




Fausto Milletari

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ABOUT ME

AI scientist, passionate about engineering and infrastructure. Ph.D. in computer vision with more than 13k citations and 46 authored publications in 8 years. Interested in leadership roles.

WORK EXPERIENCE

01/01/2022 – CURRENT New York City, United States

Senior AI scientist / Product owner Paige.ai

1. Developed AI methods for histopathology
2. Developed a full product in less than 10 months from ideation to production (Mitosis detection / Paige Breast as presented at USCAP 2023)
3. Lead a team of 5 developers
4. Applied state-of-the-art engineering and produced high-quality code for healthcare applications
5. Created and maintained FDA/IVD quality management system for product I was responsible for

31/03/2020 – 31/12/2021 Munich, Germany

Lead of AI Johnson & Johnson

1. AI team lead. Developed deep learning algorithms for surgical video analysis (Eg. surgical tool detection/tracking/identification)
2. Created foundational AI infrastructure implementation based on AWS (EKS)
3. Created a common code base to support the work of a team of 10+ contributors within JnJ
4. Implementation of industry standards to validate, test, and benchmark clinical AI models
5. Engagements with other teams in order to contribute to the definition of the software architecture for our product

30/09/2018 – 30/03/2020 Santa Clara, CA, United States

Senior Applied Research Scientist NVIDIA inc.

- State of the art DL algorithms for medical image understanding
 - Segmentation (V-Net, 3D U-Net, DeepLab, AHnet)
 - Classification (quantitative disease prediction, survival, etc)
 - Registration (volume alignment using CNNs)
- Interactive neural networks
 - Smart annotation tools to generate labels
 - Synergy between CNNs and Radiology
- Transfer learning
- Federated learning
 - Head of collaboration with King's College London on Federated Learning
- Web apps and frontend development
 - Javascript, Vue.js for PoC and demo development
- Infrastructure and training
 - Large scale training in cloud
 - Deep learning apps lifecycle: data curation, training, testing, deployment on edge devices or cloud
 - kubernetes, polyaxon, kubeflow pipelines
- Python development: Pytorch and TensorFlow frameworks
- Initiatives
 - Organizer of DART19/DART20 workshop at MICCAI
 - Organizer of DCL20 workshop at MICCAI
 - Invited talks and keynotes at various conferences

31/07/2017 – 30/09/2018 Santa Clara, CA, United States

Senior Solutions Architect NVIDIA Corporation

- Solution architect with expertise on deep learning for healthcare
- Support customer projects and accelerate solutions via GPUs
- Built partnerships, commercial relationships, Proof of concepts and demos with both small and big players in healthcare.
- Built professional relationship with CEO of NVIDIA, Jensen H. Huang
- Participated to definition and development of NVIDIA vision in healthcare through weekly meetings with CEO and VP staff.
- Main responsibilities consist of developing, researching and engineering machine learning and deep learning systems solving problems in healthcare.
- Research and production of scholarly articles. I have designed, trained and researched most of the methods used during healthcare demos by NVIDIA including one of the GTC2018 CEO Keynote demos.

03/07/2016 – 30/07/2017 New York, United States

Deep Learning Scientist Butterfly Network inc.

- Deep learning for smart ultrasound probe
- Profound knowledge of ultrasound physics and image formation
- Segmentation of cardiac ultrasound images
- Key-point detection
- Reinforcement learning for data acquisition guidance
- Developed industry-grade DL solutions in fast paced startup environment
- Contributed to development of Butterfly IQ probe.

30/09/2013 – 03/07/2016 Munich, Germany

PhD Student/Researcher - Computer Aided Medical Procedures Technische Universität München

1. Machine learning approaches for segmentation detection and tracking
2. Published V-Net, the most cited paper ever published by my PhD lab at TUM and the most cited of the 3DV conference through its history
3. Published 17 papers in 3 years
4. Finished the PhD with the highest mark

PhD thesis here: <https://mediatum.ub.tum.de/doc/1395260/1395260.pdf>

31/10/2012 – 14/07/2013 Munich, Germany

Research assistant Technische Universität München

- Research in computer vision, object tracking
- Teaching "Tracking and Detection" course at TUM

EDUCATION AND TRAINING

12/11/2021 – 10/10/2022 Budapest, Hungary

Pilot License - PPL(A) Airwin Kft.

