The Future of Predictive Modeling

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Insurance Organizational Overview

An information business focused on risk taking

Make – Sell - Serve

Producer Segmentation
Market Planning
Revenue Forecasting
Cross sell and Up sell
Retention and Profitability

Risk Selection and Pricing
Portfolio Management
Premium Adequacy
Billing and Collections Management

Payment Accuracy
Claim Collaboration
- > Fraud Detection
- > Subrogation
- > Risk Transfer
- > 3rd Party Deductible
- > Reinsurance Recoverable

Evaluating a Predictive Model for Underwriting

- Predictive modeling takes time and effort ($$)
- More accurate pricing is revenue neutral
- How does one know if the result is worth the effort?
- Need to evaluate the monetary impact of the predictive modeling project.

Assumptions of The Formula Value of Lift (VoL)

- Assume a competitor comes in and takes away the business that is less than your class average.
- Because of adverse selection, the new loss ratio will be higher than the current loss ratio.
- *What is the value of avoiding this fate?*
- VoL is proportional to the difference between the new and the current loss ratio.
- Express the VoL as a $ per car year.

Compare Old and New Premiums

- Business will be selected away if a competitor's premium is less than current premium.
- If the competitor's premium is more accurate than current premium, the remaining risks will have higher loss ratio.
- Compare predictive modeling cost to difference in loss ratio.

The Value of Lift (VoL) Formula

- L_C = Current losses
- P_C = Current Loss Cost
- L_N = New losses of business remaining
  - After adverse selection
- P_N = New Loss Cost
  - After adverse selection
- E_C = Current exposure in car years

