Who is my target audience?

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Overview

Stakeholder:

Amy White, Marketing Manager

Business Problem:

Amy is tasked with identifying keywords and demographic information to use as part of a paid marketing push for an online class to improve your career.

She wants to target individuals making less than $50K a year.

Selecting a Data Set

US Census Data

- For this project, I chose a data set from Kaggle that came from the US Census. This data set has the following set of features:
- The original data set had 32,561 entries and 15 columns. The data set used here had 32,537 entries and 13 columns after dropping irrelevant information.

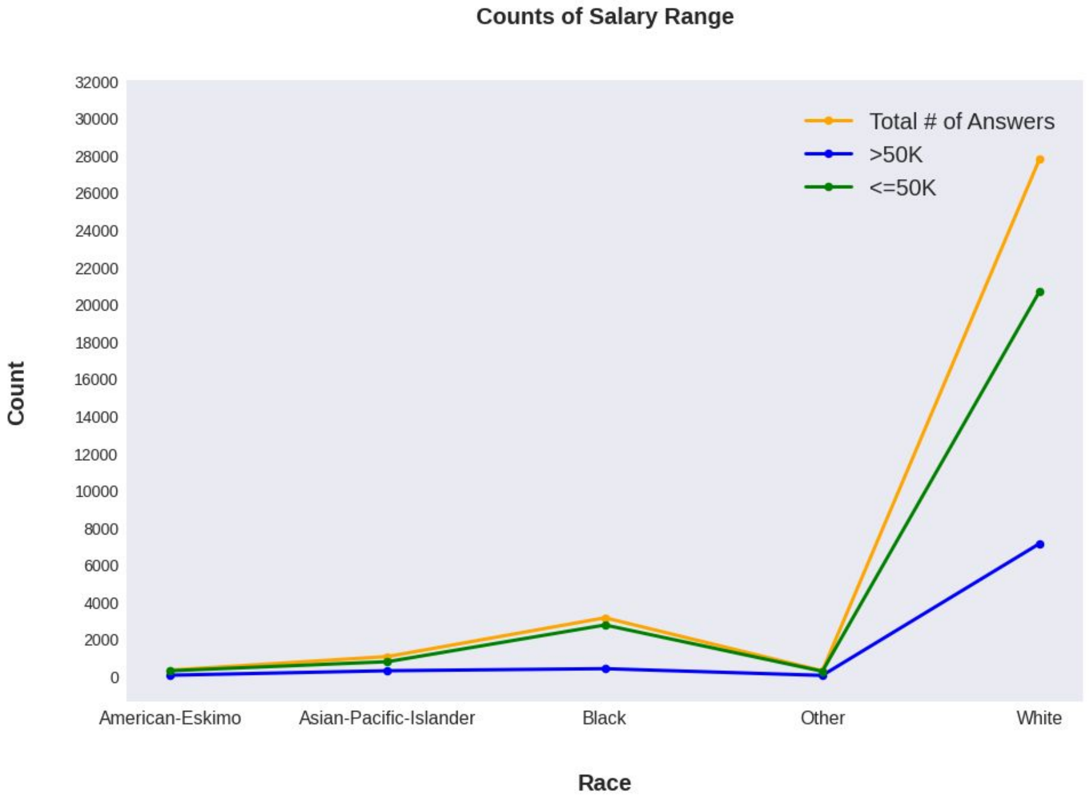
```
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   age             32537 non-null  int64
 1   workclass       32537 non-null  object
 2   education       32537 non-null  object
 3   marital_status  32537 non-null  object
 4   occupation      32537 non-null  object
 5   relationship    32537 non-null  object
 6   race            32537 non-null  object
 7   gender          32537 non-null  object
 8   capital_gain    32537 non-null  int64
 9   capital_loss    32537 non-null  int64
 10  hours_per_week  32537 non-null  int64
 11  native_country  32537 non-null  object
 12  outcome         32537 non-null  object
```

Visual 1 - Line Graph of Salaries by Race

This line plot represents salaries by race. This census data categorized salaries as either >50K or <=50K.

