



Verisk  
Analytics

$$\sum_{k=1}^N [n_k \ln n_k]$$

## Using Novel Data for Vehicle Rating

THE SCIENCE OF RISK<sup>SM</sup>

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# Life in the Fast Lane

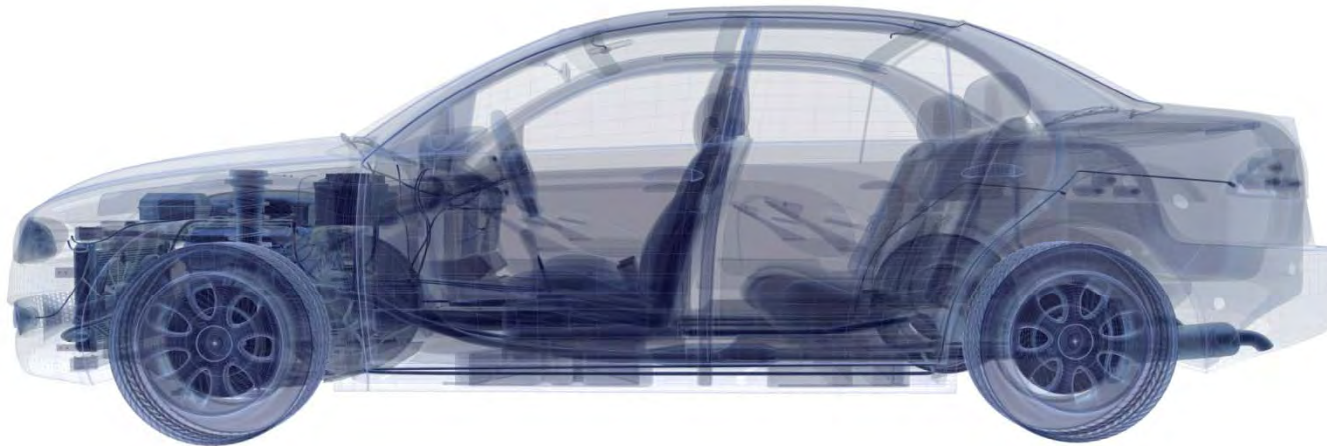
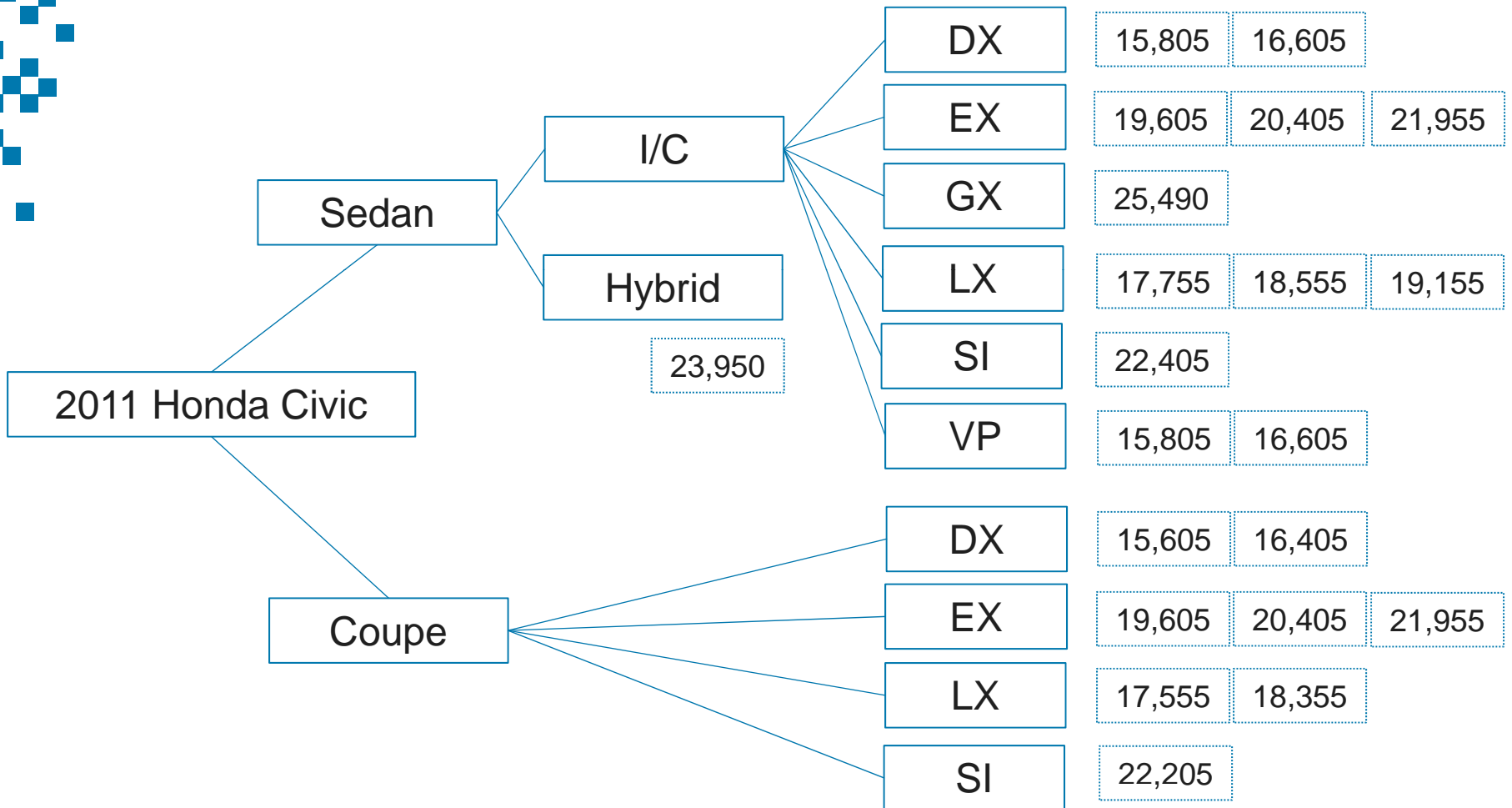


