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Soft Robot Revolution:

Turning Soft Materials into Intelligent Machines

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Venue: Room212 (12B), 1F, Faculty of Eng. Bldg. 2

Abstract:

The research of soft robotics has been exploring, since its incarnation, the power of physical adaptation in autonomous robots. The capability of shape conformability to environment, for example, can facilitate control of grasping and climbing, on the one hand, and soft sensors can transform rich information extracted from complex physical stimuli, on the other. While these explorations are important and fundamental on its own right, there has been a new trend of investigation on the notions of plastic physical adaptation, in which robots can modify their own bodies in a more persistent form. Previously there were demonstrations, for example, of robots that can change the shapes and sizes of manipulator's end-effectors, self-reconfigurable modular robots, and growing tree-trunk like structures. For opening a door to this new field of autonomous adaptive robots, we have been exploring a set of technologies to autonomously design and construct complex soft robots, such as multi-material 3D printing, electrically conductive elastomers, and model-free design automation processes. With the recent rapid progress of these technologies, we are now able to tackle a highly challenging problem of autonomous design optimisation inspired from biological systems. In this talk, I would like to introduce some of our recent soft robotics projects in our laboratory and to discuss the challenges and perspectives of this research area.



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