

How to Use Predictive Modeling to Investigate Claims

CAS Predictive Modeling Seminar
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Discussion Topics

- Background
- Claims Applications of Predictive Modeling
 - Occurrence
 - Report
 - Adjustment/Development
 - Settlement
 - Lags
- Loss Adjustment Expenses
- Fraud Analysis – yes, you can do it too!

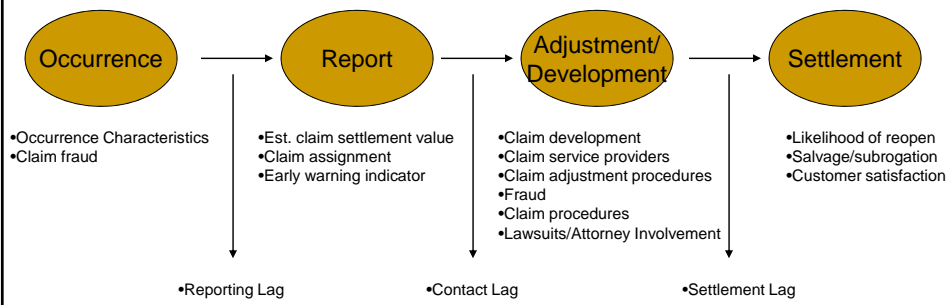


Background

Background Discussion

- The insurance claims function is responsible for the largest expenditure of an insurance company
- There is a lot of claims data available
 - Stages of claim process
 - Many sources unstructured
- This data can be applied in many ways
- Even small wins can mean big financial impacts

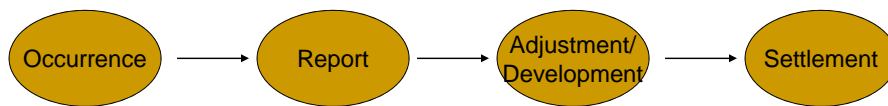
Predictive Modeling Opportunities for Claims



Claims Applications of Predictive Modeling

Claims Applications of Predictive Modeling

- Occurrence
- Report
- Adjustment/Development
- Settlement
- Lags



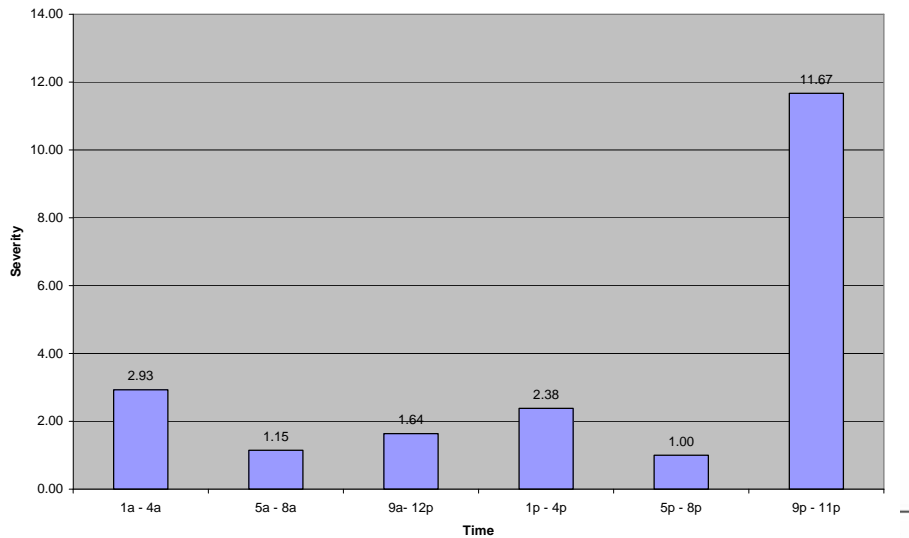
Occurrence

Occurrence

- Auto
 - Time of accident
 - Day of the week
 - Location (rural/suburban/urban)
 - Number of vehicles involved in accident
 - Police report
 - Severity of impact
- Homeowners
 - Time of loss
 - Day of the week
 - Storm involved?
 - Seasonality
- Worker's Compensation
 - Circumstances surrounding accident
 - Policy state, benefit states

