

Image Understanding, LU 183.051
Project Suggestions
WS 2009/10

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General Remarks

- 8 projects
- Group Work
- Divide the task amongst the group
- Take advantage of group members abilities
- Appoint a manager
- Have fairly regular meetings
- Set internal deadlines

You will be assessed in terms of

- Ability to function as a team
- Scientific originality
- Use of resources
- Quality of coding
 - Our recommendation use MATLAB
- Quality of documentation
- Demonstration of function

Skills required (or to be learned)

- Get good data (measurement, physics, electrical engineering, etc.)
- Use principled methods (maths)
- Use good processing techniques (computer science)
- Validate (statistics)
- Document (writing)
- Valorize (economics and marketing)

Important Dates

Date and Time	To do
20.10.2009	1st Meeting
18.11.2009	Dead line for internim hand in
24.11.2009 at 10.00	Interim Presentation
18.01.2010	Dead line for final hand in
19.01.2010 at 10.00	Final Presentation

Interim Handin & Presentation

- Short PDF document should contain:
 - Short description of proposed solution
 - Work plan (i.e. what is planned to be finished when)
 - Assignment of group members to tasks
- Presentation Duration: 10 + 5 minutes
- You should present:
 - Solution outline
 - Work plan
 - Task assignments to group members
 - Preliminary results (if you have any)

Final Delivery

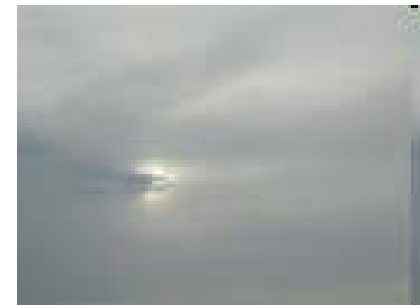
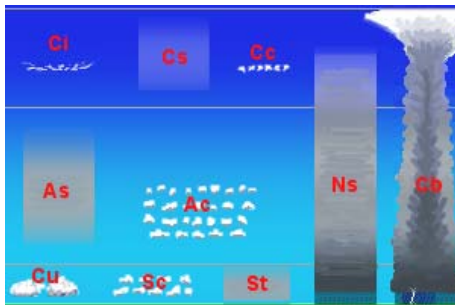
- Due: 18th of January 2010 at midnight
- **Web page** should contain:
 - Description of proposed solution
 - Pro and contra, of the proposed solution
 - The results achieved
 - Analysis of results: positive and negative ones
 - Your Conclusion
 - What can be done to make it better?
- Attach your software to the web page
 - Document your source code(s)
 - **It should work!!!**

Final Presentation

- Date: 19th of January 2010, 12.00
- Duration: 15 + 5 minutes
- You should present:
 - Solution
 - Results
 - **Live Demo**: demonstrate your software solution
 - Conclusion
 - (and also **who did what**)

Project 1: Cloud Detection

- Recognize several types of clouds (e.g. Cirrocumulus, Altostratus, Stratus, ...)
- Sky detection, cloud detection
- Database: e.g. www.wolkenatlas.de
- Difficulty: medium to hard



Project 2: Tree and leaf detection

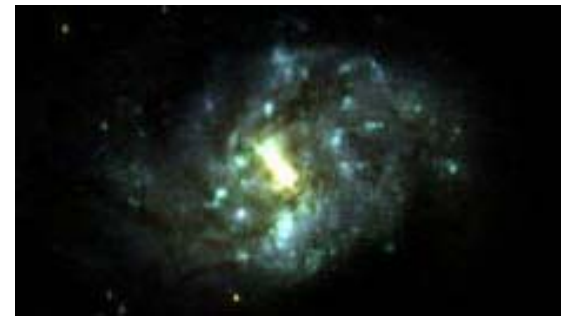


- Detect several types of trees:
e.g. oak tree, conker tree, ...
- By means of:
 - Leaf or/and
 - Tree bark
- See also:
 - www.baumkunde.de
- Difficulty: medium



Project 3: Spectroscopy

- Recognition and extration of star spectras from images
- Analysis of spectra und recognition of absorbtion lines (e.g. H alpha, beta, gamma, etc)
- Database of images
- Difficulty: medium



Project 4: Detection of Road Signs

- Detection and Recognition of different road signs
- General view and/or car view
- Build data base (training and test set)
- We will also provide you some challenging pictures
- Difficulty: medium





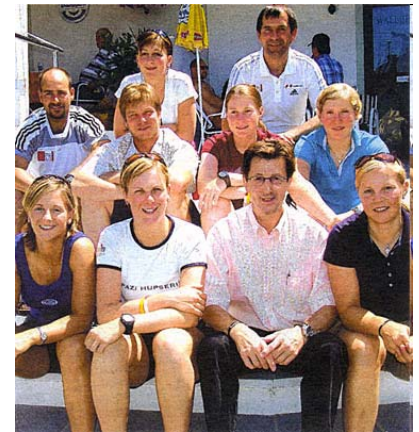
Project 5: Party-shot

- Face recognition:
 - Detect all different faces at a party
 - Each person should be photographed when smiling
- Smile detection
- Difficulty: medium to hard



Project 6: Gender Classification

- Find faces in images
- Classify them as either male or female
- Easier to start with portrait type photos, then try with photos having more than one face
- Difficulty: medium



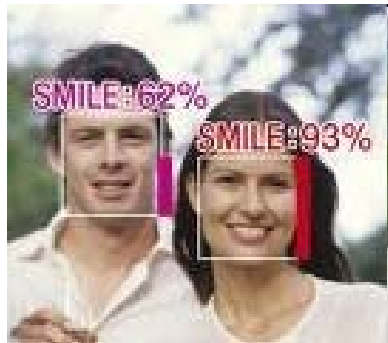
Project 7: CAPTCHA

- Solve different CAPTCHA (Hotmail, Yahoo, ...)
- Character segmentation & detection
- Use standard OCR software for solving
- Difficulty: medium



Project 8: Recognition of Facial Emotions

- ... smiling, crying, angry, ...
- Face detection
- Features?
- Difficulty: medium to heavy



Project 9: Vision-Based Rock, Paper, Scissors Game

- Create a vision based rock, paper, scissor game
- Realtime webcam image-processing
- Hand detection
- Gesture identification: Rock, paper, scissor
- Computer player (random)
- Difficulty: medium



Project 10: Recognition of doors and steps

- Help blind people navigate by using images from their mobile phone (or webcam) by recognizing
 - Doors, steps, etc
- Build object database
- Concern invariance
- Difficulty: medium to hard



Project X

- You want to work on a project that you like
- ... and have an idea ...
- Contact Us

Projects Overview

1. Clouds
2. Tree and leaf detection
3. Spectroscopy
4. Detection of road signs
5. Party shot
6. Gender classification
7. CAPTCHA
8. Recognition of facial emotions
9. Vision based Rock, Paper Scissor Game
10. Recognition of doors and steps