Title

An Embedded Interval Type-2 Neuro-Fuzzy Controller for Mobile Robot Navigation

Abstract

This paper describes intelligent navigation using an embedded interval type-2 neuro-fuzzy controller. Weightless neural network (WNNs) strategy is used because fast learning, easy hardware implementation and well suited to microcontroller-based-real-time systems. The WNNs utilizes previous sensor data and analyzes the situation of the current environment and classifies geometric feature such as U-shape, corridor and left or right corner. The behavior of mobile robot is implemented by means of interval type-2 fuzzy control rules can be generated directly from the WNNs classifier. This functionality is demonstrated on a mobile robot using modular platform and containing several microcontrollers implies the implementation of a robust architecture. The proposed architecture implemented using low cost range sensor and low cost microprocessor. The experiment results show, using that technique the source code is efficient. The mobile robot can recognize the current environment and to be able successfully avoid obstacle in real time and achieve smother motion compare than logic function and fuzzy type-1 controller.

Keywords: *Navigation, Fuzzy type-2, Embedded Mobile Robot, WNNs*