Time of Workers Compensation Loss

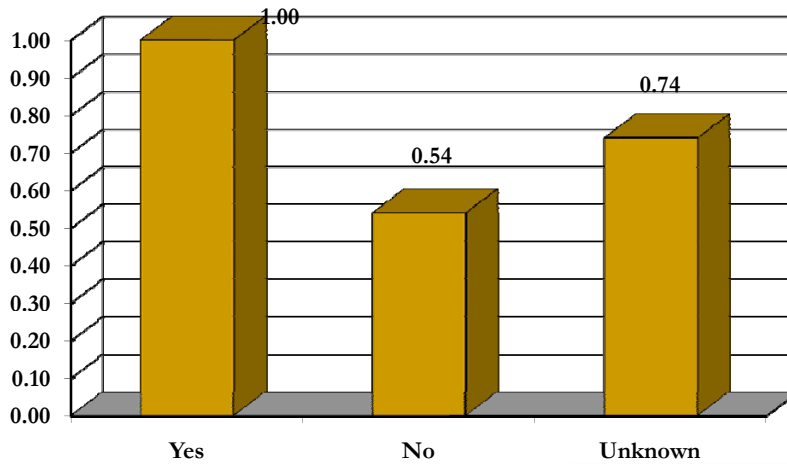
Worker's Compensation Severity Relativities by Time of Loss



Application – Occurrence Characteristics

- Policyholder education
- Loss control services
- Rating (for situations which make important characteristics more likely)
- Work with government to address issues (for example, dangerous intersections)

Limited Claim Settlement Value Modeling – Attorney Involvement



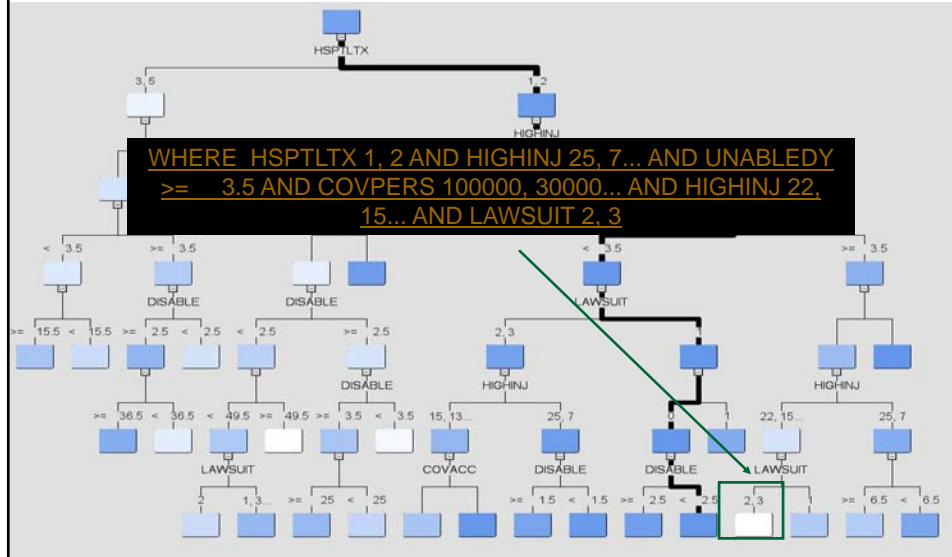
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Early Warning Signs

- Large claims
- Exceptional claims
- Delayed recovery
- Exceptional number of medical treatments
- Lawsuit development
- Coverage development

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Likelihood of Large Loss Decision Tree – Rules Based Approach

