Data Mining

Final Project

Predicting User Intent from Click Data

Context for this project

As a search marketer, I find myself looking every day at different data sources that describe the user journey across a website.

Google provides anonymous data on user behavior, from the keyword they used to find a specific page, to how long they stayed in it, to which page they jumped next etc.

Sometimes, it's hard to make decisions without understanding the correlation of the data.

The Problem

The problem: Can we predict the keyword intent from a user's click data?

Intent for the purpose of this research will be classified in "Low" "Mid" and "High" according to SEO industry standard data.

The Data:

Data Source: Google Data Studio

This data is a csv exported from an seo agency's Google Organic Search data. There's 1,000 rows of information on specific keywords, categories, clicks, impressions, click through rates, and conversions.

We can see this data set has the following columns:

- Keywords: the keywords or keyphrases users found to get to the agency's website.
- Category: the category of the topic of the keyword, if it's either about SEO, SaaS, Marketing, Link Building, if it's a Landing Page or other if it falls in another category.
- Clicks: clicks made to the page form the given keyword.
- Impressions: impressions to the page from a given keyword.
- CTR: % of users that clicked through the page after an impression.
- Position: the position of the page for a given keyword in Google's result page.
- Conversions: number of conversions for a given keyword.

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Data Transformation

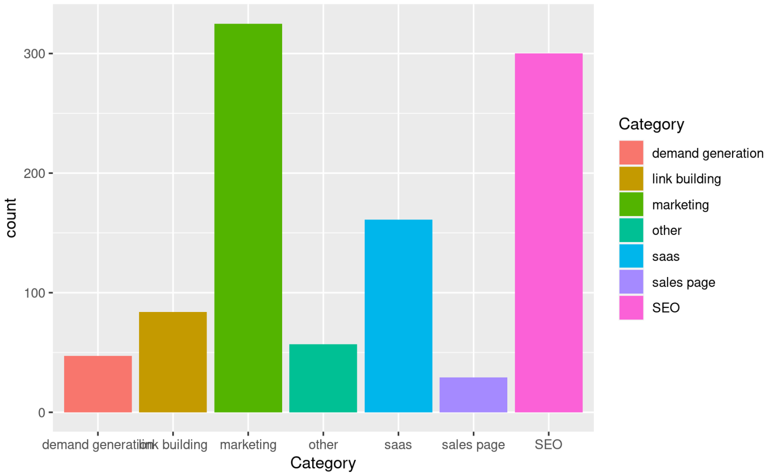
We transformed the data by adding a new column called “Intent”

Intent is classified the following way:

1. **High Intent:** keywords that include the terms best|agency|tools|consultant|consultancy” Users are looking to buy and make a purchase.
2. **Mid Intent:** keywords that include the terms "how|what|who|when|where|why|which” users have a navigational intent and are looking to solve a problem or get answers to a question.
3. **Low Intent:** all the others not classified in High or Mid

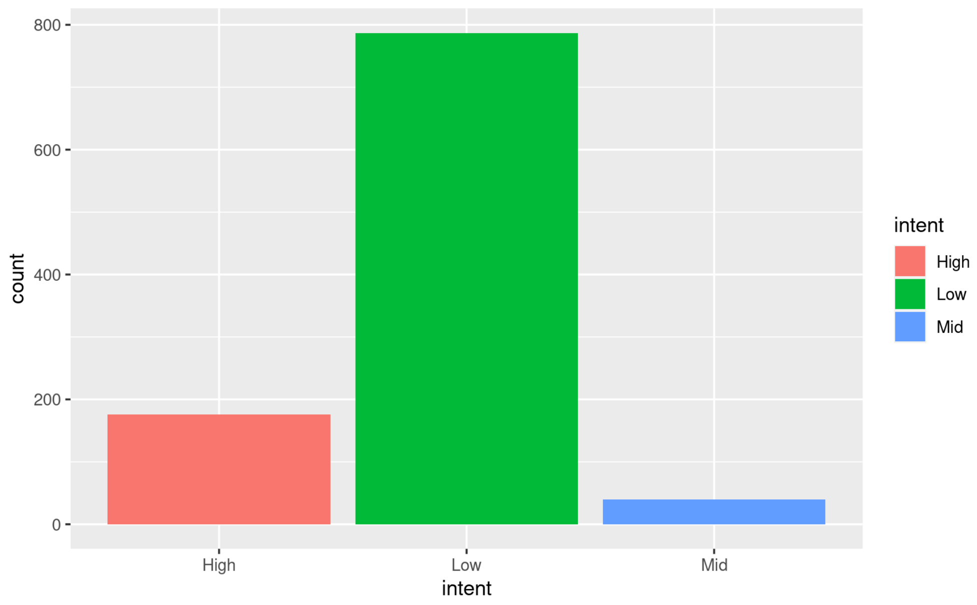
Data Visualizations:

