

Research group: Service Robotic Group - DIEES University of Catania
Head of group: Prof. Dr.Ing. Giovanni Muscato

Contact Information

Postal address: Università degli Studi di Catania
Facoltà di Ingegneria
DIEES
95125 Catania
Italy

Street address: viale A. Doria 6
95125 Catania

Tel.: +39 095 7382321
Fax.: +39 095 7387961

Email: guscato@diees.unict.it
URL: <http://robotic.diees.unict.it>

Abstract:

Service robotic group has been involved in many research activities concerning the development of mobile robots for outdoor applications. Main field of activities have been volcanic exploration with the development of the ROBOVOLC robot, the WHEELLEG hybrid robot, and the M6 articulated robot. Research activities have been performed also for the adoption of UAV for gas collection and visual inspections. Other activities involve agricultural applications for fruit picking and greenhouse spraying.



ROBOVOLC



WHEELLEG



M6



UAV



CINGO

Detailed research information:

The University of Catania was founded in 1434 and is one of the oldest University in Italy. The Dipartimento di Ingegneria Elettrica Elettronica e dei Sistemi (DIEES) was established in 1971. In the laboratory of DIEES several prototype of service and mobile robots have been designed and built. The Service robotic group has carried out research activity in the mobile and industrial robotic sectors within several national and international projects, in cooperation with private and public research centres. The group is expert in the design, realisation and testing of mobile robot prototypes, indoor and outdoor, climbing robots with particular reference to the development of embedded control systems.

Service robotic group has been involved in many research activities concerning the development of mobile robots for outdoor applications. Main field of activities have been volcanic exploration with the development of the ROBOVOLC robot a six-wheeled robot with a manipulator arm and many different cameras and sensors, the WHEELLEG hybrid robot with two front legs and two rear wheels acting together and the M6 articulated robot. The group has coordinated the European project ROBOVOLC (www.robovolc.dees.unict.it). Recently research activities have been performed, also in cooperation with the INGV (Volcanology institute of Italy), for the adoption of UAV for gas collection and visual inspections and an autopilot and several UAVs have been developed and tested. Other activities involve agricultural applications with the development of a robotic system for orange picking, a design of a CINGO robot for artichoke picking and the development of a robotic system for autonomous spraying in greenhouses. The group is partner of the European project MOW-BY-SAT (www.mow-by-sat.eu) for the development of an autonomous lawn mower robot by using cheap GPS systems.

In cooperation with the University of Hertfordshire, the group has started in the last years strong research activities on the telecontrol of remote robots by using stereovision and augmented reality interfaces.

Main recent publications on unmanned ground vehicles:

S.Livatino, G.Muscato, F.Privitera , “*Stereo Viewing and Virtual Reality Technologies in Mobile Robot Teleguide*”, accepted in IEEE Transactions on Robotics, prepublished on line 2009 (Digital Object Identifier: 10.1109/TRO.2009.2028765).IEEE Transaction on Robotics

G. Astuti, D. Longo, C. D. Melita, G. Muscato, A. Orlando, “*HIL tuning of UAV for exploration of risky environments*”, International Journal on Advanced Robotic Systems, Vol.5, N.4, (ISSN 1729-8806), December 2008.

S. Livatino, G. Muscato, S. Sessa, C.Koffel, C. Arena, A. Pennisi, D. Di Mauro, E. Malkondu, “*Depth-Enhanced Mobile Robot Teleguide based on Video Images*”, IEEE Robotic and Automation Magazine, Special issue on New Vistas and Challenges in Telerobotics, Vol15,N.4, pp.58-67, December 2008 (Digital Object Identifier 10.1109/MRA.2008.929927)

G. Astuti, G. Giudice, D. Longo, C. D. Melita, G. Muscato, A. Orlando, “*An overview of the “Volcan Project”: an UAS for exploration of volcanic environments*”, Journal of Intelligent and Robotic systems, Springer, Vol.54, pp.471-494, (published online 21/07/2008 DOI : 10.1007/s10846-008-9275-9), March 2009.

G. Muscato and G. Spampinato, “*Kinematical Model and Control Architecture for a Human Inspired Five DOF Robotic Leg*”, International Journal on Mechatronics, Elsevier, Vol. 17, N. 1, pp.45-63 February, 2007

D. Longo, G. Muscato, "*The Alicia3 climbing robot for automatic wall inspection*", IEEE Robotics and Automation Magazine, Vol. 13, N.1, pp. 42-50, March 2006.

G. Muscato, G. Spampinato, "*A Pneumatic Human Inspired Robotic Leg: Control Architecture and Kinematical Overview*", International Journal of Humanoid Robotics, World Scientific Publishing Company, Vol.3, No.1, pp.49-66, 2006.

G.Muscato, M. Prestifilippo, N. Abbate, I. Rizzuto, "*A Prototype of an Orange Picking Robot: Past History, the New Robot and Experimental Results*", Industrial Robot: An International Journal Vol.32, • N.2, 2005.

G. Muscato, D. Caltabiano, S. Guccione, D. Longo, M. Coltelli, A. Cristaldi, E. Pecora, V. Sacco, P.Sim, G.S. Virk, P. Briole, A. Semerano, T. White,"*ROBOVOLC: A Robot for volcano exploration – Result of first test campaign*", Industrial Robot : An International Journal, Vol. 30, N.3,pp.231-242, 2003.

S. Guccione, G. Muscato, "*Control Strategies Computing architectures and Experimental Results of the Hybrid Robot Wheeleg*", IEEE Robotics and Automation Magazine, (IEEE Piscataway, U.S.A.), Vol.10, N.4, pp.33-43, December 2003.