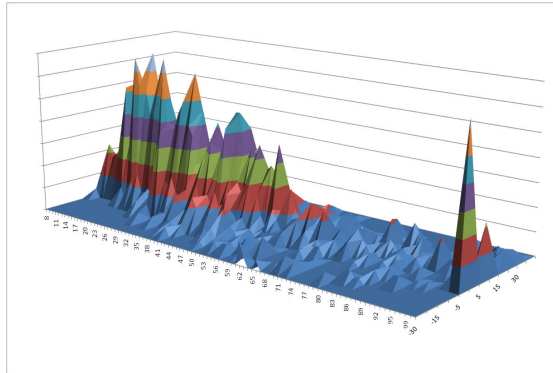


Practical Aspects of Usage-Based Insurance

Prof. Udi Makov,
Head of the Actuarial Research, University of Haifa
&
Verisk Telematics Innovation Center, Tel-Aviv



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Agenda

- Customers' reaction to rich data
- Mode of implementation
- Frequent reporting and volatility
- Thin data when launching a program
- Validation
- Pricing segmentation
- Impact of feedback
- Filing
- Measures of performance



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Customers' reaction to rich data

❖ Start with limited data and enrich in the future

➤ Benefits:

- Cheaper
- Easy to market

❑ Shortcoming

- ❑ Locked in low tech

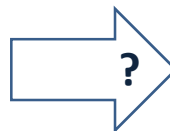


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You are only as good as your data...

Rich Data

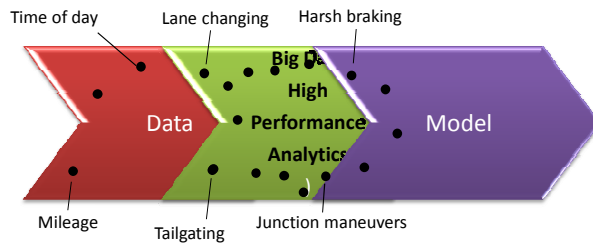


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Modeling

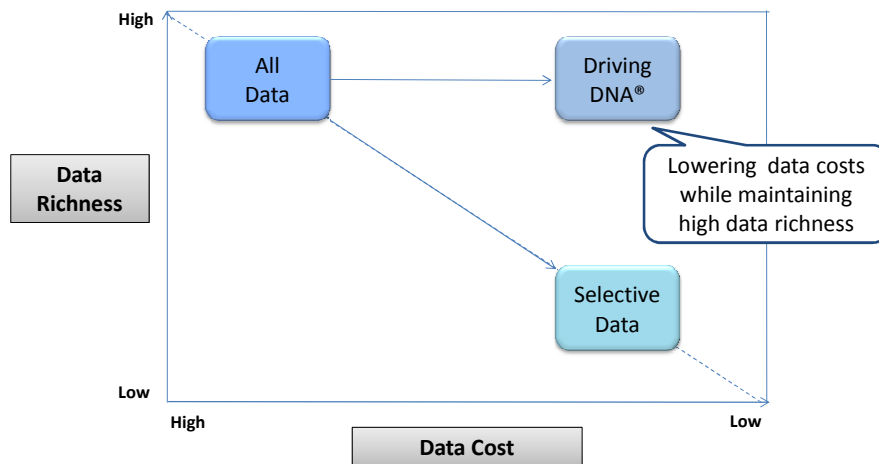
Behavioral UBI



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Risk of Lockouts



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Mode of implementation

- Economic constraints
- Benefits of long term installation
- Issues of seasonality
- Issues of learning curve and drivers' gradual complacency



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Frequent reporting and volatility

- Customers' reaction to volatile scores
- Can be avoided by smoothing the scores:
 - Over what period?
 - Using what weights?



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Thin data when launching a program

- How long to wait before launching a program?
- How to combine new data with existing database?
- How to apply score trimming?



