

## Software Requirement Specification: SAC Regression Scenario

# A Car Insurance Company



Created By: **Anubhav Oberoy**

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### User Persona:



**Stella Johnson** is **Data scientist** working with Anubhav Trainings. She is a data scientist who has been devoted to the analytics industry and the development and use of data technologies for several years. Currently, she is a Data Scientist on fulltime job, where she works on an iOS top 10 mobile game, doing a combination mix of user behavior research, exploration, data engineering, and statistical modelling. She is a master of digital marketing campaign design and analysis, as well as implementing various statistical and machine learning models to help solve real-world business problems. Before joining Anubhav Trainings, she was a Statistician at Princess Margaret Hospital where she published 2 papers in academic magazines, covering breast cancer research and image processing.

### The Business Story

Insurance is not an 'over the counter' physical product or an instant service. It is a promise. And the insured people expect the company to fulfill the promise at a time when they need it the most, which is during troubled times such as an accident. The success of an insurance company, in the long run, is often based upon its Motor Insurance Claim Settlement Ratio. A company might be making profits at first but if its customers are not happy with the claims process, the profit graph is poised to plummet in the subsequent quarters.

When the insured raises a vehicle insurance claim, they expect the insurance company to settle it at the earliest. However, the claims team has their own challenges while settling these claims. They have to rely on a pre-defined **car insurance claim process**, have to coordinate with partner garages or other third parties, and are bound by certain rules and regulations.

The general insurance industry is changing after its digitization. Insurance providers are becoming more transparent and claim-friendly. The claim process is continuously upgraded to make it trouble-free.

Stella would use SAC predictive scenario to help Insurance company meeting their goals. The goals of the Claim settlement department are:

- Improve customer satisfaction by expediting the claim process
- Reduce the chances of false claims
- Exorbitant claim amount must be scrutinized

Objectives with Smart Predict are in this use case are:

1. Understand Claim Amount per customer which is expected to come
2. Observe the claim amount pattern w.r.t. customer's income per vehicle segment
3. Check tentative customer claims as per Policy types

Below is the screenshot of all the claims data provided by Claims Department

H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
EmploymentStatus	Gender	Income	Location Code	Marital Status	Monthly Premium Auto	Months Since Last Claim	Months Since Policy Inception	Number of Open Complaints	Number of Policies	Policy Type	Policy	Renew Offer Type	Sales Channel	Total Claim Amount	Vehicle Class	Vehicle Size
Employed	F	56274	Suburban	Married	69	32	5	0	1	Corporate Auto	Corporate L3	Offer1	Agent	384.811147	Two-Door Car	Medsize
Unemployed	F	0	Suburban	Single	94	13	42	0	8	Personal Auto	Personal L3	Offer3	Agent	1131.464935	Four-Door Car	Medsize
Employed	F	48767	Suburban	Married	108	18	38	0	2	Personal Auto	Personal L3	Offer1	Agent	566.472247	Two-Door Car	Medsize
Unemployed	M	0	Suburban	Married	106	18	65	0	7	Corporate Auto	Corporate L2	Offer1	Call Center	529.861344	SUV	Medsize
Employed	M	43836	Rural	Single	73	12	44	0	1	Personal Auto	Personal L1	Offer1	Agent	138.130879	Four-Door Car	Medsize
Employed	F	62902	Rural	Married	69	14	94	0	2	Personal Auto	Personal L3	Offer2	Web	159.383042	Two-Door Car	Medsize
Employed	F	55350	Suburban	Married	67	0	13	0	9	Corporate Auto	Corporate L3	Offer1	Agent	321.6	Four-Door Car	Medsize
Unemployed	M	0	Urban	Single	101	0	68	0	4	Corporate Auto	Corporate L3	Offer1	Agent	363.02968	Four-Door Car	Medsize
Medical Leave	M	14072	Suburban	Divorced	71	13	3	0	2	Corporate Auto	Corporate L3	Offer1	Agent	511.2	Four-Door Car	Medsize
Employed	F	28812	Urban	Married	93	17	7	0	8	Special Auto	Personal L3	Offer1	Agent	425.527834	Four-Door Car	Medsize
Unemployed	M	0	Suburban	Single	67	23	5	0	3	Personal Auto	Personal L3	Offer1	Agent	482.4	Four-Door Car	Small
Unemployed	F	0	Suburban	Married	110	27	87	0	3	Personal Auto	Personal L3	Offer2	Agent	528	SUV	Medsize
Employed	M	77026	Urban	Married	110	9	82	0	3	Corporate Auto	Corporate L1	Offer2	Agent	472.029737	Four-Door Car	Medsize
Employed	M	99845	Suburban	Married	110	23	25	0	8	Corporate Auto	Corporate L3	Offer2	Branch	528	SUV	Medsize
Employed	M	83689	Urban	Single	70	21	10	0	8	Corporate Auto	Corporate L3	Offer4	Call Center	307.139132	Four-Door Car	Medsize
Employed	F	24599	Rural	Married	64	12	50	0	2	Corporate Auto	Corporate L2	Offer2	Branch	42.920271	Four-Door Car	Medsize
Medical Leave	M	25049	Suburban	Married	67	14	7	0	1	Personal Auto	Personal L3	Offer2	Call Center	454.245098	Two-Door Car	Medsize
Medical Leave	M	28855	Suburban	Married	101	12	59	0	1	Personal Auto	Personal L2	Offer3	Call Center	647.442031	SUV	Medsize
Employed	M	51148	Urban	Married	72	9	1	0	7	Personal Auto	Personal L2	Offer2	Branch	308.981664	Four-Door Car	Medsize
Employed	F	66140	Suburban	Married	101	11	21	0	3	Corporate Auto	Corporate L2	Offer1	Call Center	484.8	Four-Door Car	Small
Employed	M	57749	Suburban	Single	74	31	21	0	1	Personal Auto	Personal L2	Offer1	Branch	355.2	Two-Door Car	Medsize
Disabled	F	13789	Suburban	Divorced	79	8	49	0	1	Personal Auto	Personal L3	Offer4	Call Center	379.2	Four-Door Car	Medsize
Medical Leave	M	14072	Suburban	Divorced	71	13	3	0	2	Personal Auto	Personal L3	Offer1	Agent	511.2	Four-Door Car	Medsize
Unemployed	F	0	Suburban	Single	78	0	44	0	1	Corporate Auto	Corporate L3	Offer1	Branch	664.976768	Four-Door Car	Medsize

