Nicola Pezzotti

Nicola Pezzotti
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About Me   I was 13 years old when I started coding and I could never stop. I enjoy writing code that is scalable and solves real-world problems.

Professional experience

Research Intern, Google Research, Switzerland
February 2018 - May 2018 (expected)
I work with Alexander Mordvintsev, the creator of Google's DeepDream project, on the interpretability of Deep Neural Networks. I am with the research group on Machine Intelligence and I am collaborating remotely with Google Brain ang Google Big Picture teams.

PhD Candidate, Delft University of Technology, The Netherlands
September 2014 - November 2018 (expected)
My research consists in the development of scalable manifold-learning algorithms for the analysis of extremely large data, such as medical datasets, social-networks, text corpora and deep neural networks. My algorithms and systems were presented in the most important visual analytics venues and are used by medical researchers for the analysis of real-world data. Thanks to the Hierarchical Stochastic Neighbor Embedding (HSNE) algorithm that I developed, we were able to identify previously unknown immune-system cell types. This result was achieved by scaling up the number of cells that could be analyzed with a manifold-learning algorithm from a few thousands to several millions. HSNE is also the cornerstone for DeepEyes, a system for the visual analysis of deep neural networks during training that I developed. My algorithms are implemented in C++ and are released as part of the High-Dimensional-Inspector library.

Visiting PhD Candidate, INRIA Project Team AVIZ, France
April 2017 - June 2017
I worked with professor Jean-Daniel Fekete on the development of the Progressive Visual Analytics paradigm for the analysis of large data collections.

Research & Development Engineer, Open Technologies S.R.L, Italy
July 2011 - August 2014
I was responsible of the development of the high-end real-time scanner *Insight3* I optimized the algorithms developed during my Research Fellowship and developed several Arduino-based systems for the on-board control of *Insight3*. Furthermore, I contributed to the development of the computational-geometry module of the Open Technologies S.R.L. proprietary library and I was in charge of the control versioning and the release of the company's main software.

Research Fellow, University of Brescia, Italy
September 2011 - August 2012
I developed proprietary algorithms for the real-time computation of implicit surfaces on the GPU. These algorithms are designed to work with off-the-shelf and real-time scanning devices like the Microsoft Kinect and the PrimeSense Carmine and Capri. Furthermore, I devised a proprietary passive stereo system that led to the development of the *Insight3* high-quality real-time scanner. Due to the strict real-time requirements all the developed algorithms were implemented in C++, CUDA and Thrust.

Awards

Silver Medal, Italian Olympiad in Informatics
March 2005
Italian selection for the International Olympiad in Informatics (IOI).

Education

MSc in Software Engineering, University of Brescia, Italy
2009-2011
For my master thesis I worked on the development of fast and automatic tools for the alignment of 3D data such as point clouds, meshes and range images. This work was done in collaboration with the company Open Technologies S.R.L.
I graduated with a final grade of 110/110.

BSc in Information Engineering, University of Brescia, Italy
2005-2009
For my bachelor thesis I developed a library for interprocess communication between real-time applications working in Linux-Xenomai and other Linux applications. This work was done in collaboration with the company G2L S.R.L.

Personal interests

Long-distance running, cycling, board gaming, reading, coding competitions, traveling.

Computer science and programming skills
C++
Algorithmics
Qt
OpenGL
GPGPU
Arduino
JavaScript
Python
Deep Learning
Linux Development
Windows Development

Website
nicola17.github.io

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Gagelboschplein 535
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The Netherlands

Date of birth
17/06/1986

Nationality
Italian

Languages
Italian
English

References
Dr. A. Vilanova
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Visualization Group
Delft University of
Technology
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Prof.dr. E. Eisemann
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Prof.dr. J.D. Fekete
INRIA Project Team AVIZ
INRIA
France
jean-daniel.fekete@
inria.fr

Publications

Featured Publications

Hierarchical Stochastic Neighbor Embedding
N. Pezzotti, T. Höllt, B. Lelieveldt, E. Eisemann, A. Vilanova
Computer Graphics Forum, Proceedings of EuroVIS 2016

**Interactive Visual Analysis of Mass Cytometry Data by
Hierarchical Stochastic Neighbor Embedding Reveals Rare Cell Types**
V. van Unen*, T. Höllt*, N. Pezzotti* et al.
Nature Communications 2017

DeepEyes: Progressive Visual Analytics for Designing Deep Neural Networks
N. Pezzotti, T. Höllt, J. van Gemert, B. Lelieveldt, E. Eisemann, A. Vilanova
Transaction on Visualization and Computer Graphics, Proc. of IEEE VIS 2017

Approximated and User Steerable tSNE for Progressive Visual Analytics
N. Pezzotti, B. Lelieveldt, L. van der Maaten, T. Höllt, E. Eisemann, A. Vilanova
Transaction on Visualization and Computer Graphics, Presented at IEEE VIS 2016

Other Publications

**Interactive Visual Exploration of 3D Mass Spectrometry Imaging Data Using Hierarchical
Stochastic Neighbor Embedding Reveals Spatiomolecular Structures at Full Data Resolution**
W. M. Abdelmoula, N. Pezzotti, T. Hölt, J. Dijkstra, A. Vilanova, L. A McDonnell, B. Lelieveldt
Journal of Proteome Research 2018

CyteGuide: Visual Guidance for Hierarchical Single-Cell Analysis
T. Höllt, N. Pezzotti, V. van Unen, F. Koning, B. Lelieveldt, A. Vilanova
Transaction on Visualization and Computer Graphics, Proc. of IEEE VIS 2017

**BrainScope: Interactive Visual Exploration of the Spatial and Temporal
Human Brain Transcriptome**
S. Huisman, B. van Lew, A. Mahfouz, N. Pezzotti, T. Höllt, L. Michielsen,
A. Vilanova, M. JT Reinders, B. Lelieveldt
Nucleic Acids Research 2017

**Employing Visual Analytics to Aid the Design of White Matter
Hyperintensity Classifiers**
R. Raidou, H. Kuijf, N. Sepasian, N. Pezzotti, W. Bouvy, M. Breeuwer, A. Vilanova
International Conference on Medical Image Computing and Computer-Assisted Intervention 2016

Cytosplore: Interactive Immune Cell Phenotyping for Large Single-Cell Datasets
T. Höllt, N. Pezzotti, V. van Unen, F. Koning,
E. Eisemann, B. Lelieveldt, A. Vilanova
Computer Graphics Forum, Proceedings of EuroVIS 2016

Poisson-Driven Seamless Completion of Triangular Meshes
M. Centin, N. Pezzotti, A. Signoroni
Computer Aided Geometric Design 2015

**On-the-Fly Automatic Alignment and Global
Registration of Free-Path Collected 3D Scans**
F. Bonarrigo, N. Pezzotti, A. Signoroni
Digital Heritage International Congress 2013

**Boosting the Computational Performance of Feature-Based
Multiple 3D Scan Alignment by IAT-k-Means Clustering**
N. Pezzotti, F. Bonarrigo, A. Signoroni
3D Imaging, Modeling, Processing, Visualization and Transmission 2012

Dagstuhl Seminars

Dagstuhl seminars are invitation-only events where world leading computer scientists gather to brainstorm on hot topics and technologies in computer science.

Progressive Data Analysis and Visualization - October 2018
Seminar on large scale information retrieval and analysis with a focus on artificial intelligence.

Review Service

EuroVis 2018
European conference on Scientific Visualization, Information Visualization and Visual Analytics.

IEEE VIS 2017
Worldwide largest and most important conference on Scientific Visualization, Information Visualization and Visual Analytics.