Image Credits: © iStockPhoto.com/Alexey Dudoladov (1) and Stefan Weichert (2)

# Vehicle Series

- Family of Vehicles
- Same Make, Name, Body Type
- Similar Construction
- Used in Experience Reviews

# Family Tree



# What's in a Name?

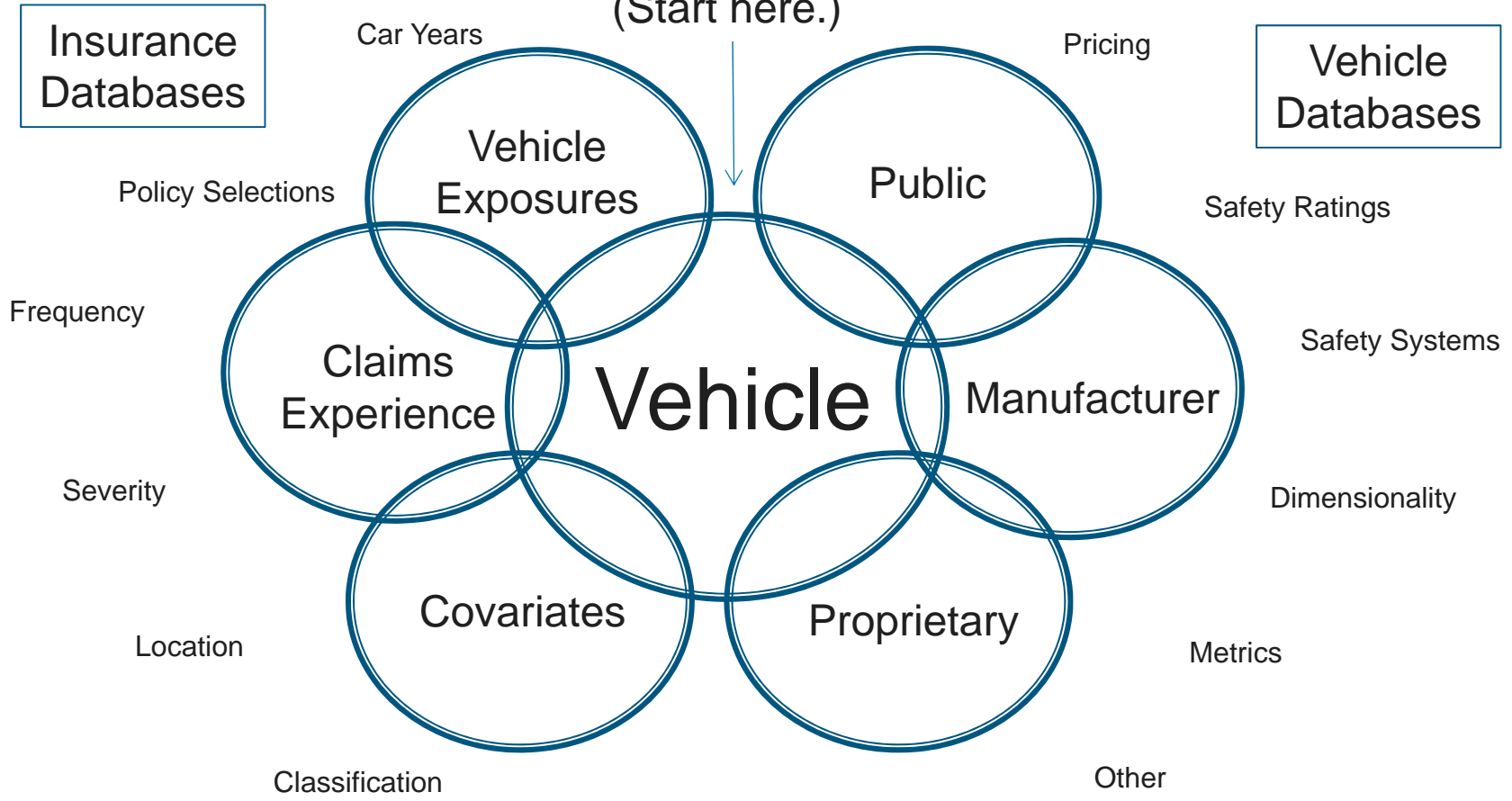
- Trim Packages
- Internal Branding
- Platforms and Parts
- Manufacturer / Nameplate
- Design Changes

