March – 2020

COMMANDIA NEWSLETTER

http://commandia.unizar.es

Collaborative Robotic Mobile Manipulation of Deformable Objects in Industrial Applications

October 30, 2019

Ecofira event

Ecofira is an international event for environmental solutions, where companies and public organizations present the latest advances in efficient environmental management. It is also a forum for debate and knowledge. Takes place every year in Valencia, and gathered in this edition about 5200 people.

November 23, 2019

Meeting at Universidad de Zaragoza

The different partners of the project presented their advances in the meeting of the COMMANDIA consortium at Universidad de Zaragoza, Spain on November 22, 2019.

November 26, 2019

COMMANDIA Tutorial on Gazebo

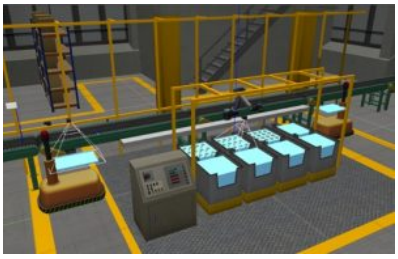
Gazebo is a robot simulator that offers the ability to accurately and efficiently simulate populations of robots in complex indoor and outdoor environments. Gazebo makes it possible to rapidly test algorithms, design robots, perform regression testing, and train AI system using realistic scenarios and has become one of the primary tools used in the ROS community. Following the first COMMANDIA Tutorial on ROS, on November 25, 2019 a tutorial on Gazebo was held on SIGMA Clermont with simultaneous streaming to University of Coimbra, University of Zaragoza, INESCOP and University of Alicante.

December 20, 2019

Student degree projects at UNIZAR on December 2019

Different students have presented their final degree projects in the framework of COMMANDIA:

"Robotic manipulation in the Robotic Operating System" by Inazio Gracia.



Several simulations are performed with an ABB robot model IRB 120 and serve as an explanation of how to perform motion planning in a simulation environment. They describe the different methods for moving a robotic manipulator in a scenario. Since normally in industries several robots work simultaneously in work cells, one of the methods of motion planning has been applied to a multi-robot case. Finally, two manipulation tasks are developed with Universal Robots' collaborative robots, more specifically the model UR5. Each task is defined in a different scenario and is performed with two different tools, a robotic gripper and a vacuum tool.

Sponsoring: Project COMMANDIA (SOE2/P1/F0638) is partially supported by Interreg Sudoe Programme and European Regional Development Fund (ERDF).

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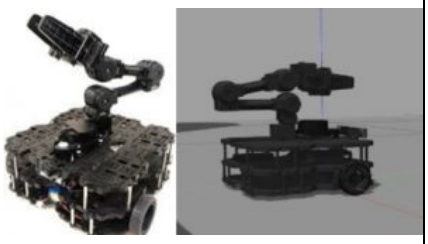
"Simulation of mobile robots in Gazebo for transport and manipulation tasks" by Gloria del Olmo.



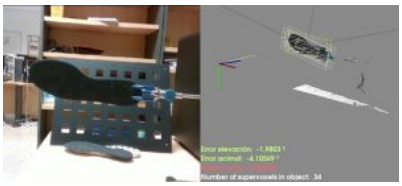
This work has focused on the TurtleBot 3 mobile base, the OpenManipulator robotic arm and the union of both. The set of software, libraries and ROS packages associated with these robots have been used to carry out the task. First of all, the ROS working environment and some of the possibilities it offers have been studied. Then, we have explained and extended the functionalities that ROS offers for the TurtleBot 3 platforms and the OpenManipulator robotic arm, and analyzed them to work in a coordinated way.

December 21, 2019

Student master projects at UNIZAR on December 2019

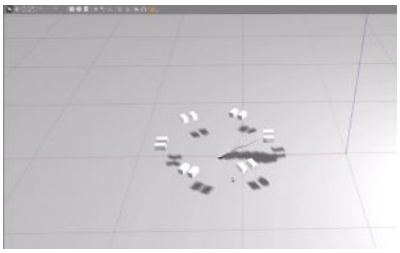
Different students have presented their final master projects in the framework of COMMANDIA:

"Visual SLAM systems for robotic manipulator control in non-rigid environments" by Ignacio Cuiral.



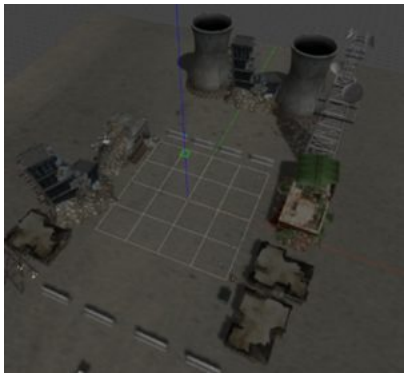
This work covers the process of investigation and study of a visual perception technique that allows the acquisition of useful information from the deformable objects in a scene to facilitate their manipulation with the use of robots.

