

# Pawan Kumar Mudigonda (publish as M. Pawan Kumar)

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Associate Professor  
Department of Engineering Science  
University of Oxford  
Parks Road  
Oxford, OX1 3PJ, UK  
[pawan@robots.ox.ac.uk](mailto:pawan@robots.ox.ac.uk)  
<http://mpawankumar.info>

## PREVIOUS EMPLOYMENT

Associate Professor, December 2014 - August 2015  
Center for Visual Computing  
École Centrale Paris, Châtenay-Malabry, France

Assistant Professor, January 2012 - November 2014  
Center for Visual Computing  
École Centrale Paris, Châtenay-Malabry, France

Postdoctoral Researcher, January 2009 - December 2011  
Supervisor: Prof. Daphne Koller  
Stanford University, Stanford, USA

Postdoctoral Research Assistant, January 2008 - December 2008  
Supervisors: Prof. Andrew Zisserman and Prof. Philip Torr  
University of Oxford, Oxford, UK

## EDUCATION

Habilitation à Diriger des Recherches (HDR), December 2013  
“Weakly Supervised Learning for Structured Output Prediction”  
École Normale Supérieure de Cachan, Cachan, France

Ph.D., Computing, November 2003 - November 2007  
“Combinatorial and Convex Optimization for Probabilistic Models in Computer Vision”  
Supervisors: Prof. Philip H.S. Torr and Prof. Andrew Zisserman  
Oxford Brookes University, Oxford, UK

B.Tech. (Hons.), Computer Science and Engineering, June 2003  
Supervisors: Prof. P.J. Narayanan and Prof. C.V. Jawahar  
International Institute of Information Technology (IIIT), Hyderabad, India

## HONORS

Outstanding Reviewer Award, CVPR 2011.

BMVA Sullivan Thesis Prize, 2008 (Best thesis submitted to a UK university in the field of computer and natural vision). Centrale Paris, Châtenay-Malabry, France

Best Student Paper Honourable Mention Award, NIPS 2007 for paper entitled “An Analysis of Convex Relaxations for MAP Estimation”.

Best Contributed Paper Award, Rank Symposium on Interacting with Still and Moving Images for paper entitled “An Invariant Large Margin Nearest Neighbour Classifier”.

Best Paper Award, ICVGIP 2004 for paper entitled “Learning Layered Pictorial Struc-

tures from Video”.

Oxford Brookes Studentship - November 2003 to November 2006.

IIIT Gold Medal for highest GPA (9.8/10) in the graduating class of 2003.

## PUBLICATIONS

### Book Chapters

M. Pawan Kumar, V. Kolmogorov and P. Torr  
“Analyzing Convex Relaxations for MAP Estimation”  
Advances in Markov Random Fields for Vision and Image Processing

M. Pawan Kumar, P. Torr and A. Zisserman  
“An Object Category Specific MRF for Segmentation”  
Towards Category-Level Object Recognition

### Journal Articles

A. Behl, P. Mohapatra, C.V. Jawahar and M. Pawan Kumar  
“Optimizing Average Precision using Weakly Supervised Data”  
In Pattern Analysis and Machine Intelligence (PAMI), 2015

M. Pawan Kumar, H. Turki, D. Preston and D. Koller  
“Parameter Estimation and Energy Minimization for Region-based Semantic Segmentation”  
In Pattern Analysis and Machine Intelligence (PAMI), 2015

M. Pawan Kumar, O. Veksler and P. Torr  
“Improved Moves for Truncated Convex Models”  
In Journal of Machine Learning Research (JMLR), 2011

M. Pawan Kumar, P. Torr and A. Zisserman  
“OBJCUT: Efficient Segmentation using Top-Down and Bottom-Up Cues”  
In Pattern Analysis and Machine Intelligence (PAMI), 2010

M. Pawan Kumar, V. Kolmogorov and P. Torr  
“An Analysis of Convex Relaxations for MAP Estimation of Discrete MRFs”  
In Journal of Machine Learning Research (JMLR), 2009

P. Kohli, M. Pawan Kumar and P. Torr  
“P3 and Beyond: Move Making Algorithms for Solving Higher Order Functions”  
In Pattern Analysis and Machine Intelligence (PAMI), 2009

M. Pawan Kumar, P.H.S. Torr and A. Zisserman  
“Learning Layered Motion Segmentations of Video”  
In International Journal of Computer Vision (IJCV), 2008

## Conference Papers

P. Dokania and M. Pawan Kumar

“Parsimonious Labeling”

In Proceedings of International Conference on Computer Vision (ICCV), 2015

D. Bouchacourt, S. Nowozin and M. Pawan Kumar

“Entropy-based Latent Structured Output Prediction”

In Proceedings of International Conference on Computer Vision (ICCV), 2015

P. Mohapatra, C. V. Jawahar and M. Pawan Kumar

“Efficient Optimization for Average Precision SVM”

