Emanuele Plebani

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INTRODUCTION

Software engineer with 8+ years of industry and academic experience specializing in full stack development, cloud computing, and machine learning. Proven track record in developing and maintaining large-scale software projects, with 3+ years of development lead experience. Consistently demonstrate the ability to manage demanding workloads, provide key features within strict deadlines, and deliver strategic leadership while mentoring teams.

SKILLS

Languages:	Python, C/C++, JavaScript, CUDA, Perl, Java
Tools:	TensorFlow, Keras, PyTorch, ONNX, Docker, Flask, Git
Expertise:	Software engineering, machine learning, model deployment, language models, statistical modeling, object detection, image segmentation, visual search, 3D reconstruction, SfM

PROFESSIONAL EXPERIENCE

DEC 2024 - PRESENT

Software Development Engineer II at AMAZON, Santa Clara, CA

- Development of new AI-based shopping features for Alexa+, including Shopping Essentials, tracking deals on products and Autobuy based on price conditions
- Contribute to the design and implementation of LLM-based service APIs and data flows, mapping service dependencies, designing integration and load tests
- Maintain and improve existing Alexa Shopping features, including deal search and notifications, and integrating them in the new AI-based flows
- Monitoring and improving the service infrastructure through Infrastructure as Code (IaC) on AWS, fixing configuration issues, and improving code quality

MAY 2022 - AUG 2022

Research Scientist Intern at META, Redmond, WA

- Developing an uncertainty-aware neural network model for eye tracking in the Aria project
- Developing out-of-distribution approaches to identify anomalous training sequences
- Running training on the internal cloud platform, integrating code in the main repository and reviewing code changes

JAN 2020 - MAY 2024

Research Assistant at IUPUI, Indianapolis, IN
Supervisor: Prof. M. Dundar

- Designed and implemented an Android app giving context-based audio suggestions to blind/visually impaired people
- Classification of mineral signatures in hyperspectral images from the CRISM Mars experiment using Bayesian models, improved speed by optimizing hot spots and parallelizing execution
- Segmentation of different cell and nerve structures in neurohistological TEM images using U-Net and an ensemble of multi-scale models
- Data visualization for graphs and tabular data in D3 (JavaScript)
- Implementation of semi-supervised segmentation methods based on CNN and Transformers in PyTorch
- Implementation of deep open-world models for fine-grained class discovery
- Automated tagging and summarization of medical notes using recurrent neural networks and Transformer language models

Jun 2014 - Jan 2020	**Advanced Research Engineer** at STMicroelectronics, Milan

- Initial design and development of the Cube.AI back-end, a tool to port neural networks from different deep learning toolboxes and ONNX to STMicroelectronics microcontroller platforms
- Optimizing memory and execution speed of neural nets on microcontrollers, with patents covering the algorithms
- Technical leadership and team coordination in the Cube.AI project, involving up to 30 people and 5 locations across Italy and France
- API design and setup of a container-based web service to demo the Cube.AI app internally and to customers
- Development of deep learning solutions for sensor data classification and activity recognition on microcontrollers, handling the full data pipeline including data collection, cleaning, training, and field evaluation
- Developing an Android application for the collection of datasets from sensor data via Bluetooth and automated the data-cleaning step
- Development, implementation in C++ and optimization of computer vision algorithms for visual search and object detection

Oct 2011 - May 2014	**Research Assistant** at Politecnico di Milano, Milan

- Development and implementation of content-based image retrieval algorithms for the MPEG CDVS standard
- Development of visual search algorithms with improved localization, multiple object search, and continuous tracking
- Person in charge of the deliverables assigned to Politecnico di Milano in the European Project ASTUTE ARTEMIS
- Advised theses on visual odometry using the trifocal tensor on omnidirectional images and robust plane detection in point clouds

Education

May 2024	**Ph.D. in Computer Science**, Purdue University GPA: 4.0/4.0 | Advisor: Prof. Murat M. Dundar
Jul 2011	**M.S. in Computer Science Engineering**, Politecnico di Milano, Milan Grade: 100/100 with First Class Honors | Major: Engineering of Computing Systems

Selected Publications & Patents

1. **E. Plebani**, N. Biscola, L. Havton, B. Rajwa *et al.*, "High-throughput segmentation of unmyelinated axons by deep learning," *Scientific Reports* 12, no. 1 (2022): 1198.

2. **E. Plebani**, B. L. Ehlmann, E. K. Leask, V. K. Fox, and M. M. Dundar, "A Machine Learning Toolkit for CRISM Image Analysis," *Icarus* 376 (2022): 114849.

3. L. Folliot, **E. Plebani**, and M. Falchetto, "Device and method for allocating intermediate data from an artificial neural network," 2023, US Patent 11,609,851.

4. P. Karimi, **E. Plebani**, D. Bolchini, "Textflow: Screenless access to non-visual smart messaging," In *26th International Conference on Intelligent User Interfaces*, pp. 186-196, 2021.

5. M. Paracchini, **E. Plebani**, M.B. Iche, D. Pau and M. Marcon, "Embedded real-time visual search with visual distance estimation," *Image Analysis and Processing-ICIAP*, September 11-15, 2017.

6. A. Nicosia, D. Pau, D. Giacalone, **E. Plebani**, A. Bosco, A. Iacchetti, "Efficient light harvesting for accurate neural classification of human activities," *ICCE*, 2018, pp. 1-4.

7. R. Varenne, J. M. Delorme, **E. Plebani**, D. Pau, V. Tomaselli, "Intelligent recognition of tcp intrusions for embedded micro-controllers," *New Trends in Image Analysis and Processing-ICIAP*, September 9-10, 2019.

8. D. Tomè, L. Bondi, **E. Plebani**, L. Baroffio, D. Pau, S. Tubaro, "Reduced Memory Region Based Deep Convolutional Neural Network Detection," arXiv:1609.02500, 2016.

Awards & Honors

Apr 2024	Gersting's Award for Outstanding Graduate Student - Purdue University
Feb 2014	Best Demo Prize - GITTI MMSP Conference (IEEE Signal Processing)