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Validation

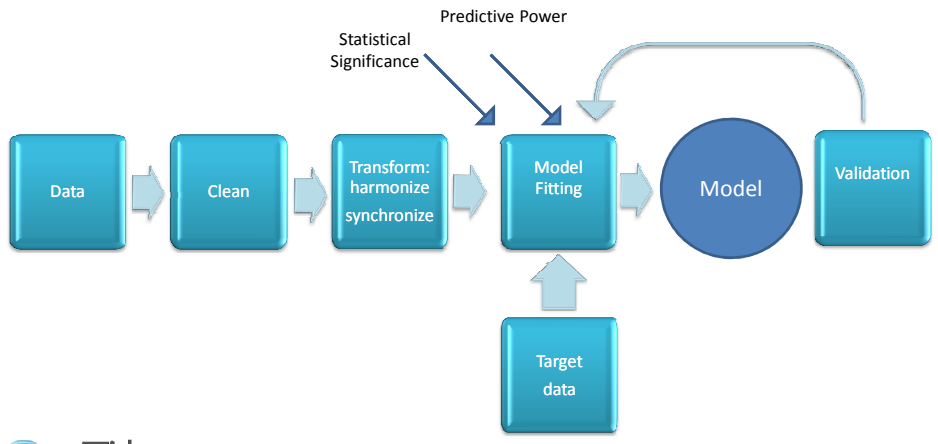
- Minimal amount of data for validation
- Model validation techniques and end-to-end validation



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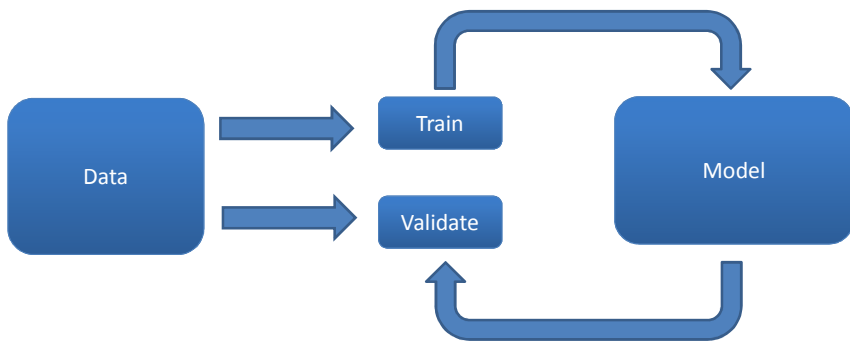
UBI Modeling Process



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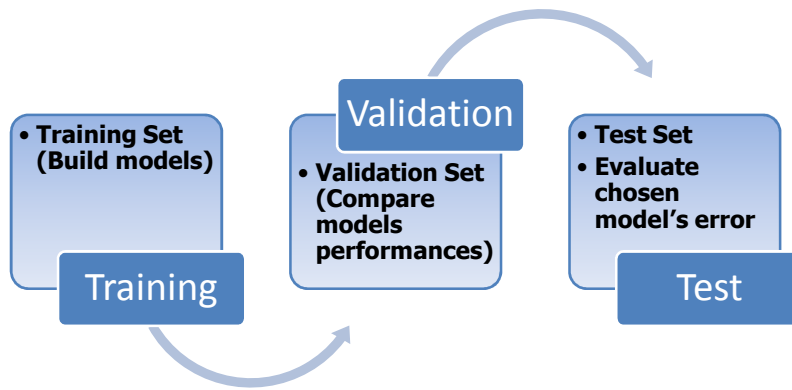
Holdout samples