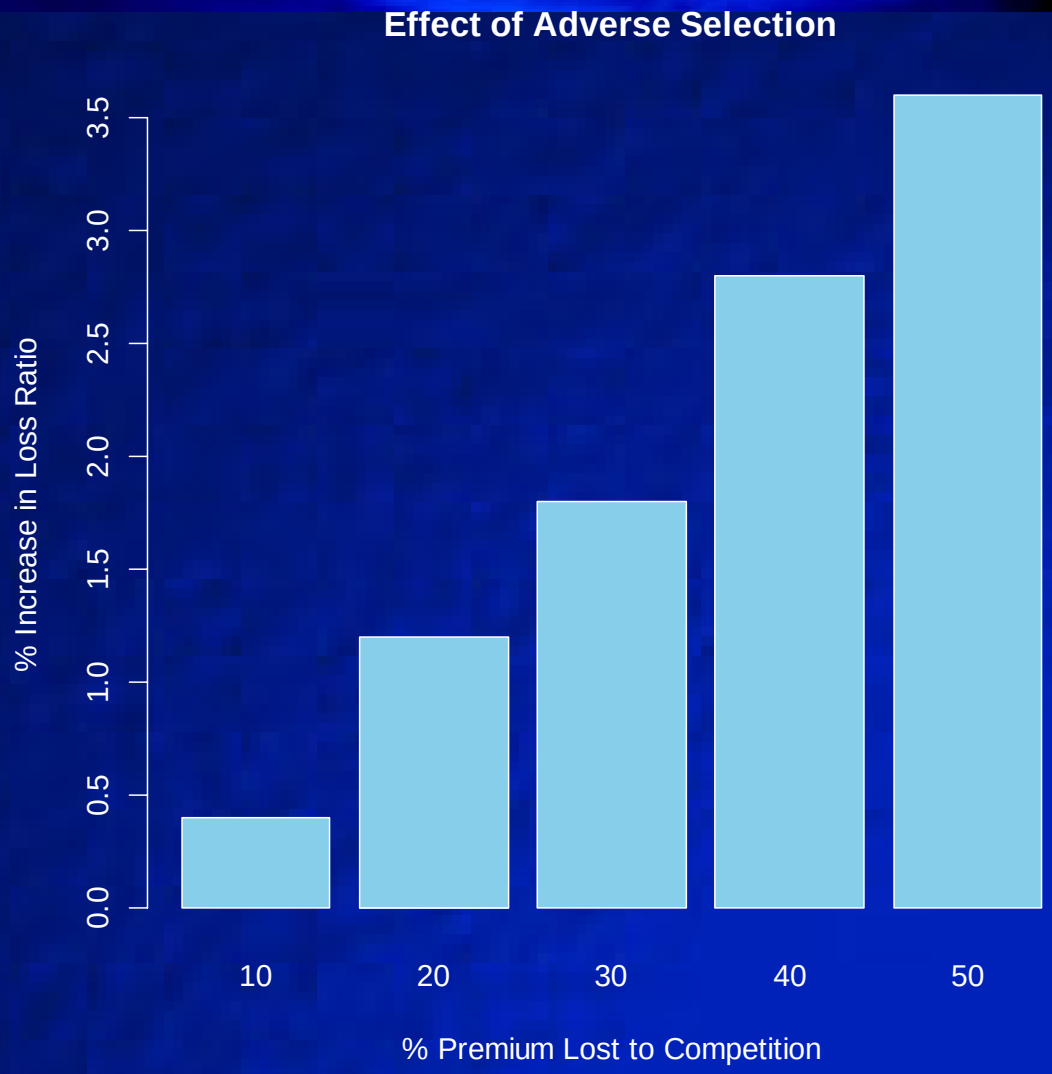
The VoL Formula

$$VoL = \frac{\left(\frac{L_N}{P_N} - \frac{L_C}{P_C}\right) \cdot P_N}{E_C}$$

- The numerator represents $ value of the potential cost of competitors skimming the cream.
- Dividing by E_C expresses this value as a $ value per car year.

Risk Classification – Adverse Selection

- Value of lift for this example
- VoL = $5.25



Premium Audit Overview

- Premium Audit Function
  - Commercial WC, GL and Auto policy premiums are based upon *estimated* exposures
    - Payroll for WC
    - Sales for GL
  - After expiration carrier has a right* to audit policy holder records to determine the actual exposures and reconcile premium
  - Various audit methods available
    - Physical
    - Telephone
    - Voluntary

***For WC this is an statutory obligation**

Premium Audit Challenge

Workers Comp Predictive Model Development Group Identified Auditor Concerns

- Limited Resources
  - People – need to train
  - Recruiting/retaining
- Limited Time
  - Decision on whether and/or how to audit
- Limited Funds
  - Need to show value of audit process ROI
- More work than people
- Pressures
  - Time, turnaround, goal attainment
- Identify "best bang for buck" audits
- Measure of Audit's value/success
- Market getting softer (turning)
  - More price competition
  - Less U/W accuracy
  - More "catches" from audit

Key need is to efficiently allocate scare resources to maximize Premium Audit's value proposition

Project Objective

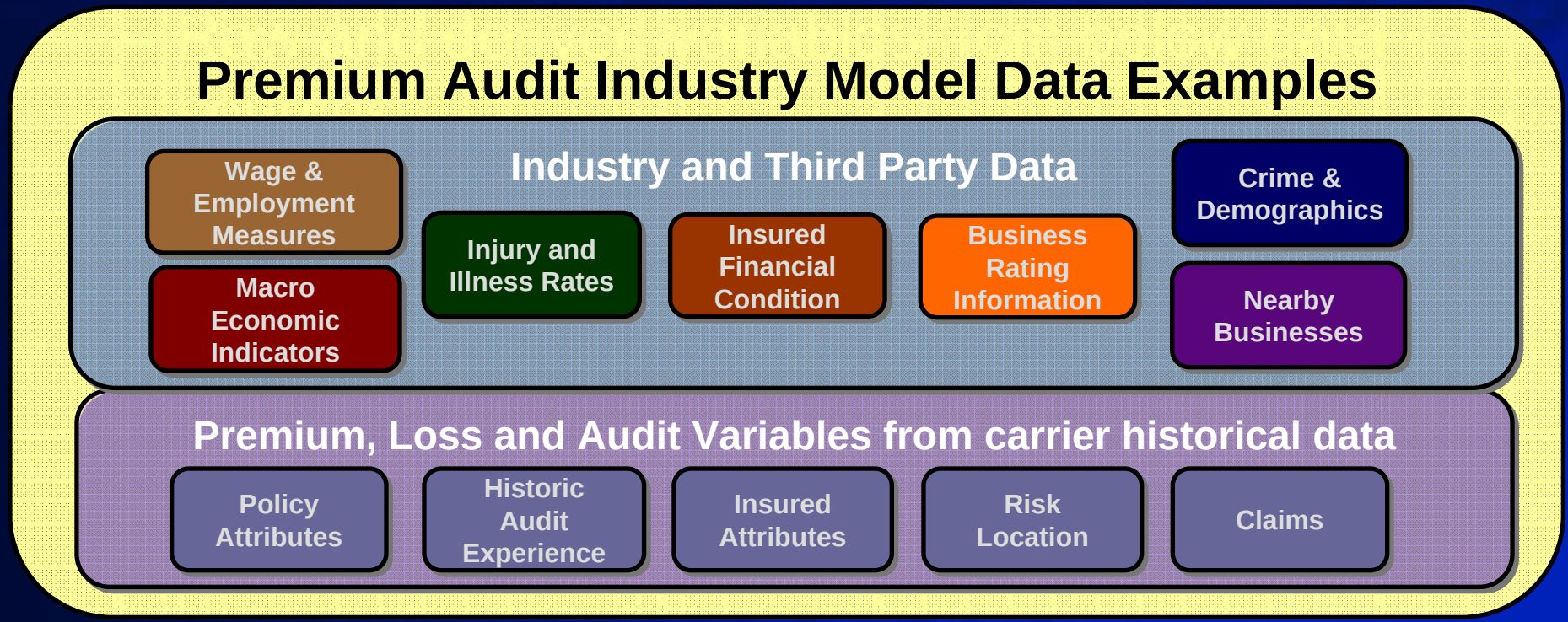
- Predictive model that will allow effective allocation of resources to maximize the financial impact of the Premium Audit Unit

