Outcome Focused Analytics – Moving AI from the White Paper to the Board Paper

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Outcome Focused Analytics

- Definition of AI
- Keys to Successful Execution of AI Initiatives
- Examples

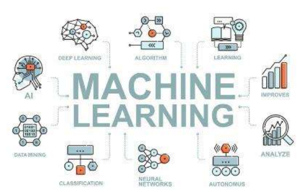
Various Definitions of AI

- **Oxford Dictionary**: the theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages

- **IBM**: field, which combines computer science and robust datasets, to enable problem-solving

- **Wikipedia**: intelligence—perceiving, synthesizing, and inferring information—demonstrated by machines, as opposed to intelligence displayed by humans or by other animals

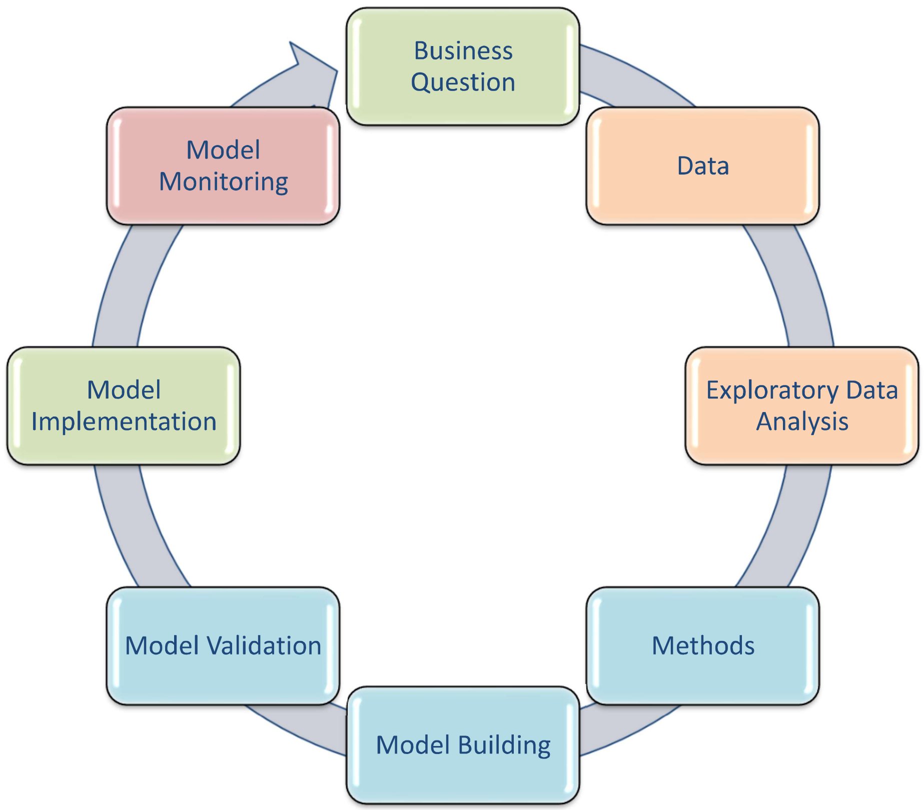
- **SAS**: Artificial intelligence (AI) makes it possible for machines to learn from experience, adjust to new inputs and perform human-like tasks



Modeling Lifecycle

Assessment

Deployment



Data

Machine Learning

Keys to Successful Execution of AI initiatives

Complete

- Across all key areas in an organization
- Championed from the top executive levels
- Include balance of targeted analytics and data exploration

Consistent

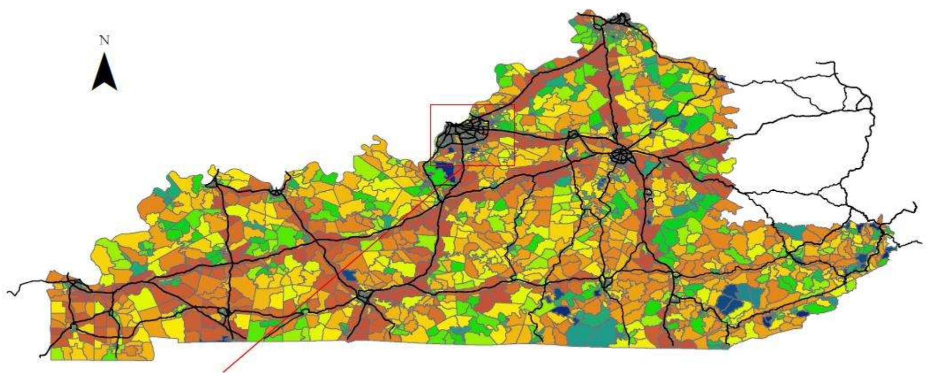
- Analytics should be focused on the overall strategy
- Analytics in different areas should be coordinated
- Championed from the top executive levels

