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Global Challenges of the 21st Century
1) Technological development and human health/ quality of life
2) Climate change and environmental sustainability
3) Democracy and cohesion in Europe

Neural Circuit Policies

A central goal of artificial intelligence is to design algorithms that are both generalisable and interpretable. We combine brain-inspired neural computation principles and scalable deep learning architectures to design compact neural controllers for task-specific compartments of a full-stack autonomous vehicle control system. We show that a single algorithm with 19 control neurons, connecting 32 encapsulated input features to outputs by 253 synapses, learns to map high-dimensional inputs into steering commands. This system shows superior generalisability, interpretability and robustness compared with orders-of-magnitude larger black-box learning systems. The obtained neural agents enable high-fidelity autonomy for task-specific parts of a complex autonomous system.

Radu Grosu is a full professor and the head of the Institute of Computer Engineering at the Faculty of Informatics of the Vienna University of Technology. He is also head of the cyber-physical-systems group within the Institute of Computer Enngineering and a research professor at the Department of Computer Science of the State University of New York at Stony Brook. Prof. Grosu's research interests include modelling, analysis and control of cyber-physical systems and biological systems. The application's focus includes distributed automotive and avionic systems, IoT, autonomous mobility, green operating systems, mobile ad-hoc networks, cardiac and neural networks, and genetic regulatory networks. Radu received the National Science Foundation Career Award, the State University of New York Research Foundation Promising Inventor Award, the Association for Computing Machinery Service Award. He is an elected member of the International Federation for Information Processing, Working Group 2.2.