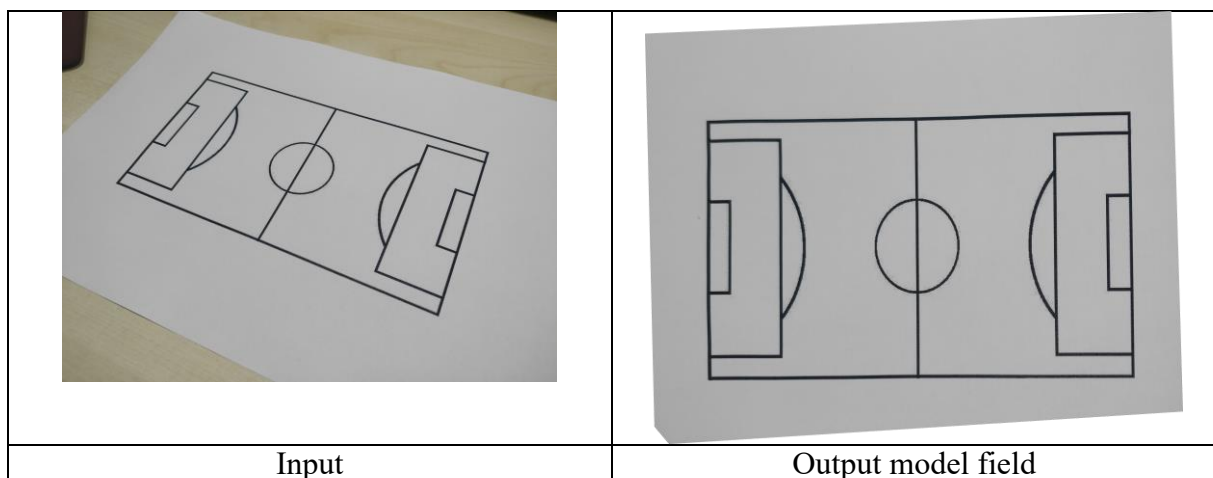


Gebze Technical University
Department of Computer Engineering
BIL 665 / BIL 463
(Introduction to) Computer Vision
Spring 2020
HW1
Apr 13th 2020

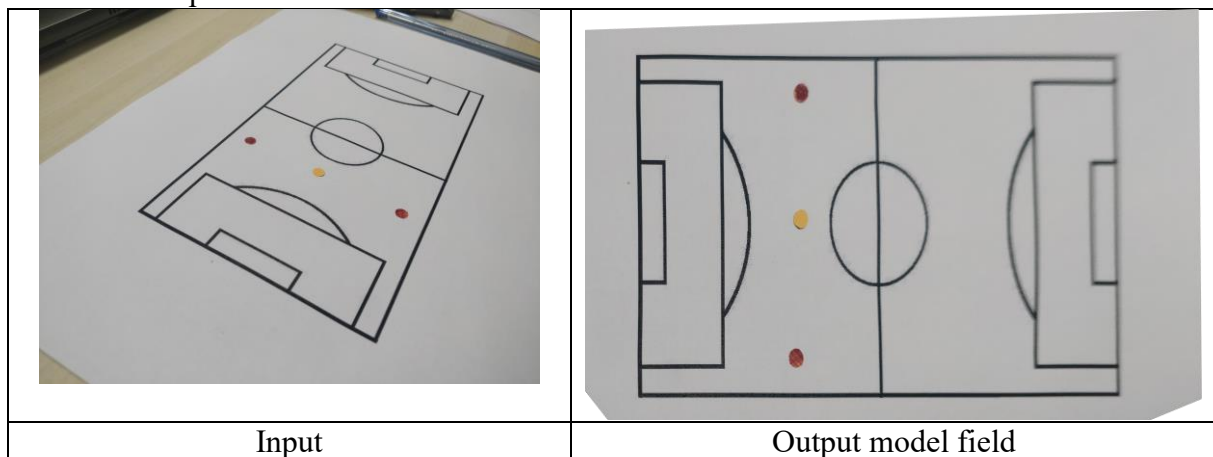
Download and install OpenCV (<https://opencv.org/>) with the Python interface. You may use any version of OpenCV and Python.

Run some of the sample code and tutorial code until you are comfortable with the environment.

In this homework, you will capture images of a target soccer field on paper. Your program will then estimate a homography that transforms this image to model soccer field. You will display the input and output images at the same time on your screen as follows



Another example



Your program should do this process at least 5 times a second. Note that will later add small circles to your soccer field to see how they are transformed to the model soccer field.

These are the algorithm steps for your homework

1. Find the main dominant lines of the input soccer field using openCV Houghlines routines.
2. Find the corners of the soccer field by the intersection points of the lines. There could be many intersections (much more than 4 if you include intersections at infinity and other less dominant lines). Use as many points as possible.
3. Estimate a homography between the input image and the model soccer field. OpenCV functions findHomography or getPerspectiveTransform will be helpful
4. Using the new transform, transform the input image and display the output as shown above. You may use OpenCV function perspectiveTransform.

Write a report that includes

- Your sample screen shots
- Your results from each step (lines, intersections, homography numbers, etc.)

Bonus:

1. Use intersection of lines at infinity for your homography.
2. Add a section in your report about the advantages of this new feature.

Notes

- Do not use any available image processing functions from OpenCV other than the functions above.
- Your program should do this process at least 5 times a second.
- Your report is important, please prepare it with care.
- You will demo your program after the class. You will download your program from Moodle, then compile and run. Please bring your web camera and computer for the demo.
- **YOU WILL NOT BE ALLOWED TO MODIFY YOUR PROGRAMS. YOU WILL RUN YOUR PROGRAM FROM THE JUPYTER NOTEBOOK.**
- Zip your source code files and a few screen captures into a single file and submit to moodle.
- We will provide sample soccer field and a few examples field pictures with this homework.