- Model output should facilitate the following business decision strategies:
  - Mandatory Audits (mandated by statute)
    1. Ordering of audits can be optimized, within contract parameters, to maximize NPV of audit activities
  - Discretionary Audits
    1. Decide which accounts to audit based on expected audit outcome*
    2. For those accounts that are audited, determine the most efficient allocation of mail, telephone, and physical audits
    3. Optimize ordering of audits to maximize NPV

* where allowed by statute and business rules

Premium Audit Model evelopment

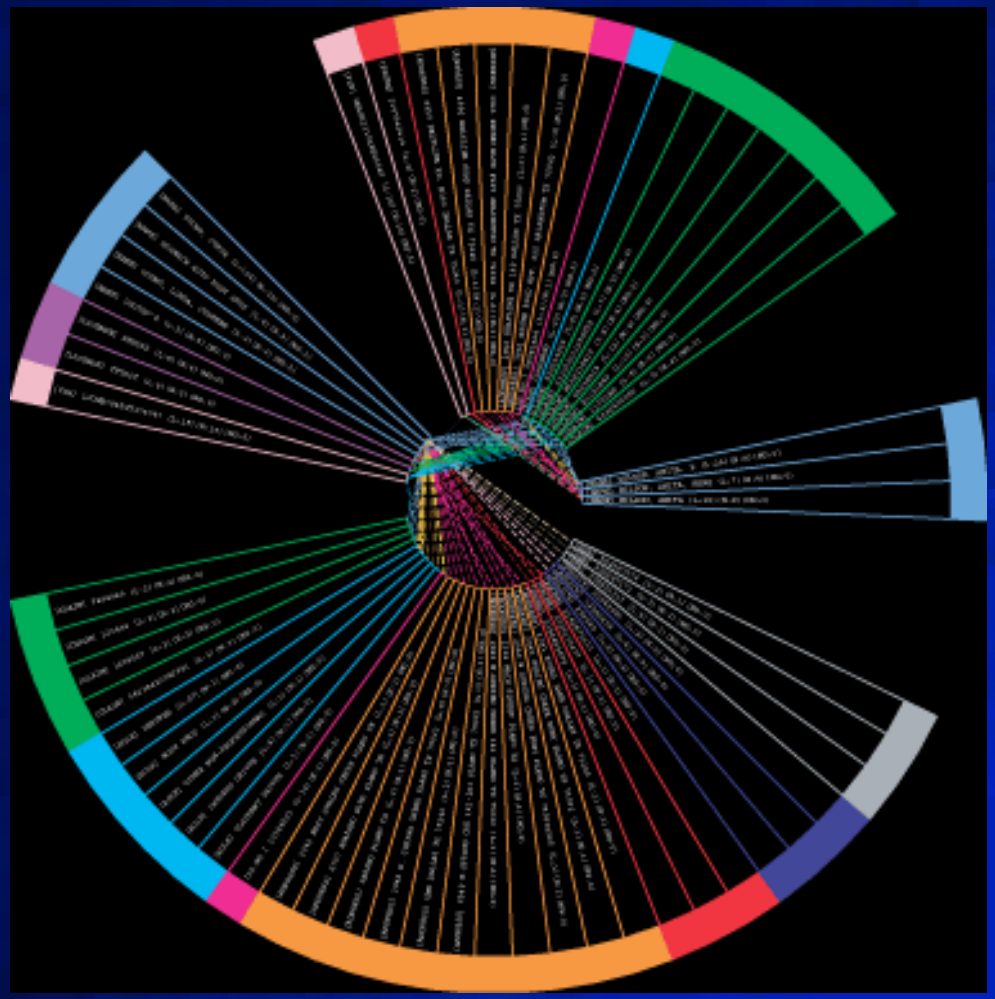
- Potential Model Components



Fraudulent Claim Detection

- Cannot explicitly identify fraudulent claims.
- Individual claim information is not sufficient to identify a fraudulent claim.
- Look at relationships over multiple claims. For example
  - a claimant in an accident who shares a telephone number with a witness to the accident
  - an insured in one accident who shares a Social Security number with an insured in another accident
  - a telephone number associated with four different people across multiple claims in a single month
  - a claimant who shares the same address as the lawyer noted on the claim

