Computer Vision Systems Programming UE

Introduction

Christopher Pramerdorfer

Computer Vision Lab, Vienna University of Technology

Course Topics

Motivation

- ► Computer Vision (CV) knowledge is important
- ► As is to be able to **put this knowledge to use**

This course encourages you to

- ► Explore a CV topic of your choice
- ► Get used to software packages and libraries
- ► Improve your CV programming skills

Your Task

Select, implement, and present a CV project of your choice

- ▶ In any programming language you like
- ▶ Using any **publicly available** libraries you want
- ▶ As long as the required effort is appropriate

Matlab, Python, or C++ recommended

Project Topics

Choose any CV topic you want, as long as you learn something

- ► Choose something that is new and interesting to you
- ► Finalize topic and scope in consultation with lecturers

Don't know what topic to choose? How about these ...

Involve concert audience by letting them control sound aspects

Accomplished by moving a balloon above their heads

Task: detect and track the balloon in 3D

- ▶ Camera parameters and balloon size are known
- ▶ Pose estimation problem

Extensions

- ▶ Detect balloon color
- ▶ Track multiple balloons simultaneously

http://www.caa.tuwien.ac.at/cvl/teaching/praktika/ballonerkennung/

Unhealthy nutrition is a problem in our society

Often there is little knowledge of the composition of meals

Image by Vichaya Kiatying-Angsulee / freedigitalphotos.net

Task: estimate share of carbs, proteins, vegetables in meals

- ▶ From photos taken with smartphone cameras

`http://www.caa.tuwien.ac.at/cvl/teaching/praktika/food/`

Bad sitting posture can cause health problems

Task: recognize good or bad posture using a Kinect sensor

Image from yogahome.net

Project Topics

Send a short project proposal to lecturers (cvsp@caa.tuwien.ac.at)

- ▶ What topic do you want to cover
- ▶ What is the scope (what are you going to implement?)
- ▶ What language and libraries do you plan to use

Do so as soon as possible (**deadline: 26.10.**)

Syllabus

1. Select a CV topic according to your interests
   - ▶ Lecturers will help you define topic and scope

2. Give a short presentation on your topic (5 minutes)
   - ▶ Explain what you are going to work on

3. Implement and test your application
   - ▶ Sensor hardware is provided

4. Write a short report (around 5 pages)

5. Give a final presentation (10-15 minutes)

Available sensors

- ▶ Kinect depth sensors
- ▶ IP camera network with overlapping views (stationary)
- ▶ Thermal imaging camera (stationary)
- ▶ Android tablets with cameras

Or use your own digital camera, smartphone, ...

Report and presentation should include

- ▶ A brief explanation of your topic
- ▶ How you implemented it (language, libraries)
- ▶ Problems you faced during development
- ▶ Tests and results

Course Location and Schedule

There are no regular lectures but two presentation meetings

Location: Seminarraum 183/2, Favoritenstr. 9
Time: Wed 10:15 – 11:45 s.t.

Schedule: `http://www.caa.tuwien.ac.at/cvl/teaching/`
`wintersemester/cvsp_lu/index.html`

Course Assistance

Assistance mainly via mail (`cvsp@caa.tuwien.ac.at`)

Weekly timeslot for personal support

- **By appointment** (`cvsp@caa.tuwien.ac.at`)
- **Time**: Wed 11:45 – 12:30 s.t. (after VO)
- **Location**: room HA04-10

  `http://www.caa.tuwien.ac.at/cvl/contact/floorplan.html`

We expect to stay in touch with you throughout the semester

Prerequisites

You must be able to develop software on your own

- This is **not** a general programming course

Basic image processing and computer vision knowledge

Grading

Initial presentation: 5%
Implementation and report: 80%
Final presentation: 15%

Presentations are mandatory!

Associated Lecture

We recommend the associated lecture that covers

- CV software and resources
- Selected CV applications