G.NARAYANAMMA INSTITUTE OF TECHNOLOGY & SCIENCE
(For Women)

AUTONOMOUS
Shaikpet, Hyderabad – 500104
Department of ECE
Faculty Development Program on "Robotics Powered with ROS"
25th May to 30th May 2020

S.No	Name of the document	Status
1.	Proposal by the Coordinator/Convenor to Principal along with budget, and permission for the venue.	NA
2.	Invitation to the resource person	NA
3.	Acceptance along with the bio-data	Yes
4.	Poster/brochure/Banner (Not photo)	Yes
5.	Programme schedule	Yes
6.	Circular	Yes
7.	Registration/Attendance of the participants	Yes
8.	Certificates (sample)	Yes
9.	All participants filled Feedback, analysis – action	Yes
10.	Resource person filled Feedback – plan of action	NA
11.	One page photos with atleast 6 with description as per the format	Yes
12.	Budget utilisation sheet	NA
13.	Press note/Newspaper publication	NA
14.	Single page report as per the format	Yes

Workshop Coordinator

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Gmail

Renuka Devi SM <renuka.devi.sm@gmail.com>

Details About my project

Durga Prasad Bethi <durgaprasad@thesmartbridge.com> Mon, May 25, 2020 at 9:17 AM
To: Renuka Devi SM <renuka.devi.sm@gmail.com>

Mam,

Please find the attached bio and Work experience

Name: Durga Prasad
Company: Smartbridge
Role: Robotics Engineer
Completed Graduation under JNTUH Affiliated College

Majorly working on ROS framework which includes software development, Robot 3D modelling, development of mathematical calculations for various robots, hardware level and developing AI applications for common needs etc

Projects:

1. Worked with Two-wheeled Robot Simulation using ROS and Gazebo
This is a basic project where we are going to control the two-wheeled robot with the help of keyboard

2. Integration of LDS sensor to the Two-wheeled Robot and Visualize the Data in Rviz.
In Robotics Lidars plays an important role in Obstacle detection, In this project, we used LDS sensor for Obstacle detection on the simulator.

3. Indoor Mapping and Navigation with four-wheeled Robot Using ROS.
Mapping and navigation through the 3D environment is a huge concept in developing a robot application. Here we used SLAM techniques to perform Mapping and navigation of the 3D environment

4. Integration of Camera to the robot for Object detection using ROS, Keras and TensorFlow.
Object detection is now one of the technique in the Robotics to get the 3D data from the environment so we used a normal HD camera library for detection of simulated objects in the Gazebo simulator.

5. SLAM with Turtlebot3 Burger
Turtlebot3 Burger is one of miniaturized robot used to research ROS, with the help of turtlebot3 burger we did the static and dynamic obstacle detection, and we trained the robot with my office environment using SLAM based on the environment the robot will move into the required workstation in the office with the help of human inputs. like file transfer from one place to another place.

–
Thanks & Regards,

Durga Prasad Bethi
Robotics Engineer

SmartBridge Educational Services Pvt. Ltd.
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Nacharam Main Road,Hyderabad, India – 500 076
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Email: durgaprasad@thesmartbridge.com | www.thesmartbridge.com

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SMARTBRIDGE

One Week Workshop on

Sri P. Subba Reddy
Chairman

Smt. G. Srividya Reddy
Secretary

Dr. K. Ramesh Reddy
Principal

"ROBOTICS POWERED BY ROS"

FREE REGISTRATION

Date 25/5/2020-30/5/2020

3 Hours/Day (10:00 AM to 1:00 PM)

Organized by:

Department of Electronics and Communication Engineering

In Association with IETE, Hyd & Smart Bridge

LIMITED SEATS APPLY NOW

Registration link: tinyurl.com/sb-ros

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PRINCIPAL

Dr. Renuka Devi S M
Co-ordinator(9441697653)
Professor, ECE

Dr.B.Venkateshulu
Convenor,
HoD-ECE Dept.

Free for faculty, Limited seats FCFS basis, Registration Starts from 21-5-2020.

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ROS

Robotics Powered by ROS

This course includes lectures, discussions on how Robotic Operating System (ROS) works, and hands-on exercises that developers can use to better understand what Robotics does, what it doesn't do, and how it works so that developers can build best solutions for the industry needs

About ROS

The Robot Operating System (ROS) is a flexible framework for writing robot software. It is a collection of tools, libraries, and conventions that aim to simplify the task of creating complex and robust robot behavior across a wide variety of robotic platforms.

