

Ian Smith

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Summary

Using the Python 3 language, I provide machine learning solutions for supply chain risk assessment. These include applications for business process automation, data pipelines, and mining web repositories for research data. My work is a key component of Intertek's chemical regulatory certification services for the manufacturing sector. I also interpret results and communicate directly to stakeholders — customers, my internal organization, and the public.

Technical Skills

Technologies: Python (Pandas, Requests, Scikit-learn, NumPy, Flask, matplotlib, Plotly), SQL, Java, JavaScript, R, Jupyter Notebooks, Git

Applications: Machine Learning, Data pipelines and ETL, Web scraping, Natural language processing, Web apps, Mathematical and Statistical models, Business-domain research

Professional Experience

Intertek

GLOBAL RESTRICTED SUBSTANCES — OTTAWA, CANADA

Engineer

October 2009 – present

Intertek is a global auditing, testing, and certification service provider. Designed and implemented a machine learning platform in Python to perform risk analysis for chemical regulatory compliance. Mine and analyze data to keep up to date on enforcement and risk trends. Automate business processes. Mentor junior team members. Regularly communicate with consulting customers, Intertek teams, and the public.

Ageus Solutions

OTTAWA, CANADA

Engineer

January 2005 – October 2009

Ageus Solutions was a successful independent consulting startup which was integrated into Intertek Health and Environmental after acquisition. One of the founders of the company. Served on board of Directors and as a corporate officer. Responsible for legal due diligence during M&A. Designed core analytical services and directed team of regulatory researchers.

Nortel Networks

OPTICAL COMPONENTS — OTTAWA, CANADA

IC Designer

June 2000 – December 2004

The former Nortel Optical Components Group designed and fabricated GaAs ICs for use in optical long haul equipment. Analyzed integrated circuits and discrete semiconductor devices for root-cause of failure. Assembled and ran laboratory at minimal cost during downsizing. Experimentally demonstrated recurring failure mechanisms. Advised manufacturing operations to implement corrective action.

Education

Carleton University

OTTAWA, CANADA

Bachelor of Computer Science, Honors

2018

With High Distinction. Data management, AI, and software engineering. Web and mobile application development. Computer Vision. Awarded Senate Medal for Outstanding Academic Achievement

University of Manitoba

WINNIPEG, CANADA

B.Sc. (Electrical Engineering)

1999

Focused on microelectronics and VLSI design. Acquired proficiency in IC design tools, statistics and mathematics, and C++.

Udacity

Data Scientist Nanodegree

2019

Supervised learning, Unsupervised Learning, Deep Learning, Stakeholder Communication, Experimental Design, Software Engineering, ETL Pipelines, NLP Pipelines

Selected Professional Projects

Material Risk Analysis Application

Purpose: Analyzes a customer's supply chain for material risks. Evaluated multi-class machine learning algorithms including Naive Bayesian Classifier, Support Vector Machine, and Random Forest to determine the types of materials used in a product based on text extracted from its design files. Renders a tabular report with recommended testing plan or design revisions, to assist a material science SME. Deployed in a Flask application using a REST API.

Results: Reduced a multi-week engineering workflow to hours. Allows customers to apply chemical testing in a targeted, cost-effective manner. 718 successful customer-projects to date.

Technology: Python (Scikit-learn, Pandas, NumPy, Flask, NLTK), Jupyter Notebooks, SQL, Javascript, Supervised Machine Learning, Statistical Analysis, Natural Language Processing, Information Theory

Material Risk Knowledge Base

Purpose: Periodically mines product recall and litigation repositories to obtain up-to-date chemical infraction data set. Cleans and transforms raw HTML and XML, processes free text, and stores results in SQL repository.

Results: Intertek maintains an industry-leading knowledge base on current uses of 723 regulated chemicals, and in which of 214 material or component types they occur.

Technology: Python (Pandas, Requests, NLTK), Java, SQL

ETL Pipelines

Purpose: Automates customers' product design encodings and results of conformity assessments from various sources. Maps schemas, cleans data, stores in engineering SQL database.

Results: Intertek is able to accept product conformity data from in-house sources, third-party service providers, or customers, and deliver a consistent, repeatable analysis product.

Technology: Python, SQL

Personal or Academic Projects

Carleton University Honors Project

Purpose: Uses Natural Language Processing to extract product structure and composition from free text obtained from industrial designs. Implemented in C++.

Results: Portions of this project were suitable for deployment in an industrial setting, as part of Intertek's Risk Analysis Application. The project was awarded a grade of A+.

Technology: C++, Machine Learning, Natural Language Processing, NLTK API. Built NLP from scratch in C++

TSX Value Analyzer

Purpose: Built to investigate fundamental analysis at a time when "value investing" was out of style and "value stocks" were depressed in price. It uses a regression learner trained on fundamentals, and predicts five-year returns of candidate investments. The Shiny framework provides the user with a GUI.

Results: Application performs well in real-world situations; selected candidates have exceeded the S&P/TSX Composite Index.

Technology: R, SQL, Javascript

Udacity Deep-Learning Project

Purpose: Classify the Oxford "Flowers" dataset by species using a convolutional neural network.

Technology: Pytorch, Deep neural networks, Computer vision

Udacity Supervised Learning Project

Purpose: Evaluated Random Forest, Adaboost, Bayesian Classifiers in scikit-learn using the California Census dataset.

Technology: Python, Jupyter Notebooks, scikit-learn