

Toronto Airbnb Prices

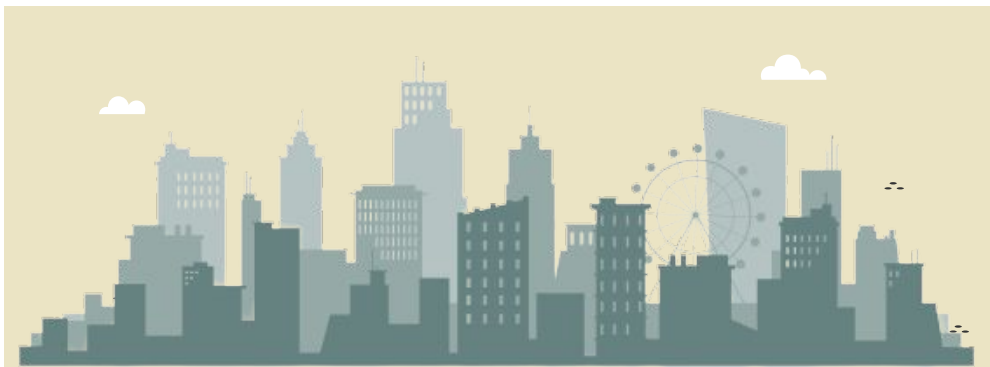
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April 6, 2022



Introduction

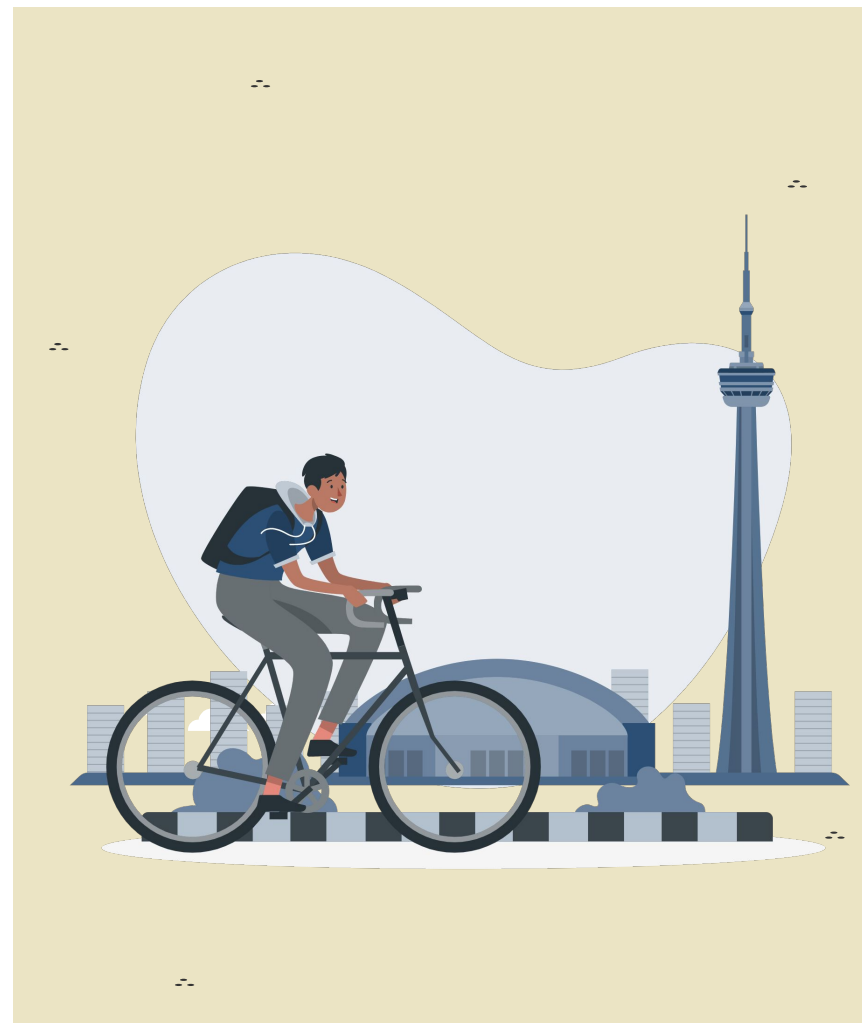
- The City of Toronto is the capital city of Ontario and is the most populous city in Canada (Statistics Canada, 2022).
- Has a vibrant tourism economy, attracting individuals from all over the world for business, arts and culture, music, etc.
- Airbnbs are great alternatives to traditional hotels.
- The objective of this analysis is to examine the factors that influence Airbnb pricing in Toronto.