# Attributes

Dimensionality	Bells and Whistles	Under the Hood
Body Styling	Original Cost New	Engine Cylinders
Length / Width	Anti-Lock Brakes	Engine Size
Bumper Height	Daytime Lamps	Engine Type
Wheelbase	Stability Control	Horsepower
Weight	Drive Wheels	Torque

Which of these help predict loss propensity?

# Wanted: Vehicle Data





# Requirements

- Predictive Power
- Accuracy
- Completeness
- Continuity
- Rights of Use
- Novelty

# Matching Hierarchy

Most Granular

Vehicle Identification #

Claims Experience

Trim Package

VIN Decoders

Key Features

Manufacturer Specs

Model

Proprietary Metrics

Manufacturer

Safety Ratings

Model Year

Production Counts

Country

Consumer Tools

Econometrics

Least Granular

# Civic Unrest

JHMFG2A5\*B

Data Source	Vehicle Identifier	Additional Info
VIN Decoder	2011 HOND CIVIC SI	COUPE2DR, 4 CYL
JD Power & Assoc.	2011 Honda Civic Coupe Si	I4 Engine
IIHS Ratings	2006-2011 Honda Civic 2-door	"... Except SI"*
IIHS Losses	2008-201x Honda Civic Si	Two-Door Model
MSN Auto	2011 Honda Civic Si Coupe	Front-Wheel Drive
NHTSA Ratings	2011 Honda Civic 2 DR FWD	Not Rated
NHTSA Production	2011 HONDA CIVIC**	Car

\* - excerpted: SI does not have AHR (All Seat Head Restraints)

