



# CASE STUDY

## PREDICT EXPECTED FIRE LOSSES FOR INSURANCE POLICIES



### Company Info

**Name:** Liberty Mutual

**Location:** Boston, United States

**Industry:** Insurance

**A Fortune 100 company, Liberty Mutual Insurance has provided a wide range of insurance products and services designed to meet their customer's ever-changing needs for over 100 years.**

Uncertainty drives prices of insurance policies up. Fire loss prediction is extremely volatile for two reasons: they rarely occur, and the losses are very high when they happen.

This challenging situation made Liberty Mutual - a 100 Fortune company founded in 1912 in Massachusetts - to decide on using state-of-the-art machine learning in forecasting a transformed ratio of loss to total insured value using almost one million historical insurance records. Their goal was well expressed in their business focus: clients should only pay for what they need.

*“LogicPlum created a solution that didn't need an expert user, and which could be managed from anywhere.”*



## The Platform

LogicPlum's platform is an AI software system that helps users to create models by exploring combinations of feature transformations and machine learning algorithms in an automated manner. It is the result of years of research put together into a single platform.

The main advantage of this automated approach is the reality of trying hundreds of models in a short amount of time. Considering the vast amount of data, the short supply of talent that can build models, and the need for a business to have a real bottom-line impact, LogicPlum's approach provides unparalleled advantages in model creation and deployment.

## Crafting Data

LogicPlum's team created a CSV file with the dataset, which was used as input to the platform. They dragged and dropped the data into the platform, which immediately performed exploratory data analysis for the team. The team activated autonomous mode, which gives LogicPlum the ability to automatically and expertly craft models without human intervention. Even though the original data has over 300 features, the LogicPlum software decided to generate even more features to capture the signal in the Liberty Mutual data.

*“The outcome was a new feature list and a dataset with significant low noise,”* added the team leader, *“which we saw later would speed up model training and increase the accuracy of the results.”*

## Developing AI

Once the dataset was ready for use, the platform started working with different models and their combinations. It tried many possibilities, such as the Random Forest algorithm and Ordinary Least Squares. Each model's performance was measured through the Normalized Gini metric and then ranked accordingly. As the platform was done in an automated manner, there was no need for the team to intervene.

After checking hundreds of algorithms, the platform selected the Extra Trees Regressor, Support Vector Machines with a linear kernel, and Elastic-net as the top three performers. The final model was obtained by blending these three results according to different weights.

When tested, the model showed a normalized weighted coefficient of 33%, which was significantly better than the results obtained without a model. A perfect model score would have been 100%. *“The platform had done a great job!”* said the team leader.





## Sound Solution

The platform had done its job, and the results were excellent. The team then decided to translate the results into a product that Liberty Mutual could easily use. Their aim was **"to create a solution that didn't need an expert user, and which could be managed from anywhere,"** explained the team leader.

LogicPlum's software engineers created a user-friendly front-end, which catered to a user's unique needs working with fire losses for insurance policies. **"What LogicPlum did bring to the model was maximum flexibility. The ability to implement a couple lines of code into a user interface is a powerful,"** summarized the team leader.

LogicPlum's AI platform helped write the report for business leaders who want to know what took place to create the solution. The software helped generate a report containing a detailed explanation of the data used, how it had been transformed, the models attempted and selected, and the final solution deployed.

The team was excited. They had created a solution that outperformed Liberty Mutual's current approach, and they had assembled it in a business solution format. Now there is an AI solution to predict fire losses with greater accuracy and live closer to its philosophy of offering its clients to pay only for what they need!



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