Training dataset to be predicted

- Requirement 1: Create the Training dataset
- Requirement 2: Create Predictive Scenario



## Regression

You want to predict numerical values for a variable based on fluctuations in correlated variables.

Example: Predict the price of an imported product based on projected transport charges, and tax duties.

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Requirement 3: Provide the Training dataset (result is known) with the Target variable name.

Create Transform										
AA Customer	AA State	1 <sup>st</sup> Customer...	AA Response	AA Coverage	AA Education	AA Effective ...	AA Employm...	AA Gender	22 Income	
1 NN71951	la	24261.01777	No	Basic	High School or Be	1/27/11	Employed	F	66525	
2 WB37082		6613.973653	No	Basic	Bachelor	1/23/11	Unemployed	F	0	
3 SM52139		2930.693543	No	Basic	College	1/31/11	Employed	M	33663	
4 FL82372	Oregon	8672.194272	No	Basic	College	1/26/11	Employed	F	22547	
5 DP45816	Arizona	11638.66926	No	Extended	High School or Be	2011-10-01	Employed	F	61486	
6 GW33762	Oregon	6846.150323	Yes	Extended	Bachelor	1/27/11	Unemployed	F	0	
7 RZ33670	California	11727.77648	No	Premium	College	2011-09-01	Disabled	F	29879	
8 PY70169	Oregon	22643.83478	No	Basic	High School or Be	2/24/11	Employed	M	93011	
9 MO91628	Oregon	2614.474305	No	Basic	Master	2011-11-02	Employed	M	65186	
10 HW87852	Oregon	2451.752695	No	Basic	Master	2011-12-02	Medical Leave	M	26840	
11 HB20453	Oregon	6781.270203	No	Basic	Bachelor	2011-04-02	Unemployed	M	0	
12 BN87372	Oregon	4974.801539	Yes	Basic	Bachelor	1/18/11	Employed	M	75644	
13 YX23800	Oregon	8591.604933	No	Basic	Bachelor	2011-11-02	Employed	M	38984	
14 DZ87709	Oregon	5592.161392	No	Basic	High School or Be	2011-01-02	Employed	F	71811	
15 XW13033	Nevada	8009.472833	No	Basic	College	2/15/11	Employed	M	20961	
16 LN31673	Washington	11318.08982	No	Extended	College	2011-06-02	Emploded	M	38923	

Requirement 4: Analyze the results as per the Regression.

