

1999 Paper 9 Question 12

Computer Vision

Contrast the use of linear *versus* non-linear operators in computer vision, giving at least one example of each. What can linear operators accomplish, and what are their fundamental limitations? With non-linear operators, what heavy price must be paid and what are the potential benefits? [8 marks]

When shape descriptors such as “codons” or Fourier boundary descriptors are used to encode the closed 2D shape of an object in an image, how can invariances for size, position, and orientation be achieved? Why are these goals important for pattern recognition and classification? [6 marks]

Define the general form of “superquadrics” used as volumetric primitives for describing 3D objects. What are their strengths and their limitations? [6 marks]