Lab session project:
Event Camera Data Processing

1. Objective

Investigate methods for processing event camera data.

- Reading and visualizing event camera data. As a starter, see this Jupyter notebook. You can use data from the event-camera dataset and simulator page.
- Evaluate at least one method for image reconstruction from events.
- Evaluate at least one method for object detection using event data.

Run these evaluations on both existing data from an online dataset, and on some self-captured data using our event camera. Study and discuss strengths and weaknesses of the tested methods.

2. Deliverable

A technical report (max 5 pages) in the IEEE conference template.

- It should be a standalone document that contains all the information needed for the reader to understand it. You must describe the methods you learned in the lecture (and other existing papers, if any) in your own words.

- The intended reader is yourself in the past, right before starting this course. The report should be written in such a way that he/she can understand most of it and reproduce the results without major difficulties.

- The report should consist of the following sections:
  (6) **Introduction**: Summarize what you are going to do.
  (7) **Methods**: Describe each of the four methods.
  (8) **Results**: Describe the set-up of the experiments, present the results and report the findings.
  (9) **Conclusion**: Summarize what you did and what you found.
  (10) **References (optional)**: You can cite existing papers in literature if you want, but it is not strictly required for this report.

3. Things to think about

Where can event cameras provide additional benefits compared to traditional RGB cameras? Where are they at a disadvantage?

Additional resources:

- G. Gallego, Event-Based Robot Vision course material, 2020, https://sites.google.com/view/guillermogallego/teaching/event-based-robot-vision.
- Event-Based Vision Resources page, University of Zürich, https://github.com/uzh-rpg/event-based_vision_resources.

4. Grading

The report will be graded based on the following criteria:

(e) **Technical soundness**: Are the methods implemented and described in a technically sound manner?

(f) **Adequacy and thoroughness of evaluation**: Is the evaluation done right? Are the results presented in a thorough manner?

(g) **Reproducibility of results**: Are the implementation and experimentation described in a complete manner, such that others can reproduce the results?

(h) **Clarity of presentation**: Is the text readable? Are the results presented in a clear and visually pleasing manner?

5. Teamwork (or not?)

You can choose to do this project either (i) individually, (ii) in a group of 2, or (iii) in a group of 3. The grade will be determined solely by the quality of the report, and not by the size of the group.