Number of Keywords per Category



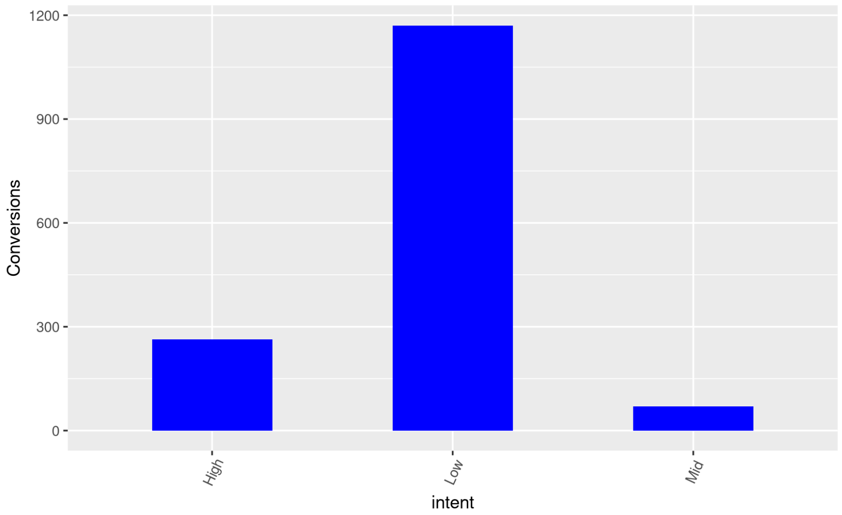
We can see here in this visualization that the Category with the most keywords is Marketing

Count for each type of Keyword Intent



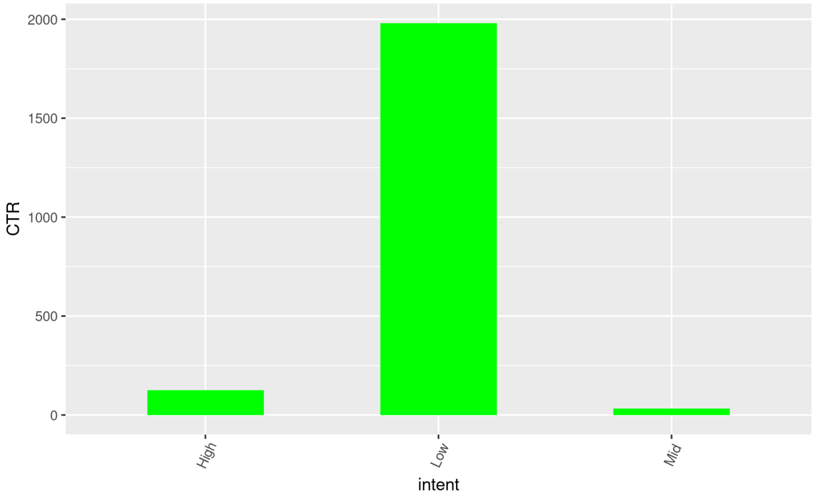
We can see form this bar plot that the intent with the most keywords is "Low"

