Sampling

CPSC 414

Original  Rendered

Loss of detail

Disintegrating textures

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A continuous-time signal can be completely recovered from its samples iff the sampling rate is greater than twice the maximum frequency present in the signal.

**point sampling**

- Pixels: pixel centres real-world pattern

**unweighted area sampling**

- Pixel coords for real pattern pixels

Textures can be pre-filtered (i.e., filtered before sampling)
post-filtering (regularly-sampled grid)

- multiple samples per pixel

\[
\begin{array}{ccc}
3x3 \text{ Bartlett} & 5x5 \text{ Bartlett} \\
1 & 2 & 1 \\
2 & 4 & 2 \\
1 & 2 & 1 \\
& 2 & 4 & 2 \\
& 3 & 6 & 2 & 3 \\
& 2 & 4 & 6 & 2 \\
& 1 & 2 & 3 & 2 & 1 \\
\end{array}
\]

post-filtering (stochastic sampling)

- jittered
- poisson
- regular
- poisson disc

importance sampling

- equal distribution unequal weights
- unequal distribution equal weights