Maximizing Profit Opportunities

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Outline

Project Description and Goals

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Overview of Data

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Methods

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Results

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Applications

Project Description

- Use machine learning to predict whether a user will buy something from our website.
  - Based upon data from their interactions with the sight.
- This would allow for…
  - Targeted Marketing Strategies
  - Dynamic Price Adjustments
  - Site and Marketing Optimization

Project Goals

1. The model will have a higher accuracy than 84.5%.
   a. The accuracy if the model only predicted no purchase
2. The model will be more likely to incorrectly predict that someone will purchase vs will not purchase.
   a. Reduces the chance that revenue opportunities are missed
3. Learn which aspects of the site most contribute to purchasing.

The Data

The Data

- 6165 user sessions on our website.
  - ~15% of which resulted in purchases
- Each session is described by…
  - **Number of pages** in different categories visited by the user (product page, info page, etc)
  - **Amount of time** spent on pages in each category
  - **Page Value** - the last page's contribution to making sales
  - **Time of the year** the session took place and holiday data
  - If the user is a **new visitor**
  - **User information**
    - Location, OS type, Browser, and Traffic Type

Methods

Machine Learning Models

Models Used:

1. XGBoost
2. Light GBM

- Both are top of the line machine learning models used for classification.

- Light GBM is faster and typically outperforms other models, but both were used for good measure.

- Many iterations were tried before selecting the final model.

Data Preparations

The data was split into three sections:

1. Training data
   a. Used to teach the model
2. Validation data
   a. Used to evaluate the model performance and help tune model parameters
3. Testing Data
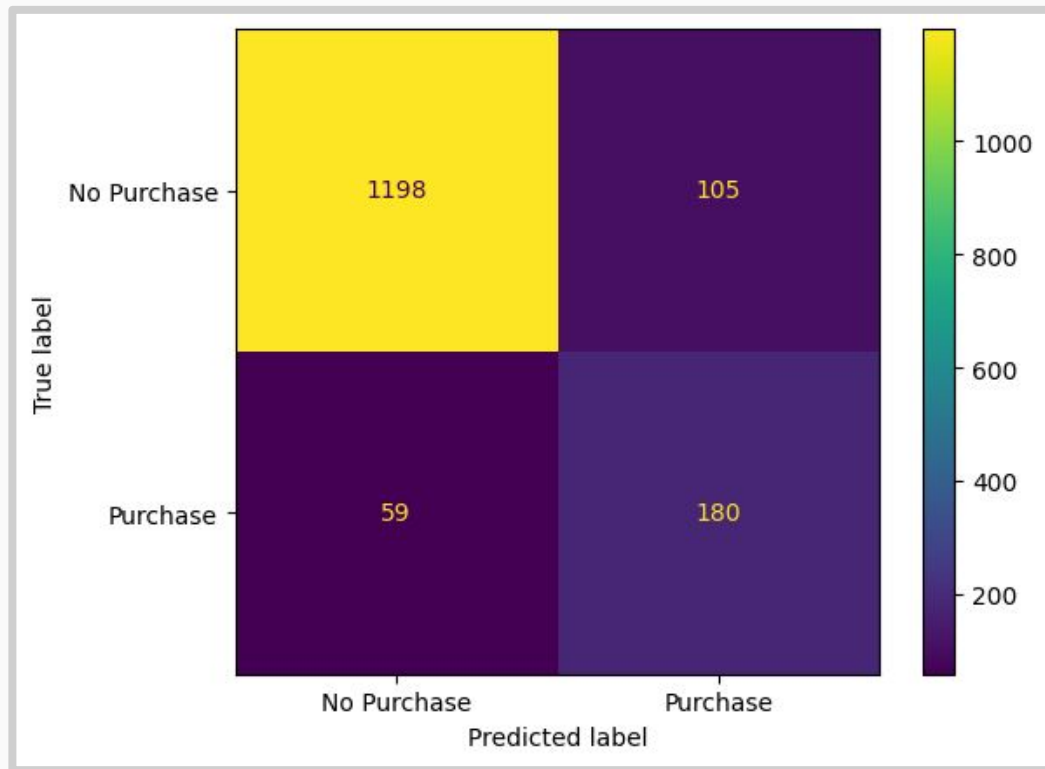   a. Novel data used to evaluate the final performance of the model

Results

93.76%

Accuracy calculated on novel testing data

Precision

The Model…

- Successfully predicts a majority of the purchases.
- Is more likely to incorrectly predict that someone will purchase vs will not purchase.

