Car Insurance

Requirements specification
for Dealing with Claims business process

1. General description of business process

A general description of the business process and a description of the performance metrics generated by this process, possible current analytical problems.

The process of dealing with claims is as follows. Our client has their insured vehicle damaged. The client reports the damage to *No Limit* via online claim form. Up to 7 days after reporting, *No Limit*'s claims adjuster visits the location where the damaged vehicle is parked and assesses its state. The assessor describes and photographs the damaged parts. During the next 14 days the employee evaluates the cost of fixing the damages by either repairing or replacing the broken parts. The appropriate cost is determined for every part separately, according to their market value for the specific groups of vehicles (provided in the *SureSale* system). After the evaluation, the claimant is informed about the total amount of indemnity granted by the insurer and asked about the bank account number. During the next 7 days, the employee performs a bank transfer to the client's account. There is no possibility to reevaluate the damages or change the compensation value.

The decrease in the average indemnity paid per month at the rate of at least 0.5% a month.
The decrease in the monthly average number of claims at the rate of at least 0.5% a month.

Typical questions

- What was the average number of claims per month in the last year?
- What is the average amount of indemnity paid?
- What is the total cost of compensations?
- Is the average number of compensations paid per month rising or falling?
- What is the average amount of compensation paid to the insured with little experience (shorter than one year)?
- What is the number of claims per car size/class?
- What is the average amount of indemnity paid by driver's experience?
- What are the maximum and minimum values of compensations?

Data

Information provided in the online claim form is stored in the *SureSale* system. It comprises claimant's insurance data and damaged car identification details. Data necessary for setting the indemnity value is available in *SureSale* as a catalogue of parts. Results of damage evaluation are described in *CarEvaluator CSV*. This system is operated by the claims adjuster during car assessment. The total indemnity value is calculated by the claims adjuster and saved in *SureSale*. The compensation is a sum of repair or replacement costs for all damaged parts. The cost of replacement for a given kind of vehicle is directly indicated in *SureSale*, while the cost of repair equals 50% of the value of the part.

2. Data sources structures

SureSale

Table	Attribute	Attribute type	Description
Clients	A client who buys the insurance (policyholder), uniquely identified by ID		
	ID	Numeric	PK
	PESEL	Numeric	Polish personal identification number; complying with PESEL integrity rules
	Name1	String – max 25 characters	First name
	Name2	String – max 25 characters	Middle name, not required, by default an empty string
	Surname	String – max 25 characters	Surname
	Sex	Character	Values: 'F' for female or 'M' for male
	Date_of_birth	Date	Day, month and year of birth; YYYY/MM/DD format; the Client has to be at least 18 years old
	Voivodeship	String – max 25 characters	Home address' element; single word
	City	String – max 30 characters	Home address' element
	Street_and_number	String – max 35 characters	Home address' element
	Account_nb	String	IBAN format; Client's bank account number for indemnity transfer; not required, initially empty
	License_issuing_date	Date	Day, month and year when the Client obtained the right to drive; YYYY/MM/DD format
Insurances	Information about insurances sold, each with unique ID		
	ID	Numeric	PK
	Sale_date	Date	Day, month and year of concluding the contract; YYYY/MM/DD format
	Car	String – 17 characters	FK Cars (VIN); the insured vehicle
	Mileage	Numeric	Anticipated number of kilometres driven in

			the insurance period; a positive integer
	Garage	Boolean	Values: 1 if the Car is generally parked in a garage, 0 otherwise; according to Client's declaration
	Agent_ID	Numeric	FK Employees; the agent who sold the insurance
	Price	Money (2 decimal places)	The price to be paid by the Client for the Insurance
	Client_ID	Numeric	FK Clients; the client who bought the insurance
Cars	Insured vehicle, uniquely identified by Vehicle Identification Number		
	VIN	String – 17 characters	PK, ISO standard
	Registration_ID	String – 7 characters	Vehicle registration plates in Poland; The first two characters are letters. The last five characters are digits. The first letter is constrained to the values: "B", "C", "D", "E", "F", "G", "K", "L", "N", "O", "P", "R", "S", "T", "W", "Z". The other characters are not constrained.
	Car_type_ID	Numeric	FK Car_Types; the specific type of a car
	Colour	String – max 15 characters	Main colour or theme
	Engine_capacity	Floating (1 decimal place)	In litres
Car_Types	A specific type of a car each with unique ID		
	ID	Numeric	PK
	Class	String – max 7 characters	Values: "cheap", "medium", "premium"
	Size	String – max 6 characters	Values: "small", "medium", "large", "cargo"
	Production_year	Numeric	Year of production, format YYYY
Claims	Client's claim for compensation (with unique ID)		
	ID	Numeric	PK
	Submission_date	Date	Day, month and year of submitting the Claim; YYYY/MM/DD format

