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Rémi Cura | PhD, Engineer

Research fields: Massive data (Lidar), GIS databases, Machine learning, Computer Vision/Graphics
Computer skills: SQL, PL/SQL, Python, C/C++, Git, JavaScript, Java
Activities: Certified cabinet maker, travels/trekking (one year around the world 2011), climbing, design

Skills and technical experience

- **Expert in massive Lidar Point cloud management**: Prototyped an efficient and end-to-end solution.
- **Expert in urban reconstruction**: Created the first procedural street modelling and reconstruction framework.
- **Expert in GIS databases**: Designed the first *open source geocoder* able to deal with fuzzy historical addresses.

Work Experience

M.I.T, Political Science Dept., Boston, USA – *Post-doctorate Associate* 08.2018 – *present*

- **Work on modelling complex and massive databases** of lobbying/campaign financing in the USA.
- **Develop graph and machine learning** tools to investigate it (networks of firms, lobbyists, and politicians in the legislative politics)
- **Supervise a team** of software developers and students as a project-manager.

Paris School of Economics, Belle Époque project, France – *Post-doctorate* 08.2016 – 02.2017

- **Created a complete historical geocoding solution** tested on Paris (19^{th} century, 10^6 addresses) using fuzzy modeling of time and addresses and collaborative interactive web edit. **SQL / Python / JavaScript**
- **Successfully dealt with uncertainty** of historical data (spatial, temporal, textual) in a fast way (<300ms).

Thales TTS/IGN (MATIS, COGIT), France – PhD, Thesis in industrial context 04.2013 – 09.2016

Authored a seminal work on *street modelling and reconstruction* at city scale:

- Created a full management **framework for massive amount of Lidar point clouds** (>10^9, I/O, compression, indexing, processing, visualization, LOD…). **Python / SQL / C**
- Proposed an automated in-base street modelling method with coherent **street geometry, street network, lane and traffic information, street objects**. **SQL / PlpgSQL / Graph**
- Conceived and implemented a **new in-base user-interaction paradigm** applied to concurrent multi-user edits. Automatic road model fitting to multi-modal street observations with **numerical optimization**. **C++**
- Seamlessly worked in two research labs and a major defense company, **producing both high quality** *publications* (awarded) **and prototypes** (tested on real-life challenging data-sets).

Teaching / Training

Oslandia, France – Freelance consulting and training 05.2017 – 01.2018

- Created a *new training* on open source tools for point clouds processing and visualization. Tailored the training to very different clients, with a consulting (problem solving) approach.

Education

Certified Professional Cabinet Maker 10.2017
PhD in Computer Science (spec. in geographical information) – Université Paris-Est, France 04.2013 – 09.2016
Master degree in Computer Science (Engineer degree) - Telecom ParisTech 2007 – 2012

Publications and Presentations

International Journal (peer reviewed):

Cura, R., J. Perret, N. Paparoditis (2017): A scalable and multi-purpose point cloud server (PCS) for easier and faster point cloud data management and processing, ISPRS Journal of Photogrammetry and Remote Sensing, Volume 127, pp.39-56

Cura, R., B. Dumenieu, N. Abadie, B. Costes, J. Perret, M. Gribaudi (2018): Historical collaborative geocoding, MDPI IJGI (to be published).

International conferences (peer reviewed):

(Best student paper award, session GeoBigData)

Cura, R., J. Perret, N. Paparoditis (2015): Point Cloud Server (PCS): point clouds in-base management and processing, ISPRS Annals of Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume II-3/W5, pp.531--539. ISPRS Geospatial Week 2015, La grande Motte, France.

Cura, R., J. Perret, N. Paparoditis (2015): StreetGen: In-base procedural-based road generation, ISPRS Annals of Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume II-3/W5, pp.409--416. ISPRS Geospatial Week 2015, La grande Motte, France.

Invited speaker:

Cura, R. (2014) A PostgreSQL Server for Point Cloud Storage and Processing. PgDays 2014, Paris.

Professional exhibition:

Stand Terra Mobilita, Future en Seine Festival. 2015, Paris

Open Access publication (not reviewed):

Cura, R., J. Perret, N. Paparoditis (2016): Implicit LOD using points ordering for processing and visualisation in Point Cloud Servers, arxiv.org

Cura, R., J. Perret, N. Paparoditis (2017): An octree cells occupancy geometric dimensionality descriptor for massive on-server point cloud visualisation and classification, arxiv.org

Cura, R., J. Perret, N. Paparoditis (2017): StreetGen: In base city scale procedural generation of streets: road network, road surface and street objects, arxiv.org

Cura, R., J. Perret, N. Paparoditis (2017): Interactive in-base street model edit: how common GIS software and a database can serve as a custom Graphical User Interface, arxiv.org

Cura, R., J. Perret, N. Paparoditis (2017): User assisted and automatic inverse procedural road modelling at the city scale, arxiv.org

Cura, R., J. Perret, N. Paparoditis (2017): A state of the art of urban reconstruction: street, street network, vegetation, urban feature, arxiv.org

PhD Thesis (peer reviewed): reviewers: Prof. Christian Heipke (L. U. Hannover), Prof. Peter Van Oosterom(T. U. Delft)

Cura Rémi (2016): Inverse procedural Street Modelling: from interactive to automatic reconstruction