Homes.Design System Requirements

Feb 7, 2023

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Introduction

Henry Homes is an entrepreneur who runs Homes Corp., a company that assists clients in redesigning their homes. With the recent advances of AI technology, Homes would like to create a platform titled Homes.Design that reduces the cost of hiring interior designers and automates the interior design process. The AI will render reimagined interior spaces using textual inputs

and photographs of the client's original space, along with links to available furniture featured in the redesigned space.

Overview / Executive Summary

The Engineering Co. will contract a software that uses advanced AI to render redesigned images of a living space, given textual input of what the space should look like and photos of the original space. The AI will reduce the cost of hiring interior designers.

Application Context / Environmental Constraints

Homes.Design is a web-based platform that will rely on customer input for specifications. Users will need to create accounts to use the platform and save their renderings. Any purchases made from the platform will be made through affiliate links, so Homes.Design will not handle any transactions. Profits will be gained through web advertisements as well.

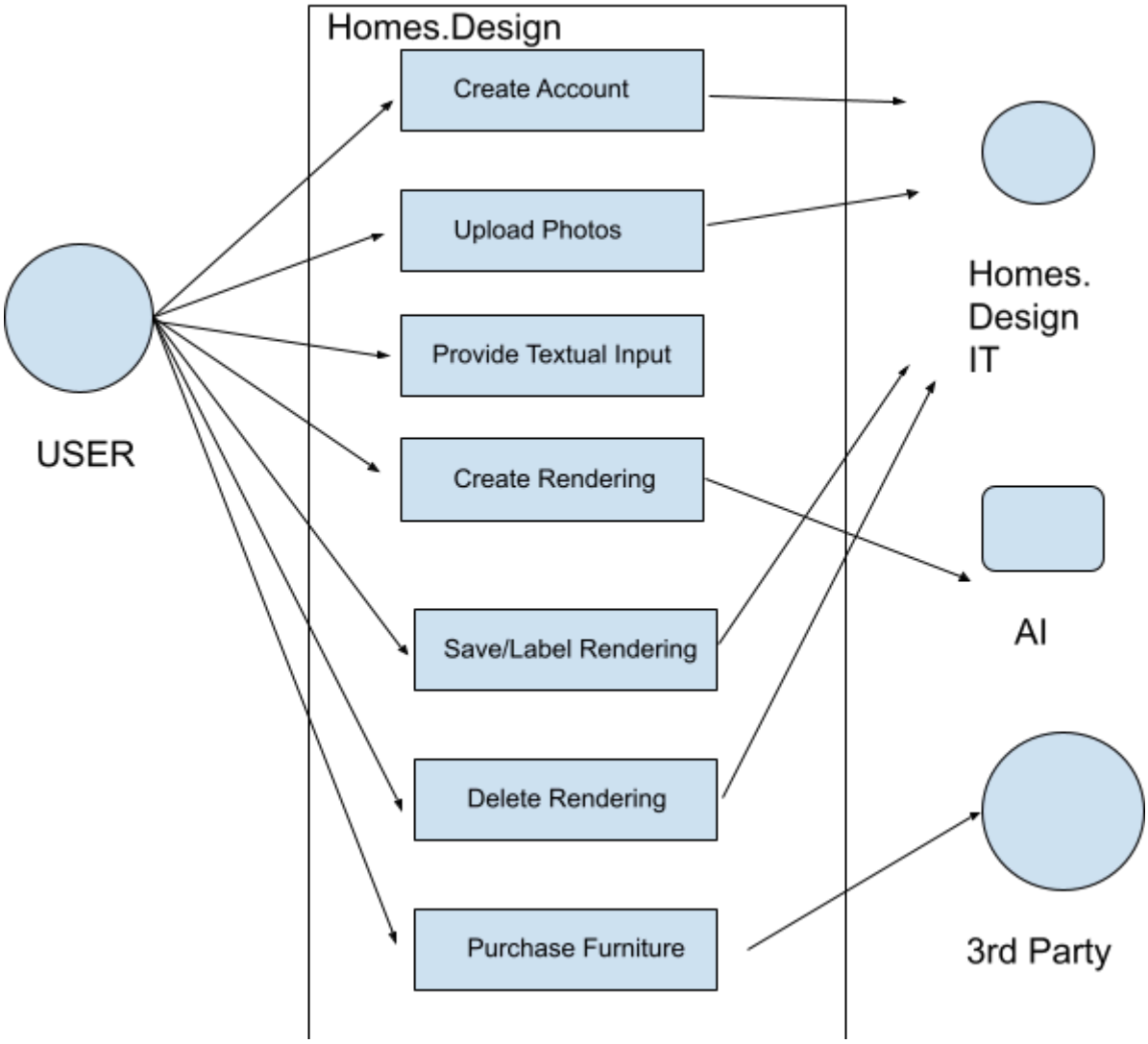
Homes.Design provides only one interface, accessible through users creating an account.

