03/06/2018 | New York, NY

Marco Cavallo

Personal Data

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Research Areas and Domains of Expertise

Primary: Visual Analytics, Data Visualization, Augmented / Virtual / Mixed / Hybrid Reality, Human Computer Interaction, User Interfaces, Full-stack Software Engineering

Secondary: Data Science, Machine Learning, Computer Vision, Computer Graphics, Mobile, Internet of Things, Wearable Sensors, Electronics Prototyping

Coding: Javascript, Python (Primary) | C#, C++, Java, PHP (Secondary)
Tools: React, D3.js, Three.js, Unity3D | Node.js, Flask, Scikit-learn, Keras, Pandas, Numpy

Work Experience

Current
Jun 2016

Research Software Engineer at IBM Research, New York
Research focused on *Intelligence Augmentation*, i.e. using information technology to supplement and support human thinking, particularly in the context of data analysis and artificial intelligence interpretability. Development of interactive visualization systems to explore complex datasets and to improve the machine learning development life cycle. These systems typically combine web tools and AR/VR applications with ML pipelines, IoT sensors and wearable devices. Member of the *Intelligent Visual Analytics* group and of the *Cognitive VR Laboratory*, and one of the founding members of *IBM ThinkReality*

Current
Feb 2014

Cofounder and Technical Lead at Unishare, Milan
Direction of both frontend and backend development of the web and mobile platforms of Unishare, an Italian startup involving about 30 universities and more than 15,000 students in the country. Coordination of a small team of developers, with focus on modern technologies such as Node.js, React and React Native.

Jan-May 2016

Research Assistant at Electronic Visualization Laboratory, Chicago
Design of *hybrid reality systems* integrating different technologies such as virtual reality, augmented reality and mobile applications. Work on computer graphics, data visualization and human-computer interaction for immersive display systems (e.g. CAVE2, SAGE2). Development of the AR smartphone app currently in use by the *Chicago History Museum*.

Education

Sep 2016 — Master of Engineering in Computer Engineering, **Politecnico di Milano**, Milan
110/110 *magna cum laude* | Thesis: "**Merging the Two Worlds: A Novel Approach to the Design of Mixed Reality Experiences**" | *Merit scholarship*, NECST Lab

May 2016 — Master of Science in Computer Science, **University of Illinois**, Chicago
GPA: 4.0/4.0 | *Merit scholarship*, Creative Coding Group, Electronic Visualization Lab

Fall 2014 — ATHENS Exchange program in Image Processing, **Telecom ParisTech**, Paris

Sep 2013 — Bachelor of Engineering in Computer Engineering, **Politecnico di Milano**, Milan | 100/100

Publications and Research

2018

Track Xplorer: A System for Visual Analysis of Sensor-based Motor Activity Predictions, **EUROVIS, IEEE VIS DSIA**
By **M. Cavallo**, C. Demiralp | Download paper

A Visual Interaction Framework for Dimensionality Reduction Based Data Exploration, **ACM CHI**
By **M. Cavallo**, C. Demiralp | Download paper

HoloBrain: An Extended Reality System To Analyze Brain Imaging Data
By **M. Cavallo**, P. Poloseki, S. Heisig | See project

2017

Wanderer: Improving Time-series Classification Performance Through Real-time Visualization of Sensor Data, **IEEE VIS VDS**
By **M. Cavallo**, C. Demiralp | Download paper

Exploring Dimensionality Reductions with Forward and Backward Projections, **KDD IDEA**
By **M. Cavallo**, C. Demiralp | Download paper

2016

Clustrophile 2: Enhancing Clustering Analysis Through Interactive Visual Experiments
By **M. Cavallo**, C. Demiralp | Download paper

Merging the Two Worlds: A Novel Approach to the Design of Mixed Reality Experiences (**Thesis)**
By **M. Cavallo**, A. Forbes, P. Lanzi | Download thesis

A VR Real-time Authoring Tool for Designing AR Experiences
By **M. Cavallo**, A. Forbes | Download paper

Experiencing The History of Chicago Through AR, **ISMAR**
By **M. Cavallo**, A. Forbes | Download paper

A 3rd Person Approach To VR Biomechanical Rehabilitation
By **M. Cavallo**, A. Rottigni, E. Marai, J. Patton | Download paper

Digital Quest: A Mixed Reality Approach to Scavenger Hunts, **IEEE VR MRA**
By **M. Cavallo**, A. Forbes | Download paper

Virtual Maps: 3D City Reconstruction from Google Street View
By **M. Cavallo** | Download paper

Patents

2018 | Virtual Generation of Labeled Motion Sensor Data from Comp. Animations

2017 | Enhanced Exploration of Dimensionally Reduced Data
Fall Detection in Virtual Reality

Additional **16** invention disclosures are currently under review, among which: Personalized Interactive Data Presentations through Augmented Reality, Mixed Reality Fine-control Through Smart Watches, A Method For Locomotion In Virtual Reality Desk Applications, Fine-grained Control of AR Applications Through Wearables, A Visual Track Algebra for Effective Analysis of Sensor Data Classification Outputs.

Selected Projects

2018 | BuildMyNet: A Visual Companion For Creating and Testing ML Pipelines
By **M. Cavallo** | See project

Tesseract: Computer Graphics Interaction in Four Dimensions
By **M. Cavallo** | See project

2017 | Virtualytics: Mixed Reality Exploratory Data Analysis
By **M. Cavallo** | See project

Improving Real-Life Motor Performance with Virtual Reality
By A. Sipolins, **M. Cavallo** | See project

Bernen House: A 3D Real-time Interface For Monitoring IoT Houses
By **M. Cavallo**, N. HInds, J. Rogers | See project

Decomposition of complex movements into primitives for Parkinson's disease assessment
By E. Pissadaki, **M. Cavallo** et al. | Download paper

2016 | BlueSky Booth Experience: Real-time Parkison's Disease Assessment
By **M. Cavallo**, E. Bilal | See project

Timefulness VR: Visualizing EEG Data in Virtual Reality
By A. Sipolins, **M. Cavallo** | See project

Interests and Activities

Photography, Film making, VFX, Design, 3D modeling, Robotics & Electronics, Videogame Programming, Team Sports, Teaching & Mentoring, World Exploration & Philantropy.

Please refer to my website mastercava.com for more information about me.