Univerza v Ljubljani

Advanced Computer Vision Methods

Laboratory work

Visual Cognitive Systems Laboratory,
Faculty of Computer and Information Science,
University of Ljubljana

ACVM Lab Exercises

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- Office hours: by e-mail/MS-Teams
  ViCoS Lab: Visual Cognitive Systems
  (Laboratorij za umetne vizualne spoznavne sisteme)
  2nd floor on the left side

Course Program and Grading

- Projects (also called practicum/assignments) – 60%
- Written exam – 40%

The dates might change!

Topics of the projects:

1. Optical Flow: LK + HS (deadline: 17.3.)
2. Color-based tracking: Mean Shift (deadline: 31.3.)
3. Correlation filters & VOT evaluation (deadline: 14.4.)
4. Kalman filter & Particle filter (deadline: 28.4.)
5. Long-term tracking (deadline: 19.5.)

Projects and Lab Sessions

- Implement methods from lectures (Python)
- Hand-in: Code + Report (two-weeks)
- How will lab work be conducted: consultations
  - We will not have pre-defined sessions
  - A short video (cca. 10min) with the project presentation will be posted every second week
  - If you have questions/issues with projects: individual consultations (contact me via e-mail or MS-Teams)
- Any question about the course/projects: use forum on Učilnica or course MS-Teams channels

Projects: Submission Structure

- Methods must be implemented by your own
- Submitted source code will be checked for duplicates
- Submit a single ZIP file – structure of a zip:

Name	Date modified	Type	Size
other	4. 03. 2020 12:22	File folder	
ex1_utils.py	9. 01. 2020 14:42	Python File	3 KB
of_methods.py	12. 02. 2020 11:29	Python File	2 KB
Report-1.pdf	1. 03. 2019 13:51	Foxit Reader PDF ...	273 KB
run_vaja_1.py	12. 02. 2020 11:29	Python File	1 KB

- Do not submit images/video sequences which are provided as a part of project instructions
- Any material you used which is not part of the instructions put into the directory *other*

Report for the Projects

- Template on Učilnica
- Strict page limit: 2 pages max
- Suggested structure:
  - Introduction
    - Very brief problem description with your own words
  - Experimental results
    - Include figures, graphs, tables
    - Suggested structure: follow the questions under section Grading
    - Describe and comment the results:
      Why the results are as they are. Do not just describe what is on the graph!
    - Describe additional experiments and comment additional insights
  - Conclusion
    - Give the most important findings of the project

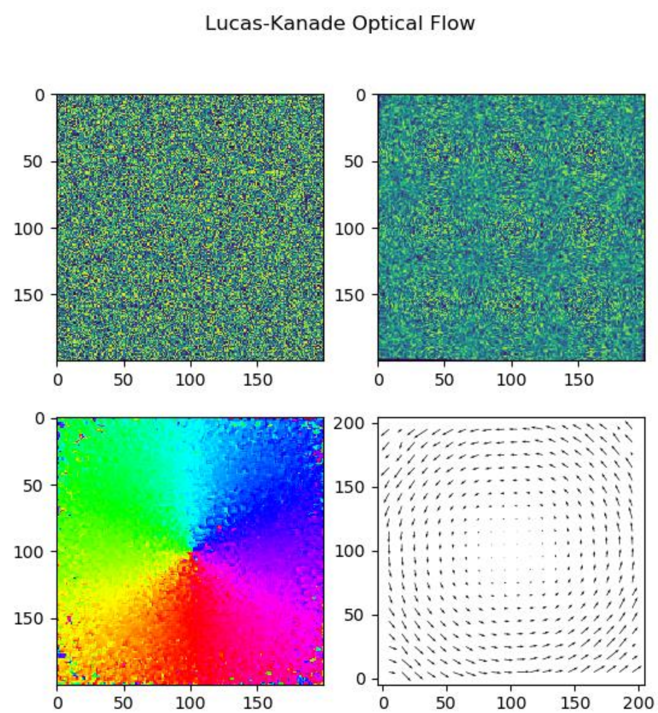
Grading of the Projects

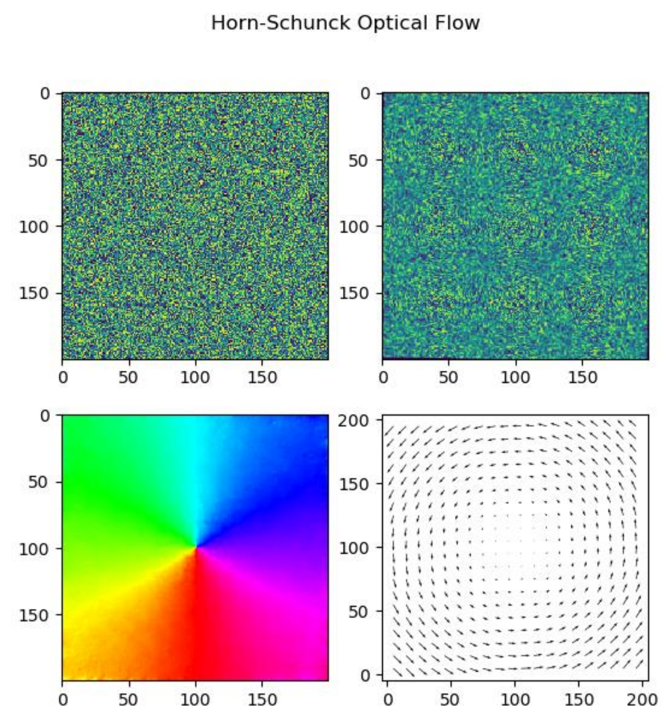
- All 5 projects are equivalent
- Each project must be graded positive (>50%)
- Strict deadline: baseline grade 100%
- Up to one week late: baseline grade 70%
  - Number of points multiplied by 0.7
- Later than one week after the deadline: **FAIL**

  You are not able to pass the course this year

Exercise 1: Optical flow

- Lucas Kanade (Assignment 1)
- Horn Schunck (Assignment 2)
- Implement both methods (help with lectures slides)
- Take care for correct input normalization

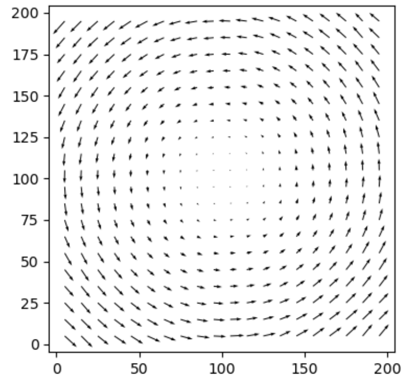




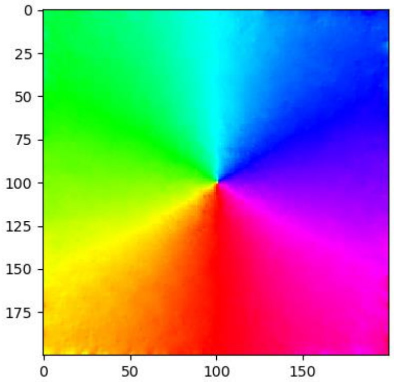
Exercise 1: Optical flow

- Using provided **`showflow`** function:

```
showflow(U, V, ax, type='field', set_aspect=True);
```




```
showflow(U, V, ax, 'angle');
```



- Other provided functions:

  `gaussderiv`, `gausssmooth`

  Use them for calculating image spatial derivatives

Exercise 1: Optical flow

- Provided data
  - Disparity
  - Camera movement
  - Proximity (collision)

- Add your own data