Antoine J.-P. Tixier

Artificial Intelligence, Deep Learning, Machine Learning, Data Science
Graph Mining, Social Network Analysis, Natural Language Processing
antoine.tixier-1@colorado.edu
Website: http://www.lix.polytechnique.fr/~anti5662/ Tixierae

Professional Experience

Postdoctoral Researcher, École Polytechnique, France Nov 2015 - present
Graph & Text Mining - CS Dept., DaSciM team
Advisor: M. Vazirgiannis. Key idea: graphs can be represented as text and conversely.
• Technical work:
- deep learning for social, bioinformatics, text, and attributed networks: classification, node embeddings, link prediction
- deep learning for NLP: text classification, sentence matching, summarization
- influential spreader detection in small and large real-world networks
- development of interactive web apps to demo research (e.g., GoWvis, DNLPvis)
- contribution of open source code (one repository with >300 ★ and >80)
- theorization of research ideas, design and implementation of experiments
- writing and presentation of articles
• Project management/supervision/administrative work:
- leading WP#5 (6 people from 2 companies) of OpenPaaS::NG (4-year €11M project)
- internally leading WP#5 (3 people) of LinTo (3-year €6M project)
- advising PhD/MS students and interns, participation to the hiring process
- writing of proposals to public funding agencies and private companies

Graduate Research Assistant, University of Colorado at Boulder, USA 2012-2015
Colorado Construction Safety Laboratory
Research funded by the NSF ($400K project) and the private sector.
• data cleaning, diagnostics, mining, visualization, feature engineering,
• NLP: attribute extraction from unstructured textual injury reports,
• Machine Learning: predictive modeling of construction injuries,
• probability and statistics: multivariate safety risk modeling and simulation,
• reporting to sponsors via conference calls and presentations,
• collaboration with sponsors' IT teams for deployment of predictive models.

Site Manager, Paris greater area, France May-Aug 2011
ARTIS construction. €12M project. Daily coordination of 6 trades (30 people). Worked under pressure within a tight schedule and budget. Quality checking, reporting to owner.

City Engineer, Montréal, Québec, Canada Jul-Aug 2010
City of Montréal. Many assignments from CAD to site supervision, surveying, and pricing.

Teaching

Introduction to Text Mining and NLP (INF 582) Spring 2017-18-19
École Polytechnique, France (3^{rd} year Polytechnique students).
Professor: Michalis Vazirgiannis. Attendance: 70 students.
Topics: text representations (vector space model, word graphs, word and document embeddings), information retrieval, keyword extraction, unsupervised and supervised document classification, deep learning for NLP.
Mission: responsible for weekly 2-hour programming sessions (teaching + preparation), managing course material on e-learning platform, sending announcements, and leading grading.

Advanced Learning for Text and Graph Data (ALTeGraD) Spring 2016-17, Fall 2017-18
MVA, ENS Cachan & MDS, École Polytechnique (two of the best AI French graduate programs).
Professor: Michalis Vazirgiannis. Attendance: 100 students.
Topics: same as INF 582 + graph theory concepts, community detection, identification of influential spreaders, influence maximization, graph kernels, and deep learning for graphs.
Mission: same as INF 582 + created from scratch, administrated, and organized grading of three Kaggle in-class competitions:

- email recipient recommendation (58 teams, 133 competitors, 1213 entries)
- link prediction in citation networks (36 teams, 88 competitors, 460 entries)
- neural graph regression (46 teams, 97 competitors, 486 entries)

› **Probability, Statistics and Decisions for Civil Engineers (CVEN 3227)** Spring 2014
University of Colorado at Boulder, USA (undergraduate level).
Professor: Ross B. Corotis. Attendance: 80 students.
Topics: probability theory, random variables and probability distributions, covariance, stochastic processes, parameter estimation, probability density estimation, confidence intervals, statistical inference, hypothesis testing, regression/correlation analyses.
Mission: held bi-weekly office hours, gave 5 lectures throughout the semester. Designed and graded midterms and finals.
🏆 **Best TA award.**

🎓 EDUCATION

› **Ph.D. in Civil Engineering** - GPA: 3.95/4.00 2013-2015
University of Colorado at Boulder, USA
Advisors: Matthew R. Hallowell, Balaji Rajagopalan
Program ranked 9/145 in the US. Took statistics and machine learning courses with applications to hydroclimatology. Methods learned: CART, Bagging, Random Forest, Boosting, SVM, PCA, clustering (k-means, k-nn, hierarchical...), kernel density estimation, copulas, bootstrapping, Monte Carlo, risk analysis, Extreme Value Theory, (non)parametric regression, time series analysis, spatial analysis.
🏆 **Doctoral Assistantship for Excellence.**

› **M.S. in Civil Engineering** - GPA: 3.88/4.00 2011-2013
University of Colorado at Boulder, USA
Construction engineering, statistics, productivity, project management (lean/agile approaches).
Master's Research Thesis, 🏆 **Research Assistantship** (2 semesters).

› **M.S. in Mechanical & Electrical Engineering** 2009-2011
ESTP Paris, France. Maths, Physics, CS, structures, materials, electronics, mechanics, hydraulics... Merit-based selection for the double degree program with CU Boulder.

› **Classes préparatoires MPSI-MP** 2007-2009
Lycée Sainte-Marie, Antony, France. Intense training in Maths and Physics.