In Proceedings of Advances in Neural Information Processing Systems (NIPS), 2014

M. Pawan Kumar

“Rounding-based Moves for Metric Labeling”

In Proceedings of Advances in Neural Information Processing Systems (NIPS), 2014

P. Dokania, A. Behl, C. V. Jawahar and M. Pawan Kumar

“Learning to Rank with High-Order Information”

In Proceedings of European Conference on Computer Vision (ECCV), 2014

A. Behl, C. V. Jawahar and M. Pawan Kumar

“Optimizing Average Precision using Weakly Supervised Data”

In Proceedings of Conference on Computer Vision and Pattern Recognition (CVPR), 2014

P.-Y. Baudin, D. Goodman, K. Puneet, N. Azzabou, P. Carlier, N. Paragios and M. Pawan Kumar

“Discriminative Parameter Estimation for Random Walks Segmentation”

In Proceedings of International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2013

W. Zaremba, M. Pawan Kumar, A. Gramfort and M. Blaschko

“Learning from M/EEG Data with Variable Brain Activation Delay”

In Proceedings of International Conference on Information Processing in Medical Imaging (IPMI), 2013

M. Pawan Kumar, B. Packer and D. Koller

“Modeling Latent Variable Uncertainty for Loss-based Learning”

In Proceedings of International Conference on Machine Learning (ICML), 2012

K. Miller, M. Pawan Kumar, B. Packer, D. Goodman and D. Koller

“Max-Margin Min-Entropy Models”

In Proceedings of Conference on Artificial Intelligence and Statistics (AISTATS), 2012

M. Pawan Kumar, H. Turki, D. Preston and D. Koller

“Learning Specific-Class Segmentation from Diverse Data”

In Proceedings of International Conference on Computer Vision (ICCV), 2011

M. Pawan Kumar, B. Packer and D. Koller

“Self-Paced Learning for Latent Variable Models”

In Proceedings of Advances in Neural Information Processing Systems (NIPS), 2010

M. Pawan Kumar and D. Koller

“Efficiently Selecting Regions for Scene Understanding”

In Proceedings of Conference on Computer Vision and Pattern Recognition (CVPR), 2010

P. Kohli and M. Pawan Kumar

“Energy Minimization for Linear Envelope MRFs”

In Proceedings of Conference on Computer Vision and Pattern Recognition (CVPR), 2010

M. Pawan Kumar and D. Koller

“Learning a Small Mixture of Trees”

In Proceedings of Advances in Neural Information Processing Systems (NIPS), 2009

M. Pawan Kumar, A. Zisserman and P. Torr

“Efficient Discriminative Learning of Parts-based Models”

In Proceedings of International Conference on Computer Vision (ICCV), 2009

M. Pawan Kumar and D. Koller

“MAP Estimation of Semi-Metric MRFs via Hierarchical Graph Cuts”

In Proceedings of Conference on Uncertainty in Artificial Intelligence (UAI), 2009

M. Pawan Kumar and P. Torr

“Improved Moves for Truncated Convex Models”

In Proceedings of Advances in Neural Information Processing Systems (NIPS), 2008

M. Pawan Kumar and P. Torr

“Efficiently Solving Convex Relaxations for MAP Estimation”

In Proceedings of International Conference on Machine Learning (ICML), 2008

M. Pawan Kumar, V. Kolmogorov and P. Torr

“An Analysis of Convex Relaxations for MAP Estimation”

In Proceedings of Advances in Neural Information Processing Systems (NIPS), 2007

M. Pawan Kumar, P. Torr and A. Zisserman

“An Invariant Large Margin Nearest Neighbour Classifier”

In Proceedings of International Conference on Computer Vision (ICCV), 2007

P. Kohli, M. Pawan Kumar and P. Torr

“P3 and Beyond: Solving Energies with Higher Order Cliques”

In Proceedings of Conference on Computer Vision and Pattern Recognition (CVPR), 2007

M. Pawan Kumar, P. Torr and A. Zisserman

“Solving Markov Random Fields using Second Order Cone Programming Relaxations”

In Proceedings of Conference on Computer Vision and Pattern Recognition (CVPR), 2006

M. Pawan Kumar and P. Torr

“Fast Memory-Efficient Generalized Belief Propagation”

In Proceedings of European Conference on Computer Vision (ECCV), 2006

M. Pawan Kumar, P. Torr and A. Zisserman  
“Learning Layered Motion Segmentations of Video”  
In Proceedings of International Conference on Computer Vision (ICCV), 2005

M. Pawan Kumar, P. Torr and A. Zisserman  
“OBJ CUT”  
In Proceedings of Conference on Computer Vision and Pattern Recognition (CVPR), 2005

M. Pawan Kumar, P. Torr and A. Zisserman  
“Learning Layered Pictorial Structures from Video”  
In Proceedings of Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP), 2004

