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Assignment 3

Programming Exercise 3 (Horn and Schunck Method)

You can download the file `copcv19_ex03.tgz` from ILIAS. To unpack the archive, use

```
tar xzvf copcv19_ex03.tgz
```

1. Supplement the routines `compute_motion_tensor()` and `horn_schunck_jacobi()` in the C programme `horn_schunck.c` with the missing code such that it becomes an implementation of the variational method of Horn and Schunck. In order to compile your programme please use the contained makefile. The compiled programme is then executed by

   `./frontend <input_image1.pgm> <input_image2.pgm> <zoom_ratio> [ground_truth.F]`

   where the integer parameter `zoom_ratio` is in general set to 1. The use of a ground truth file `ground_truth.F` is optional and triggers the computation of the average angular error (AAE).

2. Use the provided image pairs `ett1.pgm` and `ett2.pgm` as well as `yos1.pgm` and `yos2.pgm` and evaluate the performance of the method of Horn and Schunck for different values of the smoothness weight α. Is there a relation between the value for α and the number of required Jacobi iterations? Investigate also the influence of the presmoothing parameter σ on the quality of the results. In the case of the Yosemite sequence you can make use of the ground truth `yos_truth.F` to optimise your results with respect to the average angular error. Which is the smallest error you can obtain?