

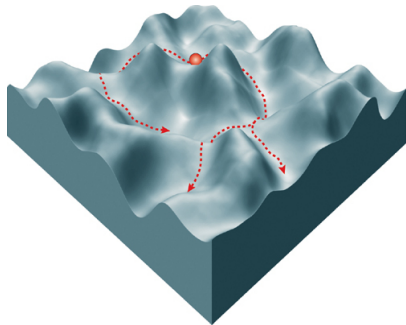
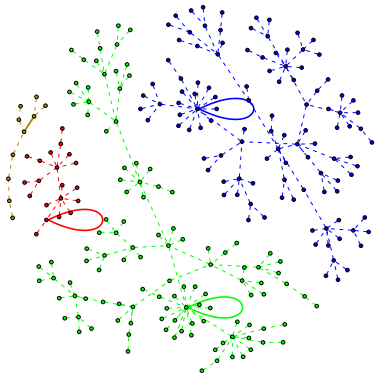
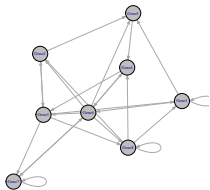
# Dynamical properties of artificially evolved Boolean network robots



A. Roli, M. Villani, R. Serra, S. Benedettini,  
C. Pinciroli and M. Birattari

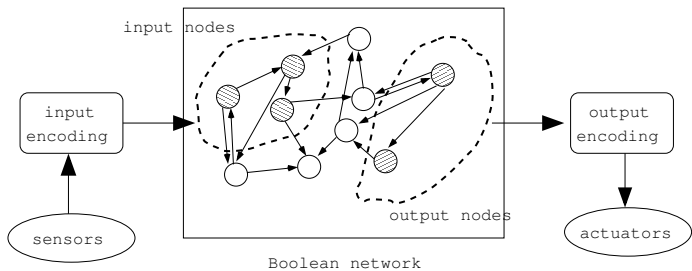
AI\*IA 2015, Ferrara

# Gene regulatory models





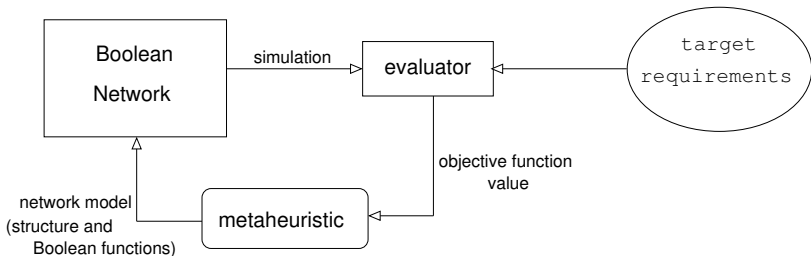
# Boolean network robotics



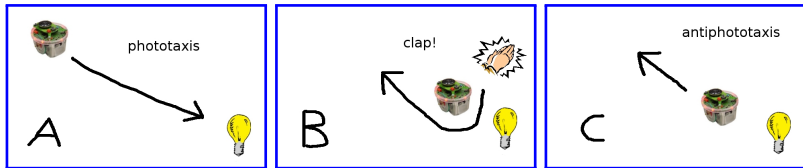


# Boolean network robotics

## Automatic design of robot controllers



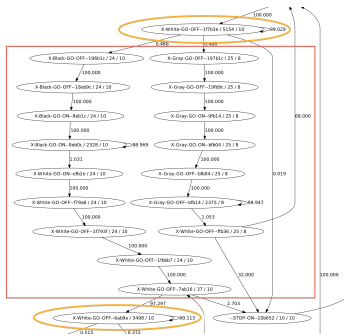
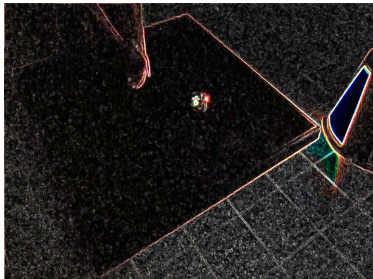
## The task



### Design process:

- **Adaptive walk** in the space of Boolean functions
- **Incremental training:** first phototaxis, then composite task

# Analysis of BN-robot dynamics



- BN trajectory states statistics
- Information theory measures

# Results



BN-robots optimally balancing robustness and evolvability show **generalisation** and **high statistical complexity**

