

ECE 516 / CS 532 Computer Vision

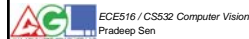
Class 3
January 30, 2008

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Advanced Graphics Lab



Announcements

- Please write down your info in the email list so that I can contact you with course announcements



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Last time

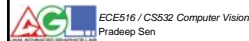
- Radiometry



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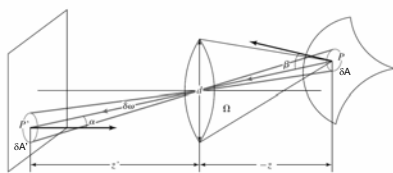
Today

- Shading and photometric stereo
- Forsyth Ch 5



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Example: Imaging with a thin lens



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Radiosity

- Total power leaving a point on a surface per unit area
- Units: W/m^2



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Directional hemispheric reflectance

- The fraction of the incident irradiance that is reflected by the surface
- Think of it as radiosity / irradiance
- Unitless

Lambertian surfaces

- Surface radiance is not a function of outgoing angle
- “Matte” surface, ie. not “shiny”
- Constant BRDF
- Also known as “diffuse”

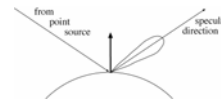
Lambertian surfaces



Nick Chirkov (<http://www.geocities.com/SiliconValley/Bay/5604/raytrace.htm>)

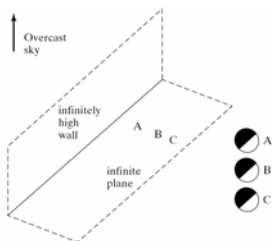
Specular surfaces

- “Shiny” or “glossy”
- In the limit, it becomes a mirror surface
- Incident light is reflected close to a specular direction
- As surface becomes more specular, the reflected lobe gets narrower

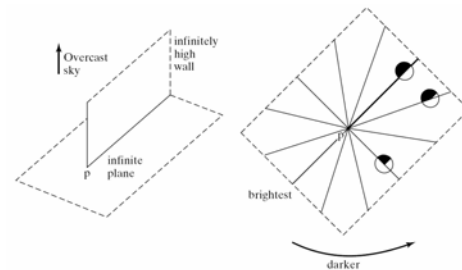


Qualitative radiometry

- Imagine what the light sources look like if you lie down on your back at the surface point



Qualitative radiometry

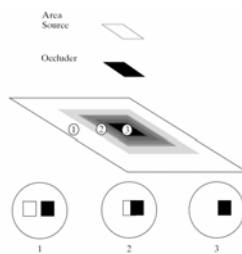


Types of light sources

- Point light source
- Linear light source
- Area light source

Point light sources

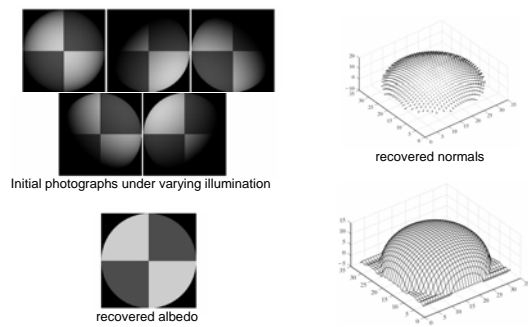
Area light sources



Photometric stereo

- Finally, a “computer vision” application!
- Given images of a diffuse object under different (known) illumination directions, determine the depth, normal and albedo at every pixel

Photometric stereo



Reading

- Forsyth, Ch 5