I-TP08

Control Techniques for Artificial Life robot

13:00-15:00   **Chair : Tomasz Kubik (Oita Univ.)**
Room : C302   **Co-Chair : Andrey A. Loukianov (Oita Univ.)**

13:00 – 13:20   I-TP08-1

Fundamental wheel Control for Artificial Life -robot

Masanori Sugisaka , Shuichi Otsu , Toshio Maeyama
(Oita Univ.)

Recently the robot industry has developed quickly. There are robots carrying luggage at factories, the amusement robots (such as the pet-type robot) in the house, and so on. As the ability of computers improve, robot ability also improves, because many calculations can be done in little time. Consequently robots can perform complex motions by various control methods. The robot in our laboratory was developed in order to assist various works in a hospital. We controlled our robot using PID control method. So this paper is written about PID control.

13:20 – 13:40   I-TP08-2

Image processing of artificial life-robot

Masanori Sugisaka, Shohei Kuriyama
(Oita Univ.)

At present, information processing by computer is greatly concerned in our society. And robots controlled by computer are much introduced in a factory's production line and so on, robot abilities develop robot obtain good results. And recently, robots greatly take part in not only limited place, for example a factory and so on, but also general a household. Some robots pleased people, others help humans task. Robots are sure to be great useful in nursing that as regarded our society as questionable. In this situation, we request that robots can take vision like human's eyes…

13:40 – 14:00   I-TP08-3

An Inexpensive Ant Robot: Basic Concept and Implementation

Boonchana Purahong, Sanya Apiratikorn, Pitikhate Sooraksa
(Department of Industrial Technology and Information Engineering
Faculty of Engineering.)

Imitating animal behaviors is one of the research projects in robotics. This paper presents basic concepts and implementation of ant robots. Our ant robots refer to the robots that are designed and built by imitating ants' behaviors. ant robot is 5x5x6 cm3. A special feature of our ant robot is low cost, we spend under 30 $US for this project.

14:00 – 14:20   I-TP08-4

Improvement on the Image Processing for an Autonomous Mobile Robot with an Intelligent Control System

Jiwu Wang (Tsinghua Univ.)
Masanori Sugisaka(Oita Univ.)

A robust and reliable path recognition system is one necessary component for the autonomous navigation of a mobile robot to help determining its current position in its navigation map. This paper describes a computer visual path-recognition system using on-board video camera as vision-based driving assistance for an autonomous navigation mobile robot. The common problem for a visual system is that its reliability was often influenced by different lighting conditions. Here, two different image processing methods for the path detection were developed to reduce the effect of the luminance: one is based on the RGB color model and features of the path; another is based on the HSV color model in the absence of luminance.

14:20 – 14:40   I-TP08-5

A Hybrid Method for Mobile Robot Probabilistic Localization Using a Single Camera

Andrey A. Loukianov and Masanori Sugisaka
(Oita Univ.)

Localization is one of the key problems in the navigation of autonomous mobile robots. The probabilistic Markov localization approaches offer a good mathematical framework to deal with the uncertainty of environment and sensor readings but their use for real-time applications is limited by their computational complexity. This paper aims to reduce the high computational cost associated with the probabilistic Markov localization algorithm. We propose a hybrid landmark-based localization method combining triangulation and probabilistic approaches, which can efficiently update position probability grid, while the probabilistic framework allows to make use of any available sensor data to refine robot's belief about its current location. The simulation results show the effectiveness and robustness of the method.

14:40 – 15:00   I-TP08-6

Intelligent navigation and control system for a mobile robot based on different programming paradigms

T. Kubik.(Wroclaw University of Technology)
M. Sugisaka(Oita Univ.)

The problem of robot navigation and control is a complex task. Its complexity and characteristics depends on the characteristics of the environment robot inhabits, robot construction (mechanical abilities to move, sense) and the job the robot is supposed to do. In this paper we propose a hybrid programming approach to mobile robot navigation and control in an indoor environment. In our approach we used declarative, procedural, and object oriented programming paradigms and we utilized some advantages of our distributed computing architecture. The programming languages corresponding to the paradigms we used were C, C++ and Prolog. In the paper we present some details of our mobile robot hardware and software structure, focusing on the software design and implementation.