

# Rafael Lacerda

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Toronto, ON, Canada

## Overview

I tailor ML / DL / NLP research to fit your business. Proven results in 4 years of experience in industry.

My contributions:

- Research and development of ML and NLP systems.
- Automation and machine learning to achieve business goals.
- Infrastructure required to host machine learning applications in the cloud.
- Communicating research to stakeholders of all skill levels.

## Education

### MSc. in Applied Computing

Sep 2016 – Dec 2017

University of Toronto, Department of Computer Science

- Courses of note: Natural Language Processing, Computational Neuroscience, Probabilistic Learning and Reasoning.
- Recipient of 30k Mitacs scholarship (2x terms).
- Natural Language & Deep Learning final thesis: Question Answering in the Legal Domain.

### BSc. in Economics

Aug 2011 – Jul 2014

Universidade Presbiteriana Mackenzie, Department of Applied Social Sciences

- Econometrics final thesis
  - The Impact of Government Intervention in the Sugarcane Industry.
  - Modeled the effect of interventions on uncertainty using Real Options analysis.
- Previously a student of Computer Science at the same university:
  - Transitioned into Economics to focus on modeling human activity. Since then I have used my CS skills as tools to assist in modeling and automation.

## Work Experience

### Data Scientist (Applied Research)

Aug 2019 – Present

Scribd Inc., Toronto, ON

- Research in taxonomy: category tree generation, document classification.
- Developed embeddings for: Entities; Long Documents (content-based & usage-based).
- Developed a document feature pipeline to enable classification of millions of long-form documents.
- Specialized in the field of entity linking to create a novel entity linker with very few compromises.
- Created a novel entity extractor: higher precision than open-source alternatives.
- Clustering of non-uniform time series in Fourier space.
- Coordinated migration of the applied research team to a cloud-based ML serving platform.
- Involved in: weekly ML / deep learning / NLP papers update; keyphrase extraction.
- Used Python, PyTorch, Scikit-Learn, Spark, Spacy, Elasticsearch, MLFlow, Databricks, AWS.

*Ross Intelligence Inc., Toronto, ON*

- Developed a state-of-the-art legal research system that surpassed IBM Watson's performance, leveraging deep learning and NLP.
- Coordinated new research that further improved the research system, by creating specialized models to extract entities in documents.
- NLP projects include information retrieval, document ranking, summarization, topic modeling, document classification and data augmentation in the legal domain.
- Deep Learning tasks included designing networks from scratch, customizing existing networks, training models and word embeddings, model selection and productionizing models.
- Built fast and scalable NLP and Deep Learning pipelines.
- Reduced inference time in production by ~70% through caching and precomputation.
- Developed statistical tests with human assessments to ensure model superiority before deployment into production.
- Used Python, Tensorflow, Keras, Solr/Lucene, Pandas, Spacy, NLTK, Scikit-Learn, MongoDB, Redis, Docker, Travis CI, Kubernetes, AWS.

#### **Other analytical roles**

- Treasury Analyst in Real Estate Investment (Jul 2014 – Apr 2016)
- Head of Customer Service in a Rocket Internet venture (Jan 2013 – Nov 2013)

### **Technical Skills**

- **Languages & Frameworks:** Python, R, PyTorch, Tensorflow, Keras, Numpy, Pandas, Scikit-learn, Spacy, NLTK, Matplotlib.
- **Databases, Caching:** SQL, NoSQL, MongoDB, Redis, Solr, ElasticSearch.
- **Cloud computing:** AWS ecosystem, Microservices architecture, REST APIs.
- **Continuous Integration, Continuous Delivery:** Github, Travis CI, Docker, Kubernetes.
- **Machine Learning:** Regression, Classification, Clustering, Dimensionality Reduction, Model Validation, Model Selection, Time series clustering in Fourier space, Dynamic Time Warping.
- **Deep Learning:** NN, CNN, RNN, LSTM, GRU, Autoencoders, Transformers.
- **Natural Language Processing:** Embeddings, Information Retrieval, Natural Language Understanding, Question Answering, Learning to Rank, Summarization, Entity Extraction, Entity Linking, BERT.

### **Prior domain knowledge in industries**

- Publishing
- Legal Research & Case Law
- Finance & Treasury
- Real Estate Investment
- Customer Service Management

### **Other Projects**

- Computational graph framework to chain video filters. Used OpenCV, Python, Numpy (2019).
  - Tensorflow-like API to chain image filters that operate in spatial and temporal dimensions.
- Emotion based movie recommendation system. Used Python, BeautifulSoup, Numpy (2016).
  - Scraped movie scripts annotated with Ekman emotions throughout the timeline.
  - Recommendations through similarity of emotional progression.