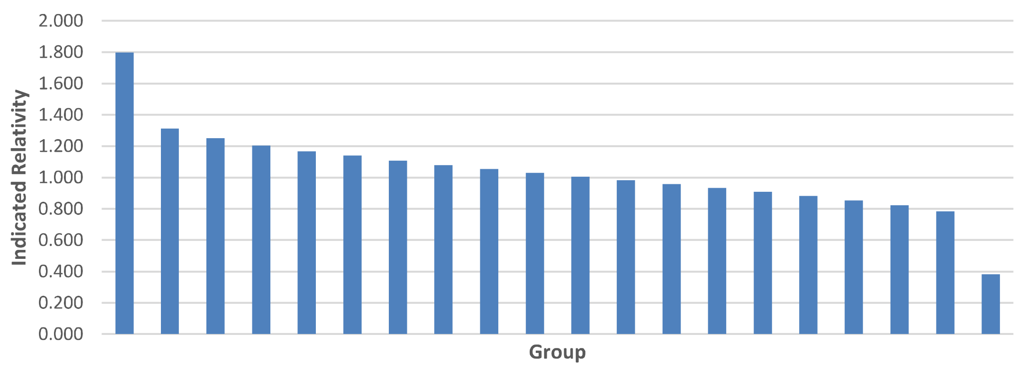
Intentional

- Begin with the end in mind
- Data collection, processing analytics and implementation are all done in purposeful manner
- Buy-in and change management
- Outcome measurement

TomTom – Road Characteristic Data

- **Business problem** – incorporating the geographical risk associated with automobile insurance
- **Examples of data**
  - Speed (median, average, harmonic average)
  - Speed limit
  - Time traveled on road segments
  - Traffic density
  - Speed variability
  - Ratio of speed to speed limit
- **Possible Solutions**
  - Dynamic risk assessment
  - Dynamic risk mitigation





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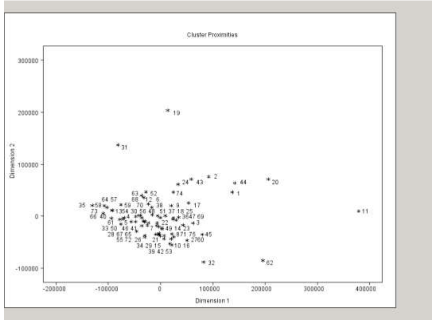
Claims – Fraud Detection Model

- **Business Problem**
  - Claim referral can be inconsistent – heavy dependence on claim adjuster
  - **False positives**
  - Claim adjuster may not be aware of all suspicious relationships
  - Not all historical fraud has been identified
  - Prioritization of potentially fraudulent claims
- **Multiple analytics solutions**
  - Predictive analysis of historical referrals (consistent referrals)
  - Predictive analysis of historical fraudulent claims (false positives)
  - Association analysis (recognition of claim patterns)
  - Clustering methods (missed claims, prioritization)
  - PRIDIT (consistent referrals, prioritization)



Suspicion Score	
Root Mean Square Error	99.7%
Distance to Nearest Cluster	99.4%
Distance from Mean	96.5%
Combined	98.3%

Factor Name	Description	Input Value
insured_kids_2	Y, N, or U	u
peril_2	Cause of Loss	Fire
public_adjuster	0 or 1	0
IMP_REP_Coverage_C	Coverage C Amount	190,500
IMP_REP_Insured_Home_Bathrooms	Number of Bathrooms	2
IMP_REP_Insured_Home_Bedrooms	Number of Bedrooms	3
IMP_REP_Insured_Home_SqFt	Square Footage	1,412
IMP_REP_Insured_Home_YearBuilt	Year Built	1973
IMP_REP_Insured_Homeowner	Homeowner (Y or N)	Y
IMP_REP_acvloss_rcttotal	Ratio of ACV Loss to RCT Total	1.13
IMP_REP_create_lag	Delay in Creating Record	9
IMP_REP_insured_age_2	Insured Age	50
IMP_REP_insured_educationlevel_2	Years of Education	12
IMP_REP_insured_homevalue_calc_r	Home Value Calculation Rounded	149
IMP_REP_insured_yearsinhome_2	Insured Years in Home	6

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Model Fairness

The latest research in model fairness and model de-biasing is introducing an additional component to the **concept of model bias that transcends the purely statistical context.** The central theme in this additional dimension of bias detection and bias mitigation is attempting to provide practitioners of analytics with mechanisms and mathematical constructs to **minimize the social inequalities that their models may capture through data** and **ensure that the model does not unfairly discriminate against certain protected classes.**

Independence	Separation	Sufficiency
$\hat{Y} \perp A$	$\hat{Y} \perp A \mid Y$	$Y \perp A \mid \hat{Y}$

