UNIVERSITÀ DI PAVIA

Anno Accademico 2019/2020

ROBOTICS	
Anno immatricolazione	2018/2019
Anno offerta	2019/2020
Normativa	DM270
SSD	ING-INF/05 (SISTEMI DI ELABORAZIONE DELLE INFORMAZIONI)
Dipartimento	DIPARTIMENTO DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE
Corso di studio	COMPUTER ENGINEERING
Curriculum	Embedded and Control Systems
Anno di corso	2°
Periodo didattico	Primo Semestre (30/09/2019 - 20/01/2020)
Crediti	6
Ore	50 ore di attività frontale
Lingua insegnamento	English
Tipo esame	SCRITTO E ORALE CONGIUNTI
Docente	FACCHINETTI TULLIO (titolare) - 5 CFU LI HOWARD - 1 CFU
Prerequisiti	Basic concepts of computer science and dynamical systems are required.
Obiettivi formativi	The course provides the know-how to design and engineering a robotic system. The study is concentrated on the systemic dimension of the design, i.e., on some of the main building blocks of a robot, their interconnection and control. This organization allows to provide the big picture of a robot system, while providing insights on some aspects that are considered of particular interest.
Programma e contenuti	The program includes the study of the characteristics of the most widely used sensors in robotic applications, including: linear and angular position sensors, pressure sensors, accelerometers, force sensors, thermal sensors, image sensors (cameras), and "time sensors". We will

	study some techniques for the use of sensors and their main application fields will be shown. Techniques and issues in real-time acquisition of sensory data will be explored. Moreover, the subject of Finite State Machines will be introduced as a useful tool for implementing robotic control and coordination algorithms. Finally, we will describe some basic techniques of robot navigation, which make use of different sensors among those presented.
Metodi didattici	Lectures (hours/year in lecture theatre): 45 Practical class (hours/year in lecture theatre): 0 Practicals / Workshops (hours/year in lecture theatre): 0
Testi di riferimento	The study material consists mostly of slides available on the course website. For further details of the various topics covered, you can consult the following texts: [1] John Brignell, Neil White. Intelligent Sensor System. Institute of Physics Publishing, Bristol and Philadelphia. [2] Paulo Verissimo, Luis Rodriguez. Distributed Systems for System Architects. Kluwer Academis Publishers. [3] Giorgio C. Buttazzo. Hard Real-time Computing System. Springer. [4] Howie Choset, Kevin M. Lynch, Seth Hutchinson, George Kantor, Wolfram Burgard, Lydia E. Kavraki, Sebastian Thrun. Principles of Robot Motion: Theory, Algorithms, and Implementations. The MIT Press.
Modalità verifica apprendimento	The exam is based on a single written test regarding the topics covered in the course. There are no tests during the course or oral tests. On the other hand, a practical test is required that involves the implementation of the control and coordination strategy of a simple mobile robot in a simulated environment. Specific information and details regarding the practice test will be given during the course. More information can be found at the page dedicated to the course on the homepage of Prof. Facchinetti.
Altre informazioni	The exam is based on a single written test regarding the topics covered in the course. There are no tests during the course or oral tests. On the other hand, a practical test is required that involves the implementation of the control and coordination strategy of a simple mobile robot in a simulated environment. Specific information and details regarding the practice test will be given during the course. More information can be found at the page dedicated to the course on the homepage of Prof. Facchinetti.
Obiettivi Agenda 2030 per lo sviluppo sostenibile	$lbl_legenda_sviluppo_sostenibile