- EASA PPL(A) training
 - Completed in ca. 52 hours

Website airwin.hu | **Field of study** Airplane pilot training | **Final grade** passed without restrictions

30/09/2013 – 14/02/2018 Munich, Germany

Ph.D. In Informatics (Computer vision/Medical image analysis) Chair for computer aided medical procedures - Technische Universität München

1. Image analysis via machine learning and deep learning methods
2. computer vision (object detection, tracking, pose estimation)
3. medical image analysis (segmentation, registration, interpretation)

Highlights:

1. Several works (17+ publications, 7 first authorships) published in first-tier conferences and journals
2. Reached **H-index 20** with a total of 9690+ citations
3. Pioneered 3D convolutional neural networks. Proposed V-Net and Dice loss. This research has been cited more than 6982 times since it was published.

4. V-Net is the **most cited paper** of Nassir Navab's lab and the most cited paper of the conference 3DV during its over 10 years of activity.
5. deep involvement in conferences/workshops as a reviewer/organizer/speaker
6. Achieved grade: **Summa Cum Laude**

Level in EQF EQF level 8

30/09/2011 - 14/11/2013 München, Germany

● **Master of Science In Informatics with high distinction** Technische Universität München

- Medical imaging, computer vision, machine learning
- Algorithms for scientific computing
- GPU programming
- Microprocessor architectures

Achieved with grade 1,2 (high distinction) ([link certificate](#)) ([link transcripts](#)) [scale: 1.0 (best) to 5.0 (worst)]

Address Arcisstraße 21, 80333, München, Germany | **Level in EQF** EQF level 7

30/09/2006 - 11/05/2011 pisa, Italy

● **Bachelor Degree in Engineering** Università di Pisa

- Logic networks, microprocessors, operating systems
- Digital and analog Electronics
- Physics, Math, engineering
- C++, Java, Matlab
- Thesis on neural networks for probabilistic prediction

Achieved degree in Computer Science/Engineering ([link certificate](#))

Address via diotisalvi n.2, 56100, pisa, Italy | **Level in EQF** EQF level 6

LANGUAGE SKILLS

MOTHER TONGUE(S): Italian

Other language(s):

German

Listening B1

Reading B1

Writing B1

Spoken production B1

Spoken interaction B1

English

Listening C2

Reading C2

Writing C2

Spoken production C2

Spoken interaction C2

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

CONFERENCES AND SEMINARS

Seminars

Eight Joint Advanced Student School (JASS 2012) - San Petersburg 2012 ([link](#))

Medical Technology Entrepreneurship - Munich 2013 ([link](#))

International Computer Vision Summer School (ICVSS) - Calabria 2013

Medical Imaging Summer School (MISS) - Sicily 2013

Multiple online seminars, courses and webinars: Nvidia DLI courses, Coursera and Udacity courses

Conferences

Multiple presentations at MICCAI, IPCAI, 3DV, etc.

Multiple presentations at GTC2016, GTC2018, GTC2018 EU and Israel

Keynote at MAQC 2019

RECOMMENDATIONS

1. Worked in close contact with upper management of NVIDIA, the CEO Jensen Huang, VP for healthcare Kimberly Powell, former Global business developer Abdul Hamid Halabi, etc.
2. Experience at butterfly network worked closely with president Gioel Molinari, former president Mark Michalski, and Dr. Michal Sofka
3. Experience in academic research at the lab of Prof. Nassir Navab at TU Munich
4. Experience at the boundary between industry and academia through NVIDIA partnership with KCL. Working currently with Dr. Jorge Cardoso and Prof. Sebastien Ourselin

ORGANISATIONAL SKILLS

Organisational skills

1. Founder and main organizer of the "*Computer Vision and Medical Image Analysis*" meetup group of Munich ([Link](#)).
2. Took part in the organization of MICCAI 2015 in Munich.
3. Organizer and main lecturer of the "*Machine Learning in Medical Imaging*" course at Technical University of Munich, winter semester 2015.
4. Founder of the DART workshop series at MICCAI (domain transfer). Organized two DART editions in 2019 and 2020
5. Organizer of DCL workshop at MICCAI (federated learning). Organized DCL2020
6. Significant experience in product ownership, team leadership and product development.

