

COMPSCI 2XB3: Binding Theory to Practice
Project Proposal

Project Title:	<i>LiveLong</i>
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By virtue of submitting this document I electronically sign and date that the work being submitted is my own individual work.

Abstract

Choosing a nursing home for yourself or a loved one is a difficult and stressful choice. *LiveLong* is an application that will help in your decision by presenting a list of nursing homes that fulfill your requirements for you to choose from, as well as warning you of any concerns that a nursing home is currently undergoing.

Using official U.S. government datasets provided by Medicare, *LiveLong* will provide information and warnings about any nursing home in its datasets. This information includes their current rating by residents, any previous abuse cases, and any safety deficiencies and warnings that are currently active on them and have yet to be resolved. *LiveLong* will also attempt to provide you with a list of nearby nursing homes, based on a search filter.

1. Objective

This project looks at the data of over 15,000 nursing homes in the U.S. and compares the closest x homes to your location. It will provide a ranking system, as well as list any warnings or deficiencies the nursing home has received from the government.

2. Motivation

Nursing homes are an important but inevitable choice for people requiring long-term care, either from old age, sickness, or any other affliction. People around them may not be always available to provide the support and care they need.

Choosing the correct nursing home is a very important part of someone's life – they'll likely be spending months to years in there, and there is a long waiting list to get in. (WebMD, 2018)

The target audience for this application are the people who are seeking long-term care for themselves or another person. This product will search for nearby nursing homes, and present them for the user to choose from.

The product should be able to provide a ranking system of nearby nursing homes, with any warnings or deficiencies applied on them by the government clearly visible for you to view.

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3. Prior Work

There are several information sources for people trying to find a good nursing home, but most of them encourages self-research and provides warnings on what to look out for when looking for one. Very few sources actively provide the user with several results upfront with government data backing their recommendations.

At the moment, much of the work in selecting a nursing home is through Google – in viewing the nearest one, checking their reviews, and comparing them with other nearby homes. The entire process is completely ‘manual’, in that all the work is done by the users themselves (National Institute on Aging, 2017).

However, there was one organization, “A Place for Mom”, that assisted in connecting you to ‘Senior Living’ advisors. These advisors would then help you in finding nursing homes with the services you required (A Place for Mom, n.d.). The website also provided information about nursing homes – what they do, the price, things to look for, and what questions you should ask when you visit.

The biggest difference between this service and my prospective product is the inclusion of government data on each of the nursing homes, as well as showing all nearby centres to your location, not just those connected to the organization.

4. Input/output and proposed solutions

1. Input

1. Fire Safety Deficiencies in U.S. Government Open Data, retrieved from <https://catalog.data.gov/dataset/fire-safety-deficiencies-61a6d>
 - a. List of all Nursing Homes with a fire safety deficiency currently active. Approximately 159,000 rows.
2. Health Deficiencies in U.S. Government Open Data, retrieved from <https://catalog.data.gov/dataset/deficiencies-02c11>. Approximately 365,000 rows.
 - a. List of all Nursing Homes with a health deficiency currently active

Both datasets can also be retrieved from Nursing Home Compare site, which is updated regularly (Nursing Home Compare, n.d.). The site also provides a list of over 15,000 nursing homes in its database, and a general rating about each of them.

2. Output

1. Data of Nursing Homes combined with any deficiencies
 - a. Combines dataset of complaints, warnings, and deficiencies to each nursing home in database
2. Ranking of nearest nursing homes, given your location
 - a. Gets the nearest x nursing homes in distance y kilometres from your location and lists them from best (least warnings/complaints) to worst (most deficiencies).

3. Solution

Start by processing the raw data. Using the information of all nursing homes in the datasets, process and store all information (address, into some data structure. Use search and sort to place nursing homes in a logical manner (i.e. Sorting by state, then by county, etc.). This will make it easy to use a search function later. It might also be feasible to create a graph of nursing homes in the same state, or of ones that are close to each other.

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Following that, find some way to 'tag' a nursing home with any deficiencies it has. I.e. Nursing Home x has a fire deficiency of code A but has no health deficiencies.

Finally, given some y location (presumably the user's location), a list of n nursing homes that is closest to y will show up. It will be ranked based on their current rating, and any deficiencies it has will also list under that nursing home. It may be feasible to also show how long a deficiency has been in place without being corrected (i.e. a longer time period before it was fixed may inflict a harsher decrease in the ranking).

5. Algorithmic challenges:

Algorithms that could be applied in this is:

1. Sorting – Used when processing the raw information and storing into some ADT. The current idea includes inserting/sorting by state, county, town, and then name. This type of method could make it easy to find a certain nursing home by a given address.
2. Searching will be used for finding a specific nursing home and returning it to a formula. It could also be used to find all nursing homes with a shared value, i.e. having one fire safety deficiency, finding all that are in this specific city, and so on.
3. Graphs – should be used in having an internal method of quickly determining the nearest nursing homes. If the user's location is in x state and in y county, we could have a graph of the states/counties as nodes, each being connected to another nearby state/county.

Starting from one node, we can check for all nursing homes in this area. If needed, we can then go to the next node and check for nursing homes there.

Some challenges:

1. Parsing raw data quickly and accurately
2. Connecting nursing homes (nodes) by their distance to one-another
3. Connecting nursing homes to deficiencies.

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6. Project plan

Week	Milestone	Deliverable
6	Presentation, Changes to Scope	<ul style="list-style-type: none"> - Present the proposal, change scope of project based on feedback from peers
Break, 7-8	Process Nursing Home data, Sort and Search	<ul style="list-style-type: none"> - Parse through and store raw data of all Nursing Homes in datasets given in some ADT (tbd). Sort by location, then name - Create longitude and latitude based on address - Create graph of counties. Have some way to connect them to the nursing homes ADT for better search method
8	Attaching deficiencies to nursing home	<ul style="list-style-type: none"> - Process through the Fire Safety and Health deficiencies datasets, apply them to their respective Nursing Home. - Sort and Search function should be complete
9-11	Finding nursing homes by location	<ul style="list-style-type: none"> - Given some location x, find the nearest n nursing homes. - Add a filter when finding (i.e. ranks) - Out of n, rank them based on the survey results and their deficiencies - Attempt connection to some map API to visually display results
12	Final touches, Testing	<ul style="list-style-type: none"> - Testing and debugging, checking for any areas that require attention - Work on visual map interface to show nearest n

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References

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