

Curriculum vitæ — Tomáš Svoboda

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Born on 9th April 1972 in Prague, Czech Republic. Male.

Work experience

- since 2011 Deputy head of the Department of Cybernetics, for teaching.
- since 2009 Member of the board of the computer science study program Open Informatics, secretary of the program.
- since 2003 Research Fellow and Assistant Profesor at the Czech Technical University, Faculty of Electrical Engineering, Department of Cybernetics.
- 2000–2003 Post-doc position at the Swiss Federal Institute of Technology (ETHZ), Computer Vision Group, <http://www.vision.ee.ethz.ch/>
- 1999–2000 Assistant Professor at the Czech Technical University

Education

- 1995–1999 PhD in Artificial Intelligence and Biocybernetics, at Czech Technical University, with thesis *Central Panoramic Cameras Design, Geometry, Egomotion*.
- 1990–1995 Master (Engineer) in control engineering study branch Technical Cybernetics at Czech Technical University, with honors, with thesis *Camera Self-Calibration and Motion Analysis*

Research interests

Machine Learning in Computer Vision, Multicamera Systems, 3D Computer Vision, Panoramic Vision, Object Recognition.

Scientific achievements

T. Svoboda's publications have more than 500 citations in Science Citation Index, his SCI based h-index is 13.

Language skills

Czech (native), English and German (fluent), French (elementary).

Professional activities

Reviewing for major scientific journals like IEEE Transactions on Pattern Analysis and Machine Intelligence, International Journal on Computer Vision, Computer Vision and Image Understanding. Reviewer for major conferences like International Conference on Computer Vision, European Conference on Computer Vision, Computer Vision and Pattern Recognition and many others.

Pedagogical activities

Teaching in the following courses: Image Processing, Pattern Recognition, Cybernetics and Artificial Intelligence, Robotics and Machine Perception, Computer Vision Methods, Problem Solving and Games

One PhD students and about 15 Master an Bachelor students have successfully defended; currently advising two PhD students.

Publications

Journal articles (international, with impact factor)

- [1] Karel Zimmermann, Jiří Matas, and Tomáš Svoboda. Tracking by an optimal sequence of linear predictors. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 31(4):677–692, April 2009.
- [2] Karel Zimmermann, Tomáš Svoboda, and Jiří Matas. Anytime learning for the NoSLLiP tracker. *Image and Vision Computing, Special Issue: Perception Action Learning*, 27:1695–1701, October 2009.
- [3] Tomáš Svoboda, Daniel Martinec, and Tomáš Pajdla. A convenient multi-camera self-calibration for virtual environments. *PRESENCE: Teleoperators and Virtual Environments*, 14(4):407–422, August 2005.
- [4] Markus Gross, Stephan Wuermlin, Martin Naef, Edouard Lamboray, Christian Spagno, Kunz Andreas, Esther Koller-Meier, Tomas Svoboda, Luc Van Gool, Silke Lang, Strehlke Kai, Andrew Vande Moere, and Oliver Staadt. Blue-c: A spatially immersive display and 3D video portal for telepresence. *ACM Transactions on Graphics (Siggraph 2003)*, 22(3):819–827, July 2003.
- [5] Tomáš Svoboda and Tomáš Pajdla. Epipolar geometry for central catadioptric cameras. *International Journal of Computer Vision*, 49(1):23–37, August 2002.

Books, editorials, and book chapters

- [1] Tomáš Svoboda, Jan Kybic, and Hlaváč Václav. *Image Processing, Analysis and Machine Vision — A MATLAB Companion*. Thomson, Toronto, Canada, 1st edition, September 2007.
- [2] Peter Sturm, Tomáš Svoboda, and Seth Teller. Special issue: Omnidirectional vision and camera networks. *Computer Vision and Image Understanding*, 103(3):155, September 2006. Editorial.
- [3] Tomáš Pajdla, Tomáš Svoboda, and Václav Hlaváč. Epipolar geometry of central panoramic cameras. In Ryad Benosman and Sing Bing Kang, editors, *Panoramic Vision : Sensors, Theory, and Applications*, pages 85–114. Springer Verlag, Berlin, Germany, 1 edition, 2001.

