

# 🤖 Ask Your Robotics Assistant

Ask technical questions about ROS, SLAM, Sensors, etc. based on uploaded manuals and tutorials.

🔴 Ask a question:

What is ROS?

📄 Context:

LAB LECTURE 1: INTRODUCTION TO ROS INSTRUCTOR: GIANNI A. DI CARO 16-311-Q INTRODUCTION TO ROBOTICS 2 PROBLEM(S) IN ROBOTICS DEVELOPMENT • Lack of standards • Little code reusability • Keeping reinventing (or rewriting) device drivers, access to robot's interfaces, management of on-board processes, inter-process communication protocols, ... • Keeping re-coding standard algorithms • New robot in the lab (or in the factory) • start re-coding (mostly) from scratch In Robotics, before ROS ROBOT OPERATING SYSTEM (ROS) 3 WHAT IS ROS? • ROS is an open-source robot operating system • A set of software libraries and tools that help you build robot applications that work across a wide variety of robotic platforms • Originally developed in 2007 at the Stanford Artificial Intelligence Laboratory and development continued at Willow Garage • Since 2013 managed by OSRF (Open Source Robotics Foundation) 4 Note: Some of the following slides are adapted from Roi Yehoshua ROS MAIN FEATURES ROS has two "sides" • The operating system side, which provides standard operating system services such as: o hardware abstraction o low-level device control o implementation of commonly used functionality o message-passing between processes o package management • A suite of user contributed packages that implement common robot functionality such as SLAM, planning, perception, vision, manipulation, etc. 5 ROS MAIN FEATURES 6 ROS PHILOSOPHY • Peer to Peer o ROS systems consist of many small programs (nodes) which connect to each other and continuously exchange messages • Tools-based o There are many small, generic programs that perform tasks such as visualization, logging, plotting data streams, etc. • Multi-Lingual o ROS software modules can be written in any language for which a client library has been written.

Currently client libraries exist for C++, Python, LISP, Java, JavaScript, MATLAB, Ruby, and more. • Thin o The ROS conventions encourage contributors to create stand-alone libraries/packages and then wrap those libraries so they send and receive messages to/from other ROS modules. • Free & open source, community-based, repositories 7 ROS WIKI • 8 SOME ROBOTS USING ROS ( > 125) 9 ROS CORE CONCEPTS • Nodes • Messages and Topics • Services • Actions • ROS Master • Parameters • Packages and Stacks 10 ROS NODES • Single-purposed executable programs oe.g.

🟢 Answer:

ROS is an open-source robot operating system A set of software libraries and tools that help you build robot applications that work across a wide variety of robotic platforms Originally developed in 2007 at the Stanford Artificial Intelligence Laboratory and development continued at Willow Garage Since 2013 managed by OSRF (Open Source Robotics Foundation) 4 ROS MAIN FEATURES ROS has two "sides" The operating system side, which provides standard operating system services such as: o hardware abstraction o low-level device control o implementation of commonly used functionality o message-passing between processes o package management A suite of user contributed packages that implement common robot functionality such as SLAM, planning, perception, vision, manipulation, etc. 5 ROS MAIN FEATURES ROS has two "sides" The operating system side, which provides standard operating system services such as: o hardware abstraction o low-level device control o implementation of commonly used functionality o message-passing between processes o package management A suite of user contributed packages that implement common robot functionality such as SLAM, planning, perception, vision, manipulation, etc