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Robotic engineering inspired by biology_biomimetics_has many potential applications: robot snakes can be used for rescue operations in disasters, snake-like endoscopes can be used in medical diagnosis, and artificial muscles can replace damaged muscles to recover the motor functions of human limbs. Conversely, the application of robotics technology to our understanding of biological systems and behaviors_biorobotic modeling and analysis_provides unique research opportunities: robotic manipulation technology with optical tweezers can be used to study the cell mechanics of human red blood cells, a surface electromyography sensing system can help us identify the relation between muscle forces and hand movements, and mathematical models of brain circuitry may help us understand how the cerebellum achieves movement control.

Biologically Inspired Robotics contains cutting-edge material_considerably expanded and with additional analysis_from the 2009 IEEE International Conference on Robotics and Biomimetics (ROBIO). These 16 chapters cover both biomimetics and biorobotic modeling/analysis, taking readers through an exploration of biologically inspired robot design and control, micro/nano bio-robotic systems, biological measurement and actuation, and applications of robotics technology to biological problems.

Contributors examine a wide range of topics, including:

A method for controlling the motion of a robotic snake
The design of a bionic fitness cycle inspired by the jaguar
The use of autonomous robotic fish to detect pollution
A noninvasive brain-activity scanning method using a hybrid sensor
A rehabilitation system for recovering motor function in human hands after injury
Human-like robotic eye and head movements in human-machine interactions

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engineering, robotics, and biomedical engineering, this text helps readers understand the technology and principles in this emerging field.