Curriculum Vitae

Personal Information

Name	Tolga Birdal, M.Sc.
Addresse	Otto Hahn Ring 6 Muenchen, Deutschland
Telephone	+49–176 80898287
E-Mail	tolga.birdal.ext@tum.de tbirdal@gmail.com
Nationality	Turkish
Date of birth	17.12.1983
Webpage	www.tbirdal.me
Interests	3D Computer Vision, Machine Vision, Pattern Recognition, High Performance Computing

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.

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
◦ Grade	1.9 / 5 (1 maximum)
▷ Period	2004–2008
◦ Acquired qualifications	**Bachelor of Science**
◦ Institute	Sabanci University
◦ Principal subjects	Electronics Engineering
◦ Grade	3.1 / 4 (4 maximum)
▷ Period	1999–2004
◦ Graduate school	Robert College
◦ Principal subjects	Science
◦ Grade	88 / 100

RESEARCH

	Below, there is a small sample of the projects I have been developed.
▷ 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

▷ Publications	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, Emrah Bala: *Flow Enhancing Line Integral Convolution Filter* ICIP, 2010, Istanbul Tolga Birdal and Aytul Ercil: *Real-time Automated Road, Lane and Car Detection for Autonomous Driving* DSPincars, 2007, Istanbul

▷ 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

CONFERENCES

▷ Summer schools

2013, IPAM Computer Vision Graduate Summer School, UCLA with NSF Scholarship

2012, International Computer Vision Summer School, Sicily, Successful Completion Certificate

▷ Trainings

2008, MVTec Halcon 8.0 Training - Munich

2007, Siemens Simatic Machine Vision Workshop - Nuremberg

2007, Intel Multi Core Programming - Ankara

▷ Academic conferences

SIU 2013, Presenter - Girne

IROS 2012, Presenter - Vilamoura

SIU 2008 - Didim

DSPInCars 2007, Presenter - Istanbul

SIU 2006 - Antalya

▷ Industrial conferences

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

AWARDS

▷ Professional 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

▷ Publication awards

SIU 2013, Alper Atalay Best Paper Award - Ranked 3^{rd}

▷ Academic awards	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 80^{th} in Istanbul and 600^{th} in Turkey in University Entrance Exam, among 1500000 applicants 2004, Received Robert College Sait Halman Computer Honor Prize (Given to one who has great achievements in Computer Science)
▷ 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 (Beginner)

ABILITIES

PROGRAMMING SKILLS	C/C++, Assembler (SSE, SSE2, SSE3, SSSE3, AVX), CUDA, Matlab, OpenCV, Halcon, C#, QT, OpenGL, Maple, and overall, the ability to adapt to different languages.
HARDWARE SKILLS	Camera Systems (Basler, IDS, Sony, JAI, The Imaging Source etc), 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, August 18, 2015

Birdal, Tolga