\*\* - inference: 2009 latest model year posted to web site as of 4/2012

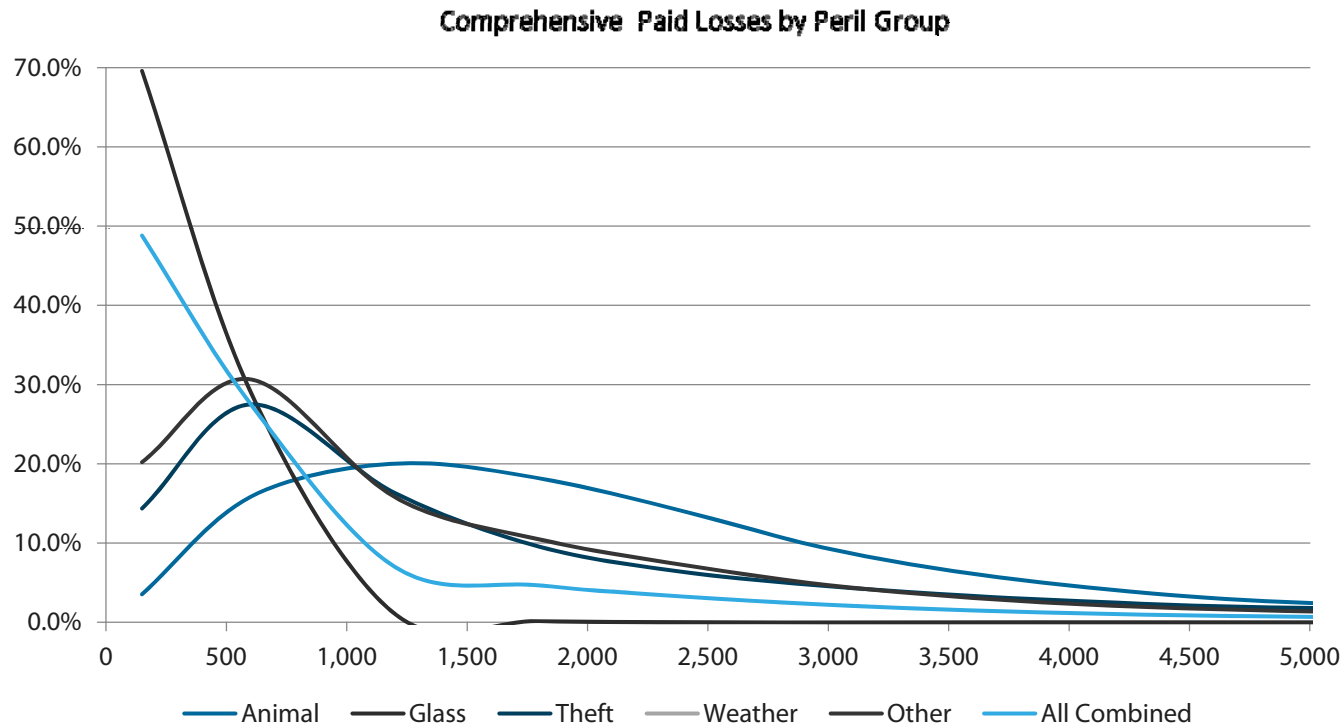
# Devil in the Details

- Exploratory Data Analysis
- Disambiguation
- String Matching
- Conflicts and Tiebreakers
- Automation and Replication
- Quality Control and Updates

