Curriculum Vitae

Personal Information

Name	Tolga Birdal, M.Sc.
Address	Georgenschwaigstrasse 11 80807, Muenchen, Deutschland
Telephone	+49–176 80898287
E-Mail	tolga.birdal@tum.de tbirdal@gmail.com
Nationality	Turkish
Date of birth	17.12.1983
Webpage	http:/tbirdal.me , https://linkedin.com/in/tbirdal , http://campar.in.tum.de/Main/TolgaBirdal
Interests	3D Computer Vision, Machine Vision, Pattern Recognition, High Performance Computing

Education

▷ Period	2014–Present
○ Acquired qualifications	**Dr. Rer. Nat. (Expected)**
○ Institute	Technical University of Munich
○ Principal subjects	Informatics
○ Thesis subject	Large Scale 3D Object Reconstruction
▷ Period	2008–2011
○ Acquired qualifications	**Master of Science**
○ Institute	Technical University of Munich
○ Principal subjects	Computational Science and Engineering
○ Thesis subject	3D Deformable Surface Recovery Using RGBD Cameras
▷ Period	2004–2008
○ Acquired qualifications	**Bachelor of Science**
○ Institute	Sabanci University
○ Principal subjects	Electronics Engineering
▷ Period	1999–2004
○ Graduate school	Robert College
○ Principal subjects	Science

Profession

▷ Period	2014–Present
○ Employer	**Siemens Corporate Technology** Otto Hahn Ring 6, 81739, Muenchen, Deutchland
○ Position	Research Scientist

◦ Projects	I have started contributing in Siemens' machine vision research as a part of my Doctoral studies. Our goal is to develop generic large scale 3d reconstruction algorithms, where the presence of clutter and occlusion is inevitable. We expect our research to assist Autonomous Systems, Medical Imaging and Quality Assurance.
▷ Period	2014–2014
◦ Employer	**Google** Mountain View, CA, USA
◦ Position	Google Summer of Code Student
◦ Supervisor	Dr. Vincent Rabaud
◦ Projects	Implementation of surface matching algorithms into OpenCV
▷ Period	2010–2014
◦ Employer	**Gravi Information Technologies** Istanbul, Turkey
◦ Position	CEO & Co-Founder
◦ Projects	Gravi is the one and only research oriented machine vision company in Turkey, who conducts its own research and develops machine vision libraries. I was responsible in the management and the direction of the research on 3D machine vision.
▷ Period	2008–2011
◦ Employer	**BeFunky Inc.** San Francisco, CA, USA
◦ Position	Chief Engineer & Co-Founder
◦ Projects	Together with my three colleagues, I have founded BeFunky, an online digital art engine, which utilizes state of the art computer vision algorithms. Besides being the co-founder I have developed the entire system and most of the basis for the algorithms running on BeFunky (www.befunky.com)
▷ Period	2009–2010
◦ Employer	**Mitsubishi Electric Research Labs** Cambridge, MA, USA
◦ Position	Intern
◦ Supervisor	Prof. Fatih Porikli
◦ Projects	At MERL, I designed an algorithm for simulating human breathing in 4D. This included the implementation of Random Walks for Image Segmentation, 3D CT processing on CUDA, and implementation of true real-time Bilateral Filtering.
▷ Period	2007
◦ Employer	**Carnegie Mellon University** Pittsburgh, PA, USA
◦ Position	Intern
◦ Supervisor	Prof. Martial Hebert & Dr. Yan. Ke
◦ Project	Shape Matching Algorithm using Spatial Segmentation Data
▷ Period	2006–2008
◦ Employer	**Sabanci University** Istanbul, Turkey

◦ Position	Teaching Assistant
◦ Supervisor	Prof. Aytul Ercil
◦ Main responsibilities	Teaching Assistant in Computer Vision & Pattern Recognition Courses
▷ Period	2005–2007
◦ Employer	**Vistek Isra Vision** Teknokent, Gebze, Turkey
◦ Position	Application Developer
◦ Supervisor	Prof. Aytul Ercil
◦ Projects	Development of industrial computer vision systems on OCR/OCV, Barcode Reading, Robot Control, Object Classification based on Halcon framework.

