

CS4620/5620: Lecture 23

Texture Mapping

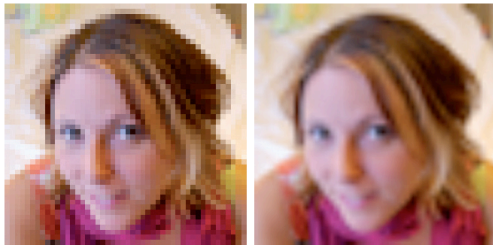
Another definition

Texture mapping: a general technique for storing and evaluating functions.

- They're not just for shading parameters any more!

Texture mapping from 0 to infinity

- When you go close...



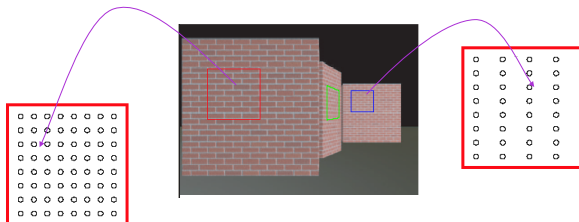
When viewed from a distance

- Aliasing!

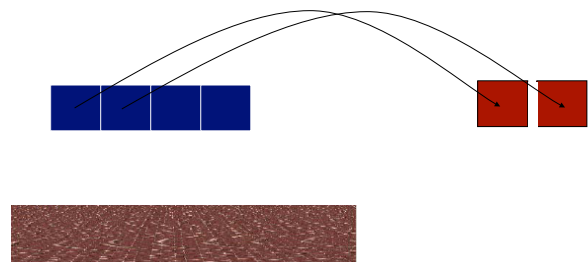


What is going on?

- Image-based texture mapping is resolution dependent



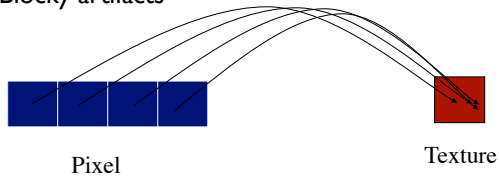
Point Sampling



- From far away
- Scintillating artifacts over multiple frames

When viewed closer...

- Nearby pixels all lie in same texel
- Blocky artifacts

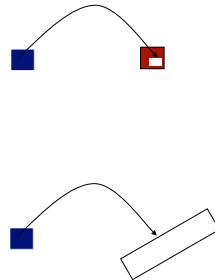


What is really the issue?

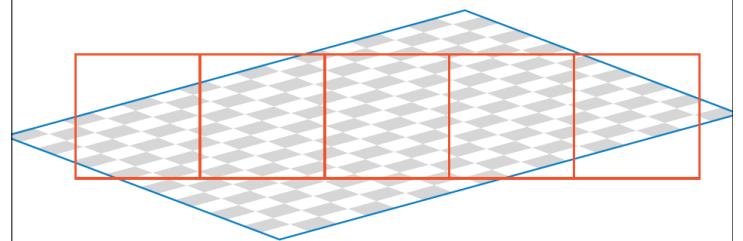
- A pixel is not a point
 - It is an area!
- Each pixel maps to some region of texture space
- Ideally, we want to integrate over mapped area

How does area map over distance?

- At optimal viewing distance:
 - One-to-one mapping between pixel area and texel area
- When closer
 - Each pixel is a small part of the texel
- When farther
 - Each pixel could include many texels



Minification



Minification: Theoretical Solution

- Find the area of pixel in texture space
- Filter the area to compute “average” texture color
 - Filtering eliminates high frequency artifacts
- How to filter?
 - Analytically compute area
 - Super-sample
 - But too expensive