Visualization Tools to Make Connections



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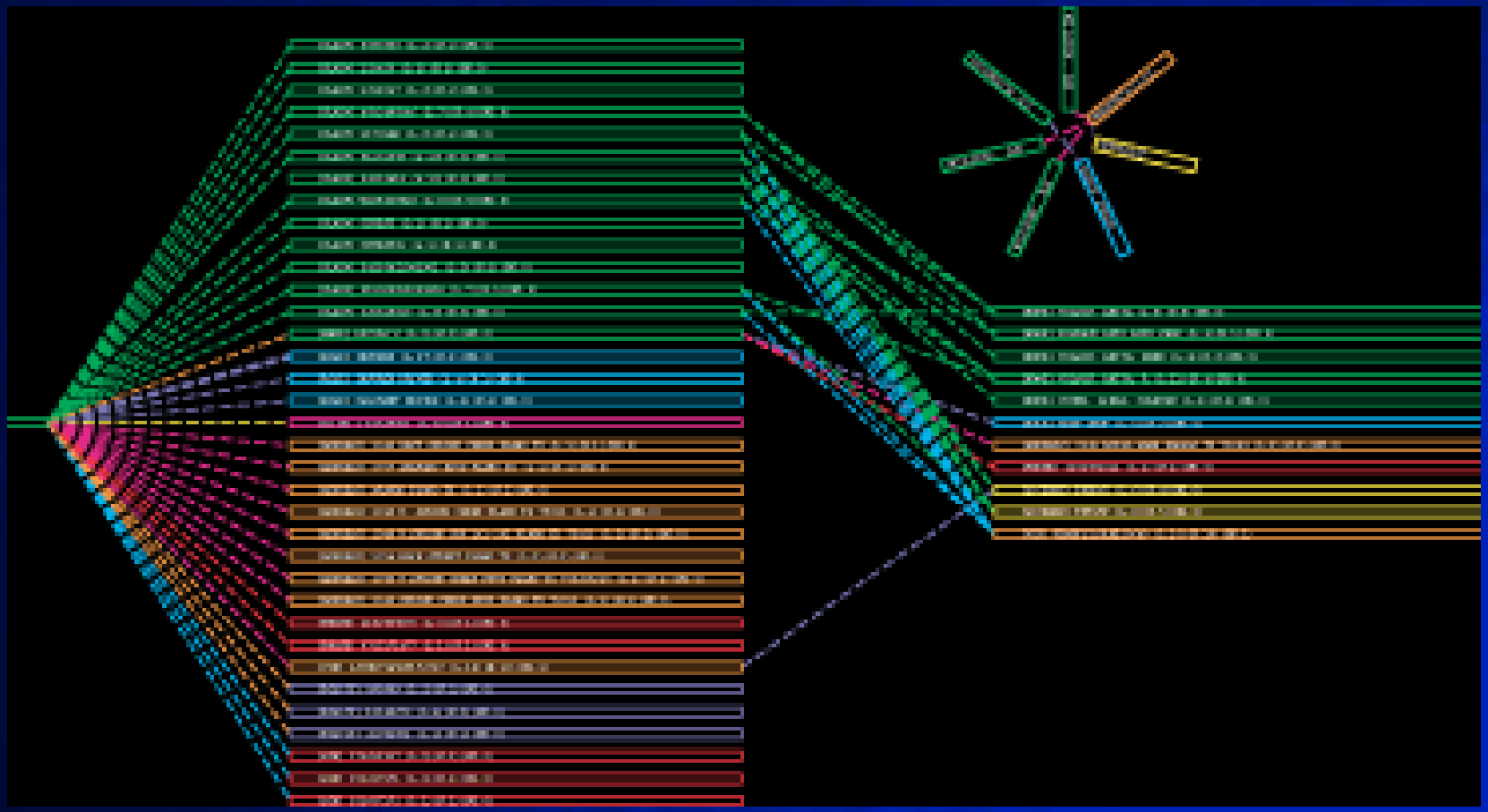

Predictive Modeling Projects you should do

Loss Control

Fraud Prevention
Property Inspections
Assess Work sites
Re-underwriting

Cost Avoidance

Automate Manual Work
Appetite Qualification
Underwriting Guides
Redundant Processes
Vendor Sourcing
Spend Analysis

Cash-flow Opportunity

Subrogation
Credit to Loss
Third Party Deductible
Premium Audit (Comm)
Account Identification
Audit Ordering
Insured to Value (PI)

Better Decision Making

Risk Selection
Renewal (Attrition)
New (Acquisition)
Cross-sell & Up-sell
Portfolio Management
Broker/Agent Profiles
Medical Management
Litigation Management
Large Loss Reserving
Improved Collaboration