Julien Rebetez

Machine Learning and Computer Vision Engineer

General Information

Birth date : 3 February 1985 — Nationality : swiss

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Professional Interests

I have generic software engineering background with a particular interest in data analysis, machine learning and computer vision. I especially enjoy working on innovative projects in small, dedicated teams. I like to challenge myself and am interested in growing into a technical leadership position.

Professional Experience

HEIG-VD / IICT Institute, Yverdon, Suisse
R&D Engineer — *March 2014 - Present*
Involved in multiple applied machine learning research projects and courses. Supervised and monitored progress of Bachelor and Master students as well as junior team members.

- In the "Terra-i" project, conducted the review of an existing machine learning big data pipeline for deforestation detection from satellite images. Highlighted problems, proposed improvements to the partner (an NGO) and led the implementation of the next generation of the system which requires less human intervention and has higher performances. The system processes about 1 billion timeseries (6 TB of input data).

- In the "Agrovision" project, designed and implemented a deep learning system for automatic crop type classification from aerial (drone) imagery of farm fields. The system successfully produced accurate classification maps.

- Performed exploratory analysis on data from a biomedical study (SKIPOGH) in partnership with the CHUV hospital.

EPFL / Laboratory of Geographic Information Systems, Lausanne, Suisse
Research Assistant (Civilian service) — *September 2013 - March 2014*
Designed, implemented and published a novel graph matching algorithm for domain adaptation in the context of remote sensing images classification.
Teaching assistant for the "Imagery of Territory" course.

HEIG-VD / IICT Institute, Yverdon, Suisse
Junior R&D Engineer — *March 2012 - June 2013*
- Worked on the "Mnemosys" project about applying machine learning to human activity recognition using Kinect and accelerometers.

- Participated in the design and implementation of multiple interactive installations (using Kinect, robots and video) for the "Stalker" exhibition at the "La Maison d'Ailleurs" museum. The exhibition and the installation lasted 6 monthes with minimal technical problems.

Google Inc.
Software Engineering Intern — *April - July 2011*
Worked with an AdSense team on an early-stage internal project used by sales teams. Performed data analysis using Google's distributed infrastructure and implemented new metrics which helped improve search relevance in the project's backend.

Iomedia Communication S.A, Lausanne, Suisse
Web developer — *December 2009 - February 2010*, *November 2008 - June 2009*
- Prototyped a tool to track and help improve search ranking of client websites.

Education

HES-SO - Haute Ecole Spécialisée de Suisse occidentale, Lausanne, Suisse
Master of Science - Information and Communication Technologies — *2010-2012*
Master thesis on 3D reconstruction using an Android smartphone.

HEIG-VD - Engineering School of State Vaud, Yverdon, Switzerland
Bachelor of Science - Computer Science — *2006-2010*

- **CIAT - International Center for Tropical Agriculture, Cali, Colombia**
  Visiting Researcher *June - September 2009*

  Bachelor thesis on the project *Amazon-Radar: Ecological Radar for Amazonia*. Improved methods for detecting land-use change caused by human activities by using satellite images and machine learning.

- **Helsinki Metropolia University of Applied Sciences, Espoo, Finland**
  Exchange student *2007-2008*

Honors & Awards

Received two prizes for my bachelor's thesis *Amazon-Radar: Ecological Radar for Amazonia* :

- Yverdon-les-bains city "Sustainable development prize" *2010*
- Maillefer S.A. prize *2010*

Programming Languages & Frameworks

I have been programming in C/C++ for about 10 years and in Python for 5 years. I have experimented with a number of tools either professionally or by working on side projects, which you can find on my github page `http://github.com/julienr`.

I have extensive experience with the following tools :

- Scientific Python : numpy, scipy, theano, tensorflow, keras (deep learning), vispy, mayavi, osgeo, gdal
- General Python : django, google appengine, flask, PyQT, PyOpenGL, cython, boost.python
- C/C++: OpenCV, Point Cloud Library (PCL), Eigen, OpenGL, Ceres
- Android : Sensors API (GPS, Accelerometer), Camera API, OpenCV4Android, NDK, OpenGL, Project Tango
- Big Data: Hadoop, HDFS, Spark
- Others : HTML/Javascript/CSS, d3js, PHP, Kinect SDK

Open Source

I have recently contributed to keras (python deep learning library), jupyter notebook (python interactive notebook) and vispy (python 3D visualization library). For a comprehensive list, see `http://github.com/julienr`.

Scientific Publications

As main author :
Augmenting a convolutional neural network with local histograms - A case study in crop classification from high-resolution UAV imagery, ESANN, 2016
Network-based correlated correspondence for unsupervised domain adaptation of hyperspectral satellite images, ICPR, 2014
Reducing user intervention in incremental activity recognition for assistive technologies, ISWC, 2013

Entrepreneurial experience

In parallel to my professional activities and based on my Master thesis project, I worked on a startup idea aimed at 3D body scanning using a smartphone. For this project, I wrote a prototype Android app using computer vision and machine learning to obtain a 3D body model. I also conducted meeting with various potential customers and enrolled in the CTI Entrepreneurship training course. In 2014, I was a finalist in the "Prix Genilem HES".

Languages

French : Mother language
English : C1[1] - Certificate in Advanced English with grade B
German : A2[1]

[1] Common European Framework of Reference for Languages `http://www.cambridgeesol.org/exams/cae.htm`