Why? Because creating truly robust, general-purpose robot software is hard. From the robot's perspective, problems that seem trivial to humans often vary wildly between instances of tasks and environments. Dealing with these variations is so hard that no single individual, laboratory, or institution can hope to do it on their own.

As a result, ROS was built from the ground up to encourage collaborative robotics software development. For example, one laboratory might have experts in mapping indoor environments, and could contribute a world-class system for producing maps. Another group might have experts at using maps to navigate, and yet another group might have discovered a computer vision approach that works well for recognizing small objects in clutter. ROS was designed specifically for groups like these to collaborate and build upon each other's work, as is described throughout this site.

Why Gazebo?

Robot simulation is an essential tool in every roboticist's toolbox. A well-designed simulator makes it possible to rapidly test algorithms, design robots, perform regression testing, and train AI system using realistic scenarios. Gazebo offers the ability to accurately and efficiently simulate populations of robots in complex indoor and outdoor environments. At your fingertips is a robust physics engine, high-quality graphics, and convenient programmatic and graphical interfaces. Best of all, Gazebo is free with a vibrant community.

Finally, after successful completion of this course students will be able understand the robot project structure, sensor integration to the robot and its importance, Robot communication process, robot project considerations, Robot simulation considerations, Basics about ROS and Gazebo simulation

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ROS

Course content:

Day1: Introduction to Robotics

- Introduction to Robotics
- Classification of Robotics
- Applications of Robotics in various industries
    - Manufacturing
    - Automobile
    - Industrial Engineering
    - Agriculture
    - Aerospace
    - Healthcare
    - Food processing units etc
- Common types of industrial Robots based on Joint type
    - Articulated
    - Cartesian
    - Cylindrical
    - Polar
    - SCARA
    - Delta
- Robotics manufacturing Companies
- Important Considerations of robotics project

Day2: Introduction to ROS and ROS cheat sheet

- Introductions to ROS
- Importance of ROS in industriesROS terminology
- ROS based Robots a. Turtlebot3 burger b. Franka Emika Panda etc
- ROS file system configuration
- ROS Cheat Sheet
- Importance of catkin workspace
- Navigating the ROS Filesystem
- Creating Catkin workspace
- ROS in built Packages

Day3: ROS topics, services

- Creating ROS Package
- Writing simple Publisher and Subscriber using python
    - Writing the Publisher topic
    - Writing the Subscriber topic
    - Building your nodes
- Writing a Simple Service and Client using python
    - Writing a Service server
    - Writing the Service Client
    - Building your nodes

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ROS

Day4: Introduction to Rviz and Gazebo simulator

- Introduction to GUI tools
- Explanation about Rviz
- Introduction to Gazebo and its features
- Hands on exercise with model builder on gazebo for making robot world

Day5: Building two wheeled Robot

- Introduction to URDF and its properties
- Basic syntax explanation
    - Links
    - Joint
    - Sensor etc.
- Building two wheeled robot using URDF

Day6: Integrating two wheeled Robot with LDS sensor

- Introduction to Xacro
- Converting two wheeled robot URDF file into Xacro file
- Introduction to Laser Distance Sensor
- Integration of laser Distance sensor to the two wheeled robot
- Object Detection through Laser rays

Note: we are not including any hardware part because hardware will come in the Advanced level courses

Prerequisites:

1. Everyone must have their own personal computer with minimum specification 4 GB RAM 64 bit Operating system, 250 GB Hard drive space
2. Knowing Basic Python, Basic HTML and linux commands is added advantage
3. Oracle VirtualBox with Ubuntu 16.04 must for this program
4. Daily sessions will be conducted through Zoom.
5. Daily Duration of the session is 3 - 4 Hrs.which includes Concept explanation, Hands on session and Q & A.
6. Session recorded videos will be provided on daily Basis
7. Related codes will be shared on the session time through email or drive access

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(6)

GNITS

Renuka Devi <renuka.devi.sm@gnits.ac.in>

Greetings from GNITS, IETE & Smart Bridge

2 messages

ECE ROS GNITS <rosgnitsece@gmail.com> Sat, May 23, 2020 at 3:39 PM
To: renuka.devi.sm@gnits.ac.in

Dear Participants,

Greetings from GNITS, IETE & Smart Bridge II.

