Helwan University
Faculty of Computers and Information

Final Exam
Open Book
3 hours

Department of Computer Science
Pattern Recognition
Spring 2014

Exam Instructions (no questions on this page): Please read carefully

- Answering a question is done by **circling ONLY** the correct choice on the **Answer Form**; no answering sheets will be distributed.
- Please choose only one answer; a question with more than one marked answer will be considered unsolved and will get zero marks.
- A question with ambiguous marking that can be interpreted as one of two (or more) answers will be considered unsolved and will receive zero marks.
- Any comment or writing will not be read by the grader. Therefore, you should not waste your time in any writing; just think then mark.
- Each correct answer receives one; and every four wrong answers receive minus one. For example, if you solve only 20 questions, 11 of them are correct and 9 are not, then 8 of the 9 will be counted as -2. Hence, you will get $11 - 2 = 9$. This is to impede those who seek credit by haphazard guessing. Therefore, if you do not know the answer it is better not to guess. It is improbable that mere guessing will improve your score significantly; it may even lower your score. If, however, you are not certain of the correct answer but have some knowledge of the question and are able to eliminate one or more of the answer choices, your chance of getting the right answer is improved, and it may be to your advantage to answer such a question.
- Each figure has a figure number. Sometimes the figure may have a caption; a caption is one or more statement at the bottom of the figure to explain that figure.
- All of the MCQ questions have the same weight.
- **No one is allowed to borrow any thing from any colleague.**

Exam Starts Next Page

The Following Problems Are Related

1. Assume that we are given a data set of two classes. We estimated the mean vectors by $\widehat{\mu}_1 = (1, 1)'$, and $\widehat{\mu}_2 = (4, 7)'$. The two classes are assumed to have a common diagonal covariance matrix in the form $\sigma^2 I$. Then, if we assume a multinormal distribution for the two classes the decision surface should be in the form $w'(x - x_0) = 0$, where $w' =$

a) $c(1, 1)$, where c is any constant $\neq 0$).

b) $c(4, 7)$, where c is any constant $\neq 0$).

c) $c(5, 8)$, where c is any constant $\neq 0$).

d) $c(1, 2)$, where c is any constant $\neq 0$).

e) None of the above.

2. The decision surface is

a) a line parallel to the line connecting $\widehat{\mu}_1$ and $\widehat{\mu}_2$.

b) a line perpendicular to the line connecting $\widehat{\mu}_1$ and $\widehat{\mu}_2$.

c) always a line parallel to the Y-axes.

d) always a line parallel to the X-axes.

e) May be any of the above.

The Following Problems Are Related

3. .

a) .

b) .

c) .

d) .

e) .