Conference articles

- [1] Tomáš Petříček and Tomáš Svoboda. Area-weighted surface normals for 3D object recognition. In *21st IEEE International Conference on Pattern Recognition*, 2012.
- [2] Mario Gianni, Panagiotis Papadakis, Fiora Pirri, Ming Liu, Francois Pomerleau, Francis Colas, Karel Zimmermann, Tomáš Svoboda, Tomáš Petříček, Geert Kruijff, Harmisn Khambhaita, and Hendrik Zender. A unified framework for planning and execution-monitoring of mobile robots. In Sanem Sariel-Talay, Stephen F. Smith, and Nilufer Onder, editors, *Automated Action Planning for Autonomous Mobile Robots: Papers from the AAAI Workshop (WS-11-09)*, pages 39–44, Menlo Park, USA, August 2011. AAAI Press.
- [3] David Hurych, Karel Zimmermann, and Tomáš Svoboda. Detection of unseen patches trackable by linear predictors. In Andreas Wendel, Sabine Stering, and Martin Godec, editors, *CVWW '11: Proceedings of the 16th Computer Vision Winter Workshop*, pages 107–114, Inffeldgasse 16/II, Graz, Austria, February 2011. Graz University of Technology - Institute for Computer Graphics and Vision, Graz University of Technology.
- [4] David Hurych, Karel Zimmermann, and Tomáš Svoboda. Fast learnable object tracking and detection in high-resolution omnidirectional images. In Leonid Mestetskiy and Jose Braz, editors, *Proceedings of VISAPP 2011 International Conference on Computer Vision Theory and Applications*, pages 521–530, Setúbal, Portugal, March 2011. INSTICC - Institute for Systems and Technologies of Information, Control and Communication, INSTICC - Institute for Systems and Technologies of Information, Control and Communication. The Best Student Paper Award.
- [5] Karel Zimmermann, David Hurych, and Tomáš Svoboda. Improving cascade of classifiers by sliding window alignment in between. In G. Sen Gupta, Donald Bailey, Serge Demidenko, and Dale Carnegie, editors, *Proceedings of the Fifth International Conference on Automation, Robotics and Applications*, pages 196–201, Private Bag 11 222, Palmerston North, New Zealand, December 2011. School of Engineering and Advanced Technology, Massey University, Massey University. CD-ROM, <http://dx.doi.org/10.1109/ICARA.2011.6144881>.
- [6] David Hurych and Tomáš Svoboda. Incremental learning and validation of sequential predictors in video browsing application. In José Braz Paul Richard, editor, *VISIGRAPP 2010: International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications*, volume 1, pages 467–474, Setubal, Portugal, May 2010. Institute for Systems and Technologies of Information, Control and Communication. CD-ROM.

- [7] David Hurych, Tomáš Svoboda, Jana Trojanová, and Yadhunandan US. Active shape model and linear predictors for face association refinement. In *The Ninth IEEE International Workshop on Visual Surveillance 2009, In conjunction with the 12th IEEE International Conference on Computer Vision, 2009*, pages 1193–1200, Piscataway, USA, October 2009. IEEE Computer Society. CD-ROM.
- [8] Pavol Vlček and Tomáš Svoboda. Combination of stochastic and adaboost approach for object tracking and recognition in video. In Bohuslav Říha, editor, *Proceedings of Workshop 2008*, volume 1, pages 122–123, Prague, Czech Republic, February 2008. Czech Technical University in Prague.
- [9] Karel Zimmermann, Tomáš Svoboda, and Jiří Matas. Simultaneous learning of motion and appearance. In *The 1st International Workshop on Machine Learning for Vision-based Motion Analysis, In conjunction with the 10th European Conference on Computer Vision 2008*, Grenoble, France, October 2008. INRIA Rhone-Alpes.
- [10] Pavol Vlček and Tomáš Svoboda. Adaptive single-view 3D tracking of the human head by incremental texture wrapping. In Daniel Donoval and Mojmir Kollár, editors, *ISCAM 2007: International Conference in Applied Mathematics for Undergraduate and Graduate Students*, volume 58, Bratislava, Slovak Republic, April 2007. FEI, Slovak University of Technology, FEI, Slovak University of Technology. The Proceedings will appear as a special issue of the Journal of Electrical Engineering.
- [11] Karel Zimmermann, Tomáš Svoboda, and Jiří Matas. Adaptive parameter optimization for real-time tracking. In *Proceedings of 11th IEEE International Conference on Computer Vision, workshop on Non-rigid registration and tracking through learning*, Madison, USA, October 2007. Omnipress.
- [12] Jiří Matas, Karel Zimmermann, Tomáš Svoboda, and Adrian Hilton. Learning efficient linear predictors for motion estimation. In *Proceedings of 5th Indian Conference on Computer Vision, Graphics and Image Processing*, number 4338 in LNCS, pages 445–456, December 2006.
- [13] Karel Zimmermann, Tomáš Svoboda, and Jiří Matas. Multiview 3D tracking with an incrementally constructed 3D model. In *Third International Symposium on 3D Data Processing, Visualization and Transmission*, Chapel Hill, USA, June 2006. University of North Carolina.
- [14] Tomas Svoboda. A software for complete calibration of multicamera systems. In Amir Said and John G Apostopoulos, editors, *Image and Video Communications and Processing, Proceedings of SPIE-IS&T Electronic Imaging*, volume SPIE 5685, pages 115–128, Bellingham, WA and Springfield, VA, January 2005. IS&T—The Society for Imaging Science and Technology and SPIE—The International Society for Optical Engineering, SPIE and IS&T. Invited paper.

