
Part 1.

- (1) We believe that the grouping algorithm graph-cuts, would be the most appropriate grouping algorithm to recover the model parameter hypotheses from the continuous vote space. The reason is that it links every pair of pixels and assigns an affinity weight for each edge.
Also, graph-cuts connect shapes with edges that have high affinity while mean shift and k-means does not, which suits those lines and circles defined by a set of boundary points in Hough Transform.
- (2) From using K-means clustering with two groups, we will have two center points which divides all the feature inputs into two clusters. Each center point will get half of the feature points and the center point will be positioned by calculating the least squared Euclidean distance. After that it will update the new center of each cluster. The process will keep repeated until half of the data points are in one group and the other half is in the other group.
- (3) TO BE CONTINUE.

Part 2.

- (a) The code is written in file **get_correspondences.m**. The function has two inputs of two images and the number of points the user wants to pick. The outputs are two $2 \times N$ point matrices of selected points.
- (b) The code is written in file **computeH.m**.
- (c) The code is written in file **warpImage.m**.
- (d) Images:

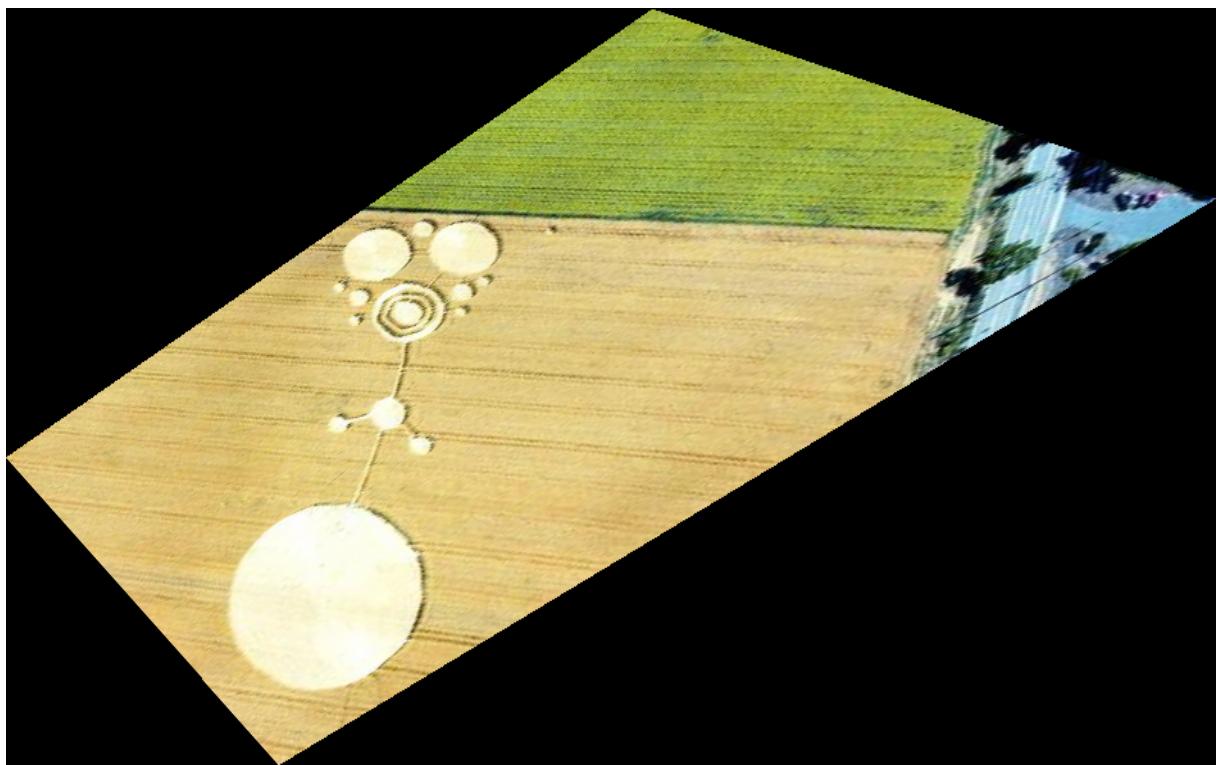


Figure 1: crop_warp

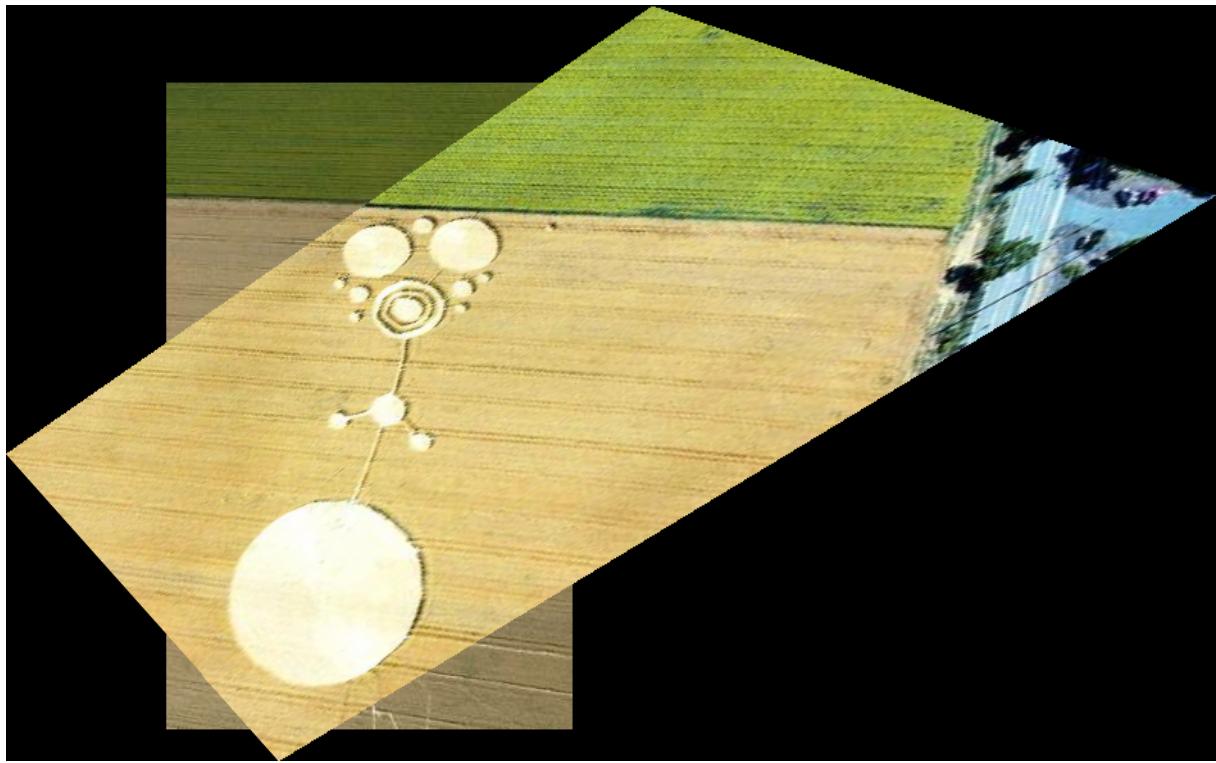


Figure 2: crop_merge



Figure 3: wdc_warp



Figure 4: wdc_merge

The data points1 and points2 are saved in the file **points.m**.

