Computer Vision Systems Programming VO

Introduction

Christopher Pramerdorfer

Computer Vision Lab, Vienna University of Technology

Lecture Topics

Computer Vision (CV) software and resources

Models vs. algorithms

CV applications with commercial success

Images from LeCun et al. 1989, Shotton et al. 2011, Taigman et al. 2013

Lecture Topics
Computer Vision Software and Resources

Programming languages and libraries

- ▶ Matlab
- ▶ Python (SciPy, scikits, ...)
- ▶ C++ (OpenCV, Shark, Caffe, ...)

Programming resources (throughout lecture)

- ▶ Code snippets, weblinks

How to approach CV problems systematically

- ▶ Difference between models and algorithms
- ▶ How to model and solve CV problems
- ▶ Numerical optimization

Lecture Topics
Selected CV Applications

CV applications with commercial success

- ▶ Face detection and panorama stitching in cameras
- ▶ Player pose estimation from 3D data for gaming (Kinect)
- ▶ Face and object recognition

We will see

- ▶ How they work
- ▶ How they are implemented

Lecture Location and Schedule

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_vo/index.html`

Follow `@tuwcvsp` on Twitter for updates

Prerequisites

Basic image processing and computer vision knowledge

- ▶ What is linear filtering?
- ▶ What is a camera matrix?

Some knowledge of probability is recommended

- ▶ What is a normal distribution?
- ▶ What is Bayes' rule?

Grading

There will be an oral exam (about 15 minutes)

Dates will be posted on `http://www.caa.tuwien.ac.at/cvl/teaching/wintersemester/cvsp_vo/index.html`

Associated Lab Exercise

We recommend the associated lab exercise to

- ► Explore a CV topic of your choice in more detail
- ► Get used to software covered in this lecture

Bibliography

LeCun, Yann et al. (1989). **Backpropagation applied to handwritten zip code recognition**. Neural computation.

Shotton, Jamie et al. (2011). **Real-Time Human Pose Recognition in Parts from a Single Depth Image**. CVPR.

Taigman, Yaniv et al. (2013). **Deepface: Closing the gap to human-level performance in face verification**. CVPR.