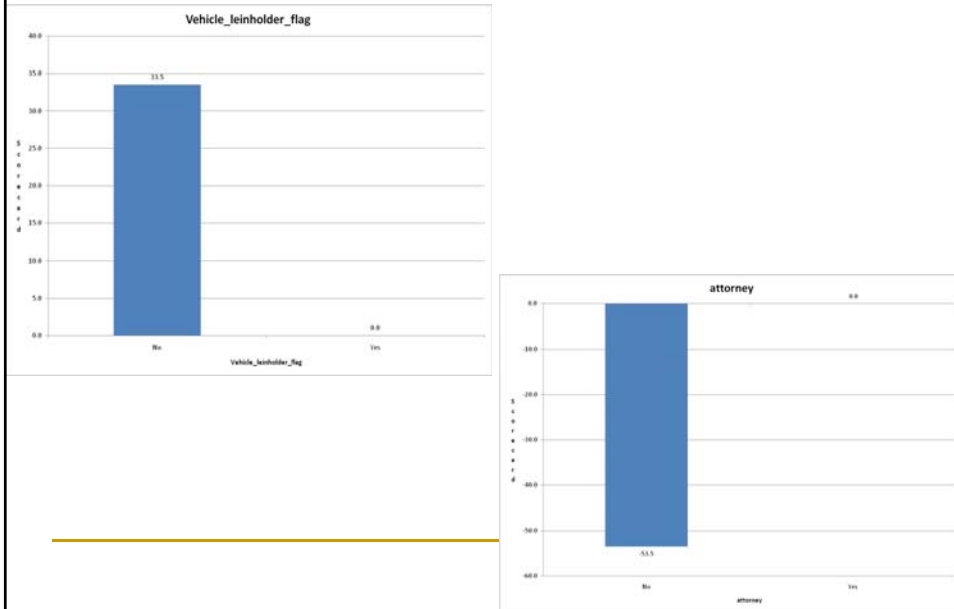


Adjustment/Development

Adjustment/
Development

- Claim development – amounts and characteristics
- Claim service providers – value added/detracted
- Claim settlement procedures – injury treatments, repair procedures, etc.
- Fraud – soft fraud, claim padding
- Claim handling procedures: reviews, updates, additional investigation, estimates, inspections, etc.
- Lawsuits/Attorney Involvement – potential for development of lawsuits

Claim Cycle Analysis

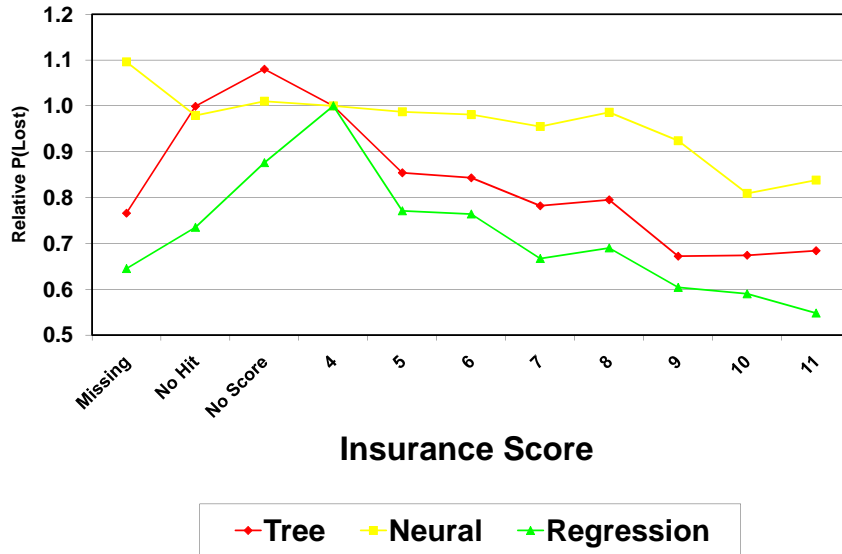


Settlement

Settlement

- Likelihood of reopen
- Salvage/subrogation potential
- Customer satisfaction
 - JD Power: 75% of the customers that shop because they are unsatisfied with insurer switch
 - By tying together claims and retention, can identify customers more likely to leave as a result of claims process

