On controlling ensembles of memoryless robots

Roderich Gross
Natural Robotics Lab
Robot gathering

Controller output is a pure function of the present input:

\[ O(t) = f(I(t)) \]
1-bit input
Rendezvous

Ensembles of physically connected modules
Occlusion-based phototaxis

One controller per module face: \( f: \{0,1\} \times \{0,1\} \rightarrow \{0,1\} \)

Doyle et al. IEEE Transactions on Robotics (early access: https://doi.org/10.1109/TRO.2020.3031880)
Generalisations

Doyle et al. IEEE Transactions on Robotics, 2021