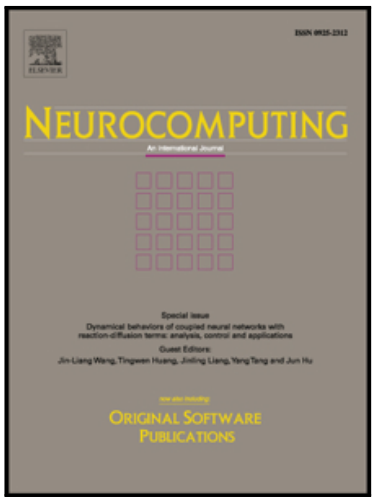

Equal but different: Task allocation in homogeneous communicating robots

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PII: S0925-2312(17)31117-7
DOI: 10.1016/j.neucom.2017.05.093
Reference: NEUCOM 18618

To appear in: *Neurocomputing*

Received date: 16 October 2016
Revised date: 12 March 2017
Accepted date: 11 May 2017

Please cite this article as: Onofrio Gigliotta, Equal but different: Task allocation in homogeneous communicating robots, *Neurocomputing* (2017), doi: 10.1016/j.neucom.2017.05.093

Equal but different: Task allocation in homogeneous communicating robots

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Abstract

Social animals have conquered the world thanks to their ability to team up in order to solve survival problems. From ants to human beings, animals show the ability to cooperate, communicate and divide labor among individuals. Cooperation allows members of a group to solve problems that a single individual could not, or to speed up a solution by splitting a task into subparts. Biological and swarm robotics studies suggest that division of labor can be favored by differences in local information, especially in clonal individuals. However, environmental information alone could not suffice despite a task requires a role differentiation to be solved. In order to overcome this problem, in this paper, we analyze and discuss the role of a communication system able to differentiate signals emitted among groups of homogeneous robots equipped with three neurocontrollers of increasing complexity, to foster the evolution of a successful role allocation strategy in a context in which local information is not enough. Moreover, emerged behaviors suggest a relation between the complexity of neural networks and the cognitive complexity of the communication strategies used to carry out role allocation.

Keywords: Collective robotics, neural networks, division of labour

1. Introduction

Social animals rule the world we live in thanks to their ability to cooperate so as to form teams of individuals able to solve tasks too difficult or impossible

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