Functional Requirements

When a user first enters the Homes.Design website, they will be prompted to make an account or log in before accessing any of the site features. If the account is not created, they cannot do anything on the site. After creating the account or logging in, they will be able to start a new session to design their living space. If applicable, they can also resume an existing session or delete a session. At the start of the session, the user will be required to upload a floorplan of the space they want to remodel, and take multiple photographs of that space with specified markers. They need to specify measurements and bounds of the space. After these photos are uploaded, they are ready to start redesigning the space. The user will see a text field that says “Ask me anything,” through which they can provide textual input as to what they would like to see in their rendering of their new space.

Afterwards, the AI will generate a new space while taking into account existing furniture from the photos provided and have the ability to understand what is replaceable with new furniture as opposed to what is a permanent fixture in the living space. The rendering will feature furniture that is available in the Homes.Design inventory, which users can purchase through affiliate links provided on the website. Should they want to purchase them, they can click on the affiliate links and be redirected to a 3rd party site. The Homes.Design website should be designed such that the furniture featured the most in renderings should be those that will provide a higher profit margin for Homes Corp.

Users should be able to save renderings that they like and provide them labels. In the event that users revisit older renderings, if the furniture they saw is no longer available for purchase, the site will inform them that the item is out of stock and provide alternatives. However, if the user does not like the rendering, they can prompt the AI to create another one using additional text input or no input at all. In the event that no input is provided, the AI will randomly generate a new rendering.



Software Qualities and Non-functional Requirements

- Profitability
    - The algorithms implemented should maximize profitability for Homes.Design. The algorithm should promote furniture that yields a higher profit margin, compared to furniture and features that are less profitable.
- Usability

    - The platform should feel fun, inviting, and easy to use for the user. The UI design should be intuitive and aesthetically pleasing.

Other Requirements

- Budget: $1,000,000 for the first version of Homes.Design. Future versions will be allowed an additional $1,000,000.
- Profit: Homes.Design will generate profit through advertisements on the website and affiliate links.
- Interface: There is currently only one interface, accessible through making an account on Homes.Design.
- Scope: Accessible to the general public, but cannot accommodate visually impaired individuals.

Assumptions / Risks

- The website will not account for those who are visually impaired.
- Robust security and privacy protocols are crucial, since users will be uploading images of their private living spaces.
- Given an affiliate link that will take the user to a different site, there is a risk that Homes Corp. will be cut out of any business transactions, should the user contact the seller directly.

Priorities / Implementation Phases

The platform should be first hosted as a website. Users should be able to upload photographs of their living space from multiple angles with specified boundaries and measurements for each photograph. Users will need to specify where landmark locations are (ex. Point A, Point B) to prevent skewing from the rendering perspective. The website will implement crawlers to gather furniture listings from other retailers, such as IKEA, Amazon, and so on, to create an inventory of available furniture on Homes.Design. The inventory will include a picture and dimensions of the available furniture.

Homes.Design should prioritize profitability, ease of use, creativity, and engagingness to the user.

Future Directions and Expected Changes

- Implement a “marketplace” through which users can sell furniture. Sellers must upload pictures of their furniture with a description. Homes Corp. will gain a percentage of the profits.
- Implement a walkthrough rendering. Rather than viewing a rendered space in a 2D fashion, users will be able to view renderings through a 3D rendering that allows them to click around a space (similar to a first-person video game), or even use VR goggles (virtual reality goggles) to view a space immersively. Viewing renderings in AR (augmented reality) is also in consideration instead of VR.