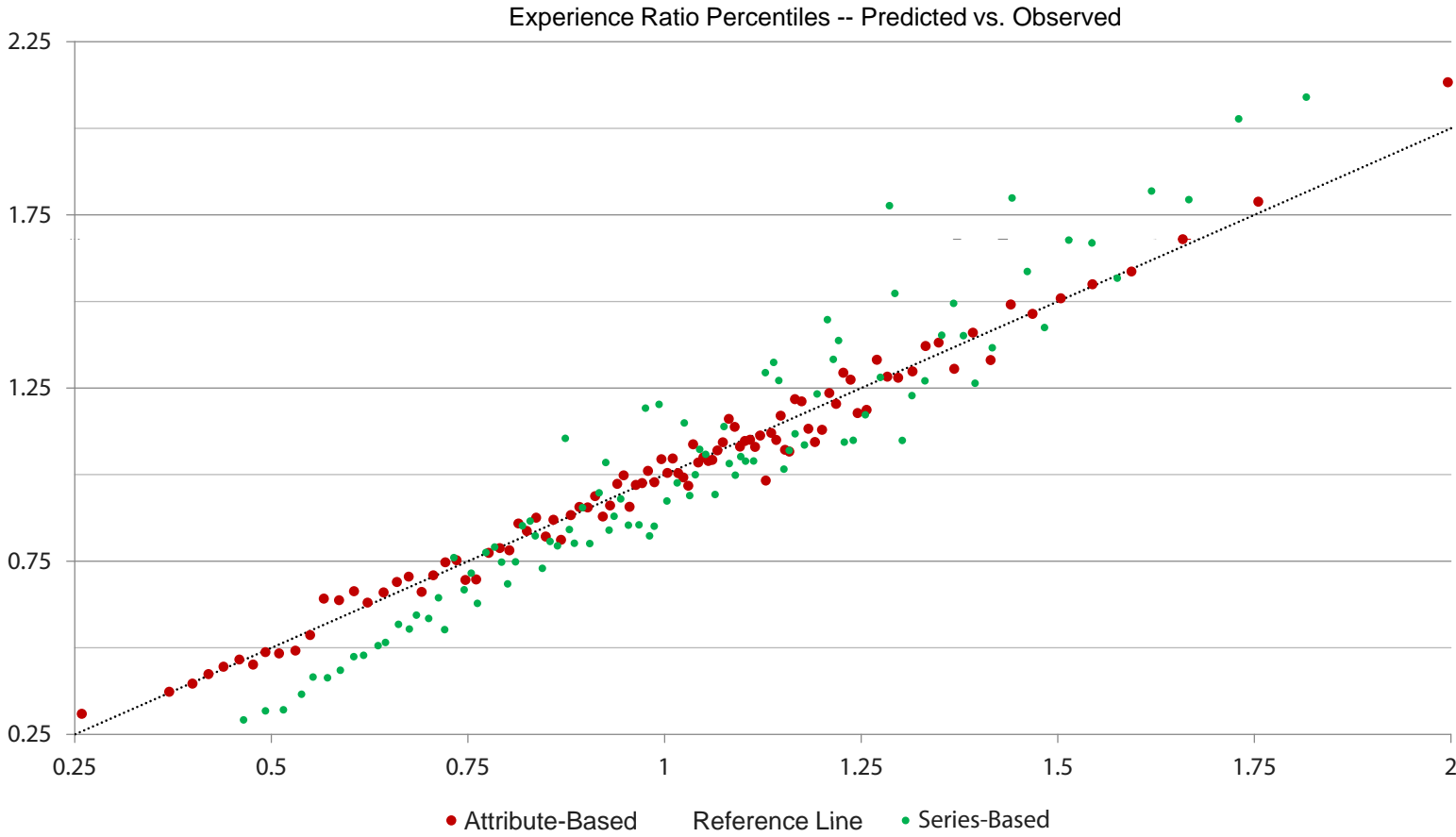
# Model Development

- Attribute Selection
- Controls and Covariates
- Correlations and Interactions
- Form and Structure
- Sub-model Approach

