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# Background

- Initial idea
  - Predict how land values react to higher traffic volumes and subsequent changes in greenhouse gas emissions
  - Detailed data on emissions elusive
  - Data on study sites, particularly those outside Metro's jurisdiction, also elusive

### Background

- Revised idea
  - What affects land value?
- Hedonic regression
  - Way to estimate demand, value
  - Breaks dependent variable down into component parts
  - Land value reflective of demand generated by nearby transportation, pollution, and other factors

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# Model

• Basic Regression Model (univariate):

○ Y = mx + b

- Assumptions of linear regression
  - o Y and X variable(s) have linear relationship
  - $\circ$  Each X has normal distribution of residual error
  - $\circ$  Homoscedastic
  - $\circ$  No autocorrelation

### Method

- Data from RLIS November 2005
- Determine variables of interest

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## Method (continued)

MIXED FEATURE TYPES



 Use Near function to determine distances to selected features

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### Method (continued)



- Normalize variable fields using log or square functions in the *Field Calculator*
- Run Ordinary Least Squares tool to determine fitness of model

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### Results

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#### Results

- Our Model:
  - Y =  $1679x_1 6209x_2 + 19288x_3 + 262352x_4 + 4947x_5 1834712.4$
  - o Y = Total Value
  - $\circ$  X<sub>1</sub> = Distance to Freeway
  - $\circ$  X<sub>2</sub> = Distance to Cemetery
  - $\circ$  X<sub>3</sub> = Distance to College or University
  - $\circ$  X<sub>4</sub> = Building Square Footage
  - $\circ$  X<sub>5</sub> = Building Age
  - # = Intercept

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#### Conclusion

- We need a fast supercomputer
- Although roughly half of our dependent variable is "explained" by our model, other factors may make for better fits
- Our model does not fit assumptions of linear regression
- Random sampling would have been a better route for this analysis (100,000 samples)
- Would have been valuable to use univariate regression for each variable singularly to determine whether the variable was useful

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## **Potential Future Analysis**

- Use other independent variables such as
  - Distance to water bodies
  - Distance to city center
  - Incidents of violent crime
  - Weight schools based on test scores
  - Weight freeway based on traffic counts
- Include other locations such as neighboring counties
- Use different methods of regression and variable normalization

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## Questions



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#### References

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