THE ROBOTICS SOCIETY STUDENT CHAPTER
Reg. No.: TRSSC/20/007
BIRLA VISHVAKARMA MAHAVIDYALAYA
[AN AUTONOMOUS INSTITUTION]
MANAGED BY CHARUTAR VIDYA MANDAL
ENGINEERING COLLEGE, VALLABH VIDYANAGAR: 388 120

Report

ROS A2Z Bootcamp (Workshop)

Robot Operating System (ROS) is one of the most important software tools in the robotics industry. ROS is an open-source robotics middleware suite, albeit it is more of a set of software frameworks for robot software development than an operating system (OS). Under the banner of Udaan 2022, the TRS BVM Student Chapter hosted a hands-on bootcamp workshop on ROS on 3rd April 2022. Every year, BVM Engineering College hosts a techno-cultural festival called "Udaan – An Euphoric Leap." This Techno-Cultural Festival allows students to explore and enhance their technological and cultural interests while also empowering them to put their ideas into action in the real world. Mr. Trushant Adeshara, Software Robotics Engineer at Wastefull Insights in Vadodara, Gujarat, led the session. The workshop was designed for ROS beginners and intermediates.

The first session began with a welcome speech by Vishvas Suthar. Participants were subsequently enlightened by Professor Dr. Vinay Patel, Faculty Advisor, TRS BVM Student Chapter, who explained the significance of ROS and other robotics tools. Further to that, Principal Dr. Indrajit Patel inspired students with a captivating speech about BVM Engineering College's technical activities and projects. He encouraged students to participate in similar events and to make use of the institute's resources.

Mr. Trushant took over the session after that. He began by giving an overview of the Linux operating system and installing ROS. Volunteers from the TRS BVM Student Chapter assisted the participants with installation and troubleshooting.

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The first session was mostly focused on learning the fundamentals of ROS and the tools that are used to operate it. It covered the following topics:

- ROS's Importance and Applications
- ROS Basics
- Build Systems & Build Tools
- File Structure in ROS
- Packages in ROS
- Nodes & Topics
- Services & Actions
- ROS CLI Tools
- ROS GUI Tools

All of these concepts were taught to the attendees through hands-on practice with an example package provided by Mr. Trushant, a specialist in the field. To generate the simulation, the participants had to run the commands.

Session 2 continued after the lunch break, with participants simulating 2D mapping and navigation for a differential drive, two-wheeled robot in Gazebo. The following subjects were discussed during this session:

- Robot Design in Fusion 360
- URDF vs SDF vs XACRO
- RVIZ & Gazebo
- Significance of Simulators
- Visualizing robot in Gazebo
- Integration laser Scanning using LiDAR
- Teleop integration
- Custom/Pre-loaded world addition to gazebo
- 2D Mapping using Gmapping algorithm
- Roadmap for navigation

Professor Dr. Haresh Patolia, Faculty Advisor, TRS BVM Student Chapter, addressed eloquently at the end of the Programme. He thanked Mr. Trushant Adeshara, all of the attendees, volunteers, and the organizing team for their efforts.

Participants were enthralled by the prospect of learning more about this robotics technology and had built a solid foundation in robotics with ROS. They were able to explore a new operating system, a software tool, a designing and 3D modelling software, a robotics software tool, a simulator, and a simulation visualization tool courtesy to the map from Linux to ROS by our expert. This workshop established the foundations of robotics work. The learners were highly motivated and even suggested that more workshops on this topic be held.

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Principal Dr. Indrajit Patel motivating students

Professor Dr. Vinay Patel welcoming students

Professor Dr. Haresh Patolia concluding the session

Convener: Prof. (Dr.) Vinay J Patel

Coordinator: Prof. Ashish Thakkar

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