Giulio Marin

Curriculum Vitae

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Personal

First name	Giulio
Last name	Marin
Gender	Male
Date of birth	September 14, 1989
Nationality	Italian
Visa	USA H1-B

Education

2014–Present **Ph.D. student in Information Engineering**
Department of Information Engineering, University of Padova.
Topics: Computer Vision, Image Processing, Machine Learning
Supervisor: Prof. Pietro Zanuttigh

2011–2013 **M.Sc. ('Laurea Magistrale') in Communication Engineering**
Department of Information Engineering, University of Padova
Grade: 110/110 cum laude.
Dissertation title: "Confidence Estimation of ToF and Stereo Data for 3D Data Fusion"
Supervisors: Prof. Pietro Zanuttigh, Ph.D. Carlo Dal Mutto

2008–2011 **B.Sc. ('Laurea Triennale') in Information Engineering**
Department of Information Engineering, University of Padova
Grade: 110/110.
Dissertation title: "Linear Blend techniques for hand modeling from laser scanner data"
Supervisors: Prof. Pietro Zanuttigh, Ph.D. Carlo Dal Mutto

Master Thesis

Title	*Confidence Estimation of ToF and Stereo Data for 3D Data Fusion*
Supervisors	Prof. Pietro Zanuttigh, Ph.D. Carlo Dal Mutto

Description Aim of this thesis is to produce accurate depth maps estimation by combining information from Time-of-Flight (ToF) range cameras and stereo vision systems. These two families of imaging systems, considered alone have complementary characteristics, therefore I combined the two depth information to improve the quality of the acquired three-dimensional scene. Firstly I devised some measures on the correctness of the two depth estimations in order to weight the two hypotheses in the fusion process. Then I extended a technique for cost aggregation to combine the two depth hypothesis according to their reliability. Experimental results show that the proposed fusion approach outperforms the performance of the two systems alone. A paper related to this proposed fusion approach is currently under submission: G. Marin, S. Mattoccia, P. Zanuttigh, "Locally Consistent ToF and Stereo Data Fusion Based on Confidence Measures".

Skills
- Acquisition of 3D data from ToF sensors and depth map computation from stereo vision systems
- Calibration of heterogeneous imaging systems (ToF and stereo system together)
- Model the data quality of ToF sensors and stereo systems by estimating confidence measures

Bachelor Thesis

Title *Linear Blend techniques for hand modeling from laser scanner data*

Supervisors Prof. Pietro Zanuttigh, Ph.D. Carlo Dal Mutto

Description In this work I show how it is possible to create a three-dimensional model of a real hand using a 3D scanner. Through the use of specialized software I also built a skeleton for each model with the aim of create a database containing the hands of different people.These models were used to develop a technique for hand recognition by a 3D camera and partial results have been published in: F. Dominio, M. Donadeo, G. Marin, P. Zanuttigh, G.M. Cortelazzo, "Hand Gesture Recognition with Depth Data", ACM Multimedia Artemis Workshop, 2013.

Skills
- Acquired the knowledge about ICP, Kinematic chains and Linear blend skinning
- 3D modeling and animation in Autodesk Maya and other 3D mesh processing software
- Construct digital, three dimensional models using a 3D Laser Scanner

Publications

Journals
- G. Marin, F. Dominio, P. Zanuttigh, "Hand Gesture Recognition with Jointly Calibrated Leap Motion and Depth Sensor", Multimedia Tools and Applications, Springer, 2015.

Conference papers

- G. Pozzato, S. Michieletto, E. Menegatti, F. Dominio, G. Marin, L. Minto, S. Milani, P. Zanuttigh, "Human-Robot Interaction with Depth-Based Gesture Recognition", Real Time Gesture Recognition for Human-Robot Interaction Workshop, 2014.
- G. Marin, F. Dominio, P. Zanuttigh, "Hand gesture recognition with Leap Motion and Kinect devices", IEEE International Conference on Image Processing, Paris, France, 2014.
- G. Marin, M. Fraccaro, M. Donadeo, F. Dominio, P. Zanuttigh, "Palm Area Detection for Reliable Hand Gesture Recognition", Proceedings of MMSP 2013, Pula, Italy, 2013.
- F. Dominio, M. Donadeo, G. Marin, P. Zanuttigh, G.M. Cortelazzo, "Hand Gesture Recognition with Depth Data", ACM Multimedia Artemis Workshop, 2013.

Book chapters

- F. Dominio, G. Marin, M. Piazza, P. Zanuttigh, "Features descriptors for depth-based hand gesture recognition", Computer Vision and Machine Learning with RGB-D Sensors, Springer, 2014.

Miscellaneous

July 2014 **International Computer Vision Summer School**

This summer school aimed to provide both an objective and clear overview and an in-depth analysis of the state-of-the-art research in Computer Vision.

Class Projects

Course **Channel Codes and Capacity 2012-2013**

Description Implementation of encoder and message passing decoder for an LDPC code of 802.11n standard. The code was written in MATLAB with some critical functions in C language to reduce the execution time.

Skills

- Learned to integrate C/C++ function in a MATLAB program
- Applied message passing theory for maximum a posteriori symbol detection

Course **Source Coding 2012-2013**

Description Implementation two different kinds of compression and decompression techniques: arithmetic coding and LZW coding, which is a dictionary based approach used into the GIF compression scheme. The code was written in MATLAB.

