

Questions on “Computer Vision”

4190.408 Artificial Intelligence
Department of Computer Science and Engineering
Seoul National University

Prof. Byoung-Tak Zhang

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1. Why is vision difficult for computers? How is human vision different from computer vision? A computer vision system consists of low-level (or early) vision and high-level (or late) vision. What are typical processes of low-level vision? What are typical tasks of high-level vision?
2. What is an edge detector? What is LoG filtering? What does a Sobel operator do? How are line drawings analyzed? How are labels assigned to lines? How do you detect impossible objects?
3. What approaches are used to find objects in scenes? Describe three major approaches. What is $2^{1/2}$ -D sketch? What kinds of additional information are used for object recognition?
4. How can surface and depth information be recovered from images? What kinds of surfaces there are? What are superpixels? How do you use machine learning to extract depth information and scene-structure from monocular images? What is the multiscale Markov random field network?
5. How do you track moving objects, such as automobiles, in video? What is particle filtering? How can a particle filter track humans and cars?
6. Describe the hierarchical visual processes of human vision. How does the bottom-up and top-down processes interact? What is a deep belief network (DBN)? Describe the architecture. How does the DBN be trained from image data. What are typical example applications? What is the hierarchical temporal model (HTM)? What’s the basic idea of HTM? What is the similarity of HTM to human memory? How is HTM different from DBN?
7. What is an image grammar? What is a picture grammar? How can we parse images to build stochastic grammars of images?