Thank you for registering for this online 6-Day workshop on " **Robotics Powered by ROS**" organized by GNITS from 25th to 30th May 2020, timings 10 AM to 1 PM, in association with IETE & Smart Bridge. We are very happy to share that this workshop has received a huge response. But we have accepted only limited strength for smooth, good coordination. I am sure, all of you will have a great learning experience during this workshop.

We have created a Whatsapp group for the workshop participants, so please join by clicking on the link.

https://chat.whatsapp.com/JBk9aQnWfkZAJVnxC223WD

Since the workshop is more of practical oriented, all of you need to do the below installation in your laptop/system at home, to get ready for doing practical's learnt during the sessions. Installation guidelines in the below link

https://tinyurl.com/ros-installation

You will get a link(Zoom) for joining the workshop online, in What'sApp on Monday morning.

Attendance is mandatory for Faculty & Students, also there will be a final assessment to get e-certificate

The Schedule of the workshop is attached

Wish you all happy learning.

Thank You

Sincere Regards,

ROS Workshop team

ECE Dept, GNITS

Robotics_schedule.pdf
423K

Renuka Devi <renuka.devi.sm@gnits.ac.in> Sun, May 24, 2020 at 11:01 AM
To: durgaprasad@thesmartbridge.com

****Please ignore this mail if you have received it earlier**.**

[Quoted text hidden]

Robotics_schedule.pdf
423K

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ROS

Nb. of Participants — 65

Students — 17.

Faculty — 48.

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(7) Final.

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Certificate of Participation

This is to certify that

Dr. Renuka Devi SM

has participated in 6 days Online Workshop on **ROBOTICS POWERED BY ROS** from **25-05-2020** to **30-05-2020,** organised by Department of **ECE, GNITS** in association with **IETE HYDERABAD & SMARTBRIDGE.**

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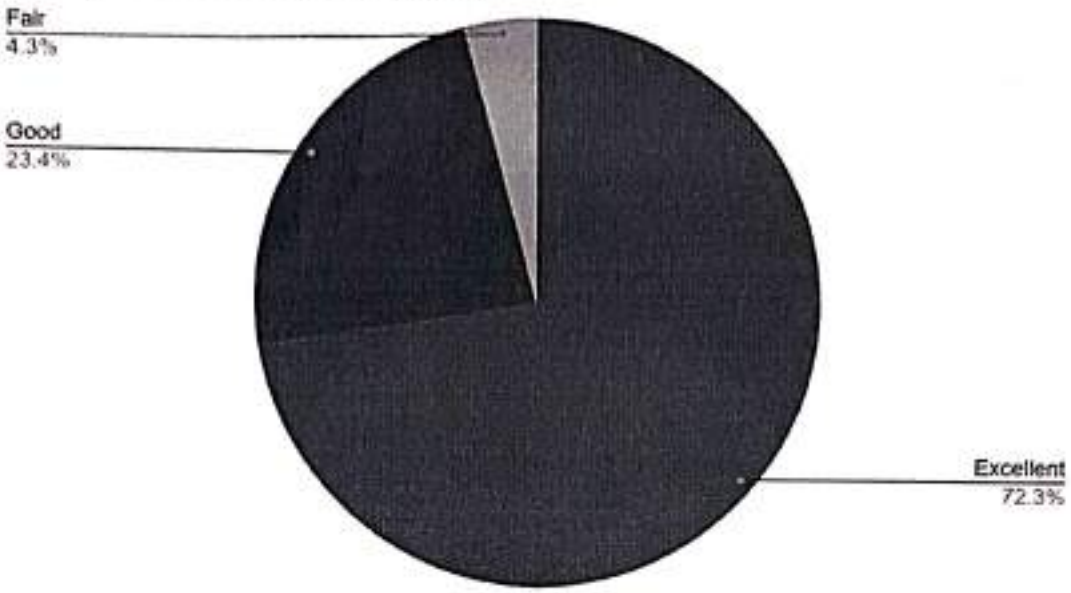
PRINCIPAL

