



Machine Learning for Applications in Computer Vision

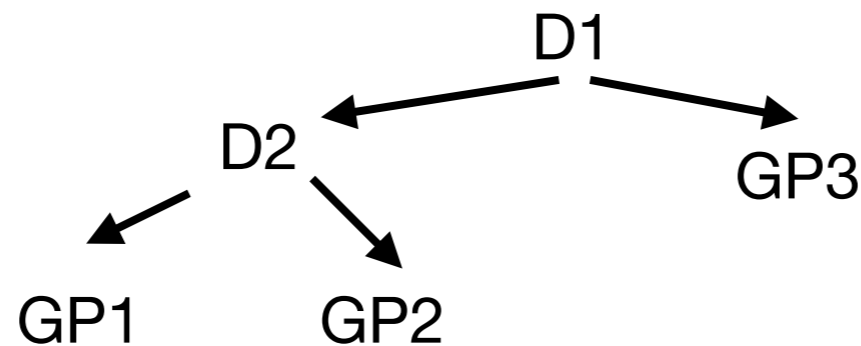
Project Organisation

- Students will work in groups: ideally 6 groups, each has 3 students.
- Every group will be assigned to one advisor.
- Student Lab will be open for students: 02.05.014
- Computers in the lab are equipped with the required hardware.
- Final project presentation: **10.07.15**



Project Topics

- “Random GP Forest”:
 - combination of Random Forest with GP



- application e.g.: segmentation, classification, human posture estimation

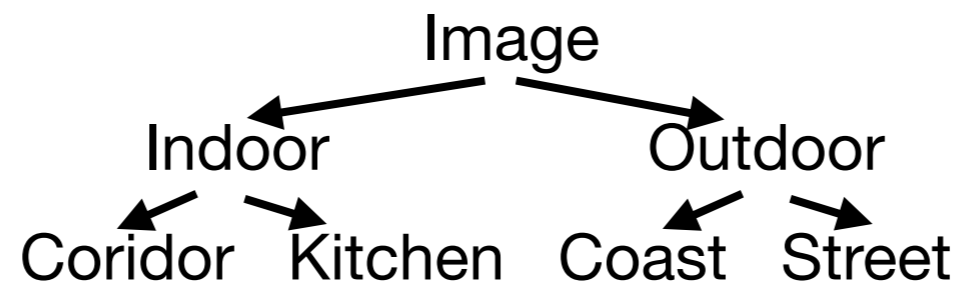
Paper: “Large-scale Gaussian process classification using random decision forests”,

B. Fröhlich, E. Rodner, M. Kemmler, J. Denzler



Project Topics

- Hierarchical Scene Recognition
 - CNN features with Random Forests
 - requires self implementation of Random Forests
 - subtrees will be trained for user-specified classes



- Analysis of CNN
 - How to decide the #kernels in convolution ?
 - What is the effect of the #layers on the performance ?
- Uncertainty quantification of the CNNs
 - How to update the classifier with uncertain data ?



Project Topics

- Facial Expression Recognition
 - take pre-trained network (AlexNet)
 - use it to extract features
 - feed them into classifier (SVM) / do classification in place
- Intriguing Alexnet
 - take Alexnet, design algo that changes input sth. the net predicts a different class
 - reimplement Fergus 2014 paper
- Object pose recognition
 - given a known object, predict the pose with a CNN
 - training data could be self-rendered



Hints for Your Talk

- 20 min. + 5–10 min. for discussion
- Don't put too much information on one slide
 - 1-2 min. per slide → 10-20 slides
- Recommended structure
 - Introduction, Problem Motivation, Outline
 - Approach
 - Experimental results
 - Discussion
 - Summary of the (scientific) contributions



Evaluation Criteria

- Successful completion of the exercises
- Gained expertise in the topic
- Quality of your talk



Regular Attendance Is Required

- Attendance at final presentation is mandatory
- In case of absence: Medical attest



Enjoy the projects!