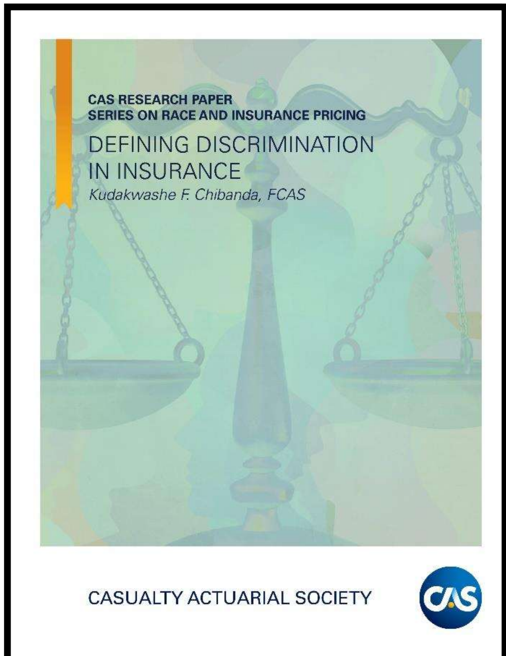
A - protected attribute

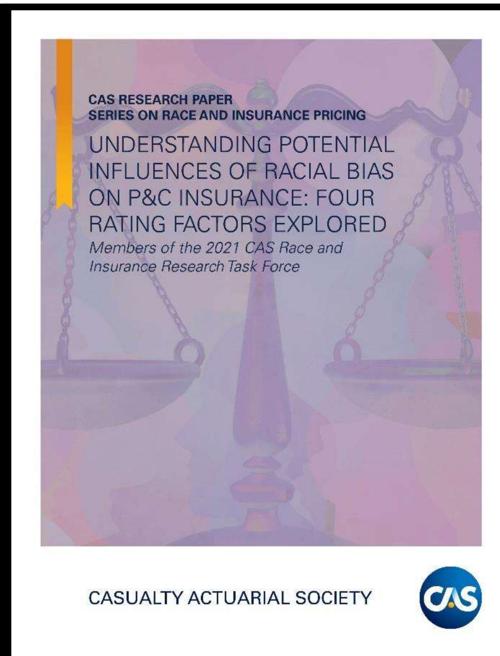
Y - observed value of target variable

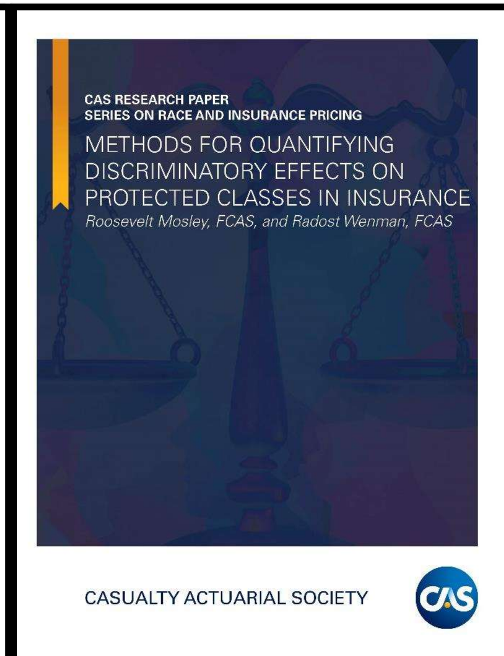
$\hat{Y}$ - predicted value of target variable

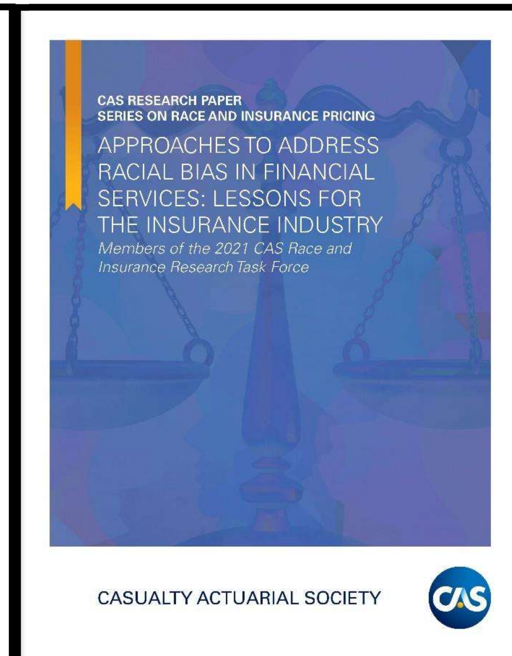
CAS Research Series on Race and Insurance Pricing

https://www.casact.org/publications-research/research/research-paper-series-race-and-insurance-pricing









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