ALEXANDRIA UNIVERSITY
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TWO NOVEL FUZZY KNOWLEDGE ACQUISITION TECHNIQUES

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Symbol	Meaning	Page
$\mu_A(x)$	Membership value of fuzzy set A for numerical value x	15
x_i	i^{th} fuzzy input variable	36
y_i	i^{th} fuzzy output variable	36
$x_i^{(p)}$	i^{th} fuzzy input variable for training pattern p.	36
$y_i^{(p)}$	i^{th} fuzzy ouput variable for training pattern p.	36
$\bar{y}$	Centroid of fuzzy variable y.	36
n	Number of input variables.	36
D(Rule i)	Degree of belief in rule	38
μ^i	Degree of belief in rule i.	15
A_i^{iq}	Fuzzy set for input variable i in rule q.	38
B_i^{iq}	Fuzzy set for output variable i in rule q.	39
m	Number of output variables.	39
M	Number of fuzzy rules in the rule base.	39
E	Error	39
N	Number of training patterns.	39
w_{ip}	weight from neuron i to neuron p	41
$Y^{(o)}$	Actual output vector.	42
Y	Desired output vector.	42
η	Learning rate.	43
e_p	Error for pattern p.	43
Z_i	Cluster center of cluster i.	46
$\tilde{I}$	Triangular fuzzy number	51

Abstract

The use of fuzzy logic to model and manage uncertainty in an expert system places high computational demands on the inference engine.

An obvious and fundamental question arising from the real implementation of an expert system is how can the knowledge be obtained. In general, this issue is termed as knowledge acquisition and is thought as a bottleneck for building a realistic expert system.

In this thesis, knowledge acquisition and fuzzy inference technique are surveyed. An automated method for extracting fuzzy rules is presented and a refinement of the membership function is performed using a feedforward neural network. Also, the fuzzy rules are refined by eliminating insignificant rules.

Two hybrid fuzzy neural systems are presented and their performance is compared to the suggested fuzzy knowledge acquisition systems.