**Propose a project.\***

All people age [citation needed]. However, many new challenges emerge with advanced age.

Over the last month, I have been volunteering my time with a startup company that has the goal of making “aging in place” easier for the elderly. Aging in place is the idea that, whenever possible, people resist moving to retirement homes or assisted living centers. This is borne out by research, which shows upwards of 78% of people over 50 years old want to remain in their current residence – see https://github.com/craklyn/DIChallenge/blob/master/Q3/IndependencePreferred.png. . Further, retirement homes and assisted living centers can be very expensive. Typical low-cost options in the United States can begin at $1,000 per month for independent living centers to $10,000 per month for skilled nursing homes. Consequently, if it’s possible to develop technology that helps people live independently longer, it will improve those people’s quality of life and limited budget.

The challenge, then, is to define technology that can be useful to elderly people at large. With this project, I want to understand the living conditions of the elderly. Additionally, I want to predict how these conditions will change in the future as the population’s age distribution shifts toward having a larger fraction of elderly people.

My goal is to understand current housing conditions, segmented by age. The hypothesis is that people choose to live in smaller housing as they age, enter retirement, and their children move out. This would make sense given that larger houses are more expensive, carry a larger property tax burden, and require more effort to keep clean and maintained. The aging occupants may also find some houses to be too difficult to live in due to being multiple stories, having basement or attic storage that cannot be accessed without stooping over, or having other properties that are challenging to individuals with limited strength, mobility, or cognition. The initial parameters to study versus age are house size, yard size, number of floors, and house/property value.

I am going to carry out my analysis on publicly available King County data. King County contains much of the greater Seattle metropolis, and this author’s home is found there. To do this analysis, I want to combine two separate datasets:

1- Washington State Voter Registration Database:

This database contains individuals’ names, birthdates, date of registration, and address. The final digit of the street address is anonymized. For example, 1234 N 56th ST is recorded as 123o N 56th ST.

(Unfortunately, the voter registration database is acquired by completing a webform and waiting for an employee to approve a download link. Since this project was begun on a October 28 (a Friday) and must be turned in by the following Monday, I did not receive approval before the project was due.)

Because the data is slightly anonymized, it is necessary to generate a distribution of values for houses that are consistent with a given anonymized address. For example, there may be 5 houses with addresses consistent with 123o N 45 ST. If the variance in these houses’ properties is significant, the analysis would not be very useful. It will require some exploratory work to decide how to choose small-variance districts that will give insightful analysis results.

2- King County Department of Assessments:

This database contains a wealth of information on houses in King County. It includes square footage by floor, by finished/unfinished condition, count of bedrooms, bathrooms and fireplaces, heating system, and so on. It also records the values of house appraisals and sales.

Because of the time limitations, I wasn’t able to make significant progress on this analysis. I hope that my solutions to the other data problems demonstrate that I have the capacity to complete this sort of data analysis.

Projecting into the future, the population age distribution is going to shift in a predictable way. Housing is less predictable. Due to rapid business expansion, many high-paid workers are moving to Seattle and all residential prices are rising at astronomical rates. Many neighborhoods are undergoing gentrification, and it’s unlikely that more one-floor, ranch-style houses will be available in the future. Given the hypothesis that elderly population will rise in a predictable way and housing that’s convenient for the elderly will decrease or remain the same, I will predict the future housing deficit, given current housing conditions.

Coming back to the original motivation for this research, I believe this analysis will be valuable to the “aging in place” startup. They are currently working on technology to help with early stage dementia in elderly who haven’t yet moved into assisted living yet. Their devices currently have the capability to monitor house conditions (such as whether the oven was accidently left on or whether the bathroom fan should run to prevent mold), prompts the tenant to complete regular activity such as taking medication, and contacts family members if the person leaves the house at an irregular time. Understanding the living conditions of people who use this technology now and in the immediate future will help drive the design of these products: In smaller houses, a single voice interface would work, whereas in larger houses, a distributed speaker/microphone arrangement is necessary. In smaller houses, fewer doors need to be monitored and the monitors can more easily be connected to a central computer. In larger houses, there are more hazards to monitor and more prompts to give the tenant. I believe that my work on this project will help in understanding the role of technology for elderly self-care.