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**Project Initial Analysis**

1. What is the decision problem?

Major decisions like purchasing a house require comparing numerous alternatives based on what matters to the decision maker. Manually searching for homes and compare them along the same criteria is time consuming, and even websites with filtering and sorting options may still be overwhelming. We seek to be able to recommend relevant house listings to a decision maker to reduce search time and provide meaningful matches for potential new homes.

2. What is the context for the decision?

Buying a house in a major metropolitan area can be challenging. In addition to the financial limitations and ideal requirements for the kind of house, there are other supplemental factors than can play a role in this decision. Quality of life features like schooling, nightlife, restaurants, parks, public services, and major employers can also play a role. The factors weigh differently on our individual decisions while searching for a home and the generic filters in common real estate websites can only get so far. By eliciting the weights of which criteria are important for purchasing a house, our system will provide a ranked order of candidate homes based on what that individual cares about.

3. Who is the decision maker or system users? What are their upper level requirements for

the system?

The primary decision makers in mind are either new home buyers or real estate agents wishing to provide a curated selection of ideal homes for clients. The system must be able to pose questions or criteria to the decision maker, consult a curated dataset of home listings in the area, and provide a personalized list of home listings matching that criteria. The model is anticipated to consist of an attribute hierarchy with a dialogue system for entering weights.

4. What are the benefits of the system?

The unique benefits of the system include providing an ordered ranking of relevant home listings based on user criteria weights and unique criteria based on quality of life in neighborhoods that are relevant. A user will not have to decide for themselves which homes among thousands are most relevant. They will also have the advantage of choosing personal preferences that are not always found on popular real estate websites.

5. What are the system boundaries?

For this initial prototype, the system will be limited to listings in the D.C, Maryland, and Virginia area. Our team would like to keep the focus on a smaller dataset in a specific metropolitan area in order to not be spread thin. We will also limit the number of criteria the decision maker will have to make, both to reduce overwhelming the visitor and also to help us maintain a tighter focus and reduce ancillary datasets we will need to access. The final selection of criteria the user will choose from depends on what scope the team can handle as the weeks progress. Our iterative approach will give us the flexibility to drop or add features and attributes as we deem necessary.

6. Who are the stakeholders?

Stakeholders include homebuyers, real estate professionals, and the DC community. Homebuyers would value a self-service tool that they could enter their desired criteria for finding a new home and personalized ranked listings. Real estate professionals that already know their clients’ preferences can save time and efficiently provide local recommendations. The DC community, including residents and local business owners, would gain value from the prototype due to its regional focus. Residents can choose homes that meet their requirements and business owners can attract customers and renters to their neighborhoods.

7. What development approach will you use to develop the system?

We are currently considering a hybrid approach of waterfall and agile methodology to develop the system. We are planning to approach the data gathering/pre-processing, modeling, and front-end development in sequential order. However actual development of our tool may need to allow for iterative attempts in order to see what works. We have not yet committed to a particular development toolset, but we are considering spreadsheets, Python, and freely available decision support software.

8. What is your management plan for designing the system (who is going to do what and

what is your timeline)?

Our schedule is still a work in progress, but we plan on dividing the work across the coming weeks according to our project report deliverables. In about two-week intervals, our team will work on data collection and pre-processing, designing our model, developing our system, setting up a front end for users to interact with, and testing and evaluation our system. Our team all has similar backgrounds, so we are planning to split tasks equitably as we identify them. We have already assigned team members for each upcoming project report deliverable and presentation.