Topic Presentation

SVBRDF Estimation using a Physically-based Differentiable Renderer
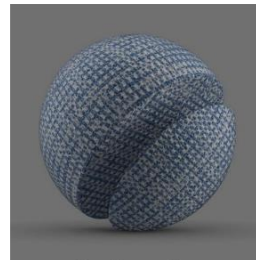
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What?

- Estimate surface material properties from images
- Constraint: Use a physically-based differentiable renderer
