



Matteo Martini

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Date of birth: 21/11/1994 **Nationality:** Italian

EDUCATION AND TRAINING

[01/11/2023 – Current]

Ph.D in Computer Science

University of Genoa

City: Genoa

Country: Italy

Field(s) of study: Virtual Reality | Extended Reality | Human-Computer Interaction

Level in EQF: EQF level 8

[01/09/2020 – 29/03/2023]

Master's Degree in Computer Science

Università di Genova

City: Genova

Country: Italy

Field(s) of study: Virtual/Mixed Reality, Deep Learning, Stereopsis, Computer Vision

Final grade: 110 e Lode **Level in EQF:** EQF level 7

Number of credits: 120

Thesis: Dynamic obstacle avoidance in Mixed Reality - An approach based on deep learning and stereopsis

The thesis focused on the development of a system that combines the ZED camera and YOLO (You Only Look Once) algorithm to recognize real-world objects and seamlessly integrate them into virtual scenes with consistent position and size. The software has been designed initially for non-intrusively informing users of a VR application about obstacles in the physical room. However, it has been tested and proven adaptable for various purposes, including the manipulation of real objects connected to their virtual counterparts to leverage passive haptic feedback.

Advisors: Manuela Chessa, Fabio Solari

Examiner: Enrico Puppo

[01/09/2017 – 29/10/2020]

Bachelor's Degree in Computer Science

University of Genoa

City: Genoa

Country: Italy

Field(s) of study: Information and Communication Technologies

Final grade: 110 cum laude **Level in EQF:** EQF level 6

Number of credits: 180

Thesis: Pi-Calculus: A Formalism For Distributed Computations

Analysis of Pi-Calculus, a formal language for describing distributed computations. Study of its formalization by observing the external vision of a system, modeled by reduction and structural congruence, the internal vision, modeled by the labeled transition, and the Harmony lemma which establishes the coherence between the two.

Supervisors: Francesco Dagnino, Elena Zucca

[01/09/2008 – 01/06/2013]

High School Diploma - Accountant and Programmer

IIS G. Ruffini

City: Imperia

Country: Italy

Field(s) of study: Information and Communication Technologies

Final grade: 83 **Level in EQF:** EQF level 5

WORK EXPERIENCE

[01/08/2023 – 31/10/2023]

Research fellow

University of Genoa

City: Genoa

Country: Italy

Research grant: Interaction systems for cognitive exergames based on VR environments.

Research supervisor: Prof. Manuela Chessa

[01/04/2023 – 30/06/2023]

Research fellow

University of Cagliari

City: Cagliari

Country: Italy

Research Grant: Development of Immersive and Non-immersive Virtual Reality Applications Integrating Motion Analysis Sensors

Research Supervisors: Dr. Giulia Sedda, Prof. Danilo Pani

The objective of this research project was to develop an immersive and non-immersive Virtual Reality application that integrate motion analysis sensors. Specifically, the focus was on designing and implementing a serious game using Unity for the upper limb rehabilitation of patients affected by Rett syndrome. The motion analysis was performed using the ZED camera.

[01/2023 – 05/2023]

Teacher for Unige Senior

University of Genoa

City: Genoa

Country: Italy

Advanced level Computer Science course. Topics covered:

- Smartphones and tablets - hardware, software, structure, connectivity, and settings
- Cloud - remote storage, applications, services
- Digital life - digital identity (SPID, CIE), digital signature, PEC (Certified Electronic Mail), relations with public administration, personal blog
- Introduction to new technologies based on AI

[10/2022 – 05/2023]

University didactic tutor

University of Genoa

City: Genoa

Country: Italy

Support for first-year students in the Bachelor's degree program in Computer Science for the courses Introduction to Programming, Algorithms and Data Structures, Computer Architecture. Classroom lectures and assistance during practical labs.

[2015 – 2016]

Collaborator

Aqua DB s.r.l.

City: Imperia

Country: Italy

Software remote installation and assistance, development of customizations requested by clients.

[2015 – Current]

Photographer and video maker

City: Imperia, Genoa

Country: Italy

Creation of photos and videos of various genres, interviews, documentaries, music videos, short films.

PUBLICATIONS

[2023]

[Dynamic obstacle avoidance in Mixed Reality: An approach based on deep learning and stereopsis](#)

Abstract:

In recent years, the compactness and capabilities of modern head-mounted displays have rekindled interest in Virtual Reality. There are now various options available, from discrete to integrated all-in-one solutions that no longer require an expensive workstation for graphical rendering. This has made it possible for a larger audience to own a personal VR device.

Despite manufacturers' safety recommendations, the home use of these devices can be dangerous. The currently available devices are equipped with basic safety systems that require defining a safe zone and just worn

users whenever they are going to move outside of it. However, these systems are not capable of detecting obstacles in a realistic home environment. For example, living rooms or bedrooms may be cluttered with

furniture and other objects that are not easily removable or that users will not remove, making it easy for them to hit something or trip over them.

To address this problem, we propose an obstacle avoidance system that combines state-of-the-art object detection with depth perception capabilities granted by stereopsis in RGB-D cameras. Our system can detect specific classes of objects, estimate their position and extent, and create a virtual counterpart for each one of them in an immersive virtual scene. This will help users visualize obstacles in their environment and avoid collisions.

SCHOOLS AND COURSES

[17/07/2023 – 21/07/2023] **European Agent Systems Summer School (EASSS)**

I attended the 23th edition of EASSS held in the Czech Technical University in Prague.

[12/04/2023 – 14/04/2023] **Crash course in geometric Computer Vision**

I attended this brief yet intense course held by Andrea Fusiello from University of Udine about classic Computer Vision principles.

OTHER EXPERIENCES

Open days for high school students

Introductory sessions for visiting high school students who are considering enrolling in the Bachelor of Science in Computer Science program. We explained and let them experience the differences between Virtual Reality and Mixed Reality and showed them past and ongoing projects that the Perception and Interaction Lab is working on.

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

Inglese

LISTENING C1 READING C1 WRITING B2

SPOKEN PRODUCTION B2 SPOKEN INTERACTION B2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Social Network | Computer Vision | YOLO | Image Processing, Image Analysis, Image Segmentation | Linguaggi: C, C++, C#, Java, Python, OCaml, Haskell, Latex, Bashscript, CUDA, Prolog | Windows | Mac | Linux | Microsoft Office | Blender | Unreal Engine | Unity | Email | Photo and Video editing