Curriculum vitae

PERSONAL INFORMATION

Andrea Campisi

📍 Bologna, Italy

✉ and.campisi@gmail.com

🖱 www.thejauffre.com

⦿ https://www.github.com/thejauffre

💬 Skype and.campisi

Gender Male | Date of birth 02/09/1992 | Nationality Italian

WORK EXPERIENCE

Nov. 2021 - Today

Autonomous driving R&D Computer Vision Engineer

Toyota Material Handling Manufacturing Italy
Via Persicetana Vecchia 10, Bologna (Italy)

– Designing of Computer Vision systems for autonomous driving
– Analysis of state-of-the-art algorithms for visual (inertial) odometry, V-SLAM
– Research and development of lane/line detection and following, marker detection and decoding, VO systems
– Contributed to draw up some patents
– Thesis co-advisor for Master Degree students

Nov. 2017 - Nov. 2021

Computer Vision & Software Engineer

T3Lab consortium
Via Sario Bassanelli 9/11, Bologna (Italy)

Designing of Computer Vision and Image Processing systems, software developer

– Software for 3D reconstruction and volume computation on Linux Embedded systems
– Fullstack videocall system for remote assistance
– Software for surface analysis through several algorithms (based on plain computer vision and CNN)
– Analysis of state-of-the-art algorithms for visual odometry
– Android applications (Augmented Reality, WEBRTC client, barcode scanners, local and remote ML inference)
– Software for a real-time localization system (RTLS) and warehouse logistic management
– Software to control lighting in an integrated operatoring room
– Thesis co-advisor for Master Degree students

EDUCATION AND TRAINING

Oct. 2015 – Mar. 2018

Master's Degree in Automation Engineering   ISCED 7

Alma Mater Studiorum Università di Bologna, Bologna (Italy)

– Mechatronics: modelling, control and optimization of mechatronic systems
– Computer Vision: basic Computer Vision principles and Image Processing algorithms
– Industrial Robotics: advanced control schemes for industrial manipulators, mobile robotics
– Wireless Sensor Networks: competences in the making of wireless sensor networks according to the Zigbee standard
– Advanced Control Systems: analysis of techniques to perform optimal, adaptive, robust control, basics of non-linear systems
– Power electronics and control techniques for electric machines
– Real-Time systems: main aspects about modern RT systems and methods to design and control automatic machines

Thesis: Development of a Photometric Stereo system

Description: The thesis presents the description of the main algorithms used to achieve a photometric stereo analysis of surfaces, as well as the realization of a hardware device capable of acquire the images, and of a software capable to analyze them. In particular, we focused on the implementation of Woodham's algorithm and other image processing operators.

| Oct. 2011 – July 2015 | **Bachelor Degree in Industrial Engineering** | ISCED 6 |

Università degli Studi di Catania, Catania (Italy)

- Automatic Controls: process control
- Industrial Engineering Drawing
- Fluid Machines: fundamental elements of plants for energy production, and the main fluid machines (engines, compressors and pumps) employed in the process of power plants
- Mechanical Engineering: analysis of the main elements used in the creation of mechanisms, dynamic balance and vibration analysis of mechanical systems
- Building Science: basic tools for the analysis, verification and design of structural systems for use in mechanical engineering
- General principles for the design of industrial plants

Thesis: Implementation of a differential model of the thermo- fluid dynamic behaviour of a toroidal heat exchanger in natural circulation

Description: The thesis presents the derivation of the analytical model associated with a toroidal circuit in natural circulation, with dynamic analysis and simulation in Matlab-Simulink. The purpose is to show how, by suitably varying the boundary conditions, the system can switch from a stable to a chaotic behaviour.

| Sept. 2006 – July 2011 | **Scientific High School Diploma** | ISCED 3 |

Liceo Scientifico "E. Majorana", Avola

| May 2004 | **Music theory and solfeggio Diploma** |

Conservatorio "V. Bellini", Catania

PERFORMED ACTIVITIES

Custom webserver using Google Cloud Platform   Started as a home project, I developed a webserver using Flask (python), gunicorn and nginx. This server, currently accessible from my website, is mantained using a CI/CD pipeline.

3D scanning system using SICK laser scanners   We developed a software to perform a 3D reconstruction from point cloud data and minimum box volume computation using a couple of SICK scanners. I developed both the main algorithm to process raw laser data, perform 3D transformations, reconstruct the point cloud and determine the volume of an object, and the software to perform the full acquisition-processing procedure. This project works both using a rotating platform (to move the scanners around the object) and a conveyor. The software has been deployed to a Toradex Apalis IMX6 board.

