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Tailored Car Shopping Experience

Motivation:

Our finalized goal is to facilitate user experience on Edmunds by personalizing car research. By tracking users' browsing history, a comprehensive dataset of users' information and shopping behavior can be created. We can then perform well-designed machine learning algorithms to understand users' need to make tailored recommendations and provide the most considerate services to customers. By taking into account all the information we have, we are able to create meaningful, individualized and custom-driven interactions. Actively understanding customers' demands and engaging individual buyers dynamically with coordinated and relevant information can help Edmunds boost browsing-to-lead conversion rates.

Model:

We apply Neural Network to model the relationship between users' characteristics and the leads they made. We use variables in the visitor file as independent variables to represent users' characteristics and info about cars they requested as dependent variables. We transform Make and Model to categorical variables and Car Age as a nominal variable to describe cars and get 377 different variables. Then we create a 377* (number of X's) matrix to represent Y. We manipulate X variables with three methods: variables with more than 95% 0's such as Number of Views for Google Ads, which do not contribute to our model, are deleted; for variables with values 0~10, we transform them into categorical variables with 0 representing 0 and 1 representing values of natural numbers; for other variables, we perform a base-10 logarithm transformation by first adding 1 to each variable value (to avoid log0) and normalize data by dividing the maximum of values of this variable.

We try two different single-layer Neural Network models with 25 or 100 nodes. 60% of the data are used to train the model, 20% data are used to test each model and the remaining 20% are used for cross-validation.

Findings:

The error decays faster for the model with 100 nodes than 25 nodes. The output vector contains five different car models and the results show that for about 75% of times this vector includes the actual car that the user finally requested for a lead.

Conclusion:

Our Neural Network can predict the leads car users would make with high accuracy based on their browsing history.

Recommendation:

We recommend Edmunds to personalize ads with this model to facilitate users' browsing experience and thus increase the browsing-to-lead conversion rates. Edmunds can optimized mobile experience by minimizing the number of operations leading to customers' interested cars.