

T-61.5070 COMPUTER VISION, Exercise 11/08

Motivation

The purpose of this exercise is to be acquainted with motion analysis.

1. An object moves in 3D space with varying velocity. The motion of the object is recorded. Is it possible to determine FOE from the image sequence?
2. Some motion field detection approaches are dealt on pages 682–685 in the textbook.
 - (a) Consider a segmented ternary image. Suggest an approach that is capable to determine the velocity of the motion field.
 - (b) What can be said about the suggested method when the brightness in the background is more than f_p or less than f_p ?
 - (c) How does nonhomogeneities in the background influence on the results?
3. Optical flow can be estimated by the following formula (Horn & Schunck 1980):

Initialize u^k ja v^k to zero, $k = 0$

Iterate until the desired error criteria is fulfilled

$$\begin{aligned}u^k &= \bar{u}^{k-1} - f_x \frac{P}{D}, \\v^k &= \bar{v}^{k-1} - f_y \frac{P}{D}.\end{aligned}$$

Give an explanation to the formula.