Project Proposal

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```r
library(tidyverse)
library(tidymodels)

data <-read_csv("data/AB_NYC_2019.csv")

imdb_data <- read_csv("data/Imdb Movie New Data_v2.csv")
```

Introduction - Lila

- An introduction to the subject matter you're investigating (citing any relevant literature)
- Statement of a well-developed research question.
- The motivation for your research question and why it is important
- Your team's hypotheses regarding the research question
  - This is a narrative about what you think regarding the research question, not formal statistical hypotheses.

Data description - Eva

We obtained this data set from Kaggle, an online data science platform with a collection of community-developed open data sets. Here is the link to where we found the data.

This data was collected by **Anand Shaw** from the **IMDb website** using sites, and converted into a .csv file. The data was updated on a daily basis until 2 months ago.

This data set collects information available on the IMDb website for different movies, such that each observation is some characteristics of a specific movie. It measures the following **21 characteristics** per movie:

1. `id`: A unique identifier for each movie.

2. `title`: The name of the movie.

3. `vote_average`: The average rating the movie has received from users (on a scale, typically from 0 to 10).

4. `vote_count`: The total number of votes or ratings submitted for the movie.

5. `status`: The current state of the movie (e.g., "Released," "Post-Production").

6. `release_date`: The date when the movie was officially released.

7. `revenue`: The total earnings the movie made (usually in USD).

8. `runtime`: The duration of the movie in minutes.

9. `adult`: Indicates whether the movie is classified as adult content (e.g., "True" or "False").

10. `budget`: The total cost of producing the movie (usually in USD).

11. `imdb_id`: The unique identifier for the movie on IMDb (Internet Movie Database).

12. `original_language`: The language in which the movie was originally produced (e.g., "en" for English).

13. `original_title`: The original title of the movie in its native language.

14. `overview`: A brief summary or description of the movie's plot.

15. `popularity`: A metric indicating how popular the movie is (typically based on views, searches, or ratings).

16. `tagline`: A short phrase or slogan associated with the movie.

17. `genres`: The categories or genres the movie belongs to (e.g., Action, Comedy, Drama).

18. `production_companies`: The names of the companies involved in producing the movie.

19. `production_countries`: The countries where the movie was produced.

20. `spoken_languages`: The languages spoken in the movie.

21. `keywords`: Important terms or phrases associated with the movie, often used for categorization or search.

