Oliver De La Cruz | *Data Scientist*

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Education

Swiss Federal Institute of Technology, ETH Zurich — **Switzerland**
Master of Science in Statistics, Data Science — *October 2016 – November 2018*
Honors: Magna Cum Laude, Rank: 3^{th}/35

University of Lausanne, HEC Lausanne — **Switzerland**
Master of Science in Finance, Financial Engineering and Risk Management — *September 2011 – September 2013*
Exchange Program in U.S: MFE - Claremont Graduate University - Fall 2012
Honors: Cum Laude, Rank: 5^{th}/67

University of Luxembourg — **Luxembourg**
Bachelor of Science in Economics and Management, Econometrics — *September 2008 – September 2011*
Exchange Program in Sweden: B.Sc in Economics - Örebro University - Fall 2010
Honors: Magna Cum Laude, Rank: 3^{rd}/88

Professional Experience

Amazon EU - Supply Chain Research — **Luxembourg**
Data Scientist Intern — *October 2017 – February 2018*
Conducted a research project on unsupervised machine learning methods to discover patterns for time series data using deep learning algorithms with Tensorflow and cloud computing leading to a cost reduction in inventory placement by 10%.

- Provided technical expertise on RDBMS and administered a columnar petabyte-scale data warehouse in Redshift
- Trained a Deep Embedded Clustering to learn feature representations and cluster assignments for outlier detection
- Sustained product selection by predicting out out-of-stock events with regularized regression and data mining techniques
- Engineered robust data integration (ETL) pipelines with Spark and plotted the output with Javascript to perform deep dives
- Architected and deployed an service infrastructure utilizing containers and several AWS stack to build large scale applications

Ernst & Young - Quantitative Advisory Services — **Luxembourg**
Senior Quantitative Analyst — *October 2013 – October 2016*
Boosted revenues by 2MM through the launch of a cloud business intelligence platform offering digital solutions with interactive data visualization, while expanding the range of valuation services for derivative products using internal models.

- Validated and monitored Value at Risk models for hedge funds and banks across Europe
- Generated ad hoc reports to gain insights on credit risk, factor sensibilities and stress testing
- Developed an end-to-end application in C++ to price convertible bonds by implementing finite difference methods
- Reviewed portfolio management processes and investment strategies to ensure consistency with the client's risk profile
- Performed predictive analytics by integrating statistical methodologies with Python to determine trends in the fund industry
- Established a database to compute the retrocessions fees for a client and programmed in SQL to estimate the profit margins

European Investment Bank - Finance Directorate — **Luxembourg**
Analyst Intern — *February 2013 – July 2013*
Improved the automation of the bank's dashboard by creating a web-based software that gathers key statistics and measurable KPIs which led to a cut in half of the time required to assess the market risk held in the trading book.

- Designed hedging and investment strategies to reduce exposure to risk factors using derivatives
- Performed daily market risk analysis of fixed-income securities in line with the executive management's reporting needs
- Identified data quality issues, upgraded business processes and executed cash reconciliation between the front and back office

Société Générale - Asset Management & Private Banking — **Luxembourg**
Summer Intern — *August 2011 – August 2011*
Increased the efficiency of data storage with proper indexing, enhanced the in-house information retrieval methods and updated the user interface design, resulting in a 50% increase in usability for non-technical staff members.

- Prepared presentations analyzing major net asset value fluctuations of institutional funds to support investment decision-making
- Created a VBA tool and incorporated stored procedures in MS SQL server in order to facilitate the task of data processing

SES Satellite Communications Services - Internal Audit — **Luxembourg**
Summer Intern — *July 2011 & September 2011*
Assisted with the drafting of the annual report delivered to the Board of Directors of the world's second largest satellite operator.

- Overhauled audit procedures and compliance with accounting policies
- Implemented an effective program to monitor crucial metrics and identify red flags regarding financial transactions

University of Luxembourg - Centre for Research in Economic Analysis **Luxembourg**
Part-Time Research Assistant *May 2011 – June 2011*
Accelerated the process of market data collection by introducing a web crawler and applied econometrics for efficient portfolio allocation to support future academic research in predictive modelling.

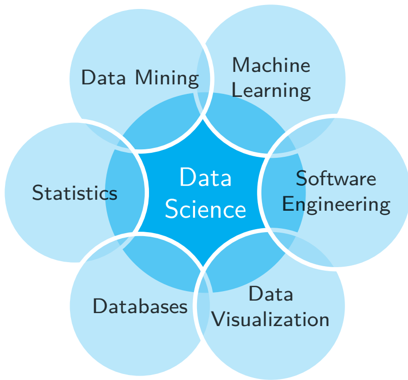
- Conducted periodic backtesting, evaluation and optimization of stock selection models
- Analyzed the financial statements of EU companies and constructed optimal portfolios to beat the Euro Stoxx 50 benchmark

Languages

English: Fluent (C2)
French:: Bilingual (C2)
Spanish: Mother tongue (C2)

Skills

Programming Languages: Python, R, C++, Scala, Matlab, SQL, JavaScript
Libraries: Numpy, Pandas, Scikit-Learn, Tensorflow, Caret, Ggplot2, Plotly
Big Data: Hadoop MapReduce, Apache Spark, Hbase, Hive, MongoDB
Databases: PostgreSQL, SQL server, MySQL, Redshift, MongoDB
Web technologies: HTML, CSS, jQuery, AJAX, XML, JSON
Frameworks: Django, React, Angular, Shiny, Bootstrap
Software Development Tools: Git, Github, Docker, Tmux
Operating systems: Microsoft Windows, Apple Mac OS X, Linux
AWS: EC2, S3, VPC, IAM, RDS, ELB, Elastic Beanstalk, CloudFormation



Research & Projects

Deep Reinforcement Learning for Autonomous Exploration, Master Thesis **November 2018**
The thesis proposes deep reinforcement learning methods that are able to navigate in complex unknown environments attaining a performance close to human-level intelligence.

- Included auxiliary tasks in the loss function to deal with the sparsity of the rewards and extract meaningful features
- Parallelized policy gradient methods to run in distributed systems using asynchronous optimization with multiple GPUs
- Integrated an external memory which acts as an internal representation of the map

Conversational Agent, Project **July 2017**
The task was to build a simple dialogue system that can handle real-world conversations. Starting from a simple Seq2Seq implementation, one needs to identify limitations of the baseline and suggest extensions that tackle speficic problems.

- Programmed an local attention and copying mechanism with a LSTM 4-layer neural network
- Applied reinforcement learning to produce better answers

Sentiment Analysis, Project **June 2017**
The task was to classify whether a tweet message posted by a user contained a positive or negative smiley by only considering the rest of the text. A multi-step method was developed consisting of preprocessing, word-vector embeddings, and classification using deep learning.

- Parsed sentences to build dependecy trees and estimated word embeddings with Word2vec or Glove approaches
- Calibrated a 3-layer convolutional neural network with max pooling and batch-normalization

Dynamic Factor Models for Asset and Liability Management, Master Thesis **September 2013**
The paper advocates term structure models which parsimoniously exploits unobserved information with the objective of forecasting interest rates and predicting future bond prices.

- Formulated a Vector autoregression (VAR) model to capture linear interdependencies among multiple time series
- Applied dimensionality reduction techniques to large number of macroeconomic variables
- Developed a Kalman Filter algorithm to estimate the latent yield curve factors

Activities & Achievements

Leadership: Organized conferences, presentations and events for the Alternative Summit in Las Vegas (2016)
Certifications: Passed CFA Level II (2017)