Insurance Score



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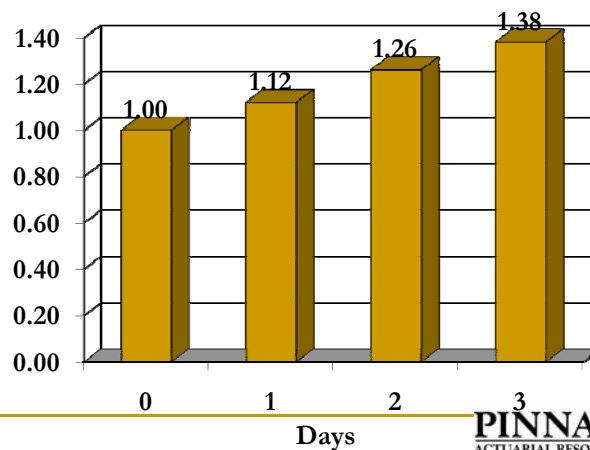
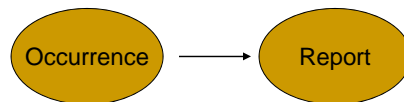
Delays in the Claims Settlement Process

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Lags

- Delays in stages of the claim settlement process
- Can occur in several stages
 - Report
 - Contact
 - Settlement
- In general, delays are costly

Report Lag



Application of Lag Analysis

Report Lag

- Ease of claim reporting
- Accident report incentives

Contact Lag

- Contact plans (max time, accident scene)
- Multiple contact modes
- Staffing?

Settlement Lag

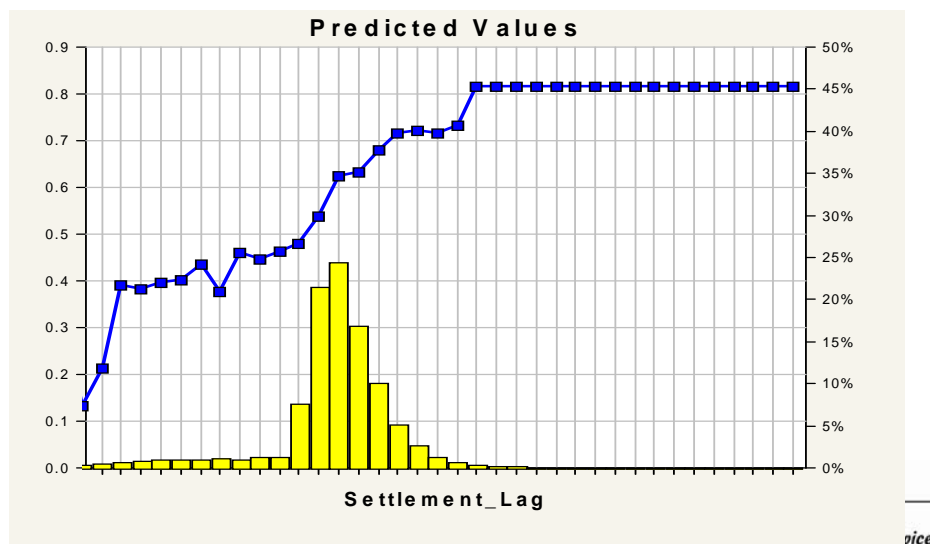
- Assignment of claims
- More focused/active management
- Claim staffing / cost allocation
- Increased communication

Loss Adjustment Expenses

Loss Adjustment Expenses

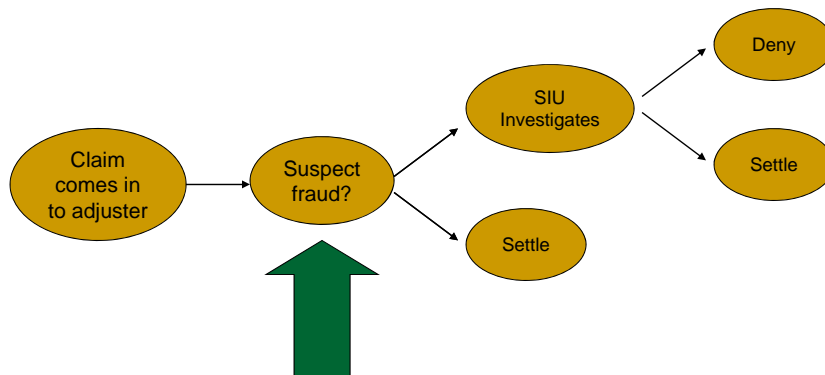
- Just as there are differences in claim cost based on characteristics, there are also differences in loss adjustment expenses
- May be opportunities for early identification, adjustment in claims handling process

ALAE / Loss & ALAE by Settlement Lag



Fraud Analysis

Traditional Claim Fraud Identification



What is the optimal process for determine potentially fraudulent cases?

