 2017 IEEE International Conference on Computer Communications (INFOCOM), May 2017

BOOK CHAPTERS

Anis Koubaa, Maram Alajlan, Basit Qureshi, **ROSLink: Bridging ROS with the Internet-of-Things for Cloud Robotics**, Robot Operating System (ROS), The Complete Reference (Volume 2), Springer, May 2017.

Experiments



New Flight Tests

On April 4, 2017, Dr. Anis Koubaa performed new flight tests with students Taha Khursheed and Belal Kawaf with real drones on Football field, Both Dronema Planner and follower applications were successfully demonstrated. Flights tests are in preparation for the FreeBots competition in Portugal scheduled for April 30, 2017. Videos are available at: <https://goo.gl/iS40I6> and <https://goo.gl/1LycI5>