Overview

Influencer Contributions

Global Performance Indicators

Root Mean Square Error (RMSE)

Prediction Confidence

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186.9

94.92%

Target Statistics

Data Partition	Minimum	Maximum	Mean	Standard Deviation
Training	0.1	2,893.24	432.09	287.74
Validation	0.52	2,306.51	429.43	286.33

Influencer Contributions

Influencer	Contribution
Monthly Premium Auto	<div><div></div>44.04%</div>
Income	<div><div></div>20.29%</div>
EmploymentStatus	<div><div></div>15.68%</div>
Vehicle Size	<div><div></div>7.65%</div>
Gender	<div><div></div>4.97%</div>

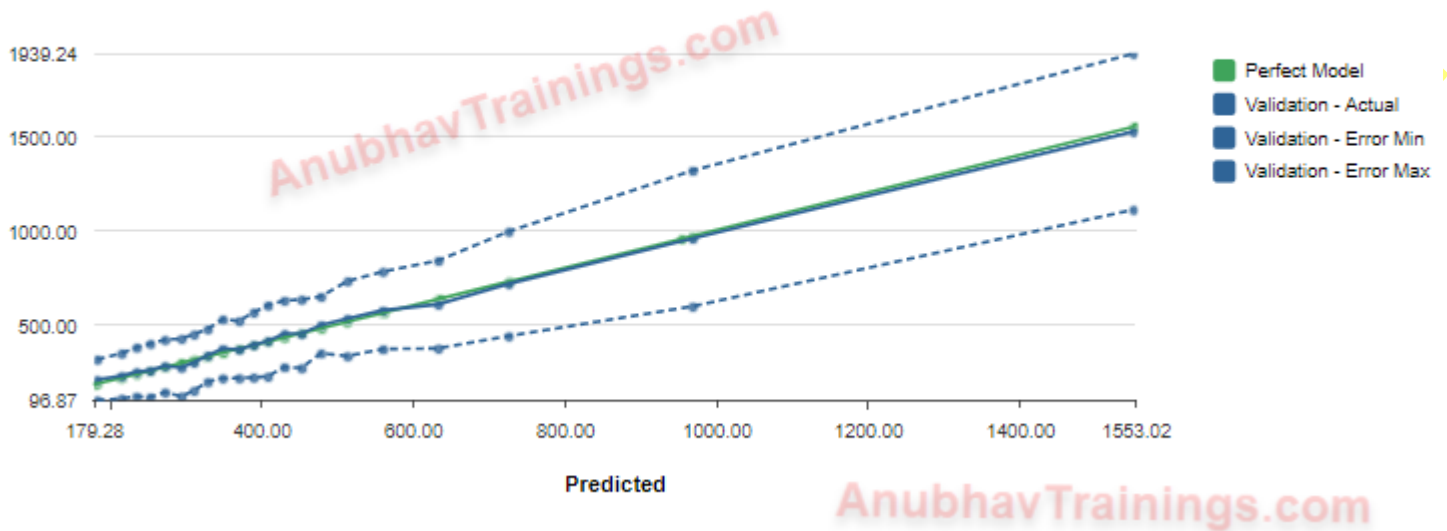
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## Requirement 5: Understand the Residual Min and Max

Predicted vs. Actual



## Requirement 6: Apply the Model on application dataset to predict the Insurance Claim Amount.

Predictive Models (1)						
	Name	Status	Creation Date	Root Mean Square Error (RMSE)	Prediction Confidence	Influencer Count
<input checked="" type="checkbox"/>	Model 1 Insurance Company Clai...	Applied	May 8, 2021 13:33:00	186.904	<div><div></div></div> 94.92%	8