We can see there is a significant gap between the orange line and the blue line in this category, indicating that the overwhelming majority of black people represented here make less than $50K.

Ultimately what this tells us, is that race is not a strong indicator of salary and shouldn't be used as a keyword.

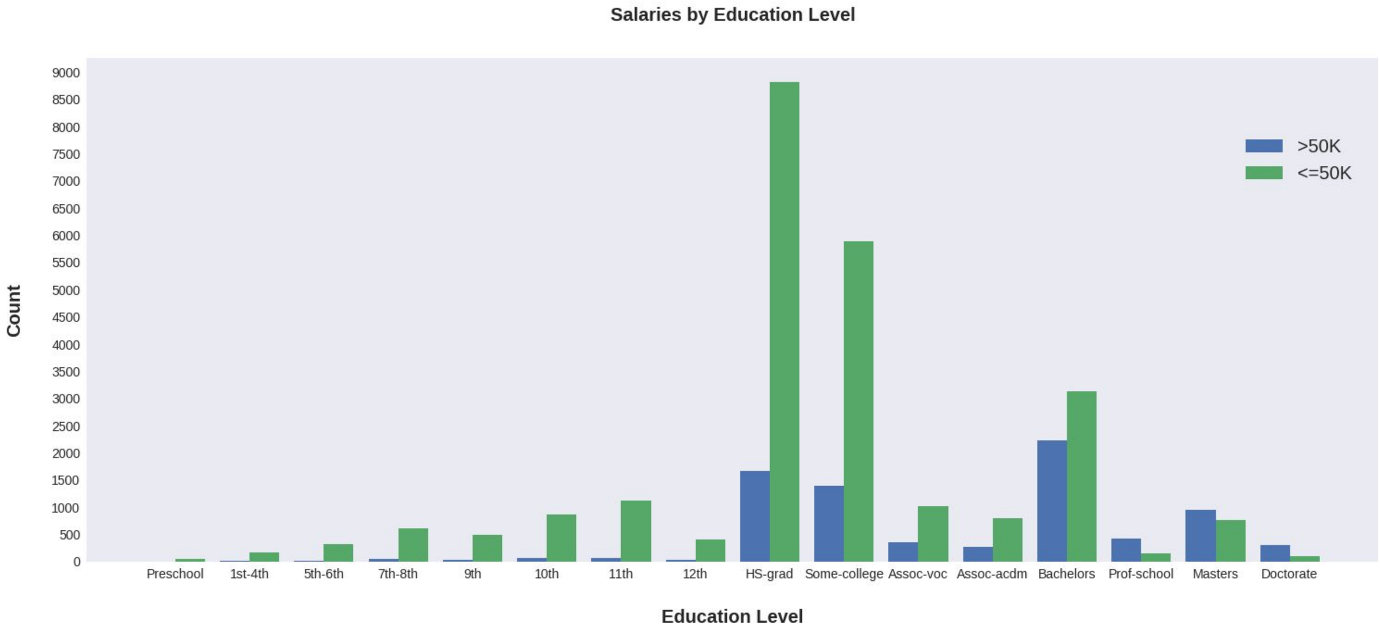


Visual 2 - Bar Chart of Salaries by Education

This bar chart represents salaries by education level. As we can clearly see it pays to stay in school! The highest concentration of salaries >$50K is from HS grad and beyond.

Prof school, masters, and doctorate, are the only columns where those earning >$50k outnumber those making <=$50K.

Meaning Bachelors degree and under will make the best keywords.

