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CS 396: Introduction to the Data Science Pipeline
Project proposal

Introduction:
COVID-19 has affected the livelihoods of millions of Americans, and consequently, their ability to to pay their rent. Under normal circumstances, this would result in mass evictions.

However, these are not normal circumstances, and as such, a national moratorium on evictions has been placed, which was recently extended through March of 2021. As of late December, it has been estimated that renters owe nearly $70 Billion in unpaid rent.

These two events are unprecedented, and as such, it is difficult to know how this affects housing prices in the short term. On one hand, a flood of residential housing would hit the market if the eviction moratorium were to be lifted, theoretically causing prices to precipitously fall. Courts could take substantially longer to process each new eviction given the existing backlog, potentially driving landlords to compromise with their tenants rather than face excessive legal costs.

On the other hand, asset prices in general have been buoyed by equally unprecedented monetary policy. M2, the measure of money stock which includes bank deposits, has ballooned by over 26% over the past year alone (roughly the amount it grew over the previous five years). In turn, treasury interest rates have dropped from 1.56% to 1.09%, making other asset classes such as equities and real estate far more attractive by comparison.

Finally, the whole situation is inextricably linked to politics, both federally and locally. Policy on either level could vastly shift the situation overnight, as public officials balk at the thought of thousands or millions of their constituents becoming homeless, and the resultant consequences for public health.

Due to this massive uncertainty, we are interested in answering the following questions:
- How has COVID-19 affected the housing market so far?
- How does this differ from region to region?
- How correlated are incidence rates with regional prices? Is this positively or negatively?
- Has buying (as opposed to renting) become more or less attractive? By region? Overall?

The overarching question is: “How have regional housing prices been affected by the COVID-19 pandemic?”

Proposed project:

We want to create a detailed heatmap of the United States that shows COVID-19 incidence and housing prices on as granular a level as possible, ideally by county, otherwise by region, state, or nationwide. We aim to allow users to view snapshots of this information over time (since January of 2020) via a slider.

Class datasets: Redfin, COVID-19
Other datasets: Zillow

In order to investigate this topic, we'll need data on both COVID-19 infection rates and housing prices in the United States.

For COVID-19 data, we will utilize New York Times' "Coronavirus Data in the United States" dataset. It features a dataset specifically filtered by counties, which will be very helpful in depicting COVID-19's direct impact geographically.

For housing price data, we'd like to use the Redfin dataset, but are having difficulty finding it. We will use Zillow's "Housing Data" dataset (which includes both buy and rent pricing information) instead in the short term, but data from both Zillow and Redfin if we are able. We'll take advantage of both Zillow's "Zillow Home Value Index" and Zillow "Observed Rent Index" (both of which reported at county level), tracking their change over time geographically as well.

Pulling these figures from the two datasets will allow us to better understand this relationship/gray-area between COVID-19 and housing prices. Examples of more specific questions we aim to be able to answer are listed below.

Evaluation/Metric:
We would gain a deeper understanding of the degree to which the pandemic has affected everyday people differently than it has affected investors. Upon completion of the project, we should be able to definitively say whether each of these statements is true or false:
- "Overall, rent payments have fallen x%, while real estate prices have risen y%, reflecting landlord's acceptance of a lower return on investment".
- "Housing costs in urban regions has fallen z% while remaining constant in rural areas"
- "Housing prices in affluent areas have actually increased, despite the overall trend of the market"

Potential impact:
People could see which regions have become more affordable, and investors could see which have become a better investment. Additionally, economists and public officials could understand the impact of the pandemic on regular people and investors, and craft policy to better serve the needs of their constituents.