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Collana	Lecture Notes in Bioengineering, , 2195-2728
Disciplina	610.285
Soggetti	Biomedical engineering Medical physics Robotics Nanoelectromechanical systems Computational intelligence Automatic control Automation Biomedical Engineering and Bioengineering Medical Physics Nanoscale Devices Computational Intelligence Control, Robotics, Automation
Lingua di pubblicazione	Inglese
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Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	reviews orimimetic deployable mechanisms with potential functionalities in biomedical robotics -- Deployable and interchangeable telescoping tubes actuated with multiple tendons -- Deployable and foldable parallelogram mechanism for generating remote center of motion -- Origami Bending and Bistability for Transoral procedures -- Force-sensitive origami trihexaflexagon gripper actuated by foldable pneumatic bellows -- Untethered Inflatable Origami -- Wormigami and Tippysaurus origami structures -- Multi-leg insect-size soft foldable robots -- Magnetically Actuated Luminal Origami (MALO) -- Compressable and steerable Slinky motions

-- Electromagnetically actuated origami structures for untethered optical steering -- Untethered soft ferromagnetic quad-jaws cootie catcher with selectively coupled degrees of freedom -- Wearable Origami Rendering Mechanism (WORM) for aspiring haptic illusions -- Wearable Compression-aware Force Rendering (CAFR) with deployable compression generating and sensing. These multi-DOF deployable robots integrated tactile interface sensing and multimodal actuation -- Kinesthesia sensorization of foldable tubular designs using soft sensors -- Flat Foldable Kirigami for Chipless Wireless Sensing -- Deployable kirigami for intra-abdominal monitoring -- Stretchable Strain Sensors by Kirigami Deployable on Balloons with Temporary Tattoo Paper -- Multi-DOF proprioceptive origami structures with fiducial markers and computer vision-based optical tracking -- Multimodal robotic deployable mechanisms with intelligent perception capabilities. .

Sommario/riassunto

This book highlights the principles, design and characterization of mechanically compliant soft and foldable robots. Traditional rigid robots with bulky footprints and complicated components prolong the design iteration and optimization for keyhole and minimally invasive transluminal applications. Therefore, there is an interest in developing soft and foldable robots with remote actuation, multimodal sensing and machine intelligence. This book discusses the use of foldable and cuttable structures to design biomimetic deployable soft robots, that can exhibit a fair number of motions with consistency and repeatability. It presents the overall design principles, methodology, instrumentation, metamorphic sensing, multi-modal perception, and machine intelligence for creating untethered foldable active structures. These robotic structures can generate a variety of motions such as wave induction, compression, inchworm, peristalsis, flipping, tumbling, walking, swimming, flexion/extension etc.Remote actuation can control motions along regular and irregular surfaces from proximal sides. For self-deployable medical robots, motion diversity and shape reconfiguration are crucial factors. Deployable robots, with the use of malleable and resilient smart actuators, hold this crucial advantage over their conventional rigid robot counterparts. Such flexible structures capable of being compressed and expanded with intelligence perceptions hold enormous potential in biomedical applications.