- [15] Karel Zimmermann and Tomáš Svoboda. Probabilistic estimation of articulated body model from multiview data. In Peter Kneppo and Jiří Hozman, editors, *IFMBE Proceedings EMBEC'05, 3rd European Medical and Biological Engineering Conference*, pages 1–6, Prague, Czech Republic, November 2005. International Federation for Medical and Biological Engineering.
- [16] Petr Doubek, Indra Geys, Tomáš Svoboda, and Luc Van Gool. Cinematographic rules applied to a camera network. In Peter Sturm, Tomáš Svoboda, and Seth Teller, editors, *Omnivis2004, The fifth Workshop on Omnidirectional Vision, Camera Networks and Non-Classical Cameras*, pages 17–29, Prague, Czech Republic, May 2004. Czech Technical University.
- [17] Petr Doubek, Tomáš Svoboda, and Luc Van Gool. Monkeys — a software architecture for ViRoom — low-cost multicamera system. In James L. Crowley, Justus H. Piater, Markus Vincze, and Lucas Paletta, editors, *3rd International Conference on Computer Vision Systems*, number 2626 in LNCS, pages 386–395, Berlin, Germany, April 2003. Springer.
- [18] Hao Shao, Tomáš Svoboda, Vittorio Ferrari, Tinne Tuytelaars, and Luc Van Gool. Fast indexing for image retrieval based on local appearance with re-ranking. In *IEEE International Conference on Image Processing*, Los Alamitos, CA, USA, September 2003. IEEE.
- [19] Katja Nummiaro, Esther Koller-Meier, Tomáš Svoboda, Daniel Roth, and Luc Van Gool. Color-based object tracking in multi-camera environments. In B. Michaelis and G. Krell, editors, *25th Pattern Recognition Symposium, DAGM'03*, number 2781 in LNCS, pages 591–599, Berlin, Germany, September 2003. Springer.
- [20] Hao Shao, Tomáš Svoboda, Tinne Tuytelaars, and Luc Van Gool. Hpat indexing for fast object/scene recognition based on local appearance. In Erwin M. Bakker, Thomas S. Huang, Michael S. Lew, Nicu Sebe, and Sean Xian Zhou, editors, *International Conference on Image and Video Retrieval*, number 2728 in LNCS, pages 71–80, Berlin, Germany, July 2003. Springer.
- [21] Petr Doubek and Tomáš Svoboda. Reliable 3D reconstruction from a few catadioptric images. In R. Benosman and E.M. Mouaddib, editors, *Proceedings of the IEEE Workshop on Omnidirectional Vision 2002*, pages 71–78, Los Alamitos, CA, June 2002. IEEE Computer Society.
- [22] Petr Doubek and Tomáš Svoboda. What space can be reconstructed from multiple catadioptric images. In Horst Wildenauer and Walter Kropatsch, editors, *Proceedings of the Computer Vision Winter Workshop*, pages 198–207. PRIP TU Vienna, February 2002.
- [23] Patrick de la Hamette, Paul Lukowicz, Gerhard Tröster, and Tomáš Svoboda. Fingermouse: A wearable hand tracking system. In Peter

- Ljungstrand and Lars Erik Holmquist, editors, *UBICOMP2002 Adjunct Proceedings*, volume 1, pages 15–16, Göteborg, Sweden, September-October 2002. TeknologTryck, Elektroteknologsektionen Chalmers, Göteborg.
- [24] Tomáš Svoboda, Hanspeter Hug, and Luc Van Gool. ViRoom — low cost synchronized multicamera system and its self-calibration. In Luc Van Gool, editor, *Pattern Recognition, 24th DAGM Symposium*, number 2449 in LNCS, pages 515–522, Berlin, Germany, September 2002. Springer.
- [25] Tomáš Svoboda and Tomáš Pajdla. Matching in catadioptric images with appropriate windows and outliers removal. In Wladyslav Skarbek, editor, *Proc. of the 9th International Conference on Computer Analysis of Images and Patterns*, number 2124 in Lecture Notes in Computer Science, pages 733–740, Berlin, Germany, September 2001. Springer.
- [26] Tomáš Svoboda and Tomáš Pajdla. Panoramic cameras for 3D computation. In Tomáš Svoboda, editor, *Proceedings of the Czech Pattern Recognition Workshop*, pages 63–70, Prague, Czech Republic, February 2000. Czech Society for Pattern Recognition. <http://cmp.felk.cvut.cz/~svoboda/Publications/svobCPRW2000.html>.
- [27] Tomáš Svoboda, Tomáš Pajdla, and Václav Hlaváč. Epipolar geometry for panoramic cameras. In Hans Burkhardt and Neumann Bernd, editors, *the fifth European Conference on Computer Vision, Freiburg, Germany*, number 1406 in Lecture Notes in Computer Science, pages 218–232, Berlin, Germany, June 1998. Springer.
- [28] Tomáš Svoboda, Tomáš Pajdla, and Václav Hlaváč. Motion estimation using central panoramic cameras. In Stefan Hahn, editor, *IEEE International Conference on Intelligent Vehicles*, pages 335–340, Stuttgart, Germany, October 1998. Causal Productions.
- [29] Tomáš Svoboda and Peter Sturm. A badly calibrated camera in ego-motion estimation, propagation of uncertainty. In Gerald Sommer, Kostas Daniilidis, and Josef Pauli, editors, *7-th International Conference Computer Analysis of Images and Patterns, Kiel, Germany*, LNCS, pages 183–190, Berlin, Germany, September 1997. Springer.
- [30] Tomáš Svoboda and Tomáš Pajdla. Efficient estimation of essential matrix in motion analysis. In *Czech Technical University Workshop 96*, pages 179–180, Brno, Czech Republic, January 1996. Czech Technical University.