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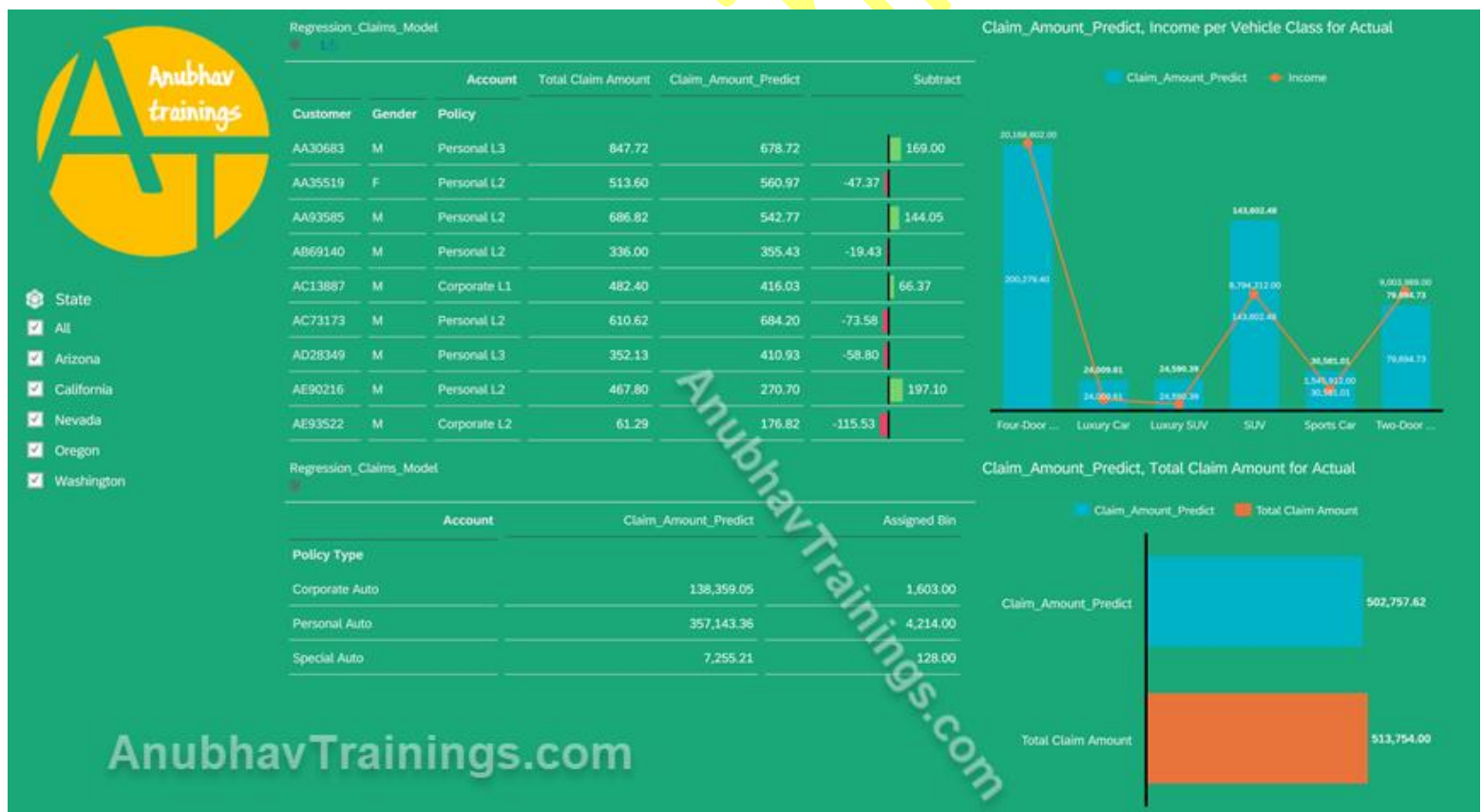
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## Requirement 7: Create a BI Model using the output dataset

Policy Type	Policy	Renew O...	Sales Ch...	Vehicle CL...	Vehicle Size	1 <sup>st</sup> Predicted Value	2 <sup>nd</sup> Assigned ...
Personal Auto	Personal L3	Offer2	Web	SUV	Medsize	573.4453125	2
Corporate Auto	Corporate L3	Offer1	Branch	SUV	Medsize	849.1813354492188	1
Personal Auto	Personal L3	Offer1	Agent	Two-Door Car	Medsize	372.9237365722656	6
Personal Auto	Personal L2	Offer1	Branch	Sports Car	Large	545.869140625	2
Special Auto	Special L2	Offer1	Branch	Four-Door Car	Large	268.5915832519531	8
Personal Auto	Personal L1	Offer3	Branch	Four-Door Car	Medsize	538.93603515625	3
Personal Auto	Personal L3	Offer1	Agent	Four-Door Car	Medsize	457.7408752441406	4
Personal Auto	Personal L3	Offer4	Branch	Four-Door Car	Small	385.041748046875	5
Personal Auto	Personal L3	Offer2	Call Center	Four-Door Car	Medsize	239.0204315185547	9
Personal Auto	Personal L2	Offer3	Call Center	SUV	Medsize	760.0922241210938	1
Corporate Auto	Corporate L2	Offer1	Branch	SUV	Small	737.001953125	1

## Requirement 8: Display the result in BI story by creating a dashboard



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