M. Pawan Kumar, P. Torr and A. Zisserman  
“Extending Pictorial Structures for Object Recognition”  
In Proceedings of British Machine Vision Conference (BMVC), 2004

INVITED TALKS  
AND SEMINARS

“Ranking with High-Order and Missing Information”  
Oxford Robotics Research Group Seminar, 2014  
Berkeley-INRIA-Stanford Symposium, 2014  
Universite Paris Est Seminar, 2014

“Loss-based Learning with Weak Supervision”  
Stanford Vision Group Seminar, 2013

“Loss-based Visual Learning with Weak Supervision”  
Berkeley-INRIA-Stanford Symposium, 2013

“Multiplicative Bounds for Metric Labeling”  
Workshop on Discrete Graphical Models and Combinatorial Optimization, University of Heidelberg, 2012  
European Conference on Operations Research, 2013  
Ecole Normale Supérieure (ENS) de Cachan Seminar, 2013  
Czech Technical University (CTU) Seminar, 2013  
Swedish Artificial Intelligence Society (SAIS) Workshop, 2014  
International Institute of Information Technology (IIIT) Seminar, 2014  
Xerox Research Center Europe (XRCE) Seminar, 2014

“Loss-based Learning with Latent Variables”  
Workshop on Statistics, Learning and Variational Methods in Imaging, University of Cambridge, 2012  
Robotics Research Group Seminar, University of Oxford, 2012  
Institute of Science and Technology - Austria, 2012

“Modeling Latent Variable Uncertainty for Loss-based Learning”  
Berkeley-INRIA-Stanford Symposium, 2012  
DAGS Internal Seminar, 2012

“Max-Margin Latent Variable Models”  
Mysore Park Workshop on Computer Vision, 2011

“Learning to Segment with Diverse Data”

Ecole Centrale Paris (ECP) Seminar, 2011  
Ecole Normale Supérieure (ENS) Seminar, 2011  
Kungliga Techniska Högskolan (KTH) Seminar, 2011

“Self-Paced Learning for Specific-Class Semantic Segmentation”  
Microsoft Research India Vision Shindig, 2010

“Curriculum Learning for Latent Structural SVM”  
TTI-Chicago Seminar, 2010

“Relaxations and Moves for MAP Estimation in MRFs”  
NIPS 2009 Workshop on Discrete Optimization

“Hierarchical Graph Cuts for Semi-Metric Labeling”  
DAGS Internal Seminar, 2009

“Improved Moves for Truncated Convex Models”  
Microsoft Research Cambridge Symposium, 2008

“An Analysis of Convex Relaxations for MAP Estimation”  
IPAM Symposium, 2008

“Invariant Large Margin Nearest Neighbour Classifier”  
Rank Symposium, 2007

“Layered Pictorial Structures for Object Category Segmentation”  
Microsoft Research Cambridge Seminar, 2005  
University of Leeds Seminar, 2005

#### TUTORIALS

“Discrete Optimization in Computer vision”  
ICIAP, 2013

“Visual Learning with Weak Supervision”  
CVPR, 2013

“Inference and Learning for Image Processing and Computer Vision”  
EUSIPCO, 2012

“Introduction to Machine Learning”  
Biomedical Image Analysis Summer School, 2012

“Learning with Inference for Discrete Graphical Models”  
ICCV, 2011

“Markov Models for Computer Vision”  
ICVGIP, 2010

“MAP Inference in Discrete Models”  
ICCV, 2009

“MAP Estimation Algorithms in Computer Vision”  
ECCV, 2008

TEACHING

“Polyhedral Combinatorial Optimization”  
Ecole Centrale Paris  
2015

“Discrete Inference and Learning for Artificial Vision”  
Coursera  
2014

“Discrete Optimization for Vision and Learning”  
Ecole Normale Superieure de Cachan  
2014-2015

“Discrete Optimization”  
Ecole Centrale Paris  
2012-2015

“Probabilistic Inference”  
Ecole Centrale Paris  
2013

PROFESSIONAL  
DUTIES

Area Chair: ICVGIP 2014, CVPR 2015, CVPR 2016.

Action Editor: CVIU.

Co-organizer for ICML 2013 workshop on “Infering: Interactions between Inference and Learning”.

Co-organizer for ISVC 2013 special track on “Optimization for Vision, Graphics and Medical Imaging”.

Co-organizer for ISVC 2012 special track on “Optimization for Vision, Graphics and Medical Imaging”.

Co-organizer for CVPR 2011 workshop on “Inference in Graphical Models with Structured Potentials”.

Program committee member: NIPS, ICML, AISTATS, ICCV, CVPR, ECCV, BMVC, ICVGIP.

Reviewer: JMLR, PAMI, IJCV.

REFERENCES

Available on request.

Last updated: 4th September, 2015.