Marco Cavallo

Personal Data

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Computer Skills

Software Engineering:	JavaScript, C++, Java, C#, Algorithms & data structures
Web development:	Node.js, React, MySql, MongoDB, PHP, jQuery, Html, CSS
Graphics and Visualization:	Unity3D, D3.js, Three.js, Augmented and Virtual Reality
User Interfaces and VR:	Vive, Rift, Leap Motion, Kinect, Mocap, Wearables, Mobile
Machine Learning and Vision:	Python & scikit-learn, OpenCV, Torch

Work Experience

Summer 2016 | Researcher at IBM TJ Watson, Yorktown Heights

Summer internship aimed at the creation of innovative tools and techniques for Interactive Data Visualization and Data Analysis for healthcare. Side project based on visualizing EEG data streams in Virtual Reality. Expected submission of 2 papers.

Spring 2016 | Researcher at Electronic Visualization Laboratory, Chicago

Working on a grant involving Augmented Reality for architecture and tourism. General research on 2D / 3D Visualization with particular interest in WebGL and Virtual Reality, performed mostly using HTC Vive and CAVE2. Submitted 4 research papers as first author, of which one accepted to IEEE VR and one to ISMAR. Created an innovative virtual environment allowing users to do real-time collaborative MR remotely.

2014-2016 | Cofounder and Lead Developer of Unishare, Milan

Unishare is an Italian startup involving 23 universities and more than 10,000 students in Italy. Directed both front end and back end development of the web platform, of which a new version will be soon released. Improved my expertise in team management and web technologies, spanning from Apache with PHP and MySql to the more recent Node.js with Express and React.

Education

Sept 2016 | Master of Engineering in Computer Engineering, **Politecnico di Milano**

Focused on Software Engineering, Database Management and Data Mining, Computer Graphics, Mobile Development, Videogame Design and Programming, Computer Security.

GPA: 29.30/30 | Detailed List of Exams

May 2016 | Master of Science in Computer Science, **University Of Illinois At Chicago**

Focused on 2D and 3D Data Visualization, Computer Graphics, C++ programming and Machine Learning. Active member of the Electronic Visualization Laboratory and of the Creative Coding Research Group. Worked on Virtual Reality applications for the CAVE2 environment.

GPA: 4.0/4.0 | Detailed List of Exams

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

2013 | Bachelor's Degree in Computer Engineering, **Politecnico di Milano**, Milan

Final Grade: 110/110

Research and Publications

Summer 2016 | **Clustrophile: A Tool for Interactive Data Analysis**

Full-stack development of a web-based tool for interactive cluster analysis, with research involving relevant features highlighting and the visualization of clusters and projections. Project involved the design and implementation in React.js of the user interface, setting up a webserver with Node.js and MongoDB and an analytics server running Python, Flask and Sci-kit Learn. Two paper submissions to CHI will be submitted in september.

April 2016 | **CAVE-AR: A VR Real-time Authoring Tool for Designing AR Experiences**

By M. Cavallo, A. Forbes - Submitted to UIST 2016 | Download paper

VR editor interface for prototyping AR applications, developed in a CAVE2 immersive environment with a 36-node computer cluster connected to 72 HD displays. Visualization of real-time data gathered from users' mobile devices, enabling online customization of content and centralized control of collaborative tasks.

March 2016 | **RiverWalk: Experiencing The History of Chicago Through AR**

By M. Cavallo, A. Forbes, A. Rhodes - Accepted to ISMAR 2016 | Download paper

Application intelligently combining different types of tracking for overlaying historical imagery onto current views of the city, leveraging an innovative spatial-based approach.

February 2016 | **RehabJim: A 3rd Person Approach To VR Biomechanical Rehabilitation**

By M. Cavallo, A. Rottigni, E. Marai, J. Patton - Submitted to CASA 2016 | Download paper

Virtual reality experiment for helping patients during post-stroke arm rehabilitation. Uses a 3rd person view of an avatar mimicking the movements of the patient.

January 2016 | **Digital Quest: A Mixed Reality Approach to Scavenger Hunts**

By M. Cavallo, A. Forbes - Published at IEEE VR 2016 | Download paper

Framework for creating futuristic scavenger hunts allowing players to interact with virtual content located in the real world. Implemented using both Unity3D and Three.js.

Additional Projects

Summer 2016 | **Realtime EEG Data Visualization in Virtual Reality**

Experiments focused on visualizing real-time insights from EEG data, collected from a Muse headset. Series of small VR videogames controlled through users' mindwaves.

Fall 2015 | **Virtual Maps: 3D City Reconstruction from Google Street View**

WebGL-based project implemented in Three.js and aimed at extracting spatial information from Google Street View imagery, visualizing it as point clouds. By combining different sources, it allows a partial 3D reconstruction of urban environments.

Fall 2015 | **Rossmann Sales Forecasting**

Kaggle.com Data Science competition involving the prediction of sales for a big German company, considering factors such as stores, promotions and competitor data. The project was implemented in Python with scikit-learn for my Machine Learning class.

Spring 2015 | **Convolutional Neural Network Acceleration using FPGA**

Hardware optimization of the CNN forward operation, implemented in C on a Xilinx FPGA. Network configuration performed in Lua with Torch framework.

Spring 2015 | **Taxi Trajectory Prediction**

Project for my Data Mining class involving taxi route optimization in one European city. Used both Python with scikit-learn and R and classified at 3rd place on Kaggle.com.

2015 | **Robot Projects: Experiments in Robotics and Electronics**

Teacher of course on Robotics and author of many wearable electronic devices.

Spring 2015 | **Securing Communications in Distributed Systems**
Computer Security project requiring the implementation of a centralized key management system to secure messages in a chat application. Implemented in Java with RMI.

2015 | **Masterpage: A Social Network for Shops and Customers**
Web-based platform aimed at helping Italian shops in surviving the economical crisis, by providing free services related to advertisement, interaction with customers and collaboration between companies. Implemented with PHP and MySql on Apache server.

Please refer to my website for a detailed list of projects and more information about me