Claim Fraud Detection

- Step 1: Claim adjuster identification
 - Recognition
 - Fraud indicators
 - Intuition
- Step 2: Automated fraud identification
 - Referrals
 - Fraudulent claims
 - Anomalies

Claim Adjuster Identification

Recognition

- “I’ve seen this before”
- Examples - Repeat offenders, provider/patient/ attorney combinations
- Relies on - Advisory claim database, experience of adjuster

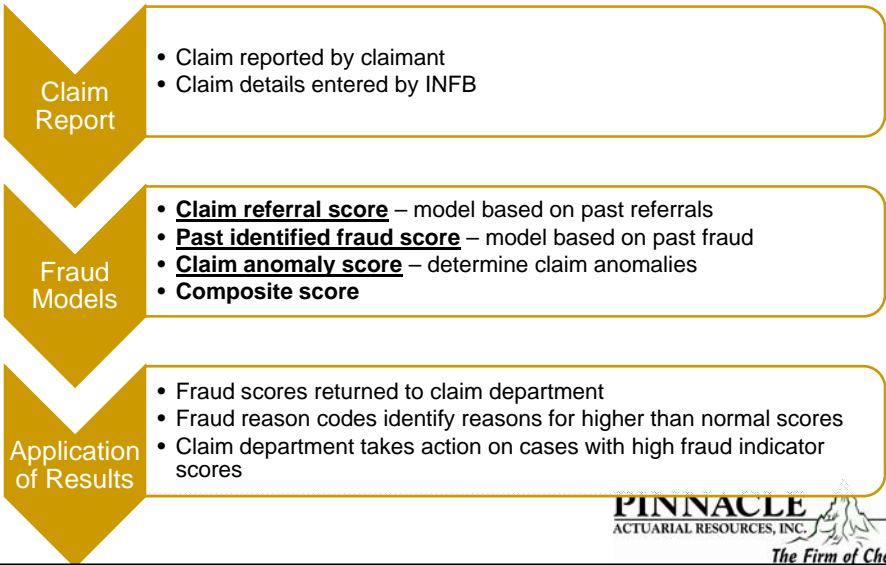
Fraud Indicators

- Rules based system to identify fraud scenarios
- Advantages
 - Easy to implement
 - Easy to understand
 - Effective against specific scenarios
- Disadvantages
 - Lag for new fraud
 - Fraudsters can find hole

