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The Evolution of Data: Implications for Actuaries

CAS 2019 Spring Meeting

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Planck

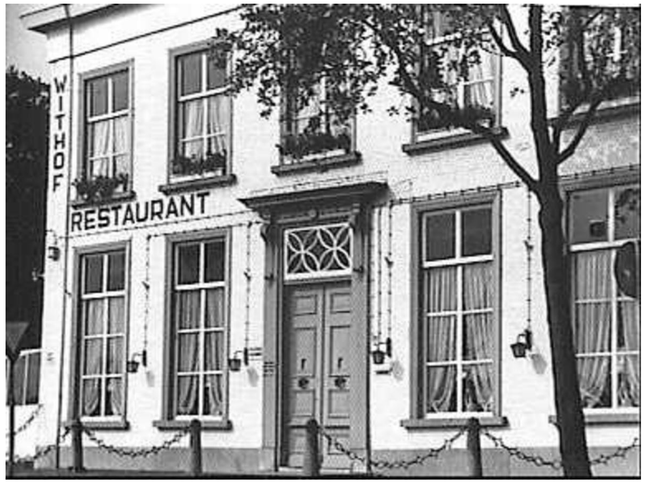
Chubb CEO on Small, Medium Business Underwriting

Artificial Intelligence for Commercial Insurance

- Predicting / Extracting / Validating **underwriting insights**
- Classifying a **risk and price** it correctly
- Detect anomalies to support **positive selection** – the opposite of adverse selection
- Monitor the up-to-date **exposure** of an existing book and re-assess the risk
- Understand the customer and offer **personalized insurance** coverage and terms
- **Adjust a claim** and streamline it
- **Detect frauds**, from submissions to claims

AI insight example for restaurants workers' compensation

Current knowledge:



Desired knowledge:

"Employees in Japanese restaurants tend to cut their hands more often. Can you automatically find the cuisine type of a business?"

Chief Underwriting Officer, top-25 US carrier

Why not to add another question to the questionnaire?

Agent declared:

Actual business:

* actual example from one of our customers

Now let’s see how a machine can do it

Challenges with producing AI underwriting insights

1. Different types of raw data require different types of AI models
2. Fetching raw data about a given business
3. Collecting big-enough training data set
4. Cleansing of the training and testing data set
5. Simple AI models not enough: complexity needed for high coverage and accuracy
6. Multi model aggregations to reason the truth
7. Production use of AI requires state-of-the-art technological architecture

295 AI underwriting insights

The expected / existing insights (e.g. ACORD):


Employees Payroll


OSHA Violations


Main Location


Years in Business


Liquor Seller


Swimming Pool


Deliveries Service


Roof Type

SIC / NAICS Code


Relevant Certificates

Open Hours


Closest Firestation

As well as alternative (surprising?) insights:


