



Anomaly Detection

How to Improve Core Product Accuracy and Efficiency with IoT

Predictive analytics can help improve product or service efficiency and accuracy. A good way to do so is developing anomaly detection, as it enables to identify items, events or observations which do not conform to expected patterns. Fraud detection, system health monitoring, event detection in IoT are just a few examples of what automated anomaly detection can help improve. But each and every application of anomaly detection is nevertheless oriented towards one thing: improving the core product quality.





Anomaly Detection to Improve Core Product Accuracy & Efficiency with IoT

About Our Customer

Coyote is the European leader of real-time road information. Founded in 2005, Coyote has 250 employees, 4.8 million users across Europe, and generated a turnover of over €100 million in 2014. Coyote uses IoT-based devices and mobile applications that enable their users to warn other drivers of traffic hazards & conditions (e.g., traffic obstruction, accident, speed camera, etc.) that are detected while driving.

Industry

Real-time road information

Market

Europe

Use Case

Anomaly Detection

“Our Smart Data projects gather 3 key components: data, people, and technology. Dataiku DSS lets us quickly reach concrete goals in our data projects so that we can focus on added-value tasks. The machine learning capacities we have internalized will allow us to leverage our IoT data to create new features like sleepy driver detection or potential road closures.”

Florian Servaux

Smart Data Team Leader
Coyote

Challenge

Improve Speed Limit Reliability

Coyote's IoT devices and apps rely heavily on the accuracy of incoming data. Of particular interest are the driving speed limits within their embedded maps. Keeping them accurate and up-to-date is a big challenge for Coyote's quality teams. In terms of data analysis, Coyote needed an automated algorithm-based solution that would correct speed limit data. Ideally, the solution would leverage the high volume of incoming data from their IoT devices (billions of rows with anonymized speed and position of their users) to turn them into actionable insights and predictions. By association, this also meant that Coyote needed to instill a data-driven approach within the company — decisions needed to be based on real-world data rather than standards analytics reports. In order to meet these challenges, Coyote approached Dataiku. The two companies already enjoyed a long-term relationship — in 2015 Coyote deployed a churn project developed using Dataiku Data Science Studio. Given the project's success, Coyote decided to extend their use of predictive analytics to their core product development.

Solution

Machine Learning to Detect & Refine Speed Limit Data

Armed with Dataiku DSS, Coyote used its Machine Learning capabilities to detect anomalies in their speed limit referential, within specific datasets. Coyote developed an algorithm to leverage vast amounts of IoT-derived data. It segments roads into sections and analyze patterns in each section. This enabled Coyote to build a predictive model that estimated the speed limit of the road section. The Machine Learning process facilitated the detection of

speed limit anomalies and, consequently, enabled Coyote to estimate the global quality & reliability of the displayed speed limit. The entire process wouldn't have been possible without Dataiku DSS' collaborative functionalities. Thanks to the platform's focus on teamwork & cooperation, which enabled employees with differing skill-sets to work together, Data Mining & Visualization are now widespread within the company and there is a growing awareness of Smart Data issues.

Results

Significant Improvement of Speed Limit Referential

Using Dataiku Data Science Studio enabled Coyote to improve their core product's accuracy & efficiency while establishing a data-driven spirit within the entire company. Key accomplishments include: Speed limit reliability increased by 9% on analyzed datasets; Automation of the speed limit correction process; A global data-driven spirit within the company; Increased customer loyalty.

“Speed limit reliability has been increased by 9% on analyzed datasets”



Coyote & Dataiku Overview

Technology



Vertica, Python, PostgreSQL

Time



4 Months

Team



3 Data Scientists
1 Data Analyst

Model



Random Forests

A single platform for data scientists, analysts and business users



Real-time IoT data ingestion to follow traffic evolution

Fast iteration to optimize a random forest algorithm



Daily automated re-training to improve accuracy



Coyote & Dataiku: Anomaly Detection Application Results

- > Easy access by Coyote product owners to the algorithm's output
- > Speed limit detection automated to increase data reliability

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