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FIFTH SEMESTER

MID SEMESTER EXAMINATION

Roll No _____

B.Tech. (IT)

September-2018

IT-307-PATTERN RECOGNTION

Time: 1.5 Hours *Max. Marks: 20*

Note: Attempt *ALL* questions.
Assume suitable missing data, if any.

Q.No.1 [2+3=5]

[a] What is Pattern Recognition (PR) System? Draw a suitable block diagram of PR System.

[b] Define features and write at least three biometric features.

Q.No.2 [5]

A sample data is collected through a digital stadiometer of 1500 peoples and out of these 500 samples are female. Classify an unknown sample of height 7 feet belongs to male or female class on the basis of Bayesian Decision theory.

$$Classes: Male\ if\ weight > 58\ Kg, otherwise\ Female$$

The distribution of collected data samples is shown in Fig.1.

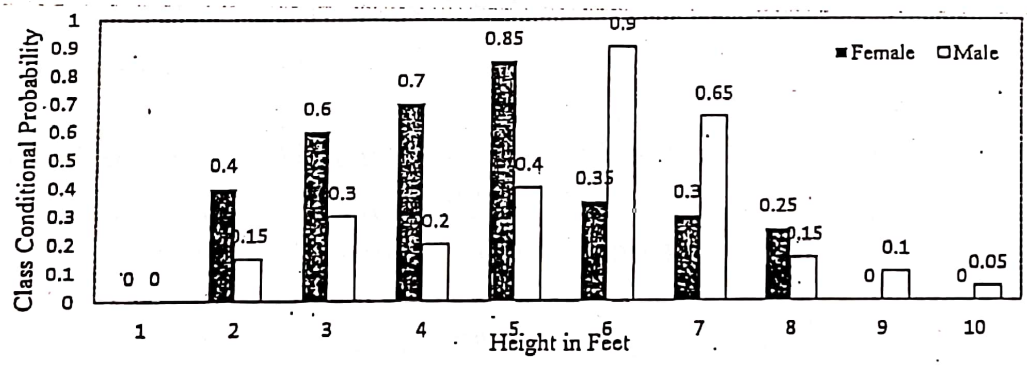

Fig.1

Q.No.3 [5]

A class test of a course is conducted with maximum marks 5. Consider a random variable X represent the marks obtained by students and it takes only integer value. The probability mass function $p_x(x)$ for X is given in Table I. Find expectation ($E[X]$) and variance (σ_X^2).

Table I

X	0	1	2	3	4	5
$p_x(x)$	0	0.1	0.15	0.25	0.3	0.2

P T.O

After awarding marks to each student, it was decided that the maximum marks should be 10. Thus, marks of students are to be updated. Let new marks be represented by a random variable Y, then find expectation ($E[Y]$) and variance (σ_Y^2).

Q.No.4 [5]

Consider the data items collected from the market as given in Table II. The features of the items include the cost of the item (₹), the size of the item (Cm^3), and the colour of the object based on these features classes are labeled.

[a] Which individual feature is the most appropriate and why for the classification?

[b] Classify a test sample of [160, 10, 'Blue] based on the appropriate mathematical model.

Table II

Features / Item No.	Cost (₹)	Volume (cm^3)	Colour	Class label
1	10	6	Blue	Inexpensive
2	15	6	Blue	Inexpensive
3	25	6	Blue	Inexpensive
4	150	1000	Red	Expensive
5	215	100	Red	Expensive
6	178	120	Red	Expensive