(e) Images:



Figure 5: town_source_1



Figure 6: town_source_2

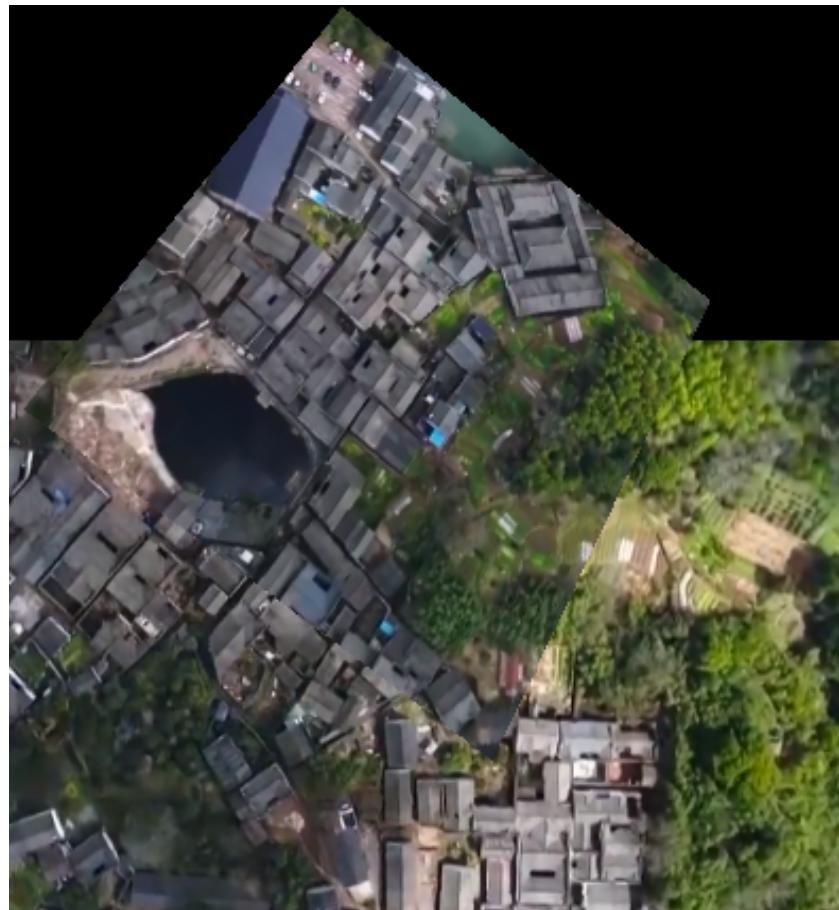


Figure 7: town_mosaic

Source: <https://www.bilibili.com/bangumi/play/ep264278>.

(f) Images:

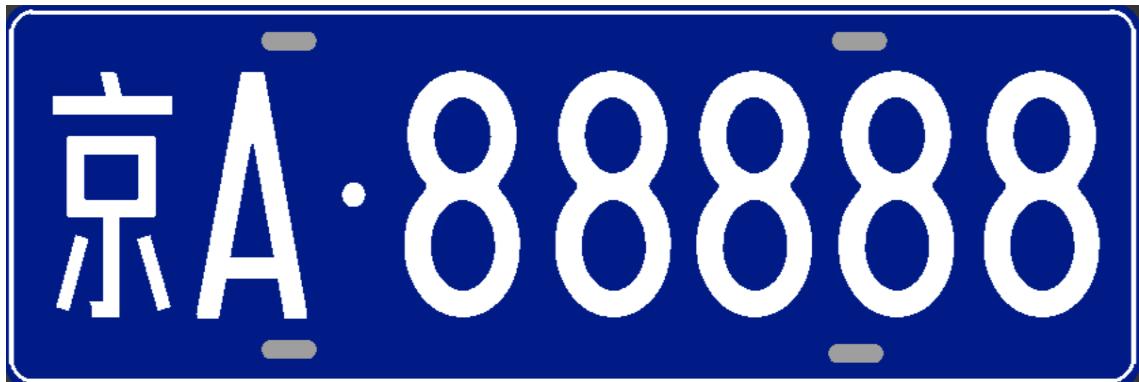


Figure 8: plate



Figure 9: car



Figure 10: car_mosaic

Source: ScreenShots from Game Forza Horizon4.

Take the license plate picture, and mosic it on the car. □

Part 3.