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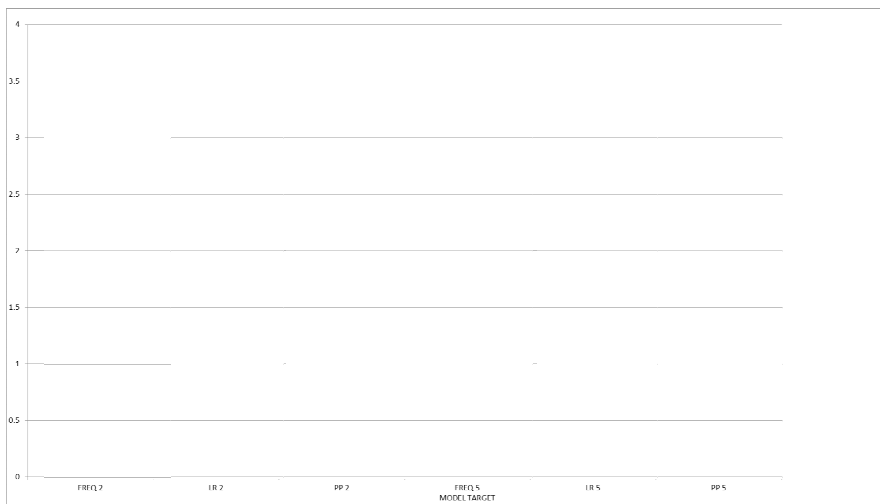
Strict validation process



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Evaluation: Group comparison

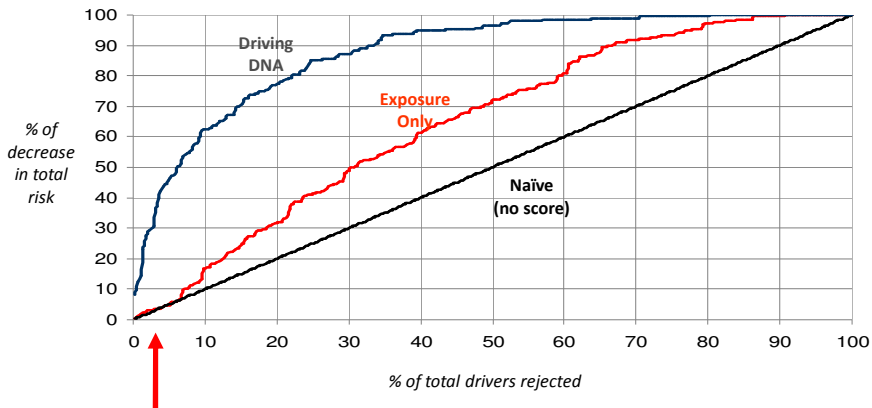


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Evaluation: ROC Analysis Example

Behavior vs. Exposure (ROC Graph) / Scenario A – 3% rejection



	Naive	EXP	DNA
% of decrease in total risk	3.0	3.3	36.9
% of safe drivers rejected	3.0	2.9	0.9

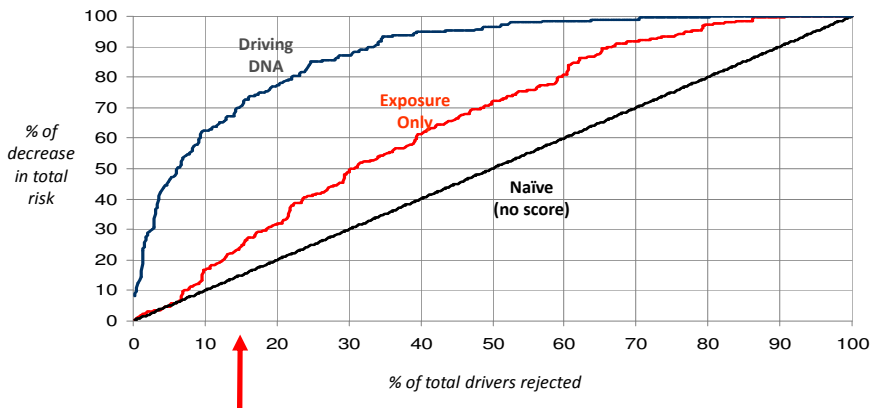


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Evaluation: ROC Analysis Example

Behavior vs. Exposure (ROC Graph) / Scenario B – 15% rejection



	Naive	EXP	DNA
% of decrease in total risk	15	25	73
% of safe drivers rejected	5	13	5