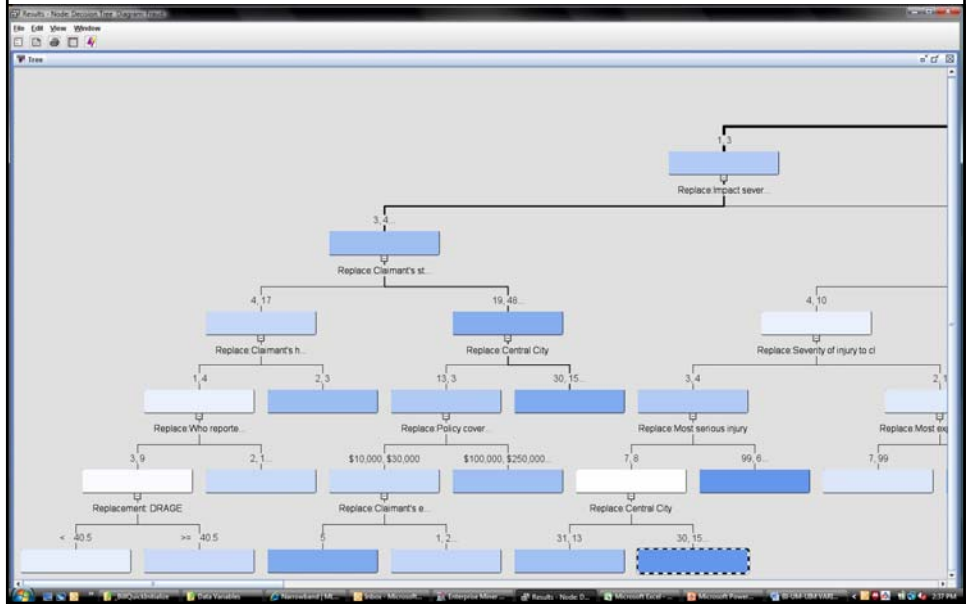
Intuition

- Something about the claim doesn’t seem right
- Relies on experience and perception of adjuster
- Difference in adjuster experience can be problematic

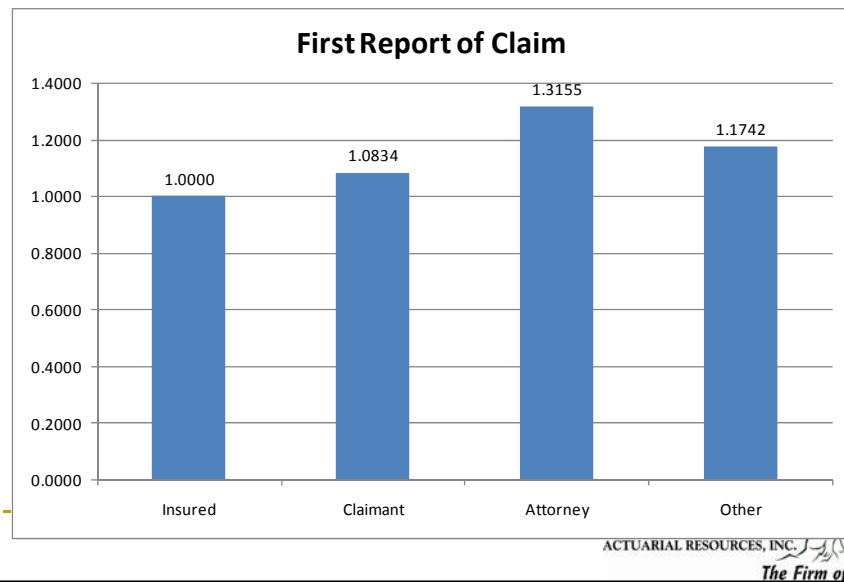
Fraud Identification Process



Claim Referral Score



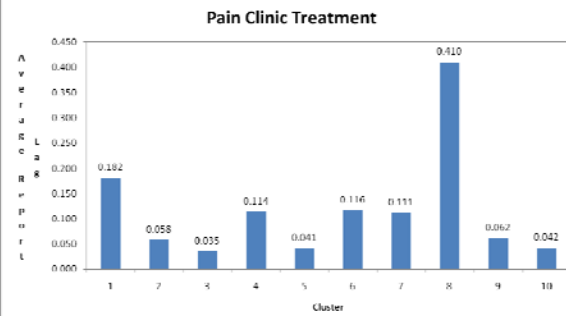
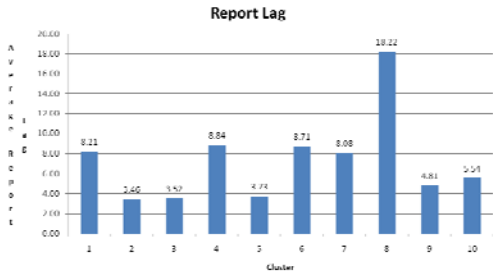
Regression: Past Identified Fraud



