國立成功大學

110學年度碩士班招生考試試題

編　號：201

系　所：電機資訊學院-資訊聯招

科　目：人工智慧

日　期：0202

節　次：第 1 節

備　註：不可使用計算機

※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. (a) (7%) Please briefly describe the main difference between a goal-based agent and a utility-based agent, in terms of how they choose actions.
   (b) (7%) The goal-based agent generally works well. If so, in what situations we need a utility-based agent further?

2. (a) (8%) Search strategies. Describe the main difference between uninformed search and informed search.
   (b) (8%) Describe the main idea of an informed search algorithm: A* search. You don't need to write pseudo codes. Just briefly the main idea or indicate the main difference between it and other algorithms.
   describe

3. (10%) A genetic algorithm is a stochastic hill climbing algorithm. Describe at least two different points between a genetic algorithm and a basic hill climbing algorithm.

4. (a) (10%) A Bayesian network is a graph or data structure that can effectively represent a full joint probability distribution. Why is it effective?
   (b) (10%) The randomized sampling algorithms, also called Monte Carlo algorithm, are used for approximate inference in Bayesian networks. The direct sampling algorithm and the Markov Chain Monte Carlo algorithms are two main types of the randomized sampling algorithms. What is the main difference between them?

5. (a) (10%) In a hidden Markov model, to solve the filtering problem and the smooth problem, what is the main idea of the forward-backward algorithm that can largely reduce the time complexity?
   (b) (10%) When learning a hidden Markov model and many other probabilistic models, the expectation-maximization (EM) algorithm is usually used. Describe the main idea of the EM algorithm.

6. (10%) Usually overfitting happens when we train a machine learning model, like a neural network. How can we reduce overfitting? Describe at least two tips.

7. (10%) Explain the curse of dimensionality.