I-SA04 Multi-Agent Systems

09:00-11:00 **Chair : Bae Jong Il (Pukyong National Univ.)**
Room : C203 **Co-Chair : Masanori Sugisaka (Oita Univ.)**

09:00 – 09:20 **I-SA04-1**

A Study of Cooperative Algorithm in Multi Robots by Reinforcement Learning

Seong-Woo Hong, Gyu-Jong Choi, Jong-Il Bae, and Doo-Sung Ahn
(Pukyong National Univ.)

In multi robot environment, the action selection strategy is important for the cooperation and coordination of multi agents. However the overlap of actions selected individually by each robot makes the acquisition of cooperation behaviors less efficient. In addition to that, a complex and dynamic environment makes cooperation even more difficult. So in this paper, we propose a control algorithm which enables each robot to determine the action for the effective cooperation in multi-robot system. Here, we propose cooperative algorithm with reinforcement learning to determine the action selection. In this paper, when the environment changes, each robot selects an appropriate behavior strategy intelligently. We employ ...

09:20 – 09:40 **I-SA04-2**

Agent-based Transportation Control with Pheromone Communication

Ken Sotobayashi, Tatsushi Nishi, Masami Konishi, and Jun Imai
(Okayama Univ.)

In this paper, we present an agent-based transportation routing method in a semi-conductor production line. The main characteristic of the proposed method is that each AGV agent individually searches candidates of its route with reference of the pheromone information based on the use of an analogy of Ant System. The proposed method is applied to several routing problems. The performances of the proposed method are compared with those of a Genetic Algorithm. The effectiveness of the proposed method is conrmed by many numerical examples. In order to demonstrate the effectiveness of the proposed method for an actual problem, the proposed method is applied to a dynamic motion planning. The proposed method ...

09:40 – 10:00 **I-SA04-3**

Auction based Task Reallocation in Multiagent Systems

Sang G. Lee, and In C. Kim
(Kyonggi Univ.)

Task allocation is a key problem in multi-agent systems. The importance of automated negotiation protocols for solving the task allocation problem is increasing as a consequence of increased multi-agent applications. In this paper, we introduce the multiagent Traveling Salesman Problem(TSP) as an example of task reallocation problem, and suggest Vickery auction as an inter-agent coordination mechanism for solving this problem. In order to apply this market-based coordination mechanism into multiagent TSPs, we define the profit of each agent, the ultimate goal of negotiation, cities to be traded out through auctions, the bidding strategy, and the order of auctions. The primary advantage of such approach is that it can find an optimal task allocation ...

10:00 – 10:20 **I-SA04-4**

Research of soccer robot system strategies

M. Sugisaka* , M. Hara**
(Oita Univ.)

In this paper, the multiple micro robot soccer playing system is introduced at first. Learning and evolving in artificial agents is a difficult problem, but on the other hand a challenging task. In our laboratory, this soccer studies mainly centered on single agent learning problem. The construction of such experimental system has involved lots of kinds of challenges such as robot designing, vision processing, motion controlling. At last we will give some results showing that the proposed approach is feasible to guide the design of common agents system.

10:20 – 10:40 **I-SA04-5**

Adapative Modular Q-Learning for Agents' Dynamic Positioning in Robot Soccer Simulation

Ki-Duk Kwon, In-Cheol Kim
(Kyonggi Univ.)

The robot soccer simulation game is a dynamic multi-agent environment. In this paper we suggest a new reinforcement learning approach to each agent's dynamic positioning in such dynamic environment. Reinforcement learning is the machine learning in which an agent learns from indirect, delayed reward an optimal policy to choose sequences of actions that produce the greatest cumulative reward. Therefore the reinforcement learning is different from supervised learning in the sense that there is no presentation of input-output pairs as training examples. Furthermore, model-free reinforcement learning algorithms like Q-learning do not require defining or learning any models of the surrounding environment. Nevertheless ...

10:40 – 11:00 **I-SA04-6**

A neuron model that a moving object can be recognized in the planer region

Yasuhiro SEKIYA (Miyazaki Univ.)
Tomoo AOYAMA, Hiroki TAMURA, Zheng TANG (Toyama Univ..)

We propose a neuron model that has the interactions between excitation and inhibition. By adopting the knowledge of the physiology, the neuron model by imitating structure of a neuron, has the system resemble a neuron. We considered a neuron system based on the arguments, and wished to examine whether the system had reasonable function. Koch, Poggio and Torre believed that inhibition signal would shunt excitation signal on the dendrites. They believed that excitation signal operated input signals and inhibition did as delayed ones. Thus, they were sure that function for directional selectivity was arisen by the shunting. We construct the neuron system with Koch's concept. Our neuron model has 3-layer structure and ...