1997 Paper 8 Question 12

Computer Vision

Explain the notion of scale-space and how it is used in various areas of computer vision. Include the following:

(a) Pyramidal representations of image structure across successive scales of blurred undersampling. [5 marks]

(b) Edge detection operators that extract edges at particular scales of analysis, but not at others. [5 marks]

(c) The behaviour of zero-crossings, their trajectories and "fingerprints" in scale-space. [5 marks]

(d) The generalised wavelet transform as a self-similar mapping into scale-space, and its attempt to capture invariances under the transformations of dilation, translation and rotation. [5 marks]