Conversions per Intent

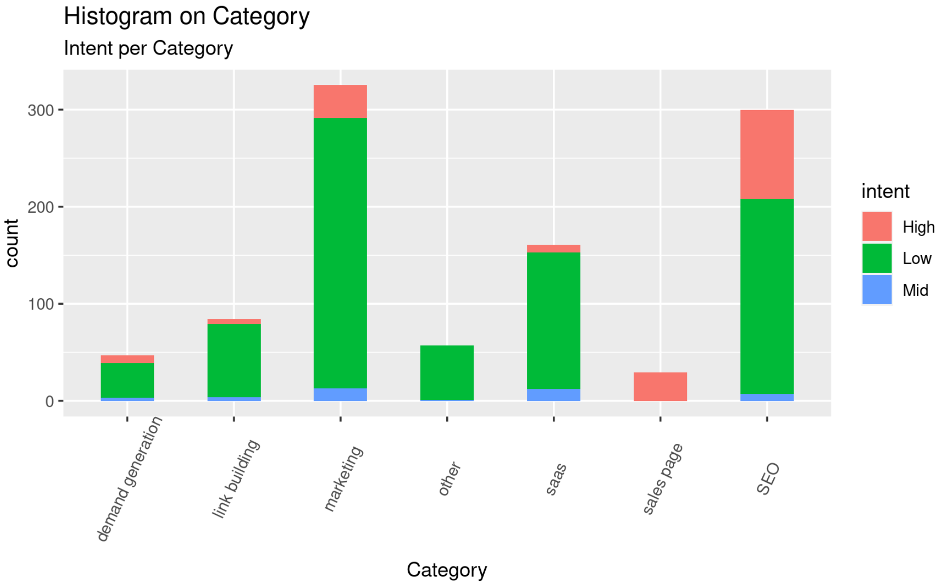


Since there are more “Low” intent keywords there are more low intent conversions.