RESEARCH

▷ Deep Learning	My recent work involves geometric 3D deep learning for object detection and recognition. The main aim is to utilize the entire global context for localization of CAD models in point clouds.
▷ 3D Reconstruction	Siemens AG proudly uses my Reconstruction-via-Detection framework in the applications of quality inspection of large industrial parts. This work has also brought me the EMVA Young Professional Award 2016.
▷ 3D Object Detection	As part of GSoC 2014, I have successfully implemented a surface matching module into OpenCV based on point-pair features. The framework is well suited for object detection in point clouds.
▷ Multi-View 3D Measurement	A multi-view system which is used for 3D reconstruction of industrial parts. It relies on triangulation fundamentals, while exploiting calibration of non-overlapping cameras in local and global coordinate spaces. (@Gravi)
▷ Deformable 3D Tracking	A novel scene flow methodology for recovering deformations on RGB-D scenes is proposed and implemented.
▷ Shape Matching and Tracking	Targeting robust Augmented Reality systems, I have implemented a detection-tracking framework, which is invariant to: Rotation/scale changes, illumination, occlusion and clutter.
▷ Scalable Image Retrieval	An improved cloud based implementation of [Nister, Stewinius 2006]. The system scales up to 5M images.
▷ Fastest Bilateral Filtering on GPU	Implementation of Fatih Porikli's Bilateral Filtering algorithm on GPU. Runs in around 2ms per image.
▷ Random Walks	Implementation of Leo Grady's famous algorithm in C. (@MERL)

▷ Breathing Simulation on GPU	Generating 4D CT breathing data. (@MERL)
▷ RoboChess	A physical 3-axis chess playing robot using color cameras. Computer vision engine, chess engine, Flash graphics, remote server communication, PLC programming are implemented.(@SU)
▷ BeFunky	An online platform where users can recreate their images using tons of state-of-the-art photo effects, and editing tools. Day by day BeFunky evolves into a bigger platform.
▷ T Vision Library	Core Library of all Gravi Industrial Vision algorithms (more thatn 1200 operations).
▷ T Effects Library	Core Library of all BeFunky effects/editing. Many low level image processing & vision algorithms are implemented (more thatn 600 operations).
▷ Workflow Analysis using 4D Data	Using 3D Reconstruction environment, I started developing a 4D data analysis framework. (@ CAMP-TUM)
▷ 3D Stereo Reconstruction & 3D Adaptive Space Carving	Implementation of state of the art 3D reconstruction algorithms.
▷ 3D Talking Avatar	Automatically generate your 3D Avatar and let it say what you say. (@ SU)
▷ Template Matching on CUDA	Pyramidal Normalized Cross Correlation matching on CUDA. (@ SU)
▷ Robo112	Autonomous, helper robot. It can read text, follow signs, and grasp pieces. (@ SU)
▷ Climbing Robot using Wireless CAMs	Obstacle avoidance for hill climbing robots. Sensor data and decisions are transmitted over wireless network. (@CMU)
▷ Active Contours on GPU	Implemented active contours without re-initialization on GPU.
▷ Painting Classification	Classification of paintings according to Genre using SVMs.

PUBLICATIONS

▷ Patents	Tolga Birdal, Mehmet Ozkanoglu, Abdi Tekin Tatar: *METHOD AND SYSTEM FOR GENERATING ONLINE CARTOON OUTPUTS* Patent application number: 20090219298. IPC8 Class: AG09G502FI
	Tolga Birdal, Emrah Bala, Emre Koc, Mehmet Ozkanoglu, Abdi Tekin Tatar: *METHOD AND SYSTEM FOR PROVIDING AN IMAGE EFFECTS INTERFACE* Patent application number: 20100223565. IPC8 Class: AG06F3048FI

▷ Publications

Tolga Birdal, Slobodan Ilic: *CAD Priors for Accurate and Flexible 3D Reconstruction* ICCV 2017, Venice

Tolga Birdal, Benjamin Busam & Nassir Navab: *A Minimalist Approach to Type-Agnostic Detection of Quadrics in Point Clouds* (under review)

Benjamin Busam, Tolga Birdal & Nassir Navab: *Camera Pose Filtering with Local Regression Geodesics on the Riemannian Manifold of Dual Quaternions* (Arxiv, upcoming)

Tolga Birdal, Slobodan Ilic: *A Point Sampling Algorithm for 3D Matching of Irregular Geometries* IROS 2017, Vancouver

Tolga Birdal, Ievgeniia Dobryden & Slobodan Ilic: *X-Tag: A Fiducial Tag for Flexible and Accurate Bundle Adjustment* 3DV 2016, Stanford University

Tolga Birdal, Emrah Bala, Tolga Eren & Slobodan Ilic: *Online Inspection of 3D Parts via a Locally Overlapping Camera Network* WACV 2016, Lake Placid

