

Due on 10 February 2020

**M.Sc. Data Science**  
Computer vision - Assignment 2

In this assignment we will learn how to find a homography and explore its uses.

1. Download the 3 images in the folder named CalvinandHobbes from the computer vision class folder <https://drive.google.com/drive/folders/1tZfZGSGfoBoXw2U6PD-AWczrVgGxj60j?usp=sharing>. We want to find a homography that maps image1.jpg to image2.jpg.
  - (a) For this, select sets of four point correspondences on the two images, store them in two arrays called pts1 and pts2 respectively.
  - (b) Compute a homography that maps image1 to image2 using DLT (you may use the inbuilt SVD function, but not the inbuilt function for computing DLT or homography).
  - (c) Compare your result with results of using the function findHomography in OpenCV.
  - (d) Observe how the homography affects the other parts of the image. Can you explain why?
2. Use the code in the above exercise to find a homography that 'straightens' image1 as follows: you are given that the aspect ratio (width/height) of the book is 30/23. Mark and store the 4 corner points of the book in image1; choose 4 points in the destination image that you will map the chosen points to (keeping the aspect ratio in mind). Then compute the homography and apply it to image1. The resulting image should be akin to what is seen in image3.
3. Find at least two different use cases of a homography and demonstrate these cases using either the given image or your own images.