

# Mapping, Planning and Navigation with ROS for Autonomous Robots

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## Abstract:

Autonomous robots have become a very useful tools in many and varied environments. In order to successful deal with dynamic environments robots must include robust modules to properly self-localize, path planning and navigate. In this tutorial, it will be presented the system and tools provided with ROS (Robotics Operation System) to construct maps of diverse environments, path planning algorithms, path execution and obstacle avoidances.

## Outline:

1. Basics of ROS (1 & 2)
  - Topics and Messages
  - Services & Actions
  - Packages & Nodes
2. SLAM (Simultaneous Localization and Mapping)
  - GSLAM
3. Path Planning Algorithms
  - A\*
  - RTT
4. Navigation
  - Constructing and using a Navigation Module
  - Experiments.

## Target audience:

Science and engineering B.Sc. or postgraduate students, professionals, and public with interest on autonomous mobile robots.

## CV of the speaker:

Antonio Marin-Hernandez has received a B.Sc. degree in Physics (1995) and a M.Sc. in Artificial Intelligence (1998) both from the University of Veracruz, and a Ph.D. in Robotics and Artificial Intelligence by the Institute Nationale Polytechnique de Toulouse (2204). He is researcher at the Research Institute of Artificial Intelligence of the University of Veracruz. Member of the National System of Researchers (SNI II). Their interest fields include, Autonomous Mobile Robots, Human-Robot Interaction, 3D perception and image processing. Marin-Hernandez has been guest researcher at LAAS-CNRS in Toulouse, France, Freie Universität Berlin in Berlin, Germany and Universidade de Coimbra, Portugal. He is an active researcher with more than 70 papers published on international conferences and journals. In 2020 he was laurate of the state prize in science and technology (Veracruz).