Tolga Birdal, Slobodan Ilic: *Point Pair Features Based Object Detection and Pose Estimation Revisited* 3DV 2015, Lyon

Umut Simsekli, Tolga Birdal: *A Unified Probabilistic Framework For Robust Decoding Of Linear Barcodes* ICASSP 2015, Brisbane

Umut Simsekli, Tolga Birdal, Emre Koc, Taylan Cemgil: *A Factorization Based Recommender System for Online Services* SIU 2013, Cyprus

Tolga Birdal, Diana Mateus, Slobodan Ilic: *Towards A Complete Framework For Deformable Surface Recovery Using RGBD Cameras* IROS 2012, Vilamoura/Portugal

Tolga Birdal and Aytul Ercil: *Real-time Automated Road, Lane and Car Detection for Autonomous Driving* DSPincars, 2007, Istanbul

CONFERENCES

▷ Academic conferences

ICCV 2017, IROS 2017 (upcoming)

3DV 2016, Presenter - Stanford University

WACV 2016, Presenter - Lake Placid

3DV 2015, Presenter - Lyon

SIU 2013, Presenter - Girne

IROS 2012, Presenter - Vilamoura

SIU 2008 - Didim

DSPInCars 2007, Presenter - Istanbul

SIU 2006 - Antalya

▷ Summer schools	2013, IPAM Computer Vision Graduate Summer School, UCLA with NSF Scholarship
	2012, 2015 & 2016 International Computer Vision Summer School, Sicily - Successful Completion Certificates
▷ Industrial conferences	2016, EMVA Business Conference - Edinburgh
	2012 / 2013, World of Industry, Exhibitor - Istanbul
	2008, TechCunch 50, Alumni & Exhibitor - San Francisco
	2008, NVISION - San Jose
	2008, ARCS - Dresden
	2007, TechCunch 40, Presenter - San Francisco
	2007, Hannover Industrial Fair, Exhibitor - Hannover
	2007, ARIF Innovation Festival, Exhibitor - Istanbul
	2008, MVTec Halcon 8.0 Training - Munich
	2007, Siemens Simatic Machine Vision Workshop - Nuremberg
	2007, Intel Multi Core Programming - Ankara

AWARDS

▷ Entrepreneurial Awards	2011, Hottest iPhone App in Photo & Video Category on Apple iTunes Store
	2009, Motorola Worldwide Mobile Widget Competition - Winner
	2009, GTS Tech Start-up Competition - Finalist, Presenter
	2007, TechCrunch40 Tech Start-up Competition - Finalist
▷ Personal awards	2016, EMVA Young Professional Award. Given to young professionals and novel works with great industrial impact 2014, Ernst von Siemens Scholarship, Siemens AG. Given to talented PhD candidates in industry, showing high academic potential 2004, Merit Scholarship, Sabanci University for success in University Entrance Exam
	2004, Ranked 81^{st} in Istanbul and $\sim 600^{th}$ in Turkey in University Entrance Exam, among ~ 1700000 applicants
	2004, Received Robert College Sait Halman Computer Honor Prize (Given to one who has great achievements in Computer Science)
▷ Publication awards	SIU 2013, Alper Atalay Best Paper Award - Ranked 3^{rd}
▷ Awards in competitions	2008, Ranked 1^{st} with robot ROBO112 in Projistor Robot Competetion at Dogus University
	2008, Ranked 2^{nd} with robot ROBO112 in ITURO Robot Competetion at Istanbul Technical University
	2000, Ranked 10^{th} in Izmir Agean Chess Tournament

Languages

Native language	Turkish
Other languages	English (Proficient), German (Intermediate)

Abilities

Programming Skills	C/C++, Assembler (SSE, SSE2, SSE3, SSSE3, AVX), CUDA, Matlab, OpenCV, Halcon, C#, QT, OpenGL, Maple, Python and overall, the ability to adapt to different languages.
Hardware Skills	Camera Systems (Basler, IDS, Sony, JAI, The Imaging Source etc), Siemens 3D Imaging Sensors, Lighting Systems (Falcon, RVSI, SmartVision), PIC, FPGA, I/O Control Modules, PLCs, Smart Cameras, Framegrabbers and other similar hardware.
Hobbies	One Frequent Jazz Drummer A Cook in the Evenings Occasional Chess Player A Former Point Guard on Basketball Fields

Muenchen, July 17, 2017

Birdal, Tolga