

学术报告会

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地点: 电信群楼2-410会议室 & 腾讯会议 (532 359 378)

A Revolutionary Theranostics Approach for Robotized Colonoscopy



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摘要:

This talk will present the underlying concepts of EndoTheranostics, a novel ERC Synergy Grant project aiming at revolutionizing the diagnosis and therapy (theranostics) of colorectal cancer (CRC), impacting the quality of life of millions of individuals. CRC represents a significant proportion of malignant diseases. Interventions are often carried out during the latter stages of development, leading to low patient survival rates and poor quality of life. At the same time, effective methods to treat polyps in the colon are limited. Current approaches are often associated with unsafe oncological margins and high complication rates, requiring life-changing surgery. EndoTheranostics will usher in a new era for screening colonoscopy, advancing the frontiers of medical imaging and robotics. A tip-growing or eversion robot with a sleeve-like structure will be created to extend deep into hollow spaces while perceiving the environment through multimodal imaging and sensing. It will also act as a conduit to transfer miniaturized instruments to the remote site within the colon for theranostics. With these capabilities, the system will be able to offer: (i) painless colon cleansing in preparation for endoscopy, (ii) real-time polyp detection and tissue characterization through AI-assisted multimodal imaging, (iii) effective removal of polyps by conveying a "miniature mobile operating chamber" equipped with microsurgical tools to the target through the lumen of the eversion robot.

简介:

Bruno Siciliano is Professor of Control and Robotics, Chair of the Scientific Council of the Interdepartmental Center for Advanced Robotics in Surgery (ICAROS) and Coordinator of the PRISMA Lab in the Department of Electrical Engineering and Information Technology at University of Naples Federico II. He is also Honorary Professor of Óbuda University, where he holds the Kálmán Chair. He is a Board Director and Head of the Robotics Department at CREATE Consortium. He has co-authored/co-edited 19 books, more than 130 journal papers and more than 300 conference papers/book chapters; his book Robotics: Modelling, Planning and Control is one of the most widely adopted textbooks worldwide and has been translated into Chinese, Greek and Italian. He has delivered more than 30 keynotes, more than 150 invited lectures and seminars at institutions worldwide, and he has been the recipient of several awards, including the recent IEEE RAS Pioneer in Robotics and Automation Award (2024). He is a Fellow of IEEE, ASME, IFAC and AAIA. He is co-editor of the Springer Tracts in Advanced Robotics series, the Springer Proceedings in Advanced Robotics series, and has served on the Editorial Boards of several journals as well as chair or co-chair for numerous international conferences. He co-edited the Springer Handbook of Robotics, which received the AAP PROSE Award for Excellence in Physical Sciences & Mathematics and was also the winner in the category Engineering & Technology (2009). His group has been granted twenty-five European projects, including a Synergy Grant and an Advanced Grant from the European Research Council. He has served the IEEE Robotics and Automation Society as President, as Vice-President for Technical Activities and Vice-President for Publications, as a member of the AdCom, and as a Distinguished Lecturer. He has been a Board Director of the European Robotics Association. Professor Siciliano is currently an IFAC Pavel J. Nowacki Distinguished Lecturer, a member of the International Foundation of Robotics Research Board and a member of the Advisory Board of Rovial Space.