"Multi-camera systems for volumetric reconstruction of 3D objects" by Enrique Hernández.



This work focuses on the study and subsequent implementation of a distributed algorithm for the perception of deformable objects, as well as the development of the appropriate software architecture for its implementation. This algorithm is within the field of cooperative control of multi-agent systems. Within this framework, the volumetric reconstruction of objects is essential in robotic manipulation. Building the 3D model of an object is a complex problem that involves aspects such as modeling, control, perception or planning.

"Multi robot strategies for Intermittent Encounters" by Pablo Guallar.



This work focuses on various aspects in the field of research in multi-robot systems, which enable the implementation of strategies in realistic simulations. This process involves a large number of small challenges to be developed, such as the calculation of trajectories and navigation, positioning of robots with respect to a given network, errors or changes during the simulation in the environment, the use of robots with differential movement, the mathematical implementation of algorithms from the scientific context, theoretical problem solving, communications between robots, etc.

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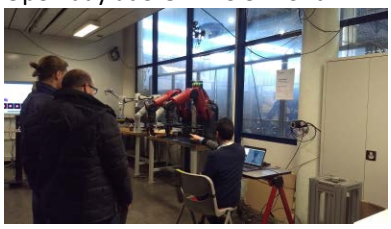
February 10, 2020

Paper: Adaptive multirobot formation planning to enclose and track a target with motion and visibility constraints

Title: Adaptive multirobot formation planning to enclose and track a target with motion and visibility constraints
Author: G. López-Nicolás, M. Aranda and Y. Mezouar
Journal: IEEE Transactions on Robotics, vol. 36, no. 1, pp. 142-156, Feb. 2020.
Abstract: Addressing the problem of enclosing and tracking a target requires multiple agents with adequate motion strategies. We consider a team of unicycle robots with a standard camera on board. The robots must maintain the desired enclosing formation while dealing with their nonholonomic motion constraints. The reference formation trajectories must also guarantee permanent visibility of the target by overcoming the limited field of view of the cameras. In this article, we present a novel approach to characterize the conditions on the robots' trajectories taking into account the motion and visual constraints. We also propose online and offline motion planning strategies to address the constraints involved in the task of enclosing and tracking the target. These strategies are based on maintaining the formation shape with variable size or, alternatively, on maintaining the size of the formation with flexible shape.
Download paper

February 15, 2020

Open day at SIGMA Clermont



SIGMA Clermont is organizing an open day on Saturday 15 February 2020. Teachers and engineering students will offer numerous scientific demonstrations to discover the different training courses and infrastructures.
Juan Antonio Corrales presented a demonstration with the Baxter robot manipulating a foam bar and also presented different work on deformable object handling.

February 22, 2020

SIMAC TANNING TECH is the international event with the most qualified offer of machinery and technologies for the footwear, leather goods and tanning industries.

INESCOP took part at SIMAC 2020 (February 19-21 in Milan, Italy), where you can find the most important manufacturers of machines for footwear manufacturing, leather goods and tanneries, accessories and component, chemical products, prototyping systems, lab machinery and equipment, consumables, automation, etc.

February 28, 2020

SICUR 2020

SICUR is Spain's leading international security event. Every two years, it brings together public and private security companies, associations and professionals in Madrid.

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March 6, 2020

COMMANDIA at Advanced Factories 2020

COMMANDIA was present at the annual meeting Advanced Factories 2020 in Barcelona (3-5, March). Advanced Factories brings together the most innovative companies in industrial automation, robotics, machine tools and digital manufacturing, along with all the technologies that are driving reindustrialization, improving industrial competitiveness and ultimately providing lower manufacturing costs and new business models.

March 13, 2020

IEEE SWYP 2020 ZARAGOZA

The IEEE Students, Women in Engineering and Young Professionals congress is the most important event of the IEEE in Spain at the student and youth level. Each year it brings together students and young engineering professionals from all over the country. It is supported and sponsored by the Spanish Section of the IEEE, the largest engineering association in the world.

Unfortunately, due to the crisis caused by the virus COVID-19 and following the recommendations of the Government of Aragon and the Ministry of Health all activities related to the SWYP 2020 were cancelled taking responsibility and prudence in this extraordinary situation. A workshop on the topics of COMMANDIA we organized was also cancelled, but we let here the poster we prepared which could have been presented.

March 25, 2020

How to flip a sole?

The sole of a shoe is a flexible piece of material that needs to be handled gently in order to fix it with the rest of the shoe. Specially if one of the faces of the sole is full of glue. The following video, courtesy of INESCOP, shows that the automatic manipulation can be performed successfully with a robot arm.

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