

PRINCE OF SONGKLA UNIVERSITY

FACULTY OF ENGINEERING

Midterm Examination: Semester II

Academic Year: 2012

Date: 20 December 2012

Time: 9.00 - 11.00

Subject: 212-651 Neural Network Design and Fuzzy Logic

Room: Robot

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Attempt all questions:

1. (a) In general, Soft Computing is a good option for complex systems. Describe four characteristics of these systems that suit Soft Computing. (4)

(b) General areas that need Soft Computing are:

- Classification
- Optimisation
- Data mining
- Prediction
- Control
- Scheduling
- Decision support or auto-decision making

Explain the following main techniques in soft computing and select the suitable application areas as listed above: (6)

- Evolutionary Computing
- Fuzzy Logic
- Artificial Neural Networks

2. For neural network, explain the following terms:

- supervised learning (2)
- unsupervised learning (2)
- reinforcement learning (2)
- Multilayer Perceptron (MLP) (2)
- Fully Connected Cascade (FCC) (2)

3. On selection of proper neural network sizes and architectures, discuss the following issues:
- EBP algorithm and number of neurons (2)
  - success rate and number of neurons (2)
  - number of required iterations and number of neurons (2)
  - computing time and number of neurons (2)
  - generalization abilities and number of neurons (2)
4. On the design a PC-based electronic nose using neural network, detail the following:
- hardware block diagram (2)
  - neural network architecture selection (2)
  - number of neurons selection (2)
  - number of training patterns selection (2)
  - training algorithm selection (2)

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