D-FP04

Intelligent System 2

13:00 – 13:20   D -FP04-1

3D Map Building of the Mobile Robot Using Structured Light

Lee Oonkyu, Kim Minyoung, Cho Hyungsuck(KAIST)
and Kim Jaehoon(Samsung Heavy Industries

For autonomous navigation of the mobile robots, the robots' capability to recognize 3D environment is necessary . In this paper, an on-line 3D map building method for autonomous mobile robots is proposed. To get range data on the environment, we use a sensor system which is composed of a structured light and a CCD camera based on optimal triangulation. The structured laser is projected as a horizontal strip on the scene. The sensor system can rotate ±30° with a goniometer. Scanning the system, we get the laser strip image for the environments and update planes composing the environment by some image processing steps. From the laser strip on the captured image, we find a center point of each column, and make line segments through blobbing these center points. Then, the planes of the environments are updated. These steps are done on-line in scanning phase. With the proposed method, we can efficiently get a 3D map about the structured environment.

13:40 – 14:00   D -FP04-3

Force Control of the NFBC Compactor Using Fuzzy Algorithm

Yoon Ji Sup(KAERI), Kim Young-Hwan, Song Sang Ho and
Kang E-sokChungnam National Univ.)

To recycle the uranium resources in the spent nuclear fuels, all the fuel rods are extracted from the spent fuel assemblies. The remaining components of the spent fuel assembly after extracting all the rods, so called a NFBC(Non-Fuel Bearing Components), should be compacted to minimize the waste volume. To this present, KAERI (Korea Atomic Research Institute) has developed he NFBC compactor by introducing a new concept of cutting and compaction, In this paper, to achieve he maximum compaction ration of the NFBC volume while reducing compactor size, an fuzzy controller, which determines the reference force of the compactor, is proposed with using the fuzzy-inference.

14:20 – 14:40   D -FP04-5

On-line Tuning of AGC gain in Hot Strip Mill Using Adaptive Neuro-fuzzy Networks

Jung Youngran, Lee DongHoon, Won sangchul and Hong Sungchul
(POSTECH)

This paper describes a method to tune AGC gain of Hot Rolling Mill system, fixed during a rolling process, on-line using adaptive neuro-fuzzy networks. We use Recursive Least Squares (RLS) method with the selective forgetting (SF) factor algorithm to derive the new learning rules of the weights and B-spline membership function, which processes fixed number of control points, for on-line tuning of the fuzzy membership function. By using the local control property of B-spline curve, the BMF's can be tuned locally during learning process. The effectiveness of the proposed method has been demonstrated through a simulation.

13:20 – 13:40   D -FP04-2

The Determination of Coagulant Feeding Rate in the Water Treatment Plant Using Intelligent Algorithms

Kim Yongyeol, Jung Hyung-Tae, Jang Gil-Soo and Park Chul-Hong
(KOWACO) and Kang E-Sok(Chungnam National Univ.),

It is difficult to determine the feeding rate of coagulant in the water treatment plant, due to nonlinearity, multi-variables and slow response characteristics, etc. To deal with this difficulty, the neuro-fuzzy system and the genetic-fuzzy system were used in determining the feeding rate of the coagulant. The fuzzy system is excellently robust in multi-variables and nonlinear problems. Therefore it uses basic algorithm, but it is difficult to construct of the fuzzy parameter such as the rule table and the membership function, Therefore we made the neuro-fuzzy system and the genetic-fuzzy system with the fusion of learning algorithms and compared the performance of the two fuzzy systems. To apply these algorithms, we made the rule table, membership function from the actual operation data of the water treatment plant. We determined optimized feeding rate of coagulant using the fuzzy operation, and also compared ...

14:00 – 14:20   D -FP04-4

Walking Robot with 4 Legs

Jang Sunghwan, Lee Jayong and Kang Hoon
(Chung-Ang University)

This paper explains the walking robot with 4 legs. One leg is composed of 4 dc server motors and have 4 d.o.f. This walking robot has simple structure using " the principle of lever". The structure of robot models the 4 legs' animal such as dog. The walking patterns is various and complex. With inspecting the walking dogs, the walking motions implemented by patterns. The center of mass is important of this type robot. The significant issue of walking is weight. As the weight is lighter, so the robot well walks. The method of walking is patterns.