Nomis Solutions- Business Proposal

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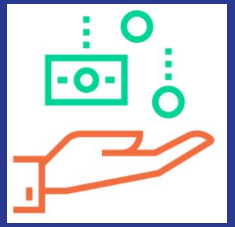
About

Nomis Solutions :

- A startup company that offers price-optimization solutions to financial service firms.
- Uses advanced analytic techniques to help its clients to set prices for consumer loans and deposits.



e-Car Loans :

- Online auto loan lender
- Potential client (*first*) for Nomis Solutions

Problem

Company

e-Car aims to improve profitability by offering loans at interest rates tailored for each customer.

The data is collected from the application form filled by the customer

Context

After an APR has been quoted, within 45 days the customer decides whether he accepts or declines the loan, i.e. if it's a "**Funded Loan**" or a "**Lost Sale**" for the company.

Problem statement

To find a methodology that increases revenue and decreases lost sales.

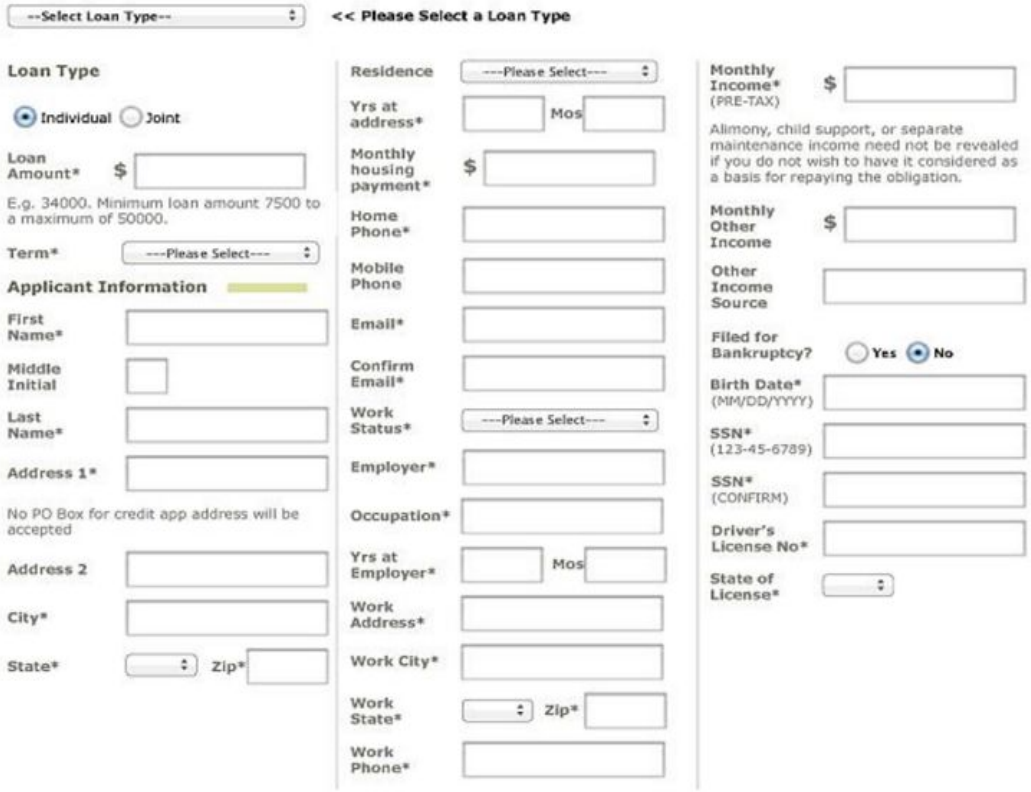
Proposed Solution

If we can predict whether a quote will be “Funded Loan”or a “Lost Sale” , then we can either reconsider the quoted APR to decrease “Lost Sale” or increase revenue.