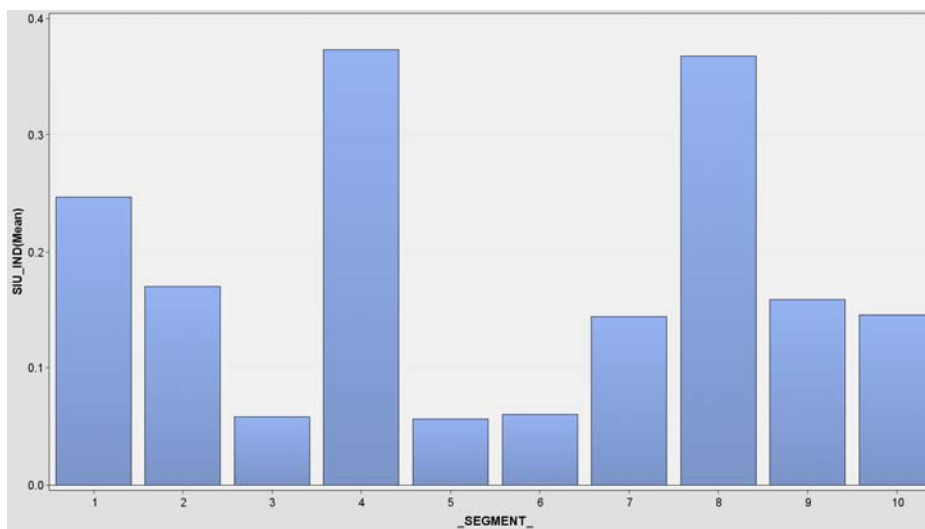
Identifying Anomalies - Segmentation

- Unsupervised classification technique
- Focuses on **input** variables
- Groups data into set of discrete clusters or contiguous groups of cases
- Used to identify outliers – potentially suspicious cases

Differences in Clusters



Fraudulent Claims Likelihood By Segment



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Application of Results – Claim Fraud Report

Claim Details

Arbitration	3	Accident Date	10/18/1999
Report Lag	3 days	Report Date	10/21/1999
Days Open	932	Coverage	Bodily Injury
Lawsuit	Suit Filed		
State	46		
Accident Location	Small Town		
	No Information		
Injury Severity	Available		
Claimant Age	46		

Fraud Model Scores

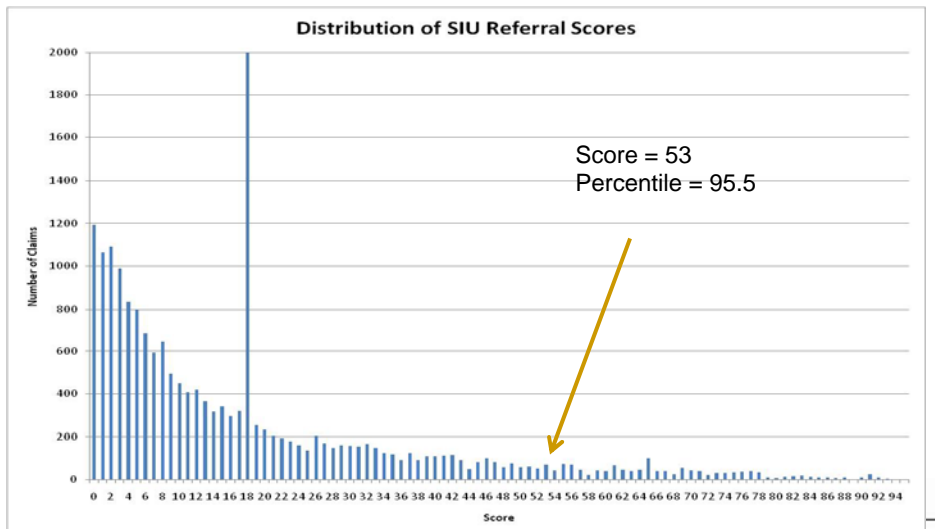
	Score	Indicator
SIU Referral	53	██████████
Past Identified Fraud	36	██████████
Claim Anomaly	13	██████████
Composite	34	██████████

Fraud Model Reason Codes

1	Delayed Reporting
2	Accident in Small Town
3	
4	



Distribution of Scores



Conclusion: Applications of Claims Modeling

- Applications
 - Claim settlement value estimation
 - Early warning indicators
 - Claim procedures
 - Fraud detection
- Benefits
 - Expense savings
 - Claim settlement efficiencies
 - Policyholder satisfaction