	Parking_place	String – max 50 characters	The place where the damaged Car is parked
	Assessor_ID	Numeric	FK Employees; the claims adjuster assessing the claim
	Indemnity	Money (2 decimal places)	The compensation granted as a result of the Claim; initially empty; might be 0 – the Claim was rejected
	Insurance_ID	Numeric	FK Insurances; the insurance which covers the claim
Employees	An employee of *No Limit*, uniquely identified by ID		
	ID	Numeric	PK
	Name	String – max 25 characters	Name
	Surname	String – max 25 characters	Surname
	Function	String – max 8 characters	Values: “assessor” (claims adjuster) or “agent” (salesperson)
Parts	A catalogue of parts; data necessary for determining the cost of part replacement or repair		
	Part	String – max 25 characters	Part of the composite PK; Values: “Engine”, “Front doors”, “Rear doors”, “Left mirror”, “Right mirror”, “Front headlights”, “Rear headlights”, “Front bumper”, “Rear bumper”
	Car_type_ID	Numeric	FK Car_Types; Part of the composite PK; the specific type of a car
	Value	Money (2 decimal places)	Market value of the part for the specific class and size of a car

CarEvaluator CSV

Main details about the assessor and damages (result of the evaluation). Each evaluation is described in one row. The first row contains column headers.
Columns:

A. Assessor ID – ID of *No Limit*’s employee (function: “assessor”); Numeric
B. Claim ID – ID of the claim; Numeric
C. Evaluation date – day of the damage evaluation, DD/MM/YYYY format
D. Engine

E. Front doors
F. Rear doors
G. Left mirror
H. Right mirror
I. Front headlights
J. Rear headlights
K. Front bumper
L. Rear bumper

The damages are described distinctively by each part (columns D-L). They can take the following values:

- 0 – no damage
- 1 – requires repair
- 2 – requires replacement

3. Scenarios of analytical problems

What is the effect of car properties on the amount and number of claims?

1. Compare the number/amount of claims of different vehicle classes (cheap, medium, premium) in the analysed month relative to previous months.
2. Compare the number/amount of claims of different vehicle sizes (small, medium, large, cargo) in the analysed month relative to previous months.
3. Compare the number/amount of claims of different vehicle colours in the analysed month relative to previous months.
4. Compare the number/amount of claims of different vehicle production years (10 years periods) in the analysed month relative to previous months.
5. Compare the number/amount of claims of different vehicle engine capacities (0.5 litre intervals) in the analysed month relative to previous months.
6. Compare the number/amount of claims with respect to the number of damaged parts in the analysed month relative to previous months.

What is the effect of driver characteristics on the amount and number of claims?

1. Are less experienced drivers responsible for more claims?
2. Which age groups are responsible for the most and the least expensive claims (2 years intervals: 18-19, 20-21, etc.)?
3. Which experience groups are responsible for the most and the least expensive claims (2 years intervals: 0-1, 2-3, etc.)?
4. Are there differences in number and value of claims between men and women from the same age/experience groups?
5. Compare the number of claims in different voivodeships in the analysed month relative to previous months.
6. What is the number of claims in relation to the driver's age?

4. Data needed for analytical problems

What is the effect of car properties on the amount and number of claims?