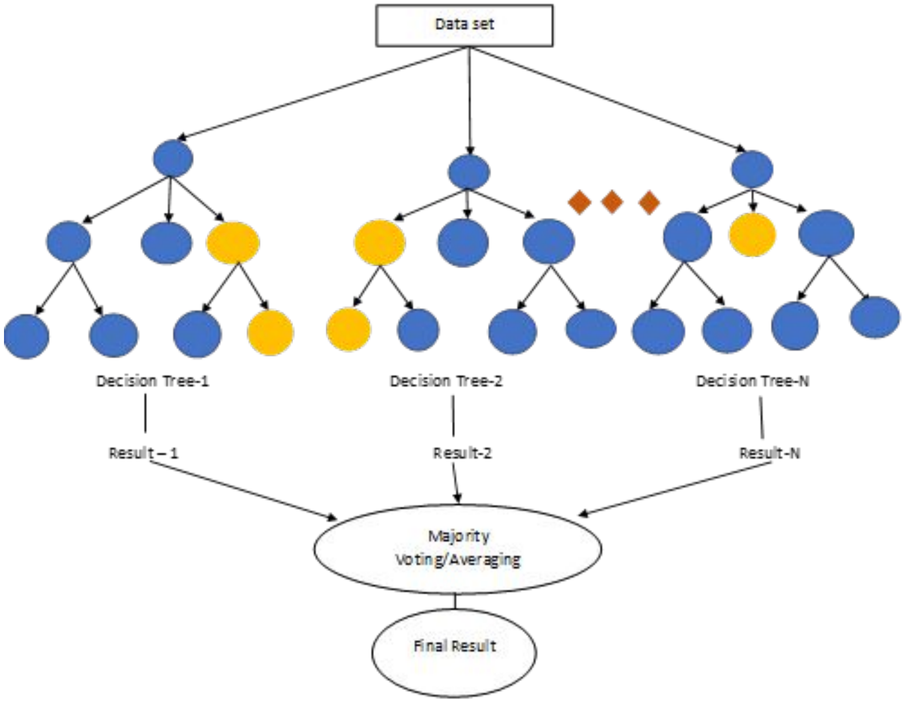


This visual gives us a much better idea of what keywords would be useful.

Machine Learning

Model - Random Forest Classifier

Using the insights gathered from the explanatory visuals, it was decided to build a Random Forest Classifier algorithm to find patterns throughout the data and predict whether or not someone makes <=$50K based off of demographic features.

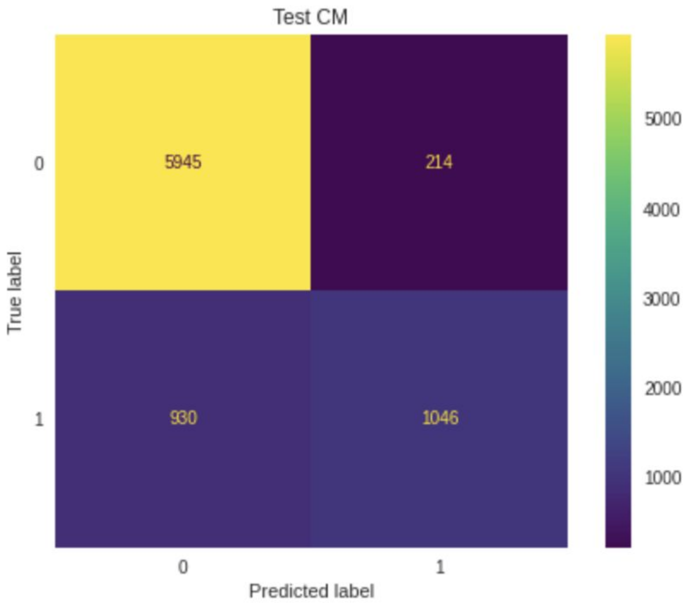


Performance Metrics

One strength of this model is that is scores highly in precision and accuracy on the <=$50K outcome set. Since this is the audience we are targeting, the performance on the >$50K outcome set isn't as important.

It was with this model we were able to achieve our highest number of True Negatives. A true negative in this case means that we predicted that they would make less than $50K, and in fact they do.

In summary, our model is 86% accurate when it comes to predicting if someone makes less than $50K.



Summary

1. This model can successfully predict whether someone makes less than $50K based off of demographic information.

2. Using a combination of education, workclass, and occupation features as keywords will result in the target audience.

3. Be cautious when using demographic data to ensure results are equitous.