- (a) Images:



Figure 11: mountain_source_1



Figure 12: mountain_source_2



Figure 13: mountain_select_1



Figure 14: mountain_select_2



Figure 15: mountain_mosaic_original



Figure 16: mountain_mosaic_RANSAC

Source: <https://unsplash.com/photos/Y8lCoTRgHPE>.
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(b) Images:

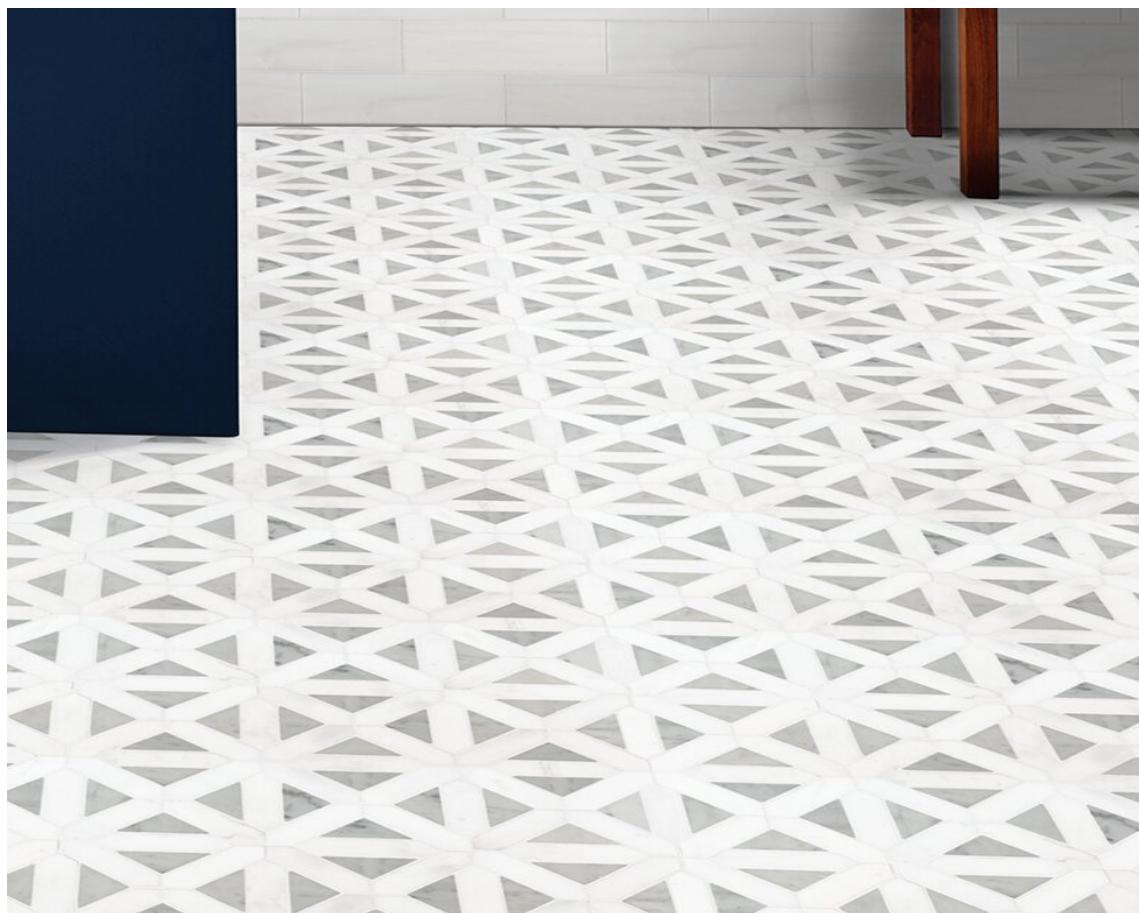


Figure 17: tiles_source



Figure 18: tiles_fronto

Source: <https://www.wayfair.com/home-improvement/pdp/msi-bianco-dolomite-marble-mosaic-tile-mvp4112.html?piid=49665325>.

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