COMMUNICATION AND INTERPERSONAL SKILLS

Communication and interpersonal skills

Conference presentations (Orals and Posters):

- Short oral/poster session at MICCAI 2013, Nagoya, Japan.
- Poster presentation at MICCAI 2014, Boston, USA.
- Oral presentation at CETUS2014 (MICCAI2014 challenge), Boston, USA.
- Short oral/poser presenter at IPCAI 2015, Barcelona, Spain.
- Poster presentation at BMVC 2015, Swansea, UK.
- Short oral/poster session at MICCAI 2015, Munich, Germany.
- Oral session at GTC2016, San Jose, California.
- GTC 2018 keynote demo for healthcare

Several other presentations in the scope of various workshops and minor scientific events organised or endorsed by the chair.

JOB-RELATED SKILLS

Job-related skills

Research topics:

1. Computer vision
2. Medical image analysis
3. Computer aided interventions and diagnosis
4. Machine learning
 - a. Classic approaches such as Random forests, Hough forests, SVM, Boosting
 - b. Sparse coding, auto-encoders
 - c. Density estimation, clustering, subspace methods
 - d. Deep Convolutional Neural Networks for images/volumes
 - e. Convolutional autoencoders
 - f. Deep reinforcement learning
 - g. Adversarial training strategies
 - h. Interactive neural networks
 - i. Federated learning and privacy in AI

Selected projects:

1. 3D convolutional neural networks. Authored most cited paper CAMP chair in collaboration with Nassir Navab.
2. Trans-cranial ultrasound for early diagnosis of Parkinson Disease - segmentation of ultrasound volumes and computer assisted diagnosis
3. Segmentation of echocardiographic images in the scope of the "CETUS" MICCAI 2014 challenge. Revisited this topic using CNNs recently and achieved best results. Presented at GTC 2018 keynote.
4. Prostate segmentation in trans-rectal ultrasound
5. Registration of multimodal (US-MRI) medical images - Management of brain-shift during brain tumour resection procedures

6. Reinforcement learning for ultrasound acquisition guidance
7. Visual object tracking in computer vision using sparse-coding and a voting based strategy
8. Medical volumetric data segmentation (V-Net)
9. Overseeing partnership between NVIDIA and KCL towards federated learning system for entire UK
10. Built training platform in python for medical DL training for both segmentation and classification.
11. AI infrastructure at JnJ. Ramping up an industry-grade effort for AI development in a large corporation.

Teaching:

1. Tutor for the exercises of "Tracking and Detection in Computer Vision", TU München, 2012-2015.
2. Tutor for the practical course "Machine learning in medical imaging", TU München, 2014-2015.
3. Guest lecturer for the course of Interventional Imaging, TU München, 2014
4. Lecturer for the practical course "Machine learning in medical imaging", TU München winter 2015.
5. Various appearances at conferences, seminars, podcasts, video interviews, press releases

Achievements:

1. The scientific work V-Net (first authorship, main contributor) has achieved widespread popularity having accumulated more than 6.5k citations achieving the status of most cited paper of the 3DV conference proceedings across its almost 15 years of activity and most cited paper of CAMP chair at TUM.

SELECTED PUBLICATIONS

Interactive segmentation of medical images through fully convolutional neural networks

T Sakinis, F Milletari, H Roth, P Korfiatis, P Kostandy, K Philbrick, B Erickson
arXiv preprint arXiv:1903.08205

Link <https://arxiv.org/pdf/1903.08205.pdf>

Privacy-preserving federated brain tumour segmentation

Wenqi Li, Fausto Milletari, Daguang Xu, Nicola Rieke, Jonny Hancox, Wentao Zhu, Maximilian Baust, Yan Cheng, Sébastien Ourselin, M Jorge Cardoso, Andrew Feng
International Workshop on Machine Learning in Medical Imaging. Springer, Cham, 2019.

Link <https://arxiv.org/pdf/1910.00962.pdf>

The future of digital health with federated learning

Rieke, Nicola, Jonny Hancox, Wenqi Li, Fausto Milletari, Holger R. Roth, Shadi Albarqouni, Spyridon Bakas et al.
NPJ digital medicine 3, no. 1 (2020): 1-7.

