

Corner Cameras

February 22, 2017

Abstract

One of the oldest ideas in photography is that of the *pinhole camera*: by passing light from a scene through a small hole, we get a reversed two-dimensional projection of the scene. In this paper, we describe using other occluder patterns to image scenes. In particular, we explain how to exploit the natural occlusions present in the real world near corners and doorways. This yields a simple and practical approach for seeing around corners in a variety of common real-world scenarios.

1 Introduction

2 Corner Camera

The simplest idea presented in this paper, and the inspiration behind all the others, is the corner camera. Imagine that the viewer is behind the corner of a building, and wants to know what's going on beyond the corner. The viewer could look at the ground in front of her and just short of the corner, and use the information on the ground to infer information about the scene beyond. Figure 1 illustrates the situation.

2.1 How to include Figures

First you have to upload the image file from your computer using the upload link the project menu. Then use the `includegraphics` command to include it in your document. Use the figure environment and the caption command to add a number and a caption to your figure. See the code for Figure ?? in this section for an example.

2.2 How to add Comments

Comments can be added to your project by clicking on the comment icon in the toolbar above. To reply to a comment, simply click the reply button in the lower right corner of the comment, and you can close them when you're done.

Comments can also be added to the margins of the compiled PDF using the `todo` command, as shown in the example on the right. You can also add inline comments:

This is an inline comment.

Here's a comment in the margin!

2.3 How to add Tables

Use the `table` and `tabular` commands for basic tables — see Table 1, for example.

Item	Quantity
Widgets	42
Gadgets	13

Table 1: An example table.

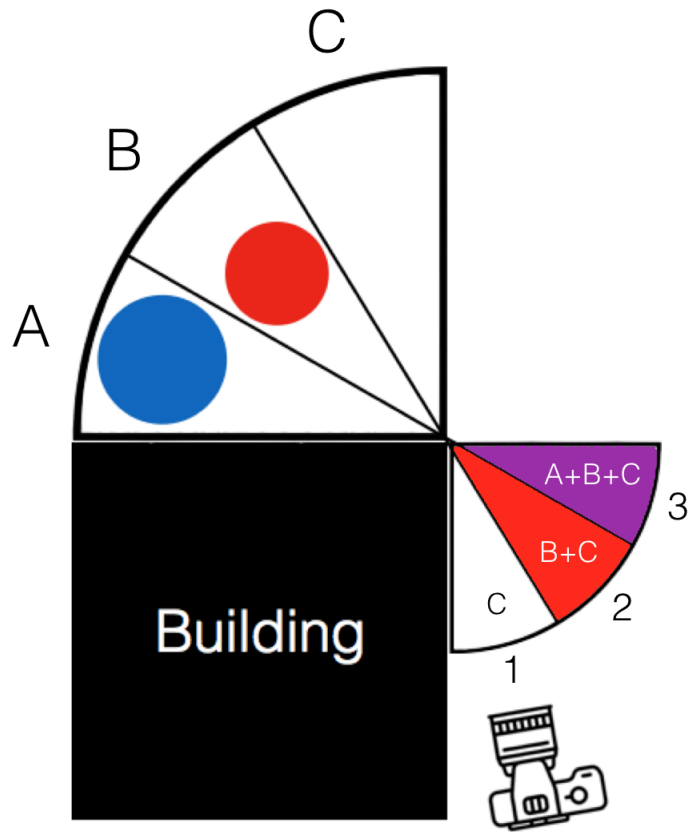


Figure 1: In the above image, the viewer behind the corner is interested in what's in zones A , B , and C , but can only see what is directly in front of her: zones 1, 2, and 3. Only Zone C is visible from Zone 1, Zones B and C are visible from 2, and all three of A , B , and C are visible from 3. This means that by subtracting the light in 1 from 2 and in 2 from 3, the viewer can infer the presence of a red object in Zone B and a blue object in Zone A .

2.4 How to write Mathematics

L^AT_EX is great at typesetting mathematics. Let X_1, X_2, \dots, X_n be a sequence of independent and identically distributed random variables with $E[X_i] = \mu$ and $\text{Var}[X_i] = \sigma^2 < \infty$, and let

$$S_n = \frac{X_1 + X_2 + \dots + X_n}{n} = \frac{1}{n} \sum_i^n X_i$$

denote their mean. Then as n approaches infinity, the random variables $\sqrt{n}(S_n - \mu)$ converge in distribution to a normal $\mathcal{N}(0, \sigma^2)$.

2.5 How to create Sections and Subsections

Use section and subsections to organize your document. Simply use the section and subsection buttons in the toolbar to create them, and we'll handle all the formatting and numbering automatically.

2.6 How to add Lists

You can make lists with automatic numbering ...

1. Like this,
2. and like this.

...or bullet points ...

- Like this,
- and like this.

2.7 How to add Citations and a References List

You can upload a `.bib` file containing your BibTeX entries, created with JabRef; or import your [Mendeley](#), CiteULike or Zotero library as a `.bib` file. You can then cite entries from it, like this: [?]. Just remember to specify a bibliography style, as well as the filename of the `.bib`.

You can find a [video tutorial here](#) to learn more about BibTeX.

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