Question Paper - Computer vision 8 (5 Mark) questions (Difficulty 3)

Here are 8 computer vision questions, designed to be of moderate difficulty (level 3/10), suitable for an exam setting, and worth 5 marks each.

1. Q1. Explain the concept of image convolution and its role in feature extraction in computer vision. Provide a simple example using a 3x3 kernel and a small image patch to illustrate the process.
2. Q2. Describe the differences between instance segmentation and semantic segmentation. Give a specific application example where instance segmentation would be preferred over semantic segmentation, and explain why.
3. Q3. What are the key steps involved in performing camera calibration? Why is camera calibration important for accurate 3D reconstruction from 2D images?
4. Q4. Explain the concept of optical flow and describe one common method for estimating it. What are some of the limitations of optical flow estimation?
5. Q5. What is a Convolutional Neural Network (CNN)? Briefly describe the function of each of the following layers in a CNN: convolutional layer, pooling layer, and fully connected layer.
6. Q6. Explain the concept of transfer learning in computer vision. Why is it often beneficial to use transfer learning when training CNNs for new tasks, especially with limited training data?
7. Q7. Describe the RANSAC algorithm and explain how it can be used to robustly estimate a model (e.g., a line or plane) from noisy data in computer vision.
8. Q8. What are Generative Adversarial Networks (GANs)? Describe the roles of the generator and discriminator networks in a GAN, and explain how they are trained.