Link <https://www.nature.com/articles/s41746-020-00323-1>

Neureg: Neural registration and its application to image segmentation.

Zhu, Wentao, Andriy Myronenko, Ziyue Xu, Wenqi Li, Holger Roth, Yufang Huang, Fausto Milletari, and Daguang Xu
In Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision, pp. 3617-3626. 2020.

Link <https://arxiv.org/pdf/1910.01763.pdf>

Straight to the point: reinforcement learning for user guidance in ultrasound

F Milletari, V Birodkar, M Sofka
Smart Ultrasound Imaging and Perinatal, Preterm and Paediatric Image Analysis. Springer, Cham, 2019. 3-10.
arXiv preprint arXiv:1903.00586

Link <https://arxiv.org/pdf/1903.00586.pdf>

Integrating statistical prior knowledge into convolutional neural network through PCA

F. Milletari, J. Jia, A. Rothberg, M. Sofka
International Conference on Medical Image Computing and Computer-Assisted Intervention. Springer, Cham, 2017.

Link <https://msofka.github.io/pdfs/milletari-miccai17.pdf>

V-Net: Fully Convolutional Neural Networks for Volumetric Medical Image Segmentation

F. Milletari, N. Navab, A. Ahmadi
International Conference on 3DVision (3DV), Stanford University, California, USA, October 2016, arXiv: 1606.04797

Link <https://arxiv.org/pdf/1606.04797.pdf>

● Robust Segmentation of Various Anatomies in 3D Ultrasound Using Hough Forests and Learned Data Representations

F. Milletari, A. Ahmadi, C. Kroll, C. Hennemersperger, F. Tombari, A. Shah, A. Plate, K. Bötzel, N. Navab
MICCAI 2015, the 18th International Conference on Medical Image Computing and Computer Assisted Intervention

Link https://link.springer.com/chapter/10.1007/978-3-319-24571-3_14

● Universal Hough dictionaries for object tracking

F. Milletari, F. Tombari, S. Ilic, W. Kehl, A. Ahmadi, N. Navab
British Machine Vision Conference (BMVC), Sussex, UK, September 2015

Link <http://campar.in.tum.de/pub/milletari2015BMVC/milletari2015BMVC.pdf>

● Left Ventricle Segmentation in Cardiac Ultrasound Using Hough-Forests With Implicit Shape and Appearance Priors

F. Milletari, M. Yigitsoy, N. Navab, A. Ahmadi
MICCAI Challenge on Endocardial Three-dimensional Ultrasound Segmentation (CETUS), Boston, MA, September 2014

Link <http://campar.in.tum.de/pub/milletari2014cetust/milletari2014cetust.pdf>

● Hough-CNN: Deep Learning for Segmentation of Deep Brain Regions in MRI and Ultrasound

F. Milletari, A. Ahmadi, C. Kroll, A. Plate, K. Bötzel, N. Navab
Computer Vision and Image Understanding (2017).

Link <https://arxiv.org/pdf/1601.07014.pdf>

● Deep Learning of Local RGB-D Patches for 3D Object Detection and 6D Pose Estimation

W. Kehl, F. Milletari, F. Tombari, S. Ilic, N. Navab
European Conference On Computer Vision (ECCV), Amsterdam, The Netherlands, October 2016

Link <https://arxiv.org/pdf/1607.06038.pdf>

● 3D Transcranial Ultrasound as a Novel Intra-operative Imaging Technique for DBS surgery - A Feasibility Study

A. Ahmadi, F. Milletari, N. Navab, M. Schuberth, A. Plate, K. Bötzel
In Proc. 6th International Conference on Information Processing in Computer-Assisted Interventions (IPCAI), Barcelona (SP), June 24, 2015

Link <https://pubmed.ncbi.nlm.nih.gov/25861056/>

GRANTS

● Grants

(x2) NVidia hardware grant program - Tesla K40 granted by Nvidia to support our research aiming to apply deep learning to medical image analysis ([link](#)).

BaCaTec - Grant for establishing a collaboration between CAMP@TUM and University of Berkeley