Jirat Srisabye 2008: A Neuro-Fuzzy Wireless Network-Based Controller for Mobile Robot Control. Master of Engineering (Computer Engineering), Major Field: Computer Engineering, Department of Computer Engineering. Thesis Advisor: Associate Professor Yodyium Tipsuwan, Ph.D. 113 pages.

Network-Based Control (NBC) systems have been widely applied to increase the capability of tradition control systems such as remote control and monitoring of control devices via a network. However, a significant problem that degrades performance of a NBC system is the network-induced delay. In general, network delays are ambiguous and difficult to estimate.

In this research, the neuro-fuzzy NBC gain scheduling scheme is proposed to improve the performance of a quadratic curve controller, which is a path tracking controller for a mobile robot. A SANFIS (Self-Adaptive Neuro-Fuzzy Inference System) is utilized to classify a current network condition in order to handle ambiguity in network behaviors. The SANFIS periodically selects optimal gains including a α gain and a β gain in a quadratic curve controller with respect to the network condition. To illustrate this proposed approach, we applied a mobile robot path tracking control problem over a wireless IP network in a simulation and an experiment and compared the performance of our neuro-fuzzy NBC gain scheduling approach with a traditional approach.

Simulation results and experimental results show that the mobile robot with neuro-fuzzy NBC gain scheduling provides significantly better NBC system performances than the traditional approach. The robot can track the path faster and more accurate.

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