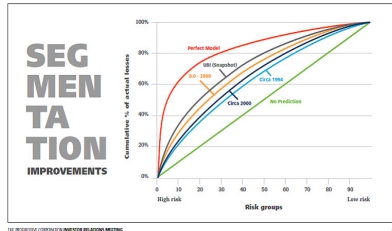


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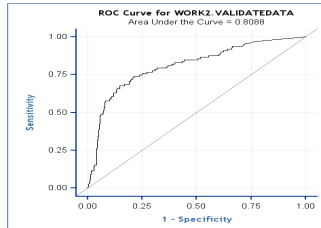


Consequences of using counting over a threshold

Count over threshold



Behavioral UBI



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Pricing segmentation

– Input parameters:

- Average discount
- Maximum discount
- Number of discount groups
- Minimal difference in discount between adjacent groups
- Negative discounts



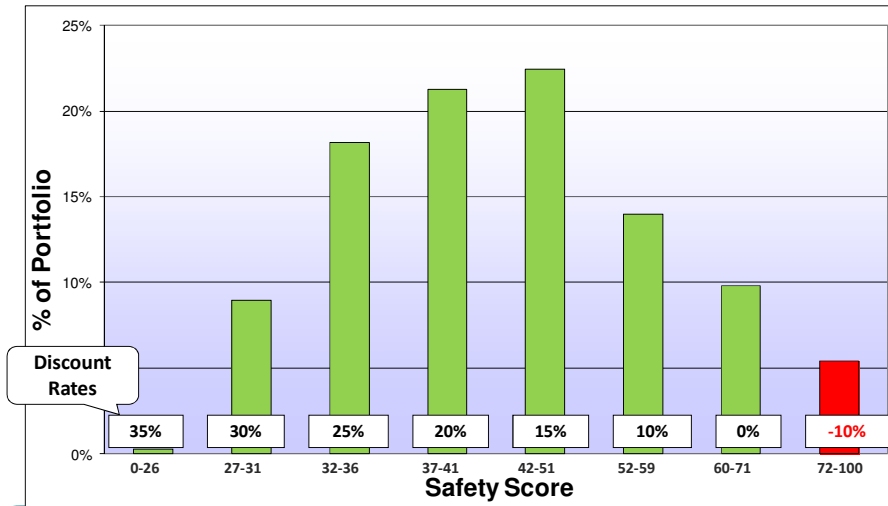
– The interplay between commercial, operational and actuarial aspects.



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Pricing / Actuary



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Pricing / Actuary

Calculate discount groups permutation (based on insurer guidelines)

Num Discount Groups:

1	2	3	4	5	6	7	8
35%	30%	25%	20%	15%	10%	0%	-10%

G1	G2	G3	G4	G5	G6	G7	G8	Average Discount	Compatibility
0-2	3-7	8-10	11-40	41-42	43-55	56-80	81-100	15.23%	0.654
0-3	4-6	7-18	19-34	35-76	77-80	81	82-100	14.4%	0.116
0-11	12-16	17-20	21-34	35-65	66-77	78-90	91-100	24.9%	0.975
0-12	13-16	17	18	19-65	66-90	91	92-100	12.6%	0.279
0-13	14-19	20-23	24-34	35-45	46-65	66-70	71-100	11.34%	0.234
0-20	21-30	31-40	41-50	51-60	61-70	71-80	81-100	30.99%	0.679



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Impact of feedback

- Relation between number of logins and feedback
- User experience and feedback

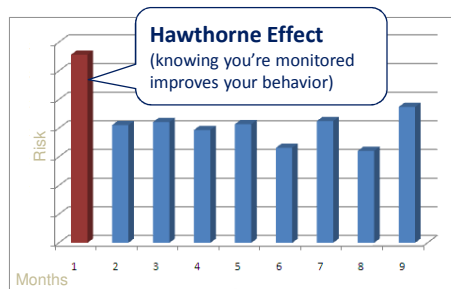


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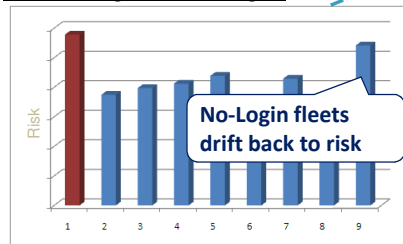