Mr.Durga Prasad
SMARTBRIDGE

Prof. A. Ravi Kumar
CHAIRMAN, IETE HYD

Dr. K. Ramesh Reddy
PRINCIPAL, GNITS

Analysis of over all Feedback



Best Part of Training	Feeback	Suggestions
Having more of practical sessions is the best part	Excellent	None
Robotics Creation using ros	Excellent	Excellent informative session on robotics
ROS Practical sessions	Excellent	NA
Gazebo simulation	Excellent	None
Practical	Excellent	Excellent
Excellent Session	Excellent	Excellent Session
Ros quiz	Excellent	Good
Robot Simulation	Excellent	Provide some handout or ppt for that sessions
Practicle sessions	Good	Record and share few videos on making of small robot under different scenarios
Each and every part in training is nice and very useful	Excellent	No
The hands-on session was just fabulous and the quiz included was actually so good.	Excellent	Everything was very good. We would like to have more sessions of this kind.
Good presentation	Good	Good presentation
Everything	Excellent	Offline class gives more intrest to us compared to inline class
Giving practical knowledge in a simple and easy way.	Excellent	Teaching level is perfect and I don't think anyone can teach like you.keep going on sir.
The way of teaching , hands-on sessions and daily quizzes	Good	Nothing
Hands on session	Excellent	Thank you
The quiz and the hands on sessions were amazing.	Excellent	We would like to have more sessions of this kind.

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All 5 days	Excellent	NA
Yes	Excellent	No
Everything	Excellent	Nothing for now
Hands on	Good	Nice Experience
Nice presentation nice practice	Excellent	Learnt a lot
Design part	Good	Overall good
Practical oriented session	Good	Very Informative Session
N	Fair	Ok
Practical experience	Excellent	Workshop could have been extended and hardware established could have been introduced thereotically
Project training	Good	This has to be reached to many people
Practical way	Excellent	Good going
Practical sessions	Excellent	Need more practical sessions
Ros	Excellent	Excellent
All the sessions	Excellent	Very nicely conducted.
Doubts were cleared then and there	Good	No suggestions
Practical session	Excellent	Very informative session
PRACTIACALS WERE AMAZING EXAMPLES BY SMARTBRIDGE	Excellent	THE COURSE CAN BE TAKEN TO STUDENTS FOR DESIGN AND DEVELOPMENT OF EMBEDDED BASED/ ROBOTICS PRODUCTS WHICH ARE VERY REQUIREMENT IN CURRENT SITUTATION THAT IS 'COVID-19' SCENARIO WHICH WILL REPLACE MUCH HUMAN INVOVEMENT. (SECURITY/ MEDICAL/ DEFENCE) BASED PROJECTS. THANKYOU.
Very good resource persons	Excellent	No comments
Very good resource persons	Excellent	No comments
Informative and Interactive	Good	2-3 more sessions might help us in understanding the course much better.
Introduction	Fair	Offline would have been better
Ros with practical	Good	Yes it is very useful thank you sir
Yesterday and today practical visualization	Good	Good session but we need more time to practice and get familiar
Yes	Excellent	No
Robot Simulation	Excellent	Provide some handout or ppt for that sessions
Hands on	Excellent	Good Workshop
Practicals	Excellent	No
Hands on training and the faculty. Kahoot game	Excellent	Nil
Hands on	Excellent	FDP on IoT
Design	Excellent	Nil

