

EEL707: Multi Media

MAJOR

Note: Give brief and precise answers; Max. Marks: 20; Time: 2 hrs

1. Explain how a line in the image plane corresponds to a point in the parametric plane in the Hough transform. Develop a general procedure for obtaining the normal representation of a line from its slope-intercept form $y = ax + b$. Find the normal representation of a line $y = -2x + 1$. (3)
2. Develop an algorithm to morph a prism of square base of side "s" but with a height of "h" into a cube of side "s". (3)
3. Why XML is both software and hardware independent? How XML is used in SMIL? (3)
4. Let two categories be (1,1), (2,2), (2,0) and (0,0), (1,0), (0,1). Plot these training points and construct by inspection the weight vector for the optimal hyper plane and the optimal margin. What are the support vectors? (3)
5. Given the objection function J :

$$J = \sum_{i=1}^N \sum_{j=1}^C \mu_{ij}^m \|x_i - c_j\|^2, \quad 1 \leq m < \infty$$

Where N is the number of data points and C is the number of clusters. Derive the equations for the centroid c_j and the membership function μ_{ij} subject to the

condition $\sum_{j=1}^C \mu_{ij} = 1; \forall i$ (3)

6. Compute the curvature for the curve defined by the following coordinate equations:

$$\begin{aligned} x(t) &= 2t^3 - 4t^2 + 1 \\ y(t) &= t^4 + 3t^2 - 6t - 2 \end{aligned} \quad (3)$$

7. Explain how the synchronization is accomplished in multimedia. (2)