



**Hauptseminar/Master Seminar:**

# **Machine Learning Methods for Computer Vision Applications**

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Advanced Seminar Course Module IN8901  
Master Seminar Module IN2107  
Seminar Module IN0014

**CAMP**  
**TUM - I16**

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## Goals of the Seminar

Seminar Topic

### Machine Learning and Computer Vision

Learn how to:

- **Read** scientific papers.
  - Do the **state of the art** on a specific topic.
  - Write a scientific **report**.
  - Do a scientific **presentation**.
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## Related Conferences / Journals

### Conferences

- (CVPR) IEEE Computer Society Conference on Computer Vision and Pattern Recognition
- (ICCV) International Conference on Computer Vision
- (ECCV) European Conference on Computer Vision
- (NIPS) Neural Information Processing Systems
- (SIGGRAPH) Special Interest Group on GRAPHics and Interactive Techniques

### Journals

- (PAMI) IEEE Transactions on Pattern Analysis & Machine Intelligence
  - (IJCV) Springer International Journal on Computer Vision
  - (CVIU) Elsevier Computer Vision and Image Understanding
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# In Practice....

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## The Seminar in Practice....

- **SWS:** 2+0 **ECTS:** 4 Credits. **Course Language:** English
  - ~ 2-3 presentations per session.
  - **Presentation:** 20 min presentation / 10 min questions. Download the template from the seminar webpage.
  - Write a **report** (max 8 pages). Download the template from the seminar webpage.
  - **Attendance** and participation of the seminar meetings
    - Participation: read the abstract, see figures, read introduction and conclusions.
    - **Prepare questions.**
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## The Seminar in Practice....

① Prepare



- Read, read and read.....
- Prepare the **presentation** and **report**.

② 2 weeks before



- Fix a meeting (send a mail to your supervisor)

③ 1 week before



- Discuss the report and presentation with your supervisor

④ Presentation



- + questions, exchange of ideas, feedback.

⑤ 1 week after



- Send the final report



## Contents of the Presentation

As a rule of thumb: max 1 slide per minute (max 20 slides for 20 mins)

- **Present the paper**
    - Type and year of publication: journal, conference, workshop, etc.
    - Authors/Institution
  - **Motivation and Goal**
    - What is the problem that the authors try to solve?
    - Name potential applications: what for?
    - General motivation: why is it interesting?
  - **Related Work (state of the art)**
    - Mention most similar approaches and explain how your paper is different from them?
    - **Citing/Referencing other people's work [Lastname-Conference-Year].**
  - **Method**
    - **Overview (1 or 2 slides): input, output, contribution (the proposed new elements).**
    - Method/Algorithm (Only key ideas).
  - **Results (short version)**
    - Explain the type of **data** used.
    - Validation: what is being validated and how.
  - **Conclusion (include your own conclusions!!)**
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## Related Work: Access to Scientific Publications

- Access to the most publications is not free
  - Many publications can be accessed for free using the TUM-proxy
  - Some places to look for publications:
    - **Google Scholar** <http://scholar.google.de>
    - **Citeseer** <http://citeseer.ist.psu.edu/>
    - **Our library**
      - Books and electronic media...
      - Link to instructions how to access/download electronic media:  
<http://www.biblio.tu-muenchen.de/medien/emedien.html>
      - Link to access/download media outside of the campus:  
<http://www.lrz-muenchen.de/services/netzdienste/proxy/documentweb/>
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## Contents of the Report (Max 8 pages)

Follow the structure of a scientific publication.

