Visionaries Final Project

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Description

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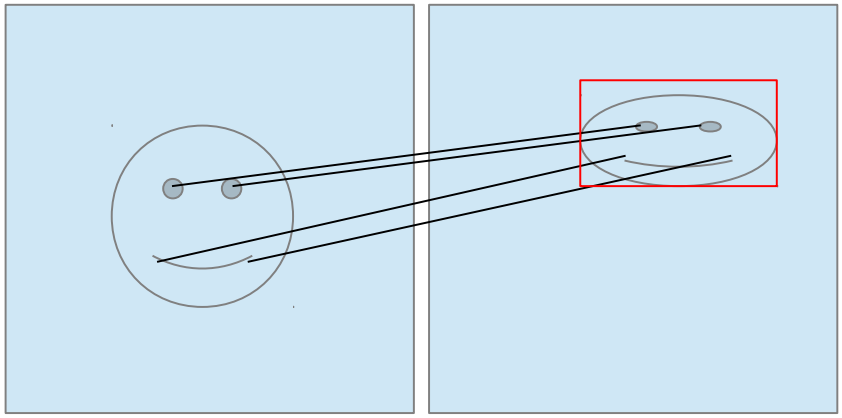
Find a reference image within a scene and estimate the pose in real time

Using the pose estimate we can draw a rectangle around the found object indicating the pose

The pose is calculated using DLT and RANSAC

Using the camera intrinsics we can calculate the rotation and translation and display a 3d object above the found object



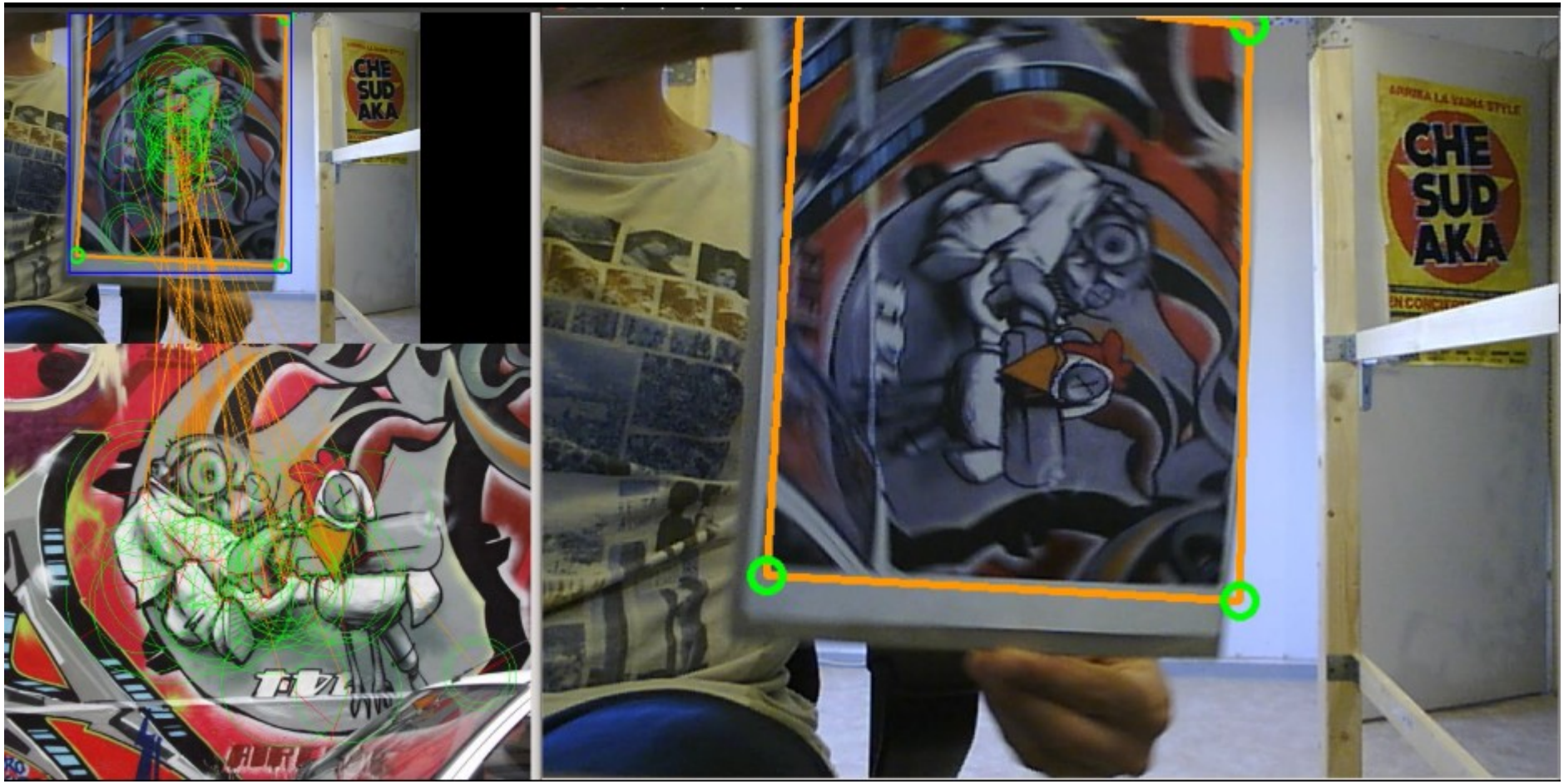
Reference Image Scene Image

Roadmap

- 17.06.2014 : Kick off
- 24.06.2014:
  - Matching between camera image and pre defined image to get the 2D-2D point correspondances
  - Implement Direct Linear Transform to calculate the homography matrix
- 01.07.2014:
  - Implement RANSAC for calculating a robust homography matrix with small error
  - Display outline of matched object using the homography. E.g. green lines are drawn around one object

- Till 08.07.2014:
  - Not done: Match multiple different objects and draw different coloured outline
  - Instead:
    - Make it more robust
    - Implement window matching
  -

Result



Problems

- Robustness
  - Initially the object was not found often in the scene
  - Sometimes it was detected, sometimes not even if the object was not moved
  - Tried: Symmetric matching, window matching, changing the parameters of descriptors, different descriptors (ORB, BRISK)
  - Solution: RANSAC
    - Subset-Samples were not drawn correctly
    - Sample duplicates in the subset
    - Using std::random_shuffle on correspondances and take a subset of the shuffled set

Live Demo

Thank you for your attention