

Denis Tome'

PH.D. IN COMPUTER VISION

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Experience

Apple

SENIOR RESEARCH ENGINEER

- Lead: Abhishek Narain

Sunnyvale, CA

Sept. 2022 - PRESENT

Epic Games

RESEARCH SCIENTIST

- Researching at the intersection between computer vision and graphics
- Human Pose Dataset creation lead
- Research and design solutions, both as stand-alone tools or support in the creation of digital humans
- Graph NN research
- Speech to tongue animation
- Lead: Iain Matthews – Principal Scientist

Pittsburgh, PA

Dec. 2019 - Sept. 2022

PRO Unlimited @ Facebook

COMPUTER VISION RESEARCHER

- Researching on Multi-View Egocentric Human Pose Estimation
- Supervisor: Hernan Badino - Research Scientist

London, UK

Oct. 2019 - Dec. 2019

Facebook Reality Labs

RESEARCH INTERN

- Supervisor: Hernan Badino - Research Scientist
- Supervisor: Chenglei Wu - Research Scientist
- Researching on Multi-View Egocentric Human Pose Estimation
- Researching on Images to 3D mesh reconstruction
- Researching on synthetic image generation for VR related problems

Pittsburgh, USA

Mar. 2019 - Aug. 2019

PRO Unlimited @ Facebook

COMPUTER VISION RESEARCHER

- Researching on the problem of Egocentric Human Pose Estimation
- Supervisor: Hernan Badino - Research Scientist

London, UK

Nov. 2018 - Feb. 2019

Oculus research

RESEARCH INTERN

- Supervisor: Hernan Badino - Research Scientist
- Researching on the problem of Egocentric Human Pose Estimation
- Researching on synthetic image generation for VR related problems
- Synthetic dataset design and generation

Pittsburgh, USA

May 2018 - Nov. 2018

SuperMediaFuture

COMPUTER VISION CONSULTANT

- Research Consultant
- Working on 3D human pose estimation
- This work helped secure \$7.5 million in venture capital funding.

London, UK

Aug. 2017 - Nov. 2017

University College London (UCL)

RESEARCHER

- Working on semi/self-supervised deep models for 3D pose estimation
- Teaching assistant in Image Processing master course
- Teaching assistant in Introduction to Programming undergraduate course

London, UK

Feb. 2016 - Dec. 2019

STMicroelectronics

RESEARCH INTERN

- Supervisor: Danilo Pau – Senior Principal Engineer - Senior Member of Technical Staff
- Researching on problem of pedestrian detection
- Researching on the problem of CNN compression for low power devices
- Fully functional demo of pedestrian detection on an embedded device

Milan, Italy

Jun. 2015 - Jan. 2016

Awards and Honors

Best Demo Award

New Orleans, USA

IEEE/CVF CONFERENCE ON COMPUTER VISION AND PATTERN RECOGNITION (CVPR)

2022

- For the demo & paper "Speech Driven Tongue Animation"
- Description: "improve realistic animations & surpass the uncanny valley by enabling data-driven tongue animation"

Best Paper Award for IMAGE COMMUNICATION Journal

EURASIP

2021

- For the paper "Deep Convolutional Neural Networks for pedestrian detection"

Outstanding Support for Teaching

London, UK

UNIVERSITY COLLEGE LONDON

2017

- Nominated for *Outstanding Support for Teaching*
- Description: "To be nominated candidates must have made a huge impact on the students they teach and/or support"
- Among 86 nominees from approx. 7100 academic staff members (less than 1.3%)
- <http://studentsunioncl.org/student-choice-teaching-awards-roll-of-honour-2017>

Publications

Speech Driven Tongue Animation

New Orleans, Louisiana

S. MEDINA, D. TOME, C. STOLL, M. TIEDE, K. MUNHALL, A. HAUPTMANN, I. MATTHEWS

IEEE INTERNATIONAL CONFERENCE ON COMPUTER VISION (CVPR), 2022

- Tongue animation from input audio only
- Novel dataset consisting of sparse tongue landmarks and audio pairs.
- Winner of the *best demo award* at CVPR '22
- Project page: denistome.github.io/papers/tongue-anim

SelfPose: 3D Egocentric Pose Estimation from a Headset Mounted Camera

DENIS TOME, T. ALLDIECK, P. PELUSE, G. PONS-MOLL, L. AGAPITO, H. BADINO, F. DE LA TORRE

IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE (PAMI), 2020

- 3D Human pose estimation from an egocentric camera perspective
- Triple-branch auto-encoder architecture with heatmaps uncertainty estimation
- denistome.github.io/papers/self-pose

XR-EgoPose: Egocentric 3D Human Pose from an HMD Camera

Seoul, Korea

DENIS TOME, PATRICK PELUSE, LOURDES AGAPITO, HERNAN BADINO

THE IEEE INTERNATIONAL CONFERENCE ON COMPUTER VISION (ICCV), 2019

- 3D Human pose estimation from an egocentric camera perspective
- Novel dual-branch auto-encoder architecture with state of the art results on 3D human pose estimation
- Novel high-resolution synthetic dataset
- denistome.github.io/papers/xr-egopose