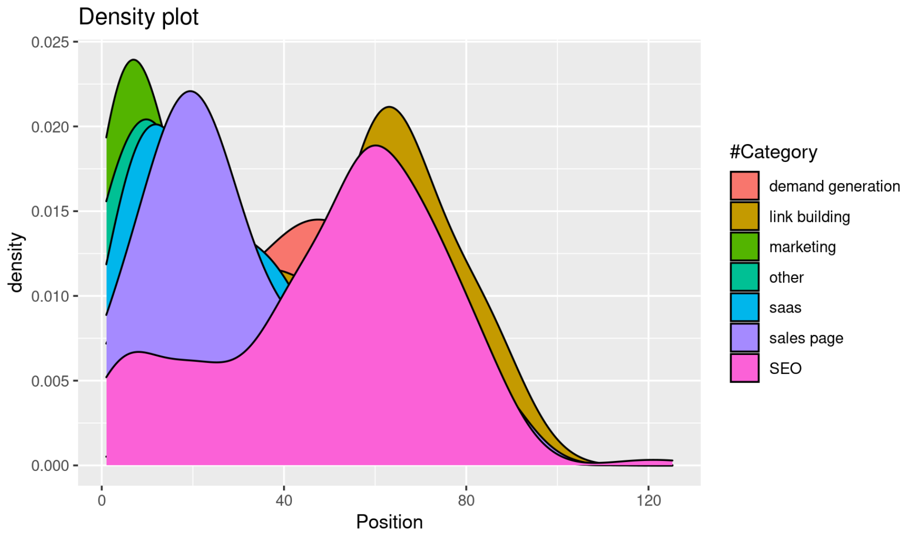
CTR for each Intent



The sum of all low intent keywords have the biggest CTR



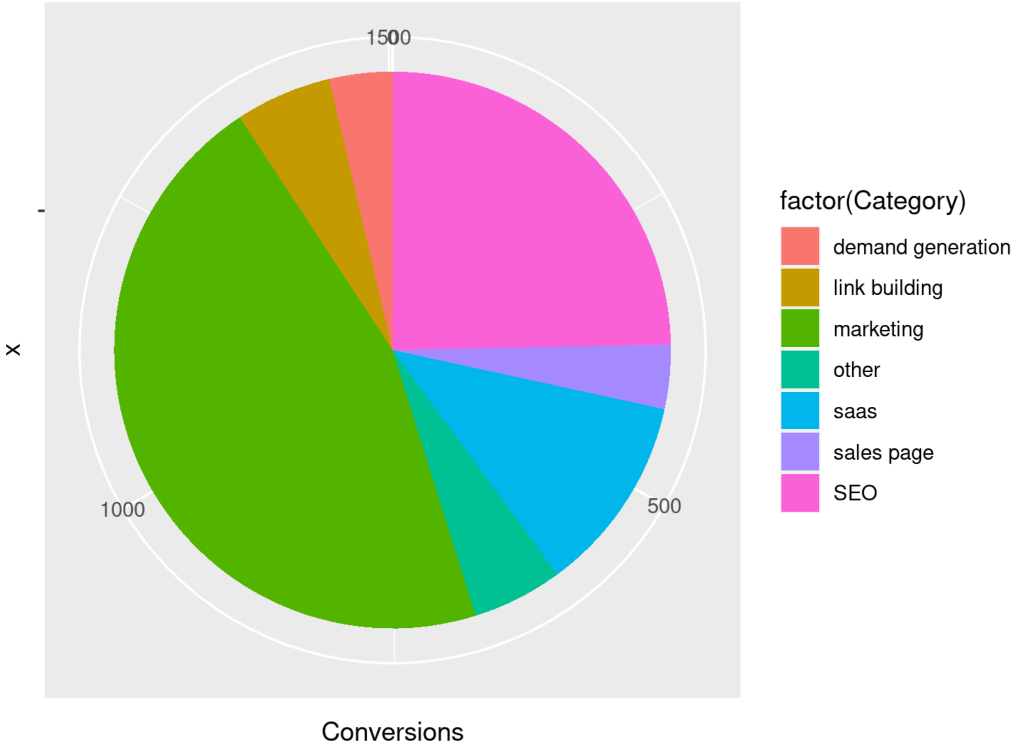
The keyword category with the higher intent is SEO



Source: agency

We can see here most Marketing keywords rank between 0-20
SEO Keywords Rank from 0 to 120

Category and Conversions Pie Chart



The Marketing Category takes most of the conversions.

Methods Used:

Linear Regression & StepWise Model

Linear regression attempts to model the relationship between two variables by fitting a linear equation to observed data. One variable is considered to be an explanatory variable, and the other is considered to be a dependent variable.Stepwise regression is the step-by-step iterative construction of a regression model that involves the selection of independent variables to be used in a final model.

For this model, the stepwise regression selected all of the variables.

Linear Regression RMSE: 6.311982
Stepwise Backward RMSE: 6.311982
Stepwise Forward RMSE: 6.311982
Stepwise Both RMSE: 6.311982

KNN

From the variables chosen by the on the regression method, I will create a K Nearest Neighbors model using the variables with the highest correlation and display the accuracy

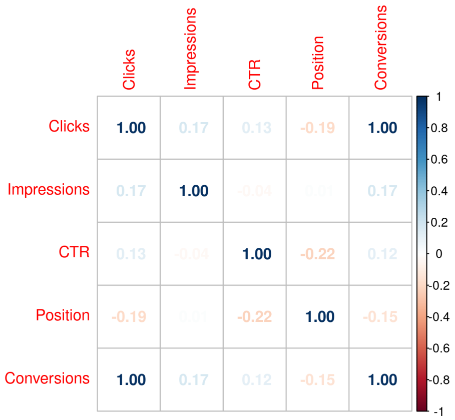
Although from part one, all Stepwise models output the same RMSE, used Stepwise Forward as it contains the least amount of variables.

Stepwise Forward

Variables Selected:CTR ~ Clicks + Impressions + Position + Conversions

Correlation Matrix

From the Correlation Check, I'm choosing Clicks and Conversions since they are highly and positively correlated



KNN Model

Variable1	Variable2	Variable3	Variable4	accurracy
<chr>	<chr>	<chr>	<chr>	<dbl>
Clicks	Position	Conversions	Impressions	0.7830424
Conversions	CTR	Position	Clicks	0.7381546
Clicks	Position	Conversions	Impressions	0.7531172
Conversions	CTR	Position	Clicks	0.7082294