An Introduction to Fuzzy Logic and Applications

Although the notion of Fuzzy Logic has been around for some time now, it is still considered a “non-classic” approach to problem-solving. This tutorial will provide an introduction to Fuzzy Logic, presenting some basic concepts, but mainly by showing several applications, both taken from the literature and from the speaker’s own experience.

Fuzzy Logic has been applied in different fields, such as automated control and decision-making support. We will learn from basic “classroom” examples, but also about automated drug infusion, medical diagnosis support, handwritten digits recognition, fraud detection and automated sleep-states classification, from the speaker’s own research background. Examples from other sources will include automated navigation systems, and industrial and consumer-goods applications. If you look around, you have probably noticed that some models of different consumer goods, such as cameras and washing machines, are currently being sold with embedded fuzzy controllers.

The underlying idea in Fuzzy Logic applications is that people are capable of decision-making using imprecise or uncertain knowledge, whereas traditional computer algorithms require precise information. Fuzzy Logic provides a means to represent human knowledge, i.e. knowledge with a “degree-of-truth”, in a way that can be processed by computer means. Fuzzy Logic stems from Fuzzy Sets, a concept introduced in 1965 by Lotfi Zadeh.