Loan Application Form : e-Car

Type of data collected from the application form:

- **Applicant:** Name / Address / Monthly Income / SSN
- **Car:** Make / Model / Year
- Loan Type



Data-Set

- ***Tier :*** Segmentation based on FICO Scores (Values: 1, 2, 3, 4)
- ***FICO :*** FICO Score
- ***Approve Date :*** Date the customer's application was approved
- ***Term :*** Term of the Loan (36, 48, 66 and 77 Months)
- ***Amount :*** Loan amount approved
- ***Previous Rate :*** Only for refinanced applications
- ***Car Type :*** N- New, U-Used, R-Refinanced
- ***Competition Rate :*** Competitor's Rate
- ***Outcome :*** 1- Customer takes loan, O- Otherwise
- ***Rate :*** APR quoted to customers by e-Car
- ***Cost of Funds :*** 1.02 to 2.127
- ***Partner :*** 1- Direct auto finance company, 2-Partner A, 3- Other Partners

Tier	FICO	Approve Date	Term	Amount	Previous Rate	Car Type	Competition rate	Outcome	Rate	Cost of Funds	Partner Bin
3	695	7/1/2002	72	35000		N	6.25	0	7.49	1.8388	1
1	751	7/1/2002	60	40000		N	5.65	0	5.49	1.8388	3
1	731	7/1/2002	60	18064		N	5.65	0	5.49	1.8388	3
4	652	7/1/2002	72	15415		N	6.25	0	8.99	1.8388	3
1	730	7/1/2002	48	32000		N	5.65	0	5.49	1.8388	1
2	725	7/1/2002	36	10000		N	4.95	0	5.79	1.8388	3
1	808	7/1/2002	72	19000		N	6.25	0	6.59	1.8388	3

208,085 Records

Challenges

Challenge 1

Framing the problem

Whether a customer accepts or declines the proposed *annual percentage rate* APR.

Challenge 2

Cleaning the Data

- Previous Rate = 0, when car type is “New” or “Used”
- Further, rows with missing values eliminated

Challenge 3

Modeling

Deciding on which model to design for better results

Implementation and Deployment

Interested Customers

We predict if the customer will be a "**Funded Loan**" or a "**Lost Sale**"

Celebrate extra $$ with a 

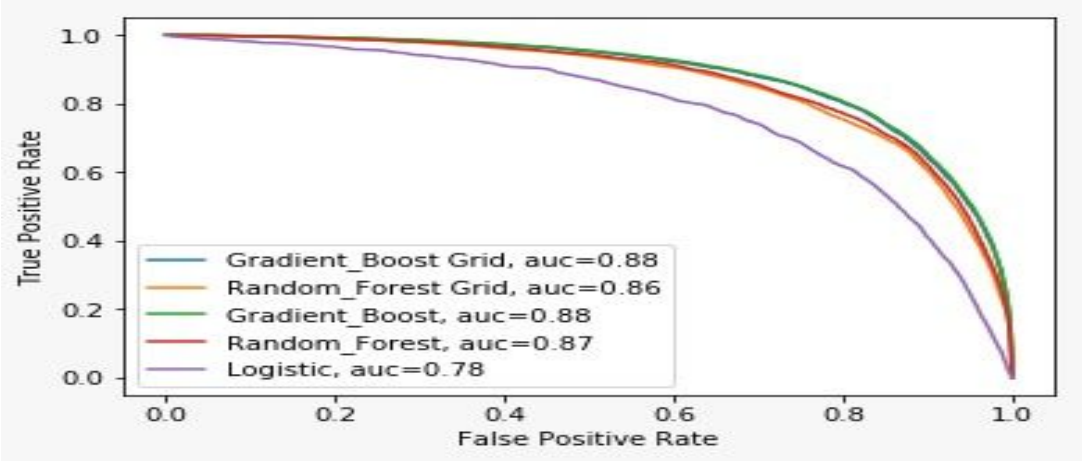
Application Form → Get Quote → Predict Outcome → Review Quote → Convert Lost sales

The e_Car team evaluates the customer's credit risk and calculates the APR to be offered to approved customers

Optimize price to "squeeze" more from a Funded Loan and "reduce" Lost Sale numbers

Results

- AUC for the tested models



- Prediction results from the Best Model - **Gradient Boosted Tree Model**

```
print(classification_report(y_test, grid_gb.predict(X_test), target_names=["Lost Sales","Funded Loans"]))
```

	precision	recall	f1-score	support
Lost Sales	0.87	0.94	0.91	32460
Funded Loans	0.73	0.52	0.61	9157
avg / total	0.84	0.85	0.84	41617

Thank You !