

Evolutionary robotics + 3d printing = rapid & low-cost
deployment of autonomous mobile robots

ABSTRACT

The design, programming and deployment of autonomous mobile robots is a highly complex, time-consuming and expensive endeavor. In this research, we propose an approach which combines evolutionary robotics with 3D printing as an approach for rapid and cheaper method for the fabrication of autonomous mobile robots. We have purposefully chosen the domains of continuum robots and hybrid articulated-wheeled robots as the proving grounds for our approach as these two areas of autonomous robotics have been proven to be among the most complex to design and program as well as being highly cost-intensive to fabricate and deploy in the real world. Capitalizing on the automated design and optimization phases of evolutionary robotics and harnessing the rapid and relatively low cost of 3D printing, our tests show that the time required and cost involved to design, fabricate and successfully deploy evolved and 3D printed continuum robots as well as hybrid articulated-wheeled mobile robots can indeed be observably be reduced. Analysis shows that the transference from simulated to real-world robots is indeed feasible and readily achievable with functioning mobile robots with autonomous behaviors that display a good level of fidelity.