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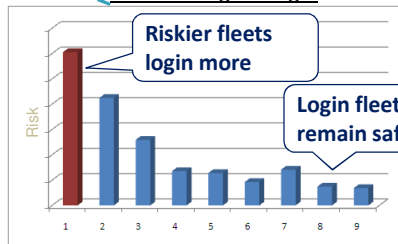
Impact of Logins and the benefit of learning (1)



Fleet Managers Don't Logins



Fleet Managers Login

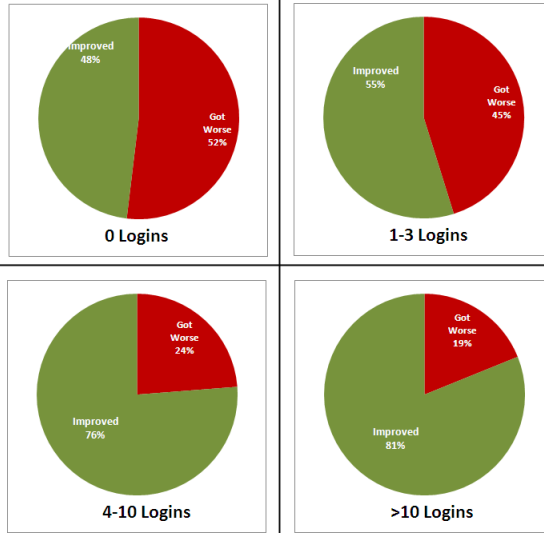


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Source: US CL



Impact of Logins and the benefit of learning (2)



*Spearman coefficient: $\rho = 0.614$

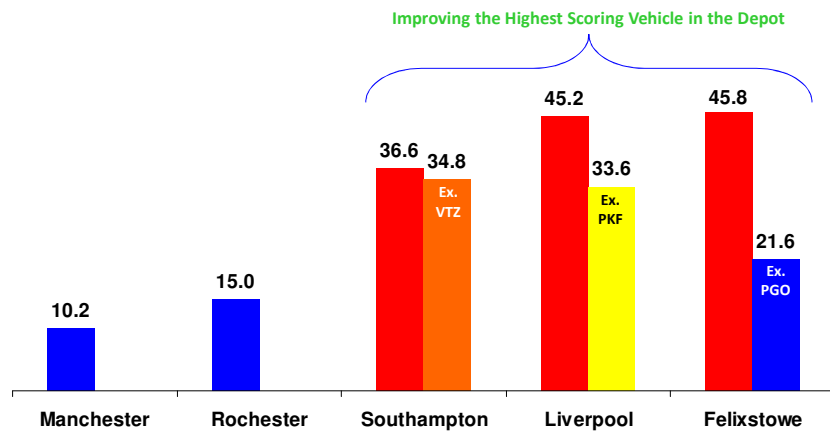


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Source: US PL



Impact of feedback : Improving the Highest Scoring Vehicles Impacts Liverpool & Felixstowe



Filing

- Challenges of UBI filing
- Strategies of UBI filing

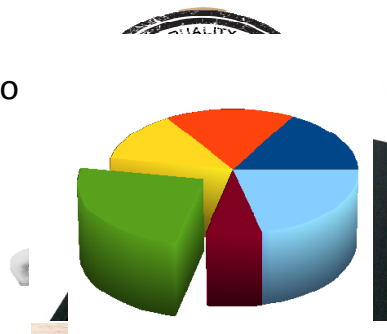


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Measures of performance

- Cost benefit analysis of implementing UBI
- Quality of data
- Quality of operations (postage, installation, communication)
- Impact of feedback
- Improvement of portfolio
- Market share



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