CS786 Quiz 3

Q1. Cooper and Shepherd's 1973 study documented differences in subject behavior as a function of visual stimulus orientation.

(a) What differences did they document? (5 marks)

(b) What is the significance of this observation on the debate over the contents of mental representations? (5 marks)

Q2. I want to categorize objects that are much larger than average as 'big' and objects that are much smaller than average as 'small', and I have trial by trial feedback available at the time when I am learning this categorization.

(a) Can you construct (i) a prototype and (ii) an exemplar model of categorization that will let me do this categorization? (2+3 marks)

(b) What would we have to assume about the distribution of sizes in the natural environment for both these models to yield the same predictions? Why? (5 marks)

Q3. Results from the Smith and Minda (1986) experiment proved challenging for classical categorization theories to model.

(a) What was the challenge? (2 marks)

(b) How does adding clusters to categorization model help solve this problem? (2 marks)

(c) What is the mathematical relationship between prototype and exemplar models and cluster-based models of categorization? (2 marks)

(d) What is the additional feature that Anderson's RMC brings to cluster-based models? (2 marks)

(e) Suppose we roll a dice 21 times. What is the probability that we will see 1 one, 2 twos, 3 threes, 4 fours, 5 fives and 6 sixes? Need not fully evaluate mathematical expression (2 marks)

Q4.

(a) What assumptions about the geometric attributes of the psychological similarity function are implicit in distance-based models of categorization? Why? (4 marks)

(b) What assumptions must be satisfied by a model of similarity that assumes that similarity S(A,B) = #matching features between A and B? Why? (6 marks)

---------- Programming Questions ----------

Q5. GCM implementation. Details in code README. (30 marks)

Q6. NGD-based MCQ solver. Details in code README. (30 marks)