Full-stack videocall system   Developed within T3Lab, this project aimed to develop a videocall system for remote assistance. We developed both the server (comprensive of database management) and client apps as web-broser application and Android app. The latter supported also an annotating system developed from scratch.

Study of algorithms to perform visual-inertial odometry   This project, meant as an internal working research, concerns the study of state-of-the-art techniques to perform visual and inertial odometry to integrate an indoor localization system. We tested implementations of some algorithms - ORB-SLAM2 (on Windows and ROS), LSD-SLAM, cartographer, gmapping and hector_slam (ROS).

Development of a tracking unicycle robot   This project, meant as a free-time activity, concerns the development of a mobile robot with an integrated camera; it is able to recognize and track a marker. I used an Arduino (motor control) and a Raspberry Pi (image analysis, high-level control)

Control system for a lifter based on Shape Memory Alloy (SMA)   This project, developed in team, concerns the dynamic analysis of a device (based on a SMA) employed to uplift a certain mass. First a Matlab/Simulink model has been designed to simulate the system behavior and determine the optimal control. Then the control has been applied successfully on a real device.

Wireless Sensor Networks project   This project, meant as laboratory activity, involves the usage of an MC1322 Freescale 802.15.4-compliant device to build and analyze a low-power wireless network.

Hydraulic press fed by a double-pump   This project is based on the analysis of a double-pump hydraulic circuit to activate a mechanical press. A study of the reaction forces on the press has been made in order to determine the best control law. Furthermore, a model of the system has been developed using the bond-graph approach.

PERSONAL SKILLS AND COMPETENCES

Mother tongue   Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	B2	B2	B2	B2
French	A1	A1	A1	A1	A1
German	A1	A1	A1	A1	A1

Technical skills
- Good knowledge of **OpenCV** and **Halcon** libraries for image processing
- Familiar with **ROS** and packages/algorithms to perform Visual Odometry (**ORB-SLAM2**, **LSD-SLAM**, **hector_slam**)
- Experience with SICK laser scanners, and algorithms to manage 3D point cloud data
- Experience with **Google Cloud Platform** (specifically **Firebase**, **Google Cloud Build**, **Cloud Run** and **Container**/**Docker** management)
- Experience with basic server setup, using **Flask, Gunicorn, Nginx**
- Good knowledge of libraries to perform Augmented Reality (Vuforia, Wikitude)
- Knowledge of libraries to perform automatic learning (**Tensorflow**, **Keras**)
- Familiar with hardware platforms used as controllers (**Arduino**, **Raspberry Pi**, **BeagleBone Black**), hardware accelerators for Neural Networks (**Google Coral**, **NVIDIA Jetson TX1**, **NVIDIA Jetson Nano**), Sub-1 GHz devices (**TI CC1350 Dev board**)
- Experience with Real-Time Operating Systems (**TiRTOS**)
- Experience with Linux Embedded systems (**Toradex**)
- Knowledge of **ZigBee** protocol, experience in the making of a radio communication stack for Sub-1 GHz devices
- Progamming languages: **C**, **C++**, **C#**, **Java**, **Android**, **Python**, LaTeX
- Discrete knowledge of SQL databases and **SQLite** library
- Basic knowledge of **WebRTC**, **JavaScript**, **HTML**, **CSS**
- Software for numerical calculation and dynamic systems simulation (**Matlab**, **Simulink**, **SimScape**, **AmeSim**, **LTSpice**)
- IDEs: **Visual Studio**, **IntelliJ**, **Eclipse**, **QT Creator**
- Good knowledge of office software (Microsoft Office), image editing software (Adobe Photoshop, GIMP), audio analysis (Adobe Audition, Audacity), CAD software (Inventor, Solidworks), graphic engine (Unity)
- Good skills with Windows and Linux operating systems

Transferable skills
- Able to work independently and individually, and also a good team player
- Good capacity to search and find solutions to unexpected problems (with or without brainstorming)
- Critical-mindend and disposed to continuous learning

Other
- I play several instruments (banjo, guitar, flute) and (try to) compose synth music in my free time
- Amateur photographer, and image manipulator
- In my spare time I like to draw, listening to music, watching movies and sometimes I play chess.
- Passionate about new technologies

Driving license   B