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EIGHTH (8TH) SEMESTER

Roll No.....
B.TECH (ECE)

MID-SEMESTER EXAMINATION

MARCH-2019

EC-412 Machine Learning

Time: 1:30 Hours

Max. Marks: 25

**Note: *Answer all SIX (06) questions.
Assume suitable missing data, if any.

1. In a two-class, two-dimensional classification task, the feature vectors are generated by two normal distributions sharing the same covariance matrix, $\Sigma = \begin{bmatrix} 1.1 & 0.3 \\ 0.3 & 1.9 \end{bmatrix}$ and the mean vectors are $\mu_1 = [0 \ 0]^T$ and $\mu_2 = [3 \ 3]^T$, respectively. Classify the vector $[1.0 \ 2.2]^T$ according to Bayesian classifier. [5]
2. Explain the Naïve Bayes classifier. [3]
3. Explain the Bayesian belief network with three types of connections, i.e. head-to-head connection, tail-to-tail, and head-to-head connection, respectively. [4]
4. Explain the Hunt's algorithm for the following Home-Loan problem under the splitting of binary attributes and nominal attributes computing the weighted Gini index. [5]

Transaction id	Home Owner	Marital Status	Annual Income	Defaulted Borrower
1	Yes	Single	125K	No
2	No	Married	100K	No
3	No	Single	70K	No
4	Yes	Married	120K	No
5	No	Divorced	95K	Yes
6	No	Married	60K	No
7	Yes	Divorced	220K	No
8	No	Single	85K	Yes
9	No	Married	75K	No
10	No	Single	90K	Yes

5. Briefly discuss the maximum likelihood parameter estimation. [3]
6. Explain the Backpropagation algorithm. [5]