Supervised Bachelor, Master, and PhD theses

- [1] Erik Derner. Car detection on a mobile robot by fusing visual and 3D lidar data. BSc Thesis CTU–CMP–2012–10, Center for Machine Percep-

- tion, K13133 FEE Czech Technical University, Prague, Czech Republic, May 2012.
- [2] Filip Sedláček. Autonomous flipper control for a tracked robot using 2D vertical laser scan. BSc Thesis CTU–CMP–2012–11, Center for Machine Perception, K13133 FEE Czech Technical University, Prague, Czech Republic, May 2012.
 - [3] Ondřej Semmler. Modulární systém pro sledování objektů ve videu v reálném čase. Bachelor thesis, Department of Cybernetics, Faculty of Electrical Engineering Czech Technical University, Prague, Czech Republic, 2010.
 - [4] Oliver Porges. Low-cost solution for automated optical inspection of printed circuit boards. Bachelor thesis, Department of Cybernetics, Faculty of Electrical Engineering Czech Technical University, Prague, Czech Republic, 2010.
 - [5] Přemysl Holásek. Mobile phone as visual ragnefinder. Master thesis, Department of Cybernetics, Faculty of Electrical Engineering Czech Technical University, Prague, Czech Republic, 2009.
 - [6] Rostislav Prikner. Pictorial structural models for human detection in videos. MSc Thesis CTU–CMP–2008–11, Center for Machine Perception, K13133 FEE Czech Technical University, Prague, Czech Republic, May 2008.
 - [7] Ctibor Varga. Detekce objektů náhodně inicializovaným sledováním. MSc Thesis CTU–CMP–2008–10, Center for Machine Perception, K13133 FEE Czech Technical University, Prague, Czech Republic, May 2008.
 - [8] Jan Konečný. Adaptivní modelování a sledování objektů ve videosekvencích. MSc Thesis CTU–CMP–2008–03, Center for Machine Perception, K13133 FEE Czech Technical University, Prague, Czech Republic, February 2008.
 - [9] Karel Zimmermann. *Fast learnable methods for object tracking*. PhD Thesis CTU–CMP–2008–09, Czech Technical University, November 2008.
 - [10] Petr Lhotský. Detection and tracking objects using sequential monte carlo method. MSc Thesis K333–24/07, CTU–CMP–2007–01, Department of Cybernetics, Faculty of Electrical Engineering Czech Technical University, Prague, Czech Republic, January 2007.
 - [11] Ondřej Mazaný. Articulated 3D human model and its animation for testing and learning the algorithms of multi-camera systems. MSc Thesis K333–25/07, CTU–CMP–2007–02, Department of Cybernetics, Faculty of Electrical Engineering Czech Technical University, Prague, Czech Republic, January 2007.

- [12] Jan Kořata. Automatic segmentation of articulated objects of unknown complexity from videos. MSc Thesis K333–26/07, CTU–CMP–2007–03, Department of Cybernetics, Faculty of Electrical Engineering Czech Technical University, Prague, Czech Republic, January 2007.
- [13] Lukáš Fajt. Pictorial structural models, learning and recognition in image sequences. MSc Thesis K333–27/07, CTU–CMP–2007–04, Department of Cybernetics, Faculty of Electrical Engineering Czech Technical University, Prague, Czech Republic, January 2007.
- [14] Petr Doubek. Vřesměrové vidění. Master thesis, Charles University, Faculty of Mathematics and Physics, Prague, Czech Republic, 2001.
- [15] Zdeněk Pohl. Searching for correspondences in panoramic images. Master thesis, Department of Cybernetics, Faculty of Electrical Engineering Czech Technical University, Prague, Czech Republic, 2001.