Real-time Driver Profiling & Risk Assessment for Usage-based Insurance with StreamAnalytix

To keep up with the new digital consumer and remain competitive, the auto insurance industry is increasingly investing in connected car solutions to offer simplified, transparent, and flexible products and pricing options.

For example, usage-based insurance is a voluntary, behavior-based insurance program that uses analytics to create highly personalized and dynamic plans based not only on the driver’s age and other demographics, but also accounts for the driver’s behavior, risks related to a vehicle, and external factors such as driving conditions and weather.
About the Customer
This leading auto insurance provider chose StreamAnalytix to ingest, transform, enrich, analyze and store automotive telematics data in real time to build an end-to-end analytics application for driver profiling & individual risk assessment, and subsequently offer dynamic, usage based, plans to its customers.

Solution Highlights

Real-time ingestion of telematics and sensor data
The auto insurance company uses a telematics device to capture and transmit vehicle performance, usage, and driver behavior data from various sensors in the car. The StreamAnalytix solution enables real-time ingestion of this sensor data using an AWS (Amazon Web Services) IoT gateway. The device captures data points such as:

- **Diver behavior:** Rapid acceleration, hard braking, hard cornering, and air bag deployment
- **Vehicle sensor data:** Oil temperature, engine performance, brake wear, and tire pressure
- **Usage data:** mileage, location, and historic riskiness of the routes used

Data processing, as it arrives
In-memory data transformation, data blending and data enrichment is performed as driver behavior, usage, and vehicle data arrives:

- Combines real-time behavior and vehicle sensor data with risk history
- Blends driving behavior data with other real-time data sources such as syndicated public data marts and weather data
- Enriches data with customer information such as contact, location, age, past purchases, past claims, and more

Automated risk analysis through machine learning
The ingestion and enrichment stages provide a rich array of key attributes needed for the predictive machine learning models running on Apache Spark. Orchestrated by StreamAnalytix, these stages assess and predict individual risk scores.

Classifying drivers as safe or risky and quantifying risk scores are based on current driving behavior, historical behavior, and supplemental data flows such as: usage data, geographic location, vehicle type, vehicle performance, and third-party data (like driving conditions and weather data).

StreamAnalytix also provides easy visual dev-ops interfaces to allow for a periodic refresh of the models based on varying patterns of data or drift in user behavior. If necessary and when appropriate, the insurer can configure StreamAnalytix to deploy real-time continuous learning models such as K-means clustering for this use case.
Smart alerting

The application creates alerts to flag risks based on altered behavior patterns as well as anomalies in vehicle performance:

- Customers may opt to be alerted in real-time on risks to enable course correction and caution
- Alerts for vehicle health can be created to flag predicted faults and repair needs, reducing the number of claims caused by vehicle breakdowns
- Smart alert models are built to reduce false positives. For instance, if a driver is braking frequently because his route shows heavy snow fall, his driving behavior will not be flagged as a risk because there is a good explanation for it

Results

An end-to-end, real-time analytics application for driver profiling & risk assessment to enable personalized, usage-based insurance plans

Through driver profiling and individual risk scores, the auto insurer is now offering data driven, and highly personalized, insurance policies and pricing plans. Additionally, the insurance giant is now also offering predictive maintenance services that prevent vehicle breakdowns and repairs.

Premium adjustments and dynamic pricing

Highly personalized premium pricing options are based on:

- **Individual scores:**
  Lower insurance premiums for safe or infrequent drivers

- **Vehicle type and make:**
  Data shows that people with a lower risk profile inherently choose certain types of cars

- **Geography:**
  Certain geographies have more favorable weather and better driving conditions, leading to lower risk and lower premiums
Increased customer loyalty and claims reduction from value-added services
Remote vehicle diagnostics and predictive maintenance services proved to be consumer-friendly value-addition which resulted in increased customer loyalty. Customers report that they like, and have come to rely on, the application’s predictions related to component failures and breakdowns. Also increasing preventative maintenance resulted in fewer claims from incidents created by vehicle malfunctions.

Real-time tracking
The application makes it easy to track driver activity and vehicle data in real-time through a custom web UI and interactive real-time dashboards. Customers can also easily track their own driving behavior and vehicle performance in real-time (through an installed mobile application) and take corrective action that can affect their insurance premiums.
StreamAnalytix is an enterprise grade, visual, big data analytics platform for unified streaming and batch data processing based on best-of-breed open source technologies. It supports the end-to-end functionality of data ingestion, enrichment, machine learning, action triggers, and visualization. StreamAnalytix offers an intuitive drag-and-drop visual interface to build and operationalize big data applications five to ten times faster, across industries, data formats, and use cases.

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