LogicPlum

CASE STUDY

HOW AI CAN BOOST EXPLORATION

Expedia

Company Info

Name: Expedia

Location: Seattle, United States

Industry: Travel

Since 1996 Expedia has been helping consumers travel smart, every step of the way.

Technology has changed our lives, particularly since the advent of the internet. One of the areas most influenced has been travel. Booking a hotel has become more comfortable than ever and with an increased amount of options. However, this affects online booking platforms, as competition is fierce, and staying ahead of the pack has become essential.

Technology is one of the businesses' best friends when it comes to competitive advantage. This was the view of Expedia, the world's largest online travel agency (OTA), and the reason behind its choice to apply modern machine learning technologies to create personalized lists of hotels on their platform. The idea behind this was clear: having the best ranking of hotels for specific users paired with the best integration of price competitiveness would give Expedia a greater chance of winning a sale.

With this aim in their minds, Expedia assembled a dataset that included shopping and purchasing data and information on price competitiveness. It also provided Normalized Discounted Cumulative Gain as the metric to be used in the evaluation of algorithms.

“Speed matters in business. It’s no different when deploying an AI model.“

Unique Machine Learning

LogicPlum's platform is a powerful engine that combines AI, machine learning, and natural language processing. It tries hundreds of diverse algorithms and combinations of them through automation, ranks the results according to a given criterion, and selects the most proficient models.

This fact allows its users to develop models that otherwise would have taken weeks, in an afternoon. What sets this platform apart from human experts is its capacity to be updated with the latest technologies rapidly and then use these smart automation to swiftly find the one that solves the problem better. Thus, allowing for quick model creation and update.

This platform is complemented by several modules. For example, R.E.A.S.O.N. is a component that helps users to architect comprehensive reports in a shorter time, and MLOps supports users with automatic model maintenance.

It is with this platform in mind that LogicPlum's data scientists decided to realize Expedia's goal.

Identifying the Signal

The data was organized as a set of search result impressions, which are ordered lists of hotels that users see when they search for a hotel on the Expedia website. The user-response fields showed whether the user had clicked on a hotel and/or had purchased a hotel room stay.

With this data in their hands, the team set LogicPlum to work. They immediately noticed that "***the system proceeded systematically. First, it did a missing value imputation. Second, it bounded certain numerical values, such as price. Third, it downsampled negative instances, and finally, it converted the categorical features into numerical ones. The result was a clean dataset that would allow for faster learning,"*** explained LogicPlum's team leader.

Meaningful Evaluation Metrics

Once the data was optimized, the platform began trying hundreds of different algorithms and their combinations. Each of them was evaluated by calculating the Normalized Discounted Cumulative Gain of the results. The system then created a ranked list of all solutions.

"This is the advantage of LogicPlum's Autonomous Modeling feature," continued the team leader, ***"it makes every algorithm count.“***

The final solution consisted of an ensemble of Gradient Boost Machines. In second place was LambdaMART, a

ranking algorithm based on Multiple Additive Regression Tree or MART. Next came linear regression, which showed to be efficient, but it probably required additional feature engineering.

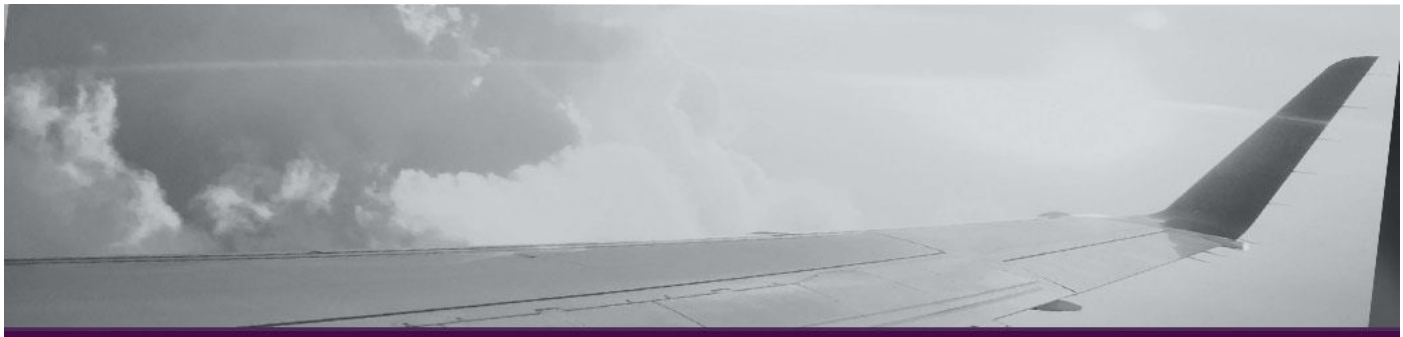
· The winning solution scored a value of 0.54, which means that 54 out of 100 relevant hotels are included in the list's highest 100 ranks.

Powerful Deployed AI

The results proved to be promising. It was now necessary to create a final product that would allow a business to manage the model without expert knowledge about machine learning. The model should also be capable of being implemented as part of other systems already present in Expedia.

"We generated an API endpoint which allows individuals to consume the model, and the platform created detailed documentation. We started by creating a simple version of the model that Expedia could use, " added the team leader.

The team was enthusiastic as they had created an efficient product that could help Expedia personalize rankings and speed up exploration and choice. ***"Speed matters in business. It's no different when it comes to deploying AI in a business setting. Speed is where LogicPlum excels,"*** concluded the team leader.



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