NTUST course: Computer Vision and Applications (CI5336701, 2022 Spring)

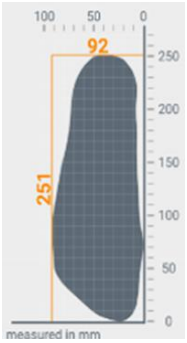
Midterm Project: Measure and compare your foot-prints by taking pictures

Date Due：2022. Apr. 29th, Friday, PM11:55 (~3 weeks)

Description

The goal of this project is to simulate a scenario for developing a solution of foot size measurement app. (No need to write the function to access your camera. Just take photos and store them as your input)

1. Writing a program to warp two images and merge them to one foot-print image. You need to take 2 photos for your foot (or your friend's) from two different views then calculate the homography from these images to generate a foot-print image, finally store and export the size of your foot-print. (choose your tools, ex. python, C++/C, openCV, Matlab).
2. Please prepare the material by yourself. First of all, you need one A4 sheet and put your foot, either right or left, on it. If your foot size is larger than A4, please generate a bigger and known-size sheet by yourself. A high contrast configuration is recommended, for instance, in a case of a black sox on a white sheet. Please take two images roughly from upper-right and upper-left directions. Then, convert these two images into a foot-print image. You need to calculate the "width" and "length" of the foot, and export values as numbers in mini-meter, ex. 250.2 mm. The below picture is one good schematic example from App. Since you already know the size of A4 sheet, you can estimate the foot size.



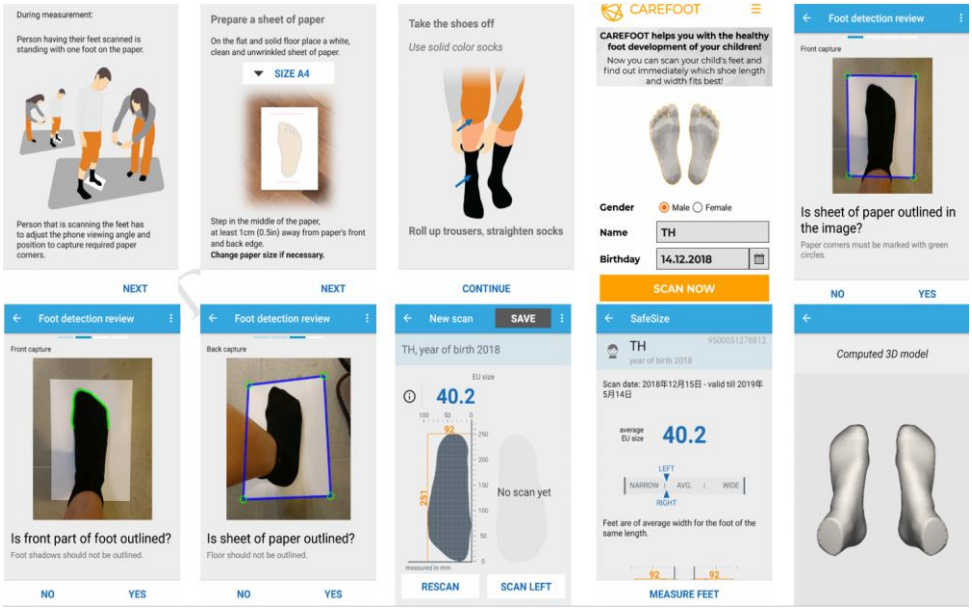
3. Main features should be included in your program:
    1. Able to read/import images.
    2. Able to determine the corns on the A4 sheet.
    3. Able to convert both images into an orthogonal view (a synthesized TOP view).
    4. Able to draw short text on the image to report the width and length of the foot.
    5. Save the result image as your_ID.jpg.
4. Deliverable: There are three types of data you should provide:
    1. Source code in C++/C, Matlab, or python etc. with simple comment: A program is able to import 2 images and output a foot-print image (with a text to indicate length and width of the foot).

2. Execution file (.exe) for this project, if written in C/C++, please compile into exe. For python / matlab user, you don't need to generate exe files. (Compulsory for C/C++, but Optional for python/matlab).
3. Two-page report (in English) saved in PDF format: to describe how you have the result, and to compare the estimated size with the ground truth (measurement size) by the ruler.

Please zip all your files, then, upload on moodle2 by due date.

Hint:

1. You can put A4 sheet on a dark ground. This will be helpful for corn detection.
2. If you are struggling in corn detection, try to make a guidance (or constrain) to ask photographer to follow. In the case, you need to describe why you have this assumption in the two-page report, and does it make sense?
3. Here is a reference scenario from "CareFoot", an App on Google store:



4. Other app. for your reference: "Accu Foot Size", "Feet it" "DIS Foot Scan".

Video: https://youtu.be/l54QsXst59I

Video: https://youtu.be/OCPRvqhTmgo

(blank below this line)