```r
glimpse(imdb_data)
```

```
Rows: 1,048,575
Columns: 15
$ title                <chr> "Inception", "Interstellar", "The Dark Knight", "~
$ vote_average         <dbl> 8.364, 8.417, 8.512, 7.573, 7.710, 7.606, 8.255, ~
$ vote_count           <dbl> 34495, 32571, 30619, 29815, 29166, 28894, 27713, ~
$ status               <chr> "Released", "Released", "Released", "Released", "~
$ release_date         <chr> "7/15/10", "11/5/14", "7/16/08", "12/15/09", "4/2~
$ revenue              <dbl> 825532764, 701729206, 1004558444, 2923706026, 151~
$ runtime              <dbl> 148, 169, 152, 162, 143, 108, 149, 139, 121, 154,~
$ adult                <lgl> FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, ~
$ budget               <dbl> 1.60e+08, 1.65e+08, 1.85e+08, 2.37e+08, 2.20e+08,~
$ imdb_id              <chr> "tt1375666", "tt0816692", "tt0468569", "tt0499549~
$ original_language    <chr> "en", "en", "en", "en", "en", "en", "en", "en", "~
$ popularity           <dbl> 83.952, 140.241, 130.643, 79.932, 98.082, 72.735,~
$ genres               <chr> "Action, Science Fiction, Adventure", "Adventure,~
$ production_countries <chr> "United Kingdom, United States of America", "Unit~
$ spoken_languages     <chr> "English, French, Japanese, Swahili", "English", ~
```

Due to the large size of the original data set, for the purpose of uploading this to our repository, we dropped the last characteristic, `keyword`, from the data set due to its redundancy, irrelevance to the research question and presence of a significant number of null values. So, our data set now contains 20 variables.

Data processing

- Description of data processing you need to do to prepare for analysis, such as joining multiple data sets, handling missing data, etc.

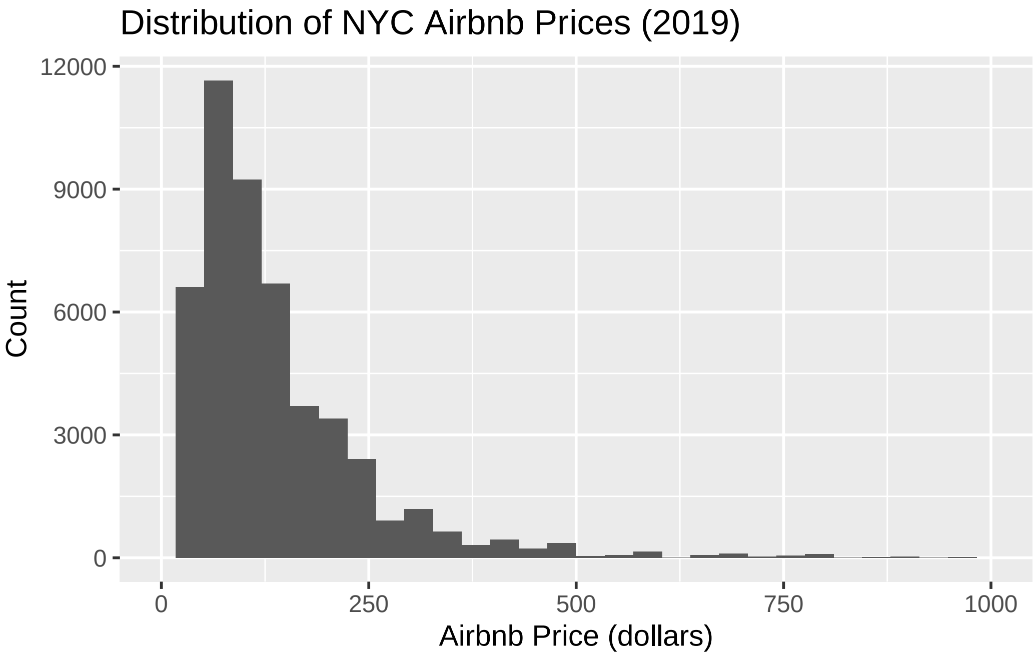
For the following New York City Airbnb dataset, to prepare the dataset for analysis, first, we need to consider missing data values within the dataset, eliminating observations that are incomplete across our predictor/response variables. The majority of these missing values appear in the last_review and reviews_per_month variables. Furthermore, we need to check for data inconsistencies in the quantitative variables by analyzing the summary statistics for the predictor variables and note whether there are extreme outliers that are improbable (ex. Airbnb prices of 0, unreasonably long minimum night Airbnb rentals). In addition, our categorical predictors, such as neighbourhood_group and room_type need to be converted to factors to allow us to use them in our regression analysis. Lastly, since our dataset describes all NYC Airbnb listings in 2019, there is a possibility of hosts with multiple Airbnb listings, and thus due to host dependency, we need to create a unique set of Airbnb listings by host_id to analyze the relationship between price and possible predictor variables.

- Visualizations, summary statistics, and narrative to describe the distribution of the **price** variable.

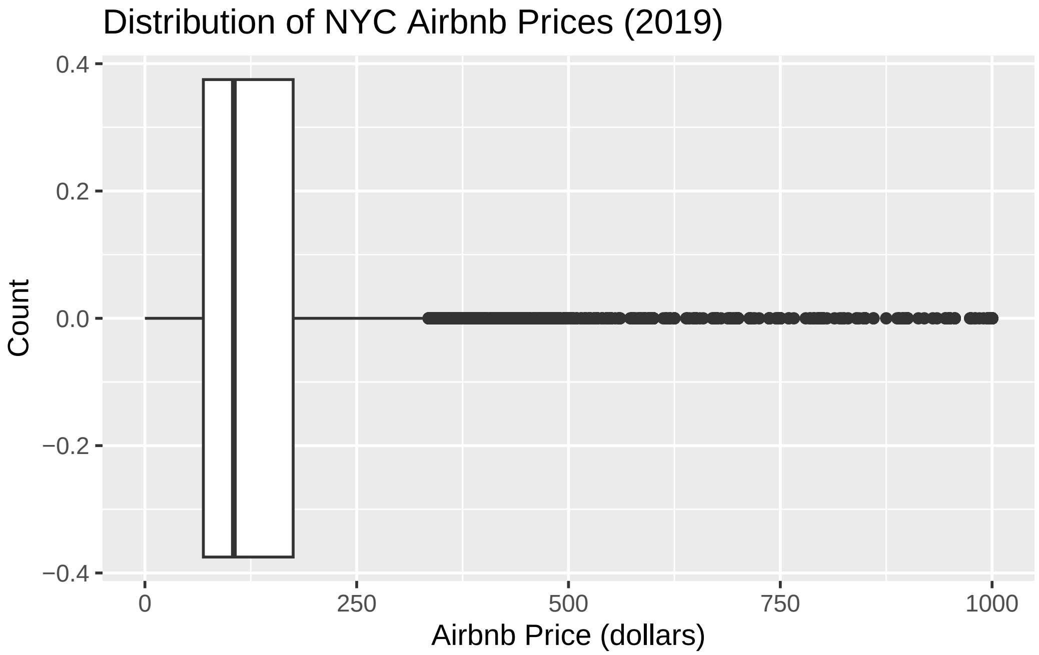
```r
summary(data$price)
```

```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
    0.0    69.0   106.0   152.7   175.0 10000.0 
```

```r
data %>%
  ggplot(mapping = aes(x = price)) +
  geom_histogram() +
  labs(title = "Distribution of NYC Airbnb Prices (2019)",
       x = "Airbnb Price (dollars)",
       y = "Count") +
  scale_x_continuous(limits = c(0, 1000))
```



```r
data %>%
  ggplot(mapping = aes(x = price)) +
  geom_boxplot() +
  labs(title = "Distribution of NYC Airbnb Prices (2019)",
       x = "Airbnb Price (dollars)",
       y = "Count") +
  scale_x_continuous(limits = c(0, 1000))
```



The visualizations describe that the distribution of NYC Airbnb prices in 2019 is heavily right-skewed and unimodal, indicating that although most NYC Airbnb prices are typically priced below 200 dollars, there are various outliers in Airbnb prices that are significantly more expensive. For the purpose of creating meaningful visualizations, we omitted Airbnb prices that are greater than 1000 in the figures. Furthermore, the distribution of Airbnb prices has a center of approximately 106.0 dollars, described by the median, and a spread of approximately 106.0 dollars, described by the interquartile range. There are multiple outliers in the dataset for prices greater than approximately 350 dollars, as shown in the boxplot visualization, as more high-end NYC Airbnbs have a significantly greater price. The majority of NYC Airbnb prices tend to be between approximately 50 and 200 dollars.

Analysis Approach - Hellen

- A description of the potential predictor variables of interest
- Regression model technique (multiple linear regression for quantitative response variable or logistic regression for a categorical response variable)

Data Dictionary - Hellen

The data dictionary can be found here [Update the link and remove this note!]