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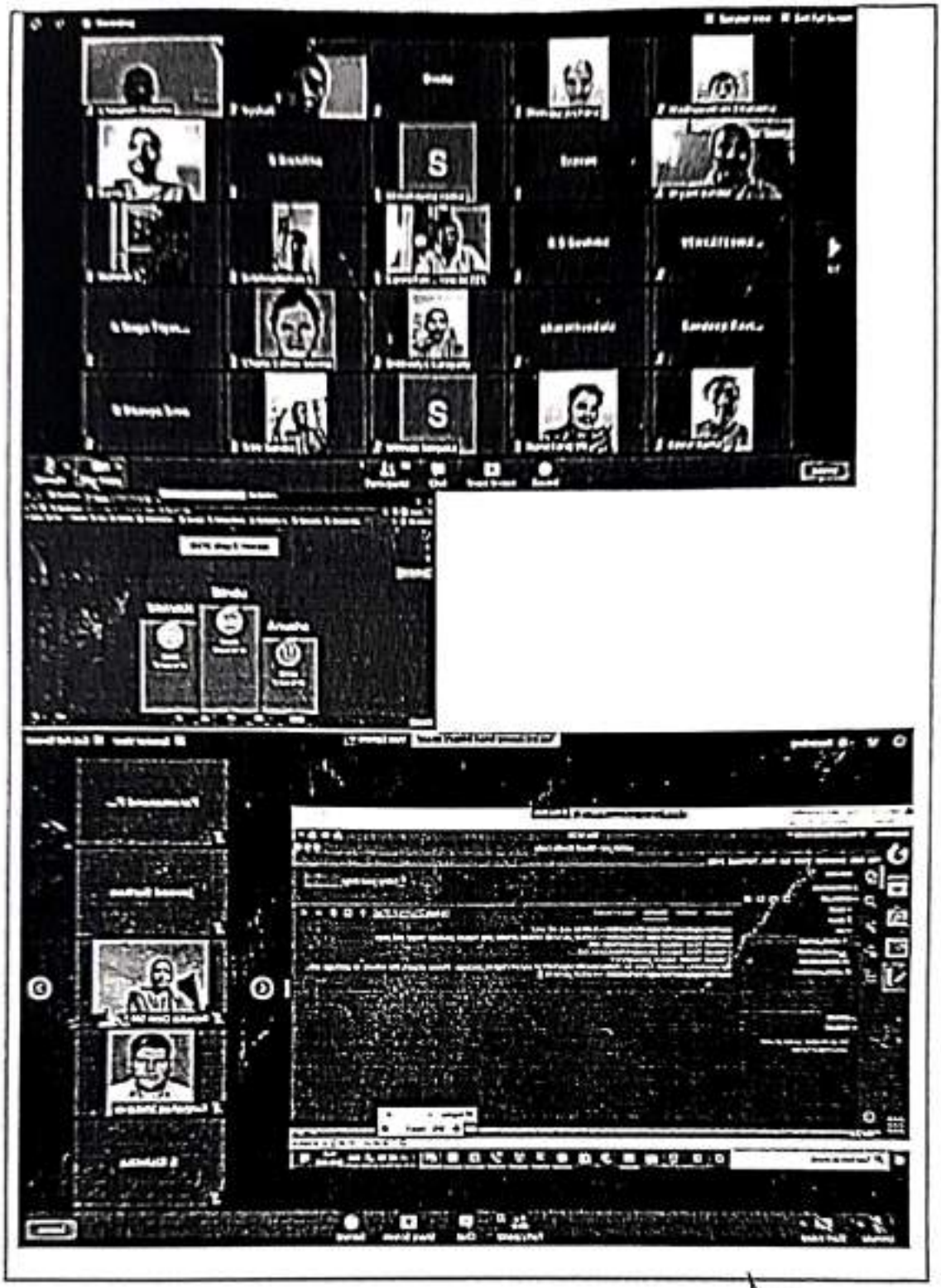

Dr. Renuka Devi S M
Co-ordinator

Dr. B Venkateshulu
HOD , ECE

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(58 & 14)

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Shaikpet Rd, Hyderabad, Telangana 500104

Department of Electronics and Communication Engg.

AY:19-20

Report on One-Week workshop on Robotics Powered with ROS, in association with IETE & SmartBridge

Name of the program : Robotics Powered with ROS
Date : 25-05-20 to 30-05-20
Venue: ONLINE

Description : The objectives of the workshop is to make the participants familiar with Robotic Operating System (ROS) and explain how robots can be simulated. Also different tools like Gazebo, Rviz and various sensors connection were explained.
Day1: Report on ROS
Day2: Introduction to ROS and ROS cheat sheet
Day3: ROS topics, services
Day4: Introduction to Rviz and Gazebo simulator
Day5: Building two wheeled Robot
Day6: Integrating two wheeled Robot with LDS sensor

Outcomes: 1. Basics of ROS were discussed in the workshop.
2. Participants were able to develop hands-on problems in Robotic Operating System.
3. Participants were able to give ideas of different real time problem that can be simulated in ROS.

Speaker details:
Name: Durga Prasad
Company: Smartbridge
Role: Robotics Engineer

Number of participants/students benefited: ~~65~~ Participants attended & given Excellent Feedback

Overall feedback was taken and feedback was analyzed(enclosed), all the participants expressed that the sessions were very good.

(Dr. Renuka Devi. S.M)
Co-ordinator

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