# Perils of Aggregation

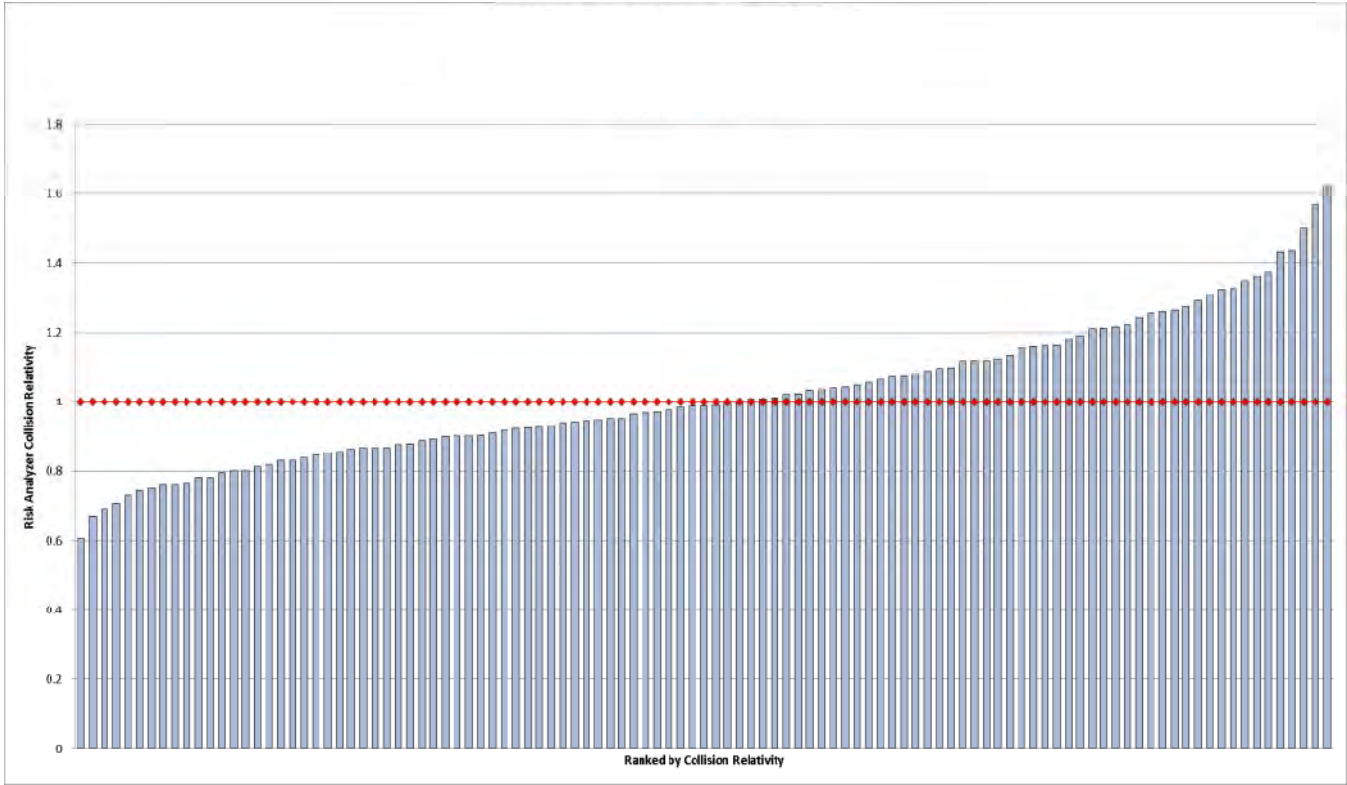


# Validation



# Segmentation

Range of Attribute-Based Predictions Within Single Series-Based “Symbol”



Collision Coverage



# Performance Matters

## 2011 Honda Civic

Trim Package	EX	SI
OCN	\$21,955	\$22,250
Body Styling	2 Door Coupe	2 Door Coupe
Seat Fabric	Leather	Carpet
Horsepower	140	197

## Predicted Outcomes

Series-Based	Collision	same
	Comprehensive	same
Attribute-Based	Collision	8% higher
	Comprehensive	15% higher

# Safety Feature

2011 Honda CR-V SE

OCN	\$22,395	\$23,645
Drive Train	Front-Wheel	Four-Wheel

## Predicted Outcomes

Series-Based	Collision	7% higher
	Comprehensive	13% higher
Attribute-Based	Collision	3% higher
	Comprehensive	same

# Design Change

## Jeep Grand Cherokee Unlimited

Model Year	2010	2011
OCN	\$41,820	\$40,315
GVWR	6,150 lbs.	6,800 lbs.
Wheelbase	109.5"	114.8"
Daytime Lights	No	Yes

## Predicted Outcomes

Series-Based	Collision	1% lower
	Comprehensive	2% lower
Attribute-Based	Collision	16% lower
	Comprehensive	same

# State of the Art

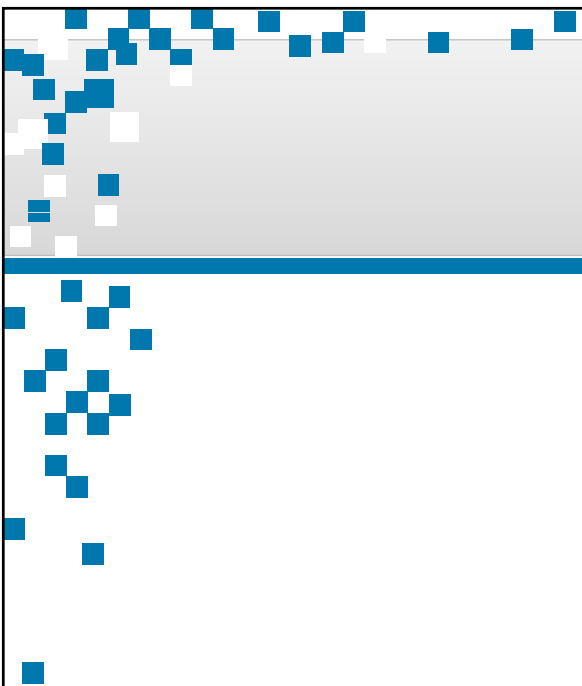
- Brake Assist
- Parking Proximity
- Lane Departure
- Active Cruise Control
- Stop-Start
- Driver Alert
- Blind Spot
- Weight Reduction

**Source:** Automobile Association of America (AAA), "AAA Announces New Vehicle Technology Trends for 2012," March 1, 2012.

<http://newsroom.aaa.com/2012/03/aaa-announces-new-vehicle-technology-trends-for-2012/>

# Define Novelty





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