Skills

- Workaround to deal with computer's finite precision.
- Practical comparison of pros and cons of arithmetic and dictionary based compression techniques with real data (text, image, sound)

Course **Wireless Systems and Networks 2012-2013**

Description Comparison of Medium Access Control (MAC) techniques for energy harvesting wireless sensor networks (EH-WSN). This project describes the state-of-the-art MAC protocols for EH-WSN and includes performance comparisons among the solutions described.

Skills
- Review the state-of-the-art literature of a topical subject
- Write a report based on a group research activity

Course **Image Processing and 3D Graphics 2011-2012**

Description Designed and implemented a method for the recognition of the boundary of the palm using data from 3D acquisitions. The code was written in MATLAB and C++ with the aid of OpenCV. This was part of a bigger project that had the purpose of tracking the movement of a hand with Microsoft Kinect™. Partial results have been presented in: G. Marin, M. Fraccaro, M. Donadeo, F. Dominio, P. Zanuttigh, "Palm Area Detection for Reliable Hand Gesture Recognition", Proceedings of MMSP 2013, Pula, Italy, 2013.

Skills
- Learned to write C++ code and exploit OpenCV algorithms
- Read code written by other people and interact with it by making changes and adding instructions.
- Used Microsoft Visual Studio and MATLAB Image Processing Toolbox
- Solved problems due to external libraries, frameworks and development environment.

Course **Embedded Systems 2010-2011**

Description ('Best App' award) Designed and implemented an Android application able to count, show and store steps recorded during a running or walking session. This application offers support for: a real time plot and other information showed, a list with all sessions stored in the database, a summary, zoomable, and scrollable plot with steps distributed in configurable intervals.

Skills
- Familiarized with computer programming on complex software platforms
- Improved the knowledge of Java, SQLite, XML and Eclipse
- Program power-constrained devices and design User Interfaces by considering the differences between mobile devices and computers
- Share code with Git

Work Experience

Vocational

Sep 2013 – Sep 2014 **Consultant**
*Aquifi, Inc. (*previously *Imimtek, Inc.)*, Palo Alto (CA), U.S.A..
Design, develop and test computer vision algorithms and demos for 3D human/computer interaction. Optimize code for low CPU utilization and low latency. Assist in design, development and testing of application API and SDK using industry best practices. Participate in design and development of other projects as assigned.

2013 **Intern (R&D group)**
Jul–Sep *Imimtek, Inc.*, Sunnyvale (CA), U.S.A..
Worked on computer vision algorithms and demos for 3D human/computer interaction with focus on hand and face.

Detailed achievements:
- Developed a C++ framework for object detection and tracking with a stereo vision system, according to the best design patterns practices.
- Learned to organize and plan activities for the next two weeks, according to the terms established by the company
- Present the work done every two weeks during company meetings, writing technical reports and showing practical demos.
- Study state-of-the-art papers and solutions to present to other colleagues during 'Technical Updates' meetings on a weekly basis.

2008–2011 **Worker cellarman**
(Summer job) *Cantina Viticoltori Ponte di Piave S.n.c.*, Ponte di Piave (TV), Italy.
Operations and activities relating to the collection and vinification of grapes delivered by members.

Detailed achievements:
- Learned how to work and relate with coworkers
- Organize activity to other people

2006–2007 **Electrician**
(Summer job) *ELECTRO NOVA DI FELET A. & PARRO G. SNC*, Oderzo (TV), Italy.
Creation and maintenance of electrical, civil and industrial automation in general (electric panels, alarm systems) home automation and TVCC.

Detailed achievements:
- Improvement in SIEMENS PLC programming
- Design and realize electrical circuits for ad-hoc mechanical machines

Miscellaneous

June 2007 **Intern**
Department of Molecular Sciences and Nanosystems, University of Venice.
Winner of 'Progetto Lauree Scientifiche' (promoted by MIUR, Confindustria).
Developed a small research project on 'inverse opals'.

Awards

Jun 2011 'Best App' award on Embedded Systems course
Department of Information Engineering, University of Padova

Nov 2007 Winner of National Contest of Electrotechnic
ITIS Galileo Ferraris, Molfetta (BA)

Computer skills

Advanced MATLAB, C, C++ ,LaTeX, Git, Review Board, OpenCV, Computer Hardware and Support, Microsoft Windows, MAC OS

Intermediate	JAVA, Microsoft Visual Studio, Eclipse, Design Patterns, HTML/CSS, Linux, Autodesk AutoCAD
Basic	Objective-C, XCode, Autodesk Maya, OpenGL
Others	ECDL

Social skills and Competences

Team work	I have worked in different kind of teams from research group to sport crew.
Manual skills	I realized different electro-mechanical structure. For example, for the Secondary School final project, I made a 'Solar Concentrator', that was brought to various exhibitions and conferences. Furthermore, for the Bachelor thesis I made a rotating support for a '3D laser scanner'.
Organization	During my studies and work experiences I lived with other students and, thanks to this experience, I learned to deal with the problems of household management and to live with other people from different countries.
Driving license	Italy: categories A1 and B. California: category C.
Memberships	IEEE Student Member

Languages

Italian	**Mother tongue**
English	**Intermediate (C1)** Conversationally fluent. I spent three months in California (U.S.A.) for an internship. Moreover, almost all the courses of the Master of Science were taught in English.
French	**Basic** Basic words and phrases only. Middle School level.

Interests

Academic	I have attended some online courses (Coursera and edX platforms) not only on computer science topics, but also on economics and business management. During last years I've also held private lessons to undergraduate students with main topics Maths and Physics.
Sport	I played soccer at a competitive level for about 13 years. Now I practice sport regularly like running, mountain biking, hiking, rock climbing and skiing.

Palo Alto, July 31, 2015