Rethinking Pose in 3D: Multi-stage Refinement and Recovery for Markerless Motion Capture

Verona, Italy

DENIS TOME, MATTEO TOSO, CHRIS RUSSELL, LOURDES AGAPITO

INTERNATIONAL CONFERENCE ON 3D VISION, 2018

- Flexible and accurate 3D pose estimation from marker-less motion capture system
- No configuration required for motion capture system
- denistome.github.io/papers/Rethinking-pose

Lifting from the Deep: Convolutional 3D Pose Estimation from a Single Image

Honolulu, Hawaii

DENIS TOME, CHRIS RUSSELL, LOURDES AGAPITO

IEEE INTERNATIONAL CONFERENCE ON COMPUTER VISION (CVPR), 2017

- Semi-supervised 3D pose estimation model trainable with incomplete data
- denistome.github.io/papers/lifting-from-the-deep

Reduced memory region based deep Convolutional Neural Network detection

Berlin, Germany

DENIS TOMÈ, LUCA BONDI, LUCA BAROFFIO, STEFANO TUBARO, EMANUELE PLEBANI, DANILO PAU

CONSUMER ELECTRONICS-BERLIN (ICCE-BERLIN), 2016 IEEE

- Techniques for CNN model compression for low-power device applications
- <http://ieeexplore.ieee.org/document/7684706/>

Deep convolutional neural networks for pedestrian detection

D.TOMÈ, F.MONTI, L.BAROFFIO, L.BONDI, M.TAGLIASACCHI, S.TUBARO

JOURNAL OF SIGNAL PROCESSING: IMAGE COMMUNICATION

- Convolutional neural network for accurate pedestrian detection
- <http://arxiv.org/abs/1510.03608>

Education

University College London (UCL)

London, United Kingdom

PH.D. IN COMPUTER VISION

Feb. 2016 - Feb. 2021

- Under the supervision of Prof. Lourdes Agapito
- Thesis title: "More is Better: 3D Human Pose Estimation from Complementary Data Sources"
- Research focused on the problem of 3D human pose estimation
- Research focused on semi-supervised and self-supervised deep learning techniques

Polytechnic University of Milan

Milan, Italy

MASTER'S DEGREE IN COMPUTER ENGINEERING

Sept. 2013 - Oct. 2015

- Master on machine learning and computer vision
- Taught in English
- Final mark: 110 *cum Laude*/110 (*Graduation with Honor*)
- Exam average score: 29.45/30 (4.0 GPA Equivalent)

Polytechnic University of Milan

Milan, Italy

BACHELOR'S DEGREE IN COMPUTER ENGINEERING

Sept. 2010 - Sept. 2013

- Taught in Italian
- Final mark: 103/110

Skills

Deep Learning Frameworks Pytorch, Tensorflow, Taichi, Caffe

3D Tools Blender, UnrealEngine, Unity3D

Computer Languages Python, C++, C#, JAVA, Matlab, Objective C

Research Interests

My research at Epic Games is at the intersection between computer vision and graphics, to help facilitate the creation of digital humans. From marker-less mocap solutions and data driven animations, to tools which help artists in content & character creation. Examples of work which I contributed to is the *Meta-Human Creator* and *The Matrix Awakens*.

During my Ph.D. I researched on the problem of 3D Human Pose Estimation for different scenarios, ranging from monocular to multi-view configurations, both from a semi-supervised and self-supervised perspective. An example of such research is 3d pose estimation for VR/AR from wearable devices. Such models were designed with limited data availability constraints and with the flexibility to rely on different heterogeneous data sources.

I have experimented with synthetic dataset generation as a means of complementing real data when training models, to achieve better performance / more robust solutions, with models currently being deployed in some of Epic's pipelines.

Previously I worked on the problem of pedestrian detection using Deep Learning techniques, creating prototypes used in automotive applications, as well as optimizing Convolutional Neural Networks models to run on low power devices. Due to this, I have experience in creating demos with deep neural network models running at 30fps on embedded devices.

Extracurricular Activity

Volunteer

Como, Italy

MUSICIAN

- I have been playing clarinet in a symphony orchestra for 14 years. In this context I have learned how to cooperate and collaborate with other people of different age and experience, in other to achieve a single goal.

Climbing group

Pittsburgh, PA

CLIMBER

- I am one of the founders of a climbing group that meets twice per week, where people are welcome to join with the idea of having a good session together, socializing, and hopefully meeting new people.

References

Prof. Lourdes Agapito

University College London

PH.D. SUPERVISOR

- E-mail address: l.agapito@cs.ucl.ac.uk

Dr. Hernan Badino

Facebook Reality Labs

RESEARCH SCIENTIST

- E-mail address: hernan.badino@fb.com

Prof. Fernando De la Torre

Carnegie Mellon University (CMU)

RESEARCH ASSOCIATE PROFESSOR

- E-mail address: ftorre@cs.cmu.edu

Francisco Vincente

Epic Games

LEAD RESEARCH ENGINEER

- E-mail address: franciscovicencar@gmail.com