

# Automatic blueprint and 3D model view of room

Obtaining a 3D model of a room or facility is today a rather expensive process due to the expensive camera equipment required. In this thesis it has been shown that it is possible to obtain a precise 3D model of an indoor space, using nothing but a smartphone for capturing images and a computer for making the calculations required.

This thesis focuses on the use case of where a 3D model of a grocery store is constructed. The two major reasons for specifically choosing a grocery store were first, that the majority of grocery stores already have an integrated camera surveillance system which makes the process of live updating changes to the 3D model possible and secondly because it is terribly difficult to manually measure up a grocery store due to its large number of alleys.

The idea is that the intended user has two choices; either go around the store capturing a picture every meter or to simply videotape the store. Capturing images will lead to a slightly more precise 3D model, but the process will become more tedious than videotaping. Afterwards the pictures or videotape will be uploaded to a computer and the calculations performed. The user will then be able to run a GUI program with the options of either displaying the store in 2D or 3D. The program offers several usable features such as 2D and 3D measurements, view points of hypothetically placed surveillance cameras, item removal check (if the user has access to live surveillance footage) and a good 3D overview for floor planning.

By succeeding in constructing a prototype program like this, the potential of SfM (structure from motion) has been proven for commercial use. This technique could be used for any purpose where it would be beneficial to know the exact geometry of a room. Another area of use could be where homeowners measure their homes in order to virtually plan their next kitchen, which furniture to fit where or simply just to receive a blueprint over their house.

