

## Final Term

4190.408 Artificial Intelligence

Dept. of Computer Science and Engineering, Seoul National University

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Answer to the questions below. Each answer should not be longer than a page.

Use graphs, figures or mathematical formulas for explanation if possible.

1. (30 points) Answer to the questions about Deep Belief Networks(DBN).
  - (a) Describe the structure of DBN. Describe how the output is calculated when the input is given. (If it is unsupervised learning, output node is the same with input node.)
  - (b) Describe the procedure/algorithm which DBN uses to learn from data.
  - (c) Which is the innovation which enabled deep learning, compared to previous neural network of multilayer perceptron(MLP)? Which strategy was used to solve the problem of vanishing gradient at DBN?
  
2. (20 points) Answer to the questions about intelligent agents.
  - (a) List more than five characteristics of intelligent agents.
  - (b) How is intelligent agent different from expert system? What is the difference between agent and 'object' of object-oriented programming?
  - (c) List more than five applications of intelligent agent.
  - (d) Describe the function of agent in detail, giving an example of application.
  
3. (20 points) Answer to the questions about rule-based expert systems.
  - (a) Describe the three core components of expert system briefly.
  - (b) Explain what forward chaining and backward chaining are, by giving an example of how a doctor diagnoses a patient's illness.
  - (c) Describe one strong point and one weak point of forward chaining and backward chaining. Describe which method is more useful in which situation.
  - (d) How could machine learning technology contribute to expert system development?
  
4. List more than five artificial intelligence technologies in the movies given below. Briefly describe three technologies which are currently possible, and two others which are currently not realistic.
  - (a) Her
  - (b) Iron Man
  - (c) Avengers
  - (d) Chappie

5. List more than five artificial intelligence technologies which are used or could be used, in the systems/services given below.

(a) Apple Siri

(b) Google Now

(c) Google Glass

(d) Jibo Robot

(110 points in total)