

For Syllabus, Question Papers, Notes & many More

RO6702 FIELD AND SERVICE ROBOTIC

DETAILED SYLLABUS

UNIT I INTRODUCTION

History of service robotics – Present status and future trends – Need for service robots - applications- examples and Specifications of service and field Robots. Nonconventional Industrial robots.

UNIT II LOCALIZATION

Introduction-Challenges of Localization- Map Representation- Probabilistic Map based Localization- Monte carlo localization- Landmark based navigation- Globally unique localization- Positioning beacon systems- Route based localization.

UNIT III PLANNING AND NAVIGATION

Introduction-Path planning overview- Road map path planning- Cell decomposition path planning- Potential field path planning- Obstacle avoidance - Case studies: tiered robot architectures.

UNIT IV FIELD ROBOTS

Ariel robots- Collision avoidance- Robots for agriculture, mining, exploration, underwater, civilian and military applications, nuclear applications, Space applications.

UNIT V HUMANOIDS

Wheeled and legged, Legged locomotion and balance, Arm movement, Gaze and auditory orientation control, Facial expression, Hands and manipulation, Sound and speech generation, Motion capture/Learning from demonstration, Human activity recognition using vision, touch, sound, Vision, Tactile Sensing, Models of emotion and motivation. Performance, Interaction, Safety and robustness, Applications, Case studies.

TEXT BOOKS

1. Roland Siegwart, Illah Reza Nourbakhsh, Davide Scaramuzza, 'Introduction to Autonomous Mobile Robots', Bradford Company Scituate, USA, 2004.

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2. Riadh Siaer, 'The future of Humanoid Robots- Research and applications', Intech Publications, 2012.

REFERENCES

1. Richard D Klafter, Thomas A Chmielewski, Michael Negin, "Robotics Engineering – An Integrated Approach", Eastern Economy Edition, Prentice Hall of India P Ltd., 2006.

2. Kelly, Alonzo; Iagnemma, Karl; Howard, Andrew, "Field and Service Robotics ", Springer, 2011.

OBJECTIVES

- To study the various parts of robots and fields of robotics.
- To study the various kinematics and inverse kinematics of robots.
- To study the control of robots for some specific applications.