- **Abstract and Introduction (~1 page)**
    - General motivation.
  - **State of the Art and Contributions (~2 pages)**
    - **Look for related papers, books, websites, videos etc.** e.g. Papers citing the studied work.
    - How is this paper different from (SoA)? e.g. What is new? What is better? What is faster?
  - **Problem statement (~1 page)**
    - Mathematical formulation
  - **Method (~2 pages)**
    - Overview: input, output.
    - Method/Algorithm.
  - **Results (~1 page)**
    - Summary of experiments and results (what type of data and validation).
    - **YOUR CRITIQUE** of the methodology, set-up and validation (what else could have been done?, is it enough to demonstrate the contribution?, is the data biased?, are there non mentioned assumptions?, can it be easily reproduced?)
  - **Conclusion (~1 page)**
    - **YOUR PERSONAL CONCLUSION & IDEAS**
  - **References (~1 page)**
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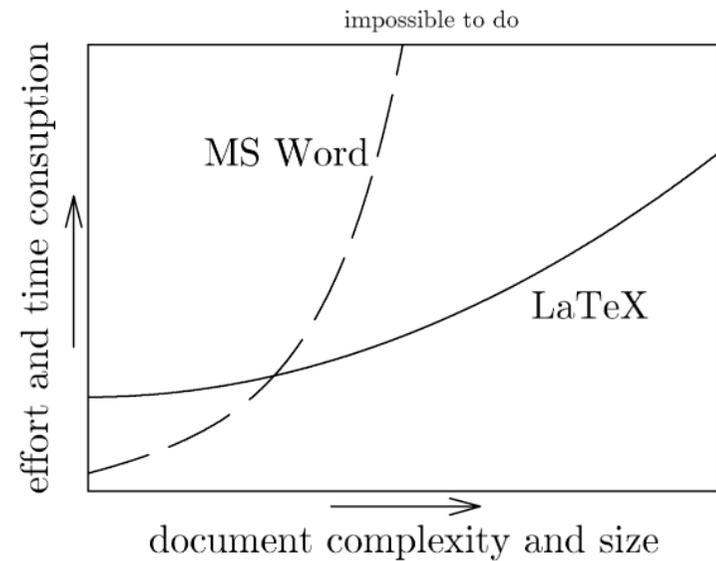


## Instructions for the Report

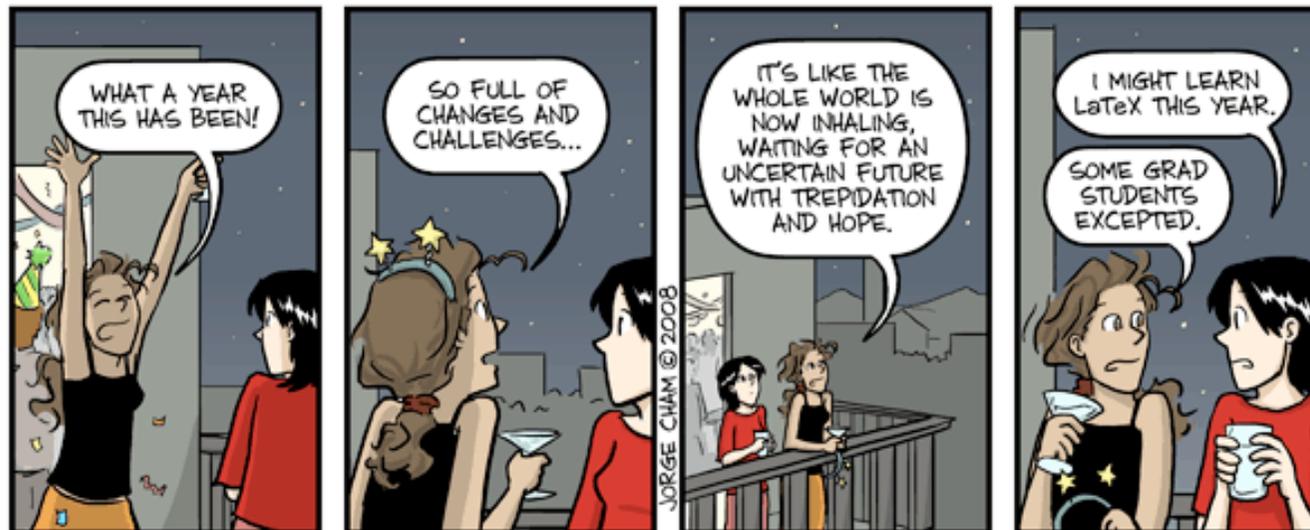
- **Do NOT copy and paste!,**
  - **not even a paragraph!**
  
  - Use the LATEX template that is on the seminar webpage.
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## LaTeX

- Document Preparation System
- Most widely used by mathematicians, scientists, engineers, philosophers, economists and other scholars in academia and the commercial world, [Wikipedia]
- Available free for Windows, Linux and Mac OS
- Example Editors <http://www.texniccenter.org/>, <http://miktex.org/>, <http://www.lyx.org/>



[Marko Pinteric]





## Evaluation Criteria

- Presentation (50%)
    - Understanding (Prepare in advance!)
    - Quality of slides/material
    - Clarity of motivation
    - Clarity of method overview
    - Appropriate use of formulas
    - Personal conclusion
  - Report (50%)
    - USE OF OWN WORDS
    - Presentation, language and structure
    - State of the art
    - Personal conclusion
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## Finally .....

