

Robotics Software Developer

Modules	Content	Sub content
Module-1	Introduction to Robotics	
	Applications of Robotics in various Industries	Manufacturing
		Automobile
		Industrial Engineering
		Agriculture
		Aerospace
		Healthcare
		Food processing units
		Food processing units
	Common types of industrial Robots and its applications	Articulated
		Cartesian
		Cylindrical
		Polar
SCARA		
Delta		
Robotics manufacturing Companies		
Important Considerations of robotics project		
Architecture of Intelligent Robots and Robotic systems		
ROS based Industrial Robots		
Module-2	Environment Setup of anaconda	
	Python Basics	
	Python Data Structures	
	Python Programming Fundamentals	Conditions and Branching
		Loops
		Functions
	Python - Files I/O	File Handling
		Create a New File
		Write to an Existing File
		Delete a File
	Python - Object Oriented Programming	Overview of OOP Terminology
		Creating Classes
		Creating Instance Objects
Accessing Attributes		
Built-In Class Attributes		
Module-3	Introductions to ROS	
	Importance of ROS in industries	
	ROS based Robots	Turtlebot3 burger

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	Installation of Ubuntu16.04		
	Installation of ROS kinetic and its packages		
	ROS file system configuration		
	Installation of visual code IDE		
	Installation of Python IDLE		
	ROS Cheat Sheet		
	Introduction to kinematics and Dynamics		
Module-4	Importance of catkin workspace		
	Navigating the ROS Filesystem		
	Creating Catkin workspace		
	ROS in built Packages	Understanding ROS Nodes	
		Understanding ROS Topics	
		Understanding ROS Services and Parameters	
		Understanding ROS Messages	
	Hands on Session with turtlesim package		
	Introduction and Creating ROS Package		
	Writing simple Publisher and Subscriber using python	Building your nodes	
		Writing the Publisher Topic	
		Writing the Subscriber Topic	
	Writing a Simple Service server and Service Client	Building your nodes	
		Writing a Service server Node	
Writing a Service Client Node			
Writing a Simple Action server and Action Client	Building your nodes		
	Writing an Action Server		
	Writing an Action Client		
Module-5	Introduction to simulation environments		
	Gazebo		
	Rviz		
	rqt		
	Creating and building a ROS package		
	Building a differential drive robot URDF	Creating a robot chassis	
		Adding wheels	
		Adding a caster	
		Adding color	
		Adding collisions	
		Moving the wheels	
Adding physical properties			
Modifications to the robot URDF			
Module-6	Introduction to Turtlebot3 burger		
	Features of Turtlebot3 Burger		

	Components of Turtlebot3 Burger	
	Specifications of Turtlebot3 Burger	
	Remote PC setup	
	SBC setup	
	OpenCR setup	
	Bringup Package	
	Basic Operations	
Module-7	Introduction to Indoor Mapping using Turtlebot3	
	Introduction to SLAM	
	Run SLAM nodes	
	Tuning Guide	
	Save Map	
	Map	
Module-8	Introduction to Navigation	
	Run Navigation Nodes	
	Estimate Initial Position	
	Send navigation goal using Rviz	
	Tuning Guide	
Module-9	Introduction to openCV	
	OpenCV OpenSave Image Files	
	OpenCV Pixels and Image Structure	
	OpenCV Image Encoding	
	OpenCV Video Streams Input	
	OpenCV Drawing Shapes	
Module-10	CvBridge Bridging OpenCV and ROS	
	Integrate camera to Two wheeled robot	