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Abstract

In order to purchase new flooring for a room, the room's floor space must be estimated. This is a timeconsuming process, with sometimes inaccurate results. We propose a mobile application, "sqft," which allows a user to take a panoramic image of a room, and receive back an estimate of the room's floor area. We have accomplished this by utilizing a deep neural network. Our application allows the capturing and importing of images, and the management of taken estimates.

Features

- Mobile application for iOS and Android
- Ability to estimate floor space from single panoramic image of a room
- Ability to take photos within the mobile app
- Ability to manage and organize photos and their associated floor space estimates
- Backup and synchronization through the cloud
- API to store and handle images and estimates

Architecture







Machine Learning

- Created convolutional neural net regression model to estimate floor space from single panoramic RGB image
- Trained and tested model on Structured3D dataset, which consists of 21,838 computer renders of residential interiors [1]
- Augmented dataset to include reflections and rotations of different images
- Wrote custom training loop and data loader to manage large dataset

syntax error



Example of an image from Structured3D dataset [1]



- image capture
- world data





Thanks to Dr. Scott Simmons for support with deep learning research and development.





Achieved 77.7% accuracy on computer rendered test data from Structured3D dataset

Model architecture: Regression model with three convolutional layers each with max pooling kernel size 2, followed by three fully connected layers

Future Work

• Further improve machine learning model through transfer learning to real-world data

Integrate support for a 360 camera for panoramic

Assess accuracy of machine learning model on real-

Add support for multiple users in mobile app

References

[1] Zheng, Jia, et al. "Structured3D: A Large Photorealistic Dataset for Structured 3D Modeling." arXiv preprint arXiv:1908.00222 (2019).

Acknowledgements