

Opportunities for innovation in the financial sector

As one of the first companies to use demographic profiles and databases as a means of accurately estimating consumer credit card risk, Capital One was eager to continue innovating in a new era of Financial Big Data. In this era, there are new opportunities across all facets of the business to improve processes and ultimately the customer experience using data.

Capital One has many advantages over the competition: they are nimble, they have a great reputation, and perhaps most importantly, they have an army of financial analysts who can think with data. The team found that its existing toolset had reached its limits, and recognized the need to take a leap forward.

Enter the Big Data Academy. The Big Data Academy is a program created by Capital One to bridge the gap from working with an Excel and SAS-based toolset to using Python, open source tools, machine learning, data science, big data infrastructure, and a host of other tools. The skills and tools learned in the Big Data Academy are intended to transform Capital One's army of analysts into data science savvy professionals who can innovate with data.

"Datascope made it as easy as possible for us to quickly build [a tool], get the messaging right for Capital One and our employees, and take it for a test drive in a productive way."

Monica Neff,
HR Director

datascope case study



To finish the Big Data Academy curriculum, Capital One needed a capstone opportunity—something to tie together everything that participants learn in the Big Data Academy. The goal was to create an experience that mimicked the type of experience that people gain from bootcamps or master’s degrees and for employees to come away with something that could be included in a portfolio or



Datascope led a workshop to brainstorm and refine the core objectives of the Data Games.

resume. To develop this capstone course, Capital One partnered with Datascope. We called this capstone opportunity “The Data Games.” Because an algorithm’s success is

largely dependent on both the data being used and the use case at hand. Indeed, most major tech companies have entire teams of machine learning experts working full-time on continuously improving their recommendation system frameworks.

The Data What?

Part hackathon (where people come together to work on open-ended, pet projects) and part Kaggle competition (where everybody works on the same problem and competes to find the best solution), the Data Games were designed to allow participants to compete and learn while tackling a relatively straightforward problem: how to detect fraudulent transactions.

As a means to achieve the above goals, Datascope led a workshop with the Capital One Labs team where we developed the core objectives for the Games. These objectives included the need to be a fun experience, to build empathy among participants, and to exercise Capital One employees’ existing expertise while giving

giving them the opportunity to practice the skills that they had acquired in the Big Data Academy. The Games needed to stretch participants’ skillsets and drive home lessons about the advantages of topics ranging from continuous deployment to modern APIs, and from machine learning algorithms to big data tools. In addition to this, the team discussed the components of a competition that would best create an environment to meet these objectives.

The Object of the Game

Fraudulent transaction detection is a quintessential data science problem in the finance industry, one that is easy for many people to understand and work on. The Data Games focused on enabling students to quickly dive in and build classifiers that could predict whether or not incoming transactions were fraudulent.

Importantly, there are lots of different ways to address this problem, which gave teams of participants the flexibility to try new things, experiment with different features, and optimize various algorithms for

performance. "Datascope quickly honed in on something that was truly an experiential learning opportunity that didn't feel like a

"Our collaboration with Datascope has already enabled hundreds of Capital One employees to flex their 'Big Data muscles,' which will dramatically change our capacity for innovating with data. The Datascope team has positioned our team to leap beyond our current potential. I look forward to working with them again."

Phil Kim,
Managing Vice President


class," reflected Monica Neff, HR Director at Capital One.

From Nothing, to Alpha, to Beta

Staying true to our human-centered design principles, we quickly developed an alpha prototype for the Data Games and put it out in the field with nine initial Data Games participants. The Datascope team developed rules and documentation as well as server and deployment code, plus "scaffolding code" for the participants that used popular open-source software libraries and demonstrated software development best practices. The result was something that you might expect from an alpha version: it worked...kind of.


On the one hand, we validated the idea that this would be an activity that people enjoyed and found valuable. On the other, we found that we clearly had a lot to do in order to improve the experience. "Going into the alpha prototype, we thought that we might need more boilerplate code to help participants with the machine learning side of things," said Matt Bryan, Senior Director of Product Management at Capital One,

"but as it turned out, they actually needed more context to get started quickly. It is a testament to Datascope's iterative approach that we were able to learn these invaluable lessons at an early stage of the process."

During the week between the alpha and beta Data Games, we rapidly iterated on the most important aspects of the experience, using what we learned from the alpha Data Games in order to deliver a successful beta Data Games to 30 participants from Capital One, including business analysts, data scientists, and managers. It has since expanded and been repeated for other cohorts of Data Games participants and is currently run autonomously by the Capital One team. 

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