Fuzzy logic as a medium of activity in robotic research

Arun Raj Vasudev and Prahlad Vadakkepat
Dept. of Electrical and Computer Engineering
4 Engineering Drive 3, National University of Singapore,
Singapore 117576

Abstract of Talk

As a control methodology, fuzzy logic combines several interesting characteristics. Its natural tolerance to imprecise information makes it more suitable for developing robust systems (as opposed to “brittle” systems) than purely analytic/symbolic methods. The rules of fuzzy logic are essentially symbolic in nature, which allows human expertise to be imparted to machines conveniently and hints at a natural bridge between reactive and deliberative thoughts in robotic control. However, despite its symbolic nature, the rules are quantified in a manner that renders them easy to implement in machines. Fuzzy logic is also a soft-computing technique with interesting approximation properties.

All this makes fuzzy logic a convenient medium of activity upon which several approaches to designing robot control systems can be tested and refined. This paper looks at instances where fuzzy logic has been used in research on behavior-based, evolutionary and knowledge engineering approaches in robotic control. The first instance is that of a behavior-based control system for controlling a multi-agent robot soccer system. The second describes application of DNA coding and evolutionary computing techniques to control system tuning, and the third is a straightforward coding of the control system using the designer’s heuristics.

It is hoped that the bringing together of such seemingly disparate approaches using fuzzy-logic as a common basis will stimulate further thought on the versatility and limitations of fuzzy logic as a medium of activity for robotic control, and the fundamental similarities between various robotic control approaches that allow fuzzy-logic to be used in this manner.

About the Speaker

Mr. Arun Raj Vasudev is a Masters by research student with the Department of ECE, NUS. He completed his bachelors in Computer Engineering from NUS in 2002. Mr. Arun is interested in intelligent robot control strategies, biologically inspired robotics and evolutionary robotics.