THE GEORGE WASHINGTON UNIVERSITY
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Dynamic Generation of Interior Building Models, Given A 2D Floor Plan

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Motivation

- 1,200,000 Residential construction projects in the US in September 2017
- 217,000 SketchUp Interior Designers
- Many man-hours and dollars spent to create interior models.

Objective

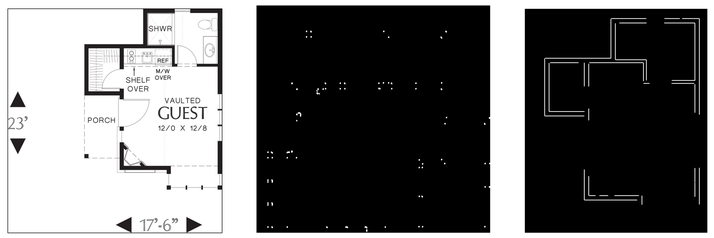
Reduce time and cost associated with building 3D models and to make them more accessible to the general public. By automating the entire process, users will no longer need to have the technical expertise necessary to operate CAD software, and will be able to view these buildings in webVR for a virtual walkthrough.

Background

Current processes for turning floorplans into 3D models is entirely and involves Automated Computer Assisted Design (AutoCAD) software as well as the technical expertise to operate such software.

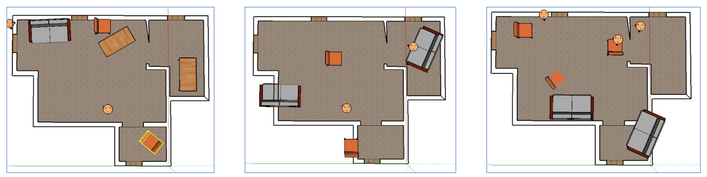
Methods

- Use computer vision to pull data from 2D image of floor plan.
- Format data in order so that a model can be created with it.



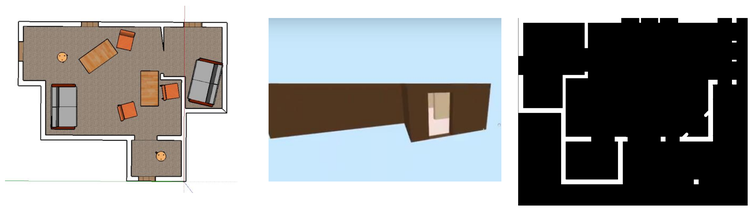
- Create a 3D model of the building

- 500 times: Randomly add furniture and assign a cost to the arrangement based on furniture placement and golden ratio in interior design principles.



- Select the best arrangement

Results



- An interactive webVR experience was created for naïve furniture placements, after corner points were used properly.

Conclusions

- Interactive models can be generated dynamically.
- The process of creating the model can be automated from an image of a floor plan to using the model in webVR.
- More research is needed on the ability of A.I. to create aesthetically pleasing designs.

Market Impact

- Cost of a modeled interior could be brought down from $1500 to $5 each iteration.
- Over 5 Million models created in a year.