Data

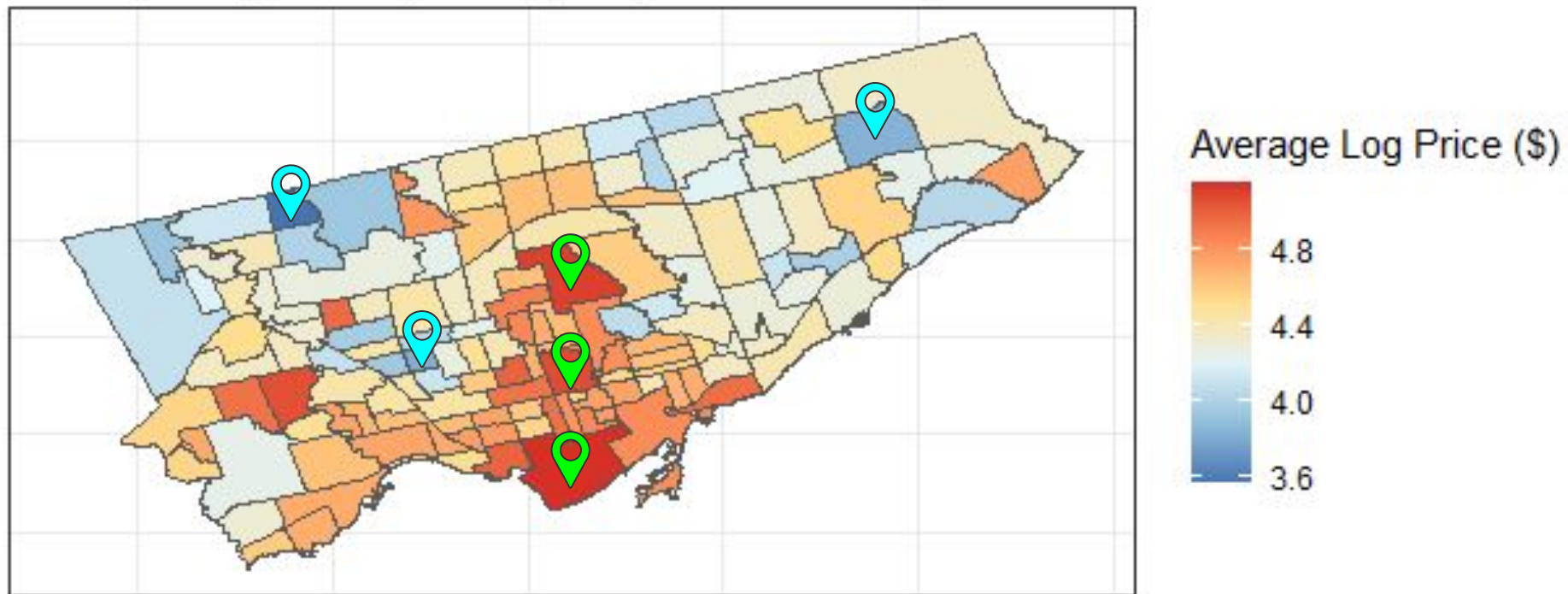
- Sourced from Inside Airbnb
- Compiled on December 5, 2021
- 15,261 listings
- Interested in modeling log price.



Available Variables

Listing Info	Host Info	Review Scores
<ul style="list-style-type: none">• Price• Neighbourhood• Room type• Bathrooms• Bedrooms• Accommodates• Availability	<ul style="list-style-type: none">• ID• Host since• Response time• Superhost• Listing count	<ul style="list-style-type: none">• # of reviews• Overall rating• Accuracy• Cleanliness• Check-in• Communication• Location• Value

Average Log Price per Night by Toronto Neighbourhood



Model

$$y_i | \alpha_{j[i]} \sim N(\alpha_{j[i]} + \beta^T x_i, \sigma_y^2) \text{ for } i = 1, 2, \dots, n$$

$$\alpha_j \sim N(\mu_\alpha, \sigma_\alpha^2), \text{ for } j = 1, \dots, J$$

$$\mu_\alpha \sim N(0, 1)$$

$$\sigma_\alpha^2 \sim N^+(0, 1)$$

$$\sigma_y^2 \sim N^+(0, 1)$$

$$\beta_k \sim N(0, 1)$$

Where:

- i is the observation number
- n is the total number of observations
- j is the room type number
- J is the total number of room types
- k is the number of covariates
- x_i is the vector of covariate data for observation i
- α_j is the room type level mean log price
- β is a vector of k coefficients corresponding to each of the covariates

Expected Results & Future Work

- Expect to see that the neighborhood the Airbnb is in, the type of room, and the variables regarding the listing itself would be the most influential on price.
- With more time, could try a second model: hierarchical model with mixed effects to allow for varying slopes.
- May be interesting to consider whether an additional bedroom/bathroom is worth more in different room types.
- Could compare the two models using LOO-CV.





References

Government of Canada, Statistics Canada (February 9, 2022).
"Census Profile, 2021 Census of Population".
www12.statcan.gc.ca. Retrieved April 02, 2022.



Thanks!

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