Important Site Features

- Page Value
  - Google analytics statistic on the amount that a page contributes to sales.
- Time spent on Pages
  - Product
  - Admin
- Traffic Type
  - (direct vs indirect)
- New Visitors
  - Is this their first time on the site?
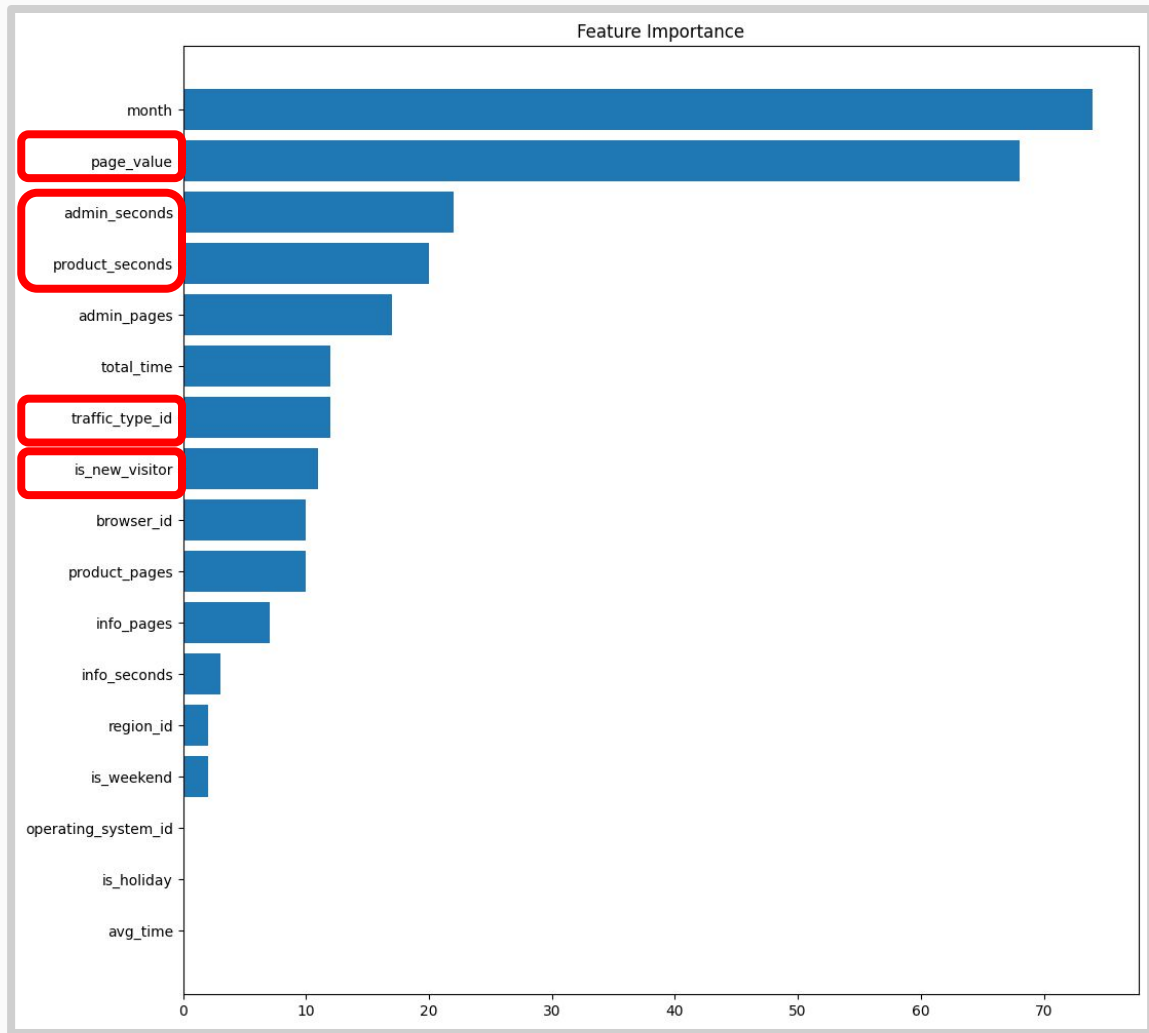
Applications

Targeted Marketing

- Use predictions to target our marketing efforts to users who are most likely to buy a product.
- For example,
  - Send personalized email campaigns
  - Display targeted ads to these users.

Dynamic Pricing

- Adjust the prices of products based on a user's likelihood to purchase.
- For example,
  - Offer discounts or promotions to users who are less likely to buy
  - Charge more for users who are more likely to buy.

Thank You!

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