1. Compare the number/amount of claims of different vehicle classes (cheap, medium, premium) in the analysed month relative to previous months.
    a. **number/amount of claims** – *SureSale*, table *Claims*, column *ID*
    b. **vehicle classes** – *SureSale*, table *Car_Types*, column *Class*
    c. **month of claim** – *SureSale*, table *Claims*, column *Submission_date*
2. Compare the number/amount of claims of different vehicle sizes (small, medium, large, cargo) in the analysed month relative to previous months.
    a. **number/amount of claims** – *SureSale*, table *Claims*, column *ID*
    b. **vehicle sizes** – *SureSale*, table *Car_Types*, column *Size*
    c. **month of claim** – *SureSale*, table *Claims*, column *Submission_date*
3. Compare the number/amount of claims of different vehicle colours in the analysed month relative to previous months.
    a. **number/amount of claims** – *SureSale*, table *Claims*, column *ID*
    b. **vehicle colours** – *SureSale*, table *Cars*, column *Colour*
    c. **month of claim** – *SureSale*, table *Claims*, column *Submission_date*
4. Compare the number/amount of claims of different vehicle production years (10 years periods) in the analysed month relative to previous months.
    a. **number/amount of claims** – *SureSale*, table *Claims*, column *ID*
    b. **vehicle production year** – *SureSale*, table *Car_Types*, column *Production_year*
    c. **month of claim** – *SureSale*, table *Claims*, column *Submission_date*
5. Compare the number/amount of claims of different vehicle engine capacities (0.5 litre intervals) in the analysed month relative to previous months.
    a. **number/amount of claims** – *SureSale*, table *Claims*, column *ID*
    b. **vehicle engine capacity** – *SureSale*, table *Cars*, column *Engine_capacity*
    c. **month of claim** – *SureSale*, table *Claims*, column *Submission_date*
6. Compare the number/amount of claims with respect to the number of damaged parts in the analysed month relative to previous months.
    a. **number/amount of claims** – *SureSale*, table *Claims*, column *ID*
    b. **number of damaged parts** – *CarEvaluator CSV*, columns *D-L*
    c. **month of claim** – *SureSale*, table *Claims*, column *Submission_date*

What is the effect of driver characteristics on the amount and number of claims?

1. Are less experienced drivers responsible for more claims?
    a. **number of claims** – *SureSale*, table *Claims*, column *ID*
    b. **driver's experience** – *SureSale*, table *Clients*, column *License_issuing_date*
2. Which age groups are responsible for the most and the least expensive claims (2 years intervals: 18-19, 20-21, etc.)?
    a. **number of claims** – *SureSale*, table *Claims*, column *ID*
    b. **driver's age** – *SureSale*, table *Clients*, column *Date_of_birth*
    c. **indemnity value** – *SureSale*, table *Claims*, column *Indemnity*
3. Which experience groups are responsible for the most and the least expensive claims (2 years intervals: 0-1, 2-3, etc.)?
    a. **number of claims** – *SureSale*, table *Claims*, column *ID*

   b. **driver's experience** – *SureSale*, table *Clients*, column *License_issuing_date*
   c. **indemnity value** – *SureSale*, table *Claims*, column *Indemnity*
4. Are there differences in number and value of claims between men and women from the same age/experience groups?
   a. **number of claims** – *SureSale*, table *Claims*, column *ID*
   b. **driver's experience** – *SureSale*, table *Clients*, column *License_issuing_date*
   c. **indemnity value** – *SureSale*, table *Claims*, column *Indemnity*
   d. **driver's age** – *SureSale*, table *Clients*, column *Date_of_birth*
   e. **driver's sex** – *SureSale*, table *Clients*, column *Sex*
5. Compare the number of claims in different voivodeships in the analysed month relative to previous months.
   a. **number of claims** – *SureSale*, table *Claims*, column *ID*
   b. **driver's place of residence (voivodeships)** – *SureSale*, table *Clients*, column *Voivodeship*
   c. **month of claim** – *SureSale*, table *Claims*, column *Submission_date*
6. What is the number of claims in relation to the driver's age?
   a. **number of claims** – *SureSale*, table *Claims*, column *ID*
   b. **driver's age** – *SureSale*, table *Clients*, column *Date_of_birth*

5. Queries based on extra data

No changes in the business process:

1. Compare the number of claims in cities of different sizes (less than 10 000 inhabitants, 10 000 – 99 999 inhabitants, 100 000 – 300 000, more than 300 000 inhabitants) in the analysed month relative to previous months.
   a. **number of claims** – *SureSale*, table *Claims*, column *ID*
   b. **cities** – *SureSale*, table *Clients*, column *City*
   c. **city size** – extra data gathered from an external source

Introducing necessary changes in the process:

2. Compare the average amounts and numbers of indemnities for car accidents depending on the role of the client (offending vs injured party) in the analysed month relative to previous months.
   a. **number of claims** – *SureSale*, table *Claims*, column *ID*
   b. **month of claim** – *SureSale*, table *Claims*, column *Submission_date*
   c. **indemnity value** – *SureSale*, table *Claims*, column *Indemnity*
   d. **driver's role** – extra data, source – the Police and modified claims form

In order to provide the answer to the second query it would be necessary to change the process of Dealing with Claims, so that it concerned car accidents in which two parties (drivers) are involved. Required information on the reasons, fault, circumstances, the other driver and their insurance should be retrieved from the modified claims form and the Police. However, that would require a major shift in the process from reporting damages to reporting an accident and involve additional parties.