- Seminar groups are usually heterogeneous. So it is normal if you do not understand the details of each presentation.
  - **DO ASK questions** about what is not clear. **This will not penalize** the presenter, they will give you **participation points** and everybody might learn something from it.
  - To get detailed **feedback** after your presentation come to our office.
  - The **duration** of the presentation will be **strictly controlled**. We will ask you to jump to your conclusions if the indicated duration is exceeded.
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## Papers & Dates

- Paper list is online.  
<http://campar.in.tum.de/Chair/TeachingWs10MLCVSeminar>
  - Send a mail with your paper of choice.
  - By **1<sup>st</sup> of November** tentative calendar online
  - Presentation dates will be in
    - end of January,
    - beginning of February
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## List of Papers

### Image Classification and Retrieval

- (2007 Science) Clustering by passing messages. Brendan J. Frey and Delbert Dueck.
  - (2008 CVPR) Semantic Texton Forests for Image Categorization and Segmentation. Jamie Shotton, Matthew Johnson, Roberto Cipolla.
  - **(taken)** (2009 BMVC) Random Forest Clustering and Application to Video Segmentation. Frank Perbet, Björn Stenger, Atsuto Maki.
  - **(taken)** (2009 ICCV) On-line Random Forest. Amir Saffari Christian Leistner Jakob Santner Martin Godec Horst Bischof.
  - (2009 ICCV) Video Scene Categorization by 3D Hierarchical Histogram Matching. Paritosh Gupta, Sai Sankalp Arrabolu, Mathew Brown and Silvio Savarese.
  - (2009 PAMI) Supervised Learning of Quantizer Codebooks by Information Loss Minimization. Svetlana Lazebnik, and Maxim Raginsky.
  - (2010 CVPR) Global and Efficient Self-Similarity for Object Classification and Detection. Thomas Deselaers and Vittorio Ferrari.
  - (2008 NIPS) Supervised Dictionary Learning. Julien Mairal<sup>1</sup>, Francis Bach, Jean Ponce, Guillermo Sapiro, Andrew Zisserman.
  - (2008 CVPR) Discriminative Learned Dictionaries for Local Image Analysis. Julien Mairal<sup>1</sup>, Francis Bach, Jean Ponce, Guillermo Sapiro, Andrew Zisserman.
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## List of Papers

### Learning Affinities

- (2009 PAMI) Learning graph matching. Tiberio S. Caetano, Julian J. McAuley<sup>?</sup>, Li Cheng, Quoc V. Le, and Alex J. Smola.
- (2010 CVPR) Learning Full Pairwise Affinities for Spectral Segmentation. Tae Hoon Kim Kyoung Mu Lee Sang Uk Lee.

### Dimensionality Reduction

- (2010 CVPR) Parametric Dimensionality Reduction by Unsupervised Regression. Miguel A. Carreira-Perpinan.

### Human Pose and Activity Analysis

- **(taken)** (2010 CVPR) Monocular 3D Pose Estimation and Tracking by Detection. Mykhaylo Andriluka, Stefan Roth, Bernt Schiele.
  - (2010 CVPR) Learning Shift-Invariant Sparse Representation of Actions. Yi Li, Cornelia Fermuller, and Yiannis Aloimonos, Hui Ji.
  - (2010 PR) Tracking humanpose with multiple activity models. John Darby, Baihua Li, Nicholas Costen.
  - (2009 PAMI) From Canonical Poses to 3–D Motion Capture using a Single Camera. Andrea Fossati, Miodrag Dimitrijevic, Vincent Lepetit, Pascal Fua.
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## List of Papers

### Medical Image Applications

- (2010 PAMI) A Boosting Framework for Visuality-Preserving Distance Metric Learning and Its Application to Medical Image Retrieval. Liu Yang, Rahul Sukthankar and Steven C.H. Hoi.
- (2007 MICCAI) Active-Contour-Based Image Segmentation using Machine Learning Techniques. Patrick Etyngier, Florent Segonne, and Renaud Keriven.
- (2010 MEDIA) GRAM a framework for geodesic registration on anatomical manifolds. Jihun Hamma, Dong Hye Yeb, Ragini Vermaa, Christos Davatzikosa.

### Image Processing

- (2010 CVPR) Personalization of Image Enhancement. Sing Bing Kang, Ashish Kapoor, Dani Lischinski.
  - **(taken)**(2010 SIGGRAPH) Personal Photo Enhancement Using Example Images. N. Joshi, W. Matusik, E. Adelson, D. Kriegman.
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