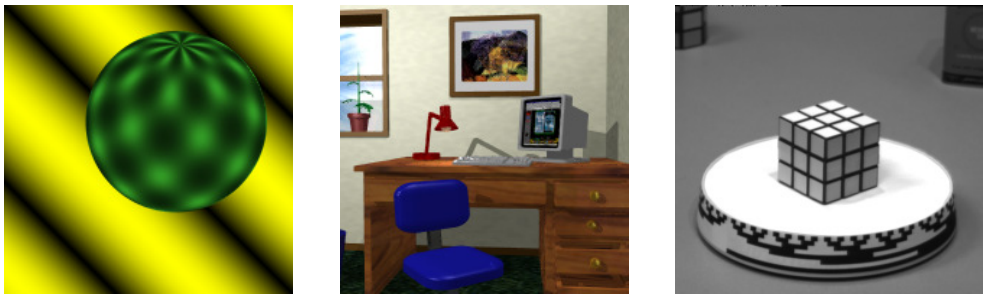
EECS432 Advanced Computer Vision, MP#1

This MP gives you an opportunity to have a deep understanding of two important methods of flow computation, i.e., the Lucas-Kanade's method and the Horn-Schunck's method. The due date is 2/3.

1 Lucas-Kanade's method

You need to really understand the Lucas-Kanade's method step by step, and then write your own implementation, which should be quite straightforward. Three test sequences (`sphere`, `office`, `rubic`) are given[1]. `office` and `sphere` are synthetic images, but `rubic` are real images.



(a) `sphere` (b) `office` (c) `rubic`

Figure 1: Data for experiments.

You are required to:

1. revisit the Lucas-Kanade's algorithm and code your implementation;
2. experiment on these three sequences;
3. use Gaussian window;
4. use uniform window, i.e., all pixels have the same weight;
5. compare these two.

Hint: Since all the methods of flow computation assume small motion to validate the flow constraint, these methods will not produce satisfactory results when the image motion is large (say more than 2 pixels), which is the most cases in real situations. How to cope with that? You should try the multiple resolution approach, as discussed in class.

2 Horn-Schunck's method

You need to write your implementation of Horn-Schunck's method. And compare it with Lucas-Kanade.

3 What to turn in

You can use whatever programming languages including Matlab. What you need to turn in includes, your results (representative results), your code and your short report of analysis ($\leq$ 1 page is fine).

[1] you can download them at the course website