

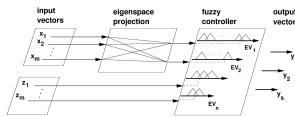
Learning 1

Chairs: Antti Koivo, Karl F. MacDorman

A General Learning Approach to Multisensor Based Control using Statistic Indices

Y. von Collani, M. Ferch, J. Zhang and A. Knoll
University of Bielefeld

- General fuzzy description for high dim. systems and sensor fusion.
- Principal component analysis and B-Spline fuzzy controller.
- Fusion of different sensor data can be handled by the controller.
- B-spline model may be utilised for sensor fusion and different problems.

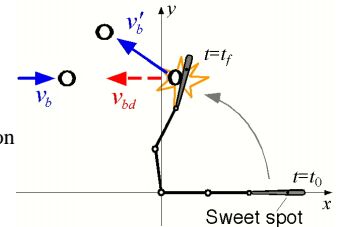


A Learning and Dynamic Pattern Generating Architecture for Skillful Robotic Baseball Batting System

X. Z. Zheng¹, W. Inamura², K. Shibata¹ and K. Ito¹

¹Tokyo Institute of Technology and ²Ishikawajima-Harima Heavy Industries

- Alternative approach to robotic dynamic manipulation
- Iterative learning combined with optimal control and ANN
- Computer simulation verification on a 3-DOF manipulator
- Effective and robust batting without given trajectory



On-Line Learning of the Sensors Fuzzy Membership Functions in Autonomous Mobile Robots

Hani Hagraas, Victor Callaghan and Martin Colley
University of Essex

- There is a necessity for online self-calibration for the fuzzy Membership Functions (MF) for fast changing and dynamic environments and difficult accessible environments.
- Our work reports on an approach based on the use of patented Genetic techniques to evolve the fuzzy MF of the individual behaviours.
- Our system learns the MF of the individual behaviours online and through interaction with the real sensors with the real world in a very short time interval of 4 minutes in outdoor challenging environments.
- This system can be applied to environments which are difficult to access such as nuclear reactors, space and under water environments.

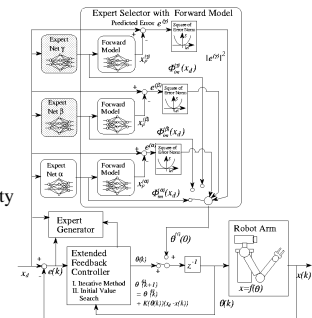


Modular Neural Net System for Inverse Kinematics Learning

E. Oyama¹ and S. Tachi²

¹Mechanical Engineering Laboratory (MEL) and ²The University of Tokyo

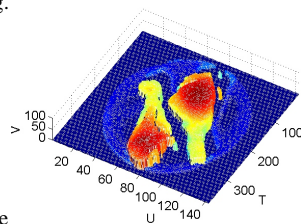
- Learning of the Discontinuous Inverse Kinematics Function
- Appropriate Switching of Multiple Continuous Neural Networks
- Success in Inverse Kinematics Learning of a 7-DOF arm Modular Neural Net System Can Handle the Discontinuity
- ¹Mechanical Engineering Laboratory (MEL) and ²The University of Tokyo



Teaching by Example in Food Assembly by Robot

T. G. Williams, J. J. Rowland, M. H. Lee and M. J. Neal
University of Wales, Aberystwyth

- Flexible assembly - make new products without reprogramming.
- Sensing real product examples to learn component placement.
- Initial results demonstrate the feasibility of the technique.
- Later results illustrate successful approximate matching of variable shapes.



Responding to Affordances: Learning and Projecting a Sensorimotor Mapping

Karl F. MacDorman
Osaka University

- To learn to recognize opportunities from experience
- Adaptive sensorimotor maps; Bayesian classification of affordance invariance in wavelet domain; Projection of maps to exploit affordances
- Effective in mobile robot
- Planned extension to abstract planning in a high DoF robot with complex dynamics