🏆 HONORS & AWARDS

• Best Teaching Assistant, Civil Engineering Dept., CU Boulder Spring 2014
• Best Paper (CEM track), 120^{th} ASEE Annual Conference, Atlanta, GA June 2013
• Doctoral Assistantship for Excellence, Civil Engineering Dept., CU Boulder April 2013
→ *highest level of support offered by the department, received over 100 Ph.D. applicants*

</> CODE

Python, R, Keras, PyTorch, TensorFlow. Web apps with Shiny (reactive & asynchronous programming) and {C3, D3, vis}.js. APIs with Flask, Plumber, and Heroku. LaTeX, HTML. Windows, Linux. Parallel and batch processing, cluster computing.

LANGUAGES

English: fluent, French: native.

☑ SERVICE

Reviewer for WSDM 2017, CIKM 2016, AAAI 2017

OTHER

IT: Colorado Construction Safety Laboratory website maintainer 2012-2015
Tennis: regional vice-champion (Paris area) with ESTP team, 1^{st} division 2011

ADVISEES

Ph.D.
- Henrietta Baker (University of Edinburgh), *AI for construction safety* 2019-current
- Guokan Shang (École Polytechnique/Linagora), *abstractive summarization* 2017-current (**one ACL paper**)

M.S.
École Polytechnique 3^{rd} year research project (Nov-Mar):

- Wenjian Dong & Runtian Zhang, *hierarchical self-attention* 2018-19
- Zekun Zhang & Wensi Ding, *abstractive summarization* (**one ACL paper**) 2016-17
- Irina Stolbova, *sentiment analysis* 2016-17
- Ndeye Fatou Diop, *word specificity scoring* 2016-17
- Dmitry Zhukov & Danilo Augusto, *graph-of-words embeddings* 2015-16

Interns

- Armita Khajeh Nassiri, *neural graph classification* Apr-May 2018
- Guillaume Leroy (2^{nd} year ENSTA ParisTech), *graph node embeddings* May-Aug 2017

SELECTED PUBLICATIONS

• Preprints

Tixier, Antoine J.-P. Notes on Deep Learning for NLP, *arXiv preprint 1808.09772*. 2018.

Tixier, Antoine J.-P., Maria-Evgenia G. Rossi, Fragkiskos D. Malliaros, Jesse Read, and Michalis Vazirgiannis. Perturb and Combine to Identify Influential Spreaders in Real-World Networks *arXiv preprint 1807.09586*. 2018.

Tixier, Antoine J.-P., Giannis Nikolentzos, Polykarpos Meladianos, and Michalis Vazirgiannis. Classifying Graphs as Images with Convolutional Neural Networks, *arXiv preprint 1708.02218*. 2017.

• Conference

Guokan Shang, Wensi Ding, Zekun Zhang, **Tixier, Antoine J.-P.**, Polykarpos Meladianos, Michalis Vazirgiannis, and Jean-Pierre Lorré. Unsupervised Abstractive Meeting Summarization with Multi-Sentence Compression and Budgeted Submodular Maximization *arXiv preprint 1805.05271*. In: *ACL 2018*.

Giannis Nikolentzos, Polykarpos Meladianos, **Tixier, Antoine J.-P.**, Konstantinos Skianis, and Michalis Vazirgiannis. Kernel Graph Convolutional Neural Networks, *arXiv preprint 1710.10689*. In: *ICANN 2018*.

Tixier, Antoine J.-P., Polykarpos Meladianos, and Michalis Vazirgiannis. Combining Graph Degeneracy and Submodularity for Unsupervised Extractive Summarization. In: *EMNLP New Frontiers in Summarization Workshop*. 2017, pp. 48–58.

Polykarpos Meladianos, **Tixier, Antoine J.-P.**, Giannis Nikolentzos, and Michalis Vazirgiannis. Real-Time Keyword Extraction from Conversations. In: *EACL*. 2017, p. 462.

Tixier, Antoine J.-P., Fragkiskos Malliaros, and Michalis Vazirgiannis. A Graph Degeneracy-based Approach to Keyword Extraction. In: *EMNLP*. 2016, pp. 1860–1870.

Tixier, Antoine J.-P., Konstantinos Skianis, and Michalis Vazirgiannis. GoWvis: a web application for Graph-of-Words-based text visualization and summarization. In: *ACL demo track*. 2016, p. 151.

Tixier, Antoine J.-P., Alex Albert, and Matthew R. Hallowell. Teaching Construction Hazard Recognition through High Fidelity Augmented Reality. In: *ASEE*. 2013. 🏆 **Best Paper Award**.

• Journal

Tixier, Antoine J.-P., Matthew R. Hallowell, and Balaji Rajagopalan. Construction Safety Risk Modeling and Simulation. In: *Risk Analysis* (2017).

Tixier, Antoine J.-P., Matthew R. Hallowell, Balaji Rajagopalan, and Dean Bowman. Construction Safety Clash Detection: Identifying Safety Incompatibilities among Fundamental Attributes using Data Mining. In: *Automation in Construction* 74 (2017), pp. 39–54.

Tixier, Antoine J.-P., Matthew R. Hallowell, Balaji Rajagopalan, and Dean Bowman. Application of Machine Learning to Construction Injury Prediction. In: *Automation in Construction* 69 (2016), pp. 102–114.

Tixier, Antoine J.-P., Matthew R. Hallowell, Balaji Rajagopalan, and Dean Bowman. Automated Content Analysis for Construction Safety: A Natural Language Processing System to Extract Precursors and Outcomes from Unstructured Injury Reports. In: *Automation in Construction* 62 (2016), pp. 45–56.

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