Customers' Age


Customers' BMI

• • •

each of those is classified using AI

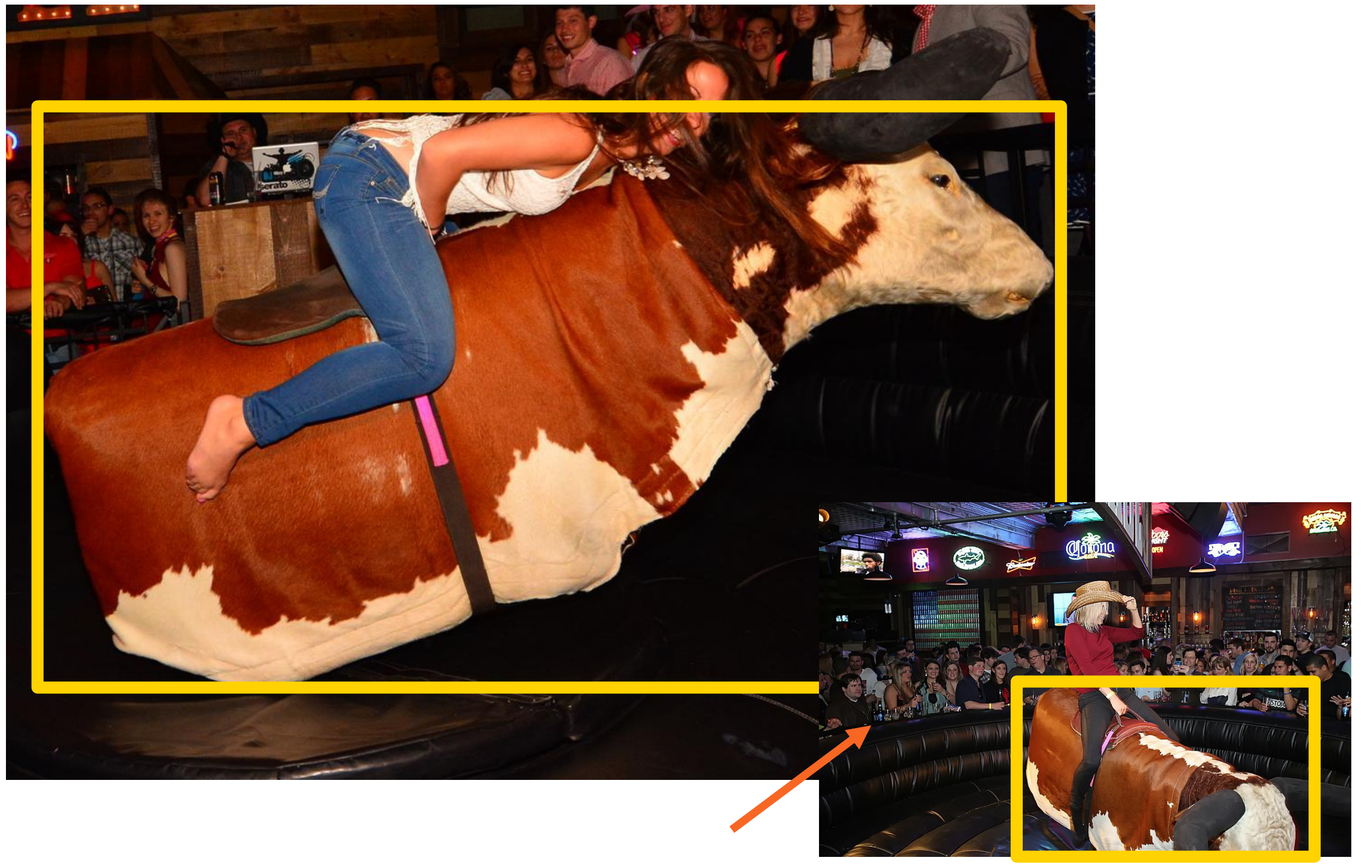
Bulls, Candles, and… Fire!?

All Businesses → Filter those with Mechanical Bull Equipment → XXXXX

Customers Reviews

… is an underground {saloon}$_2$ carved out of a converted bank vault and features {New York City}$_3$'s only **{mechanical bull}$_4$**. The **{Bull}$_5$**, or as we like to call him, Buck, is illuminated by {lighting candles}$_6$ (aka the ring of {fire}$_7$)…

Images



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Bulls, Candles, Fire, and… Beer Bottles!?

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Dance floors are more correlated to younger ages than dorms

Dance Floor vs. Lower Customers' Age

mean age is **3 years younger** in places with a dance floor

0.0018

p-value

* one sided left p-value

-2.92

z-score

Dorms Proximity vs. Lower Customers' Age

mean age is **2 years younger** in places which are near college dorms

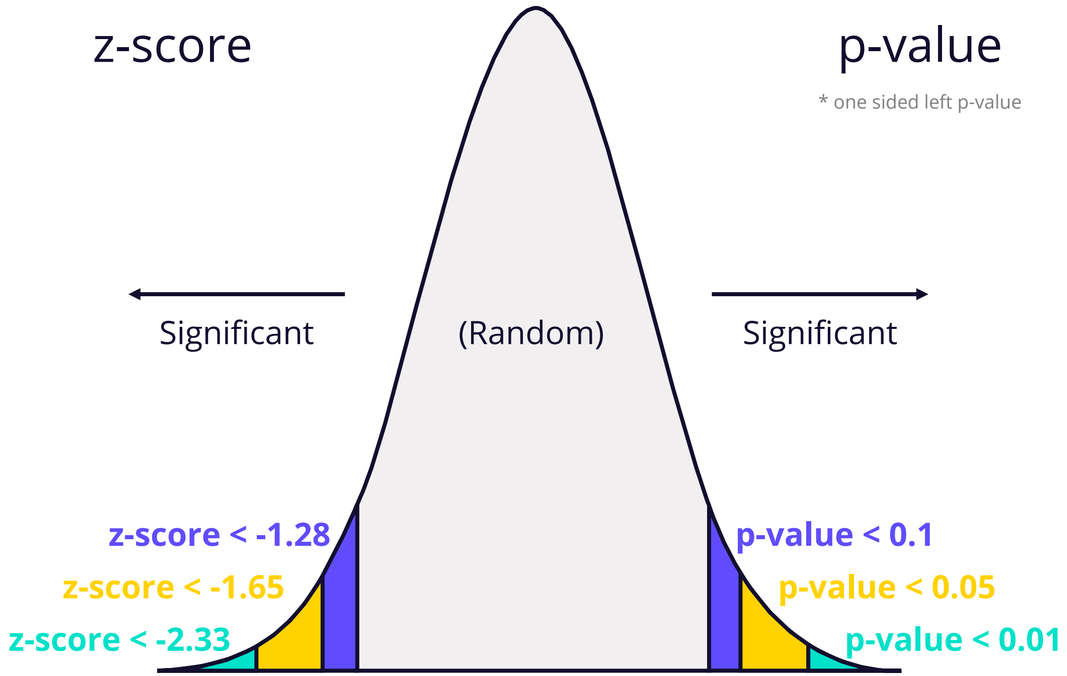
0.0493

p-value

* one sided left p-value

-1.66

z-score



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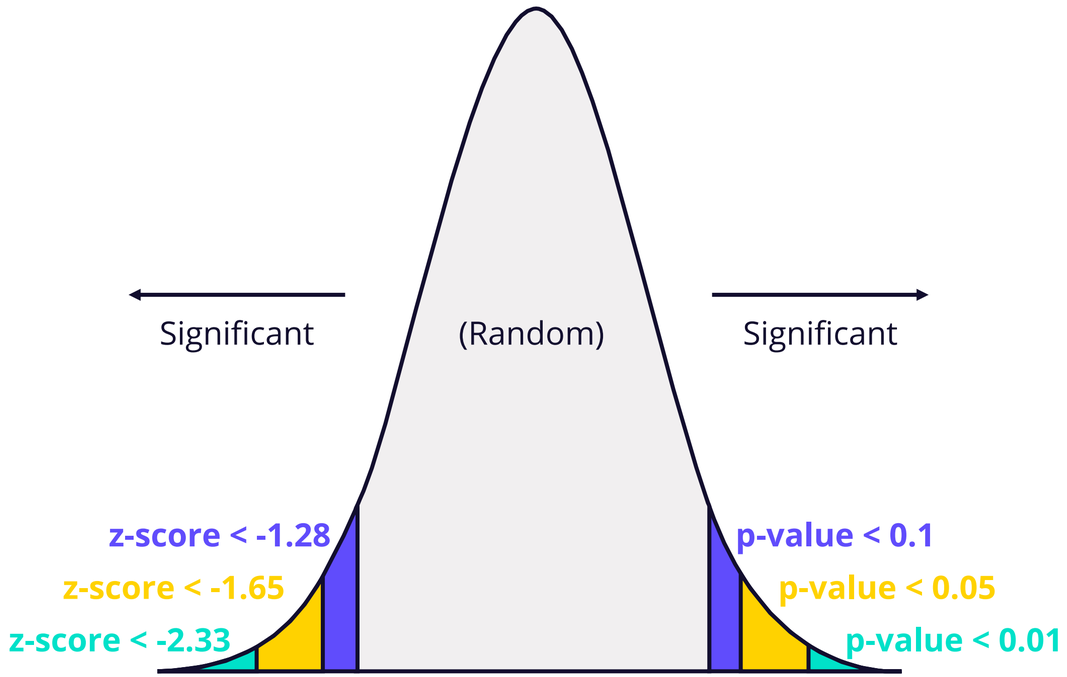
Correlations: Dance Floor vs. Lower Customers' BMI

mean BMI is **1 point lower** in places with a dance floor



0.0098

p-value

-2.33

z-score

* one sided left p-value

and we can keep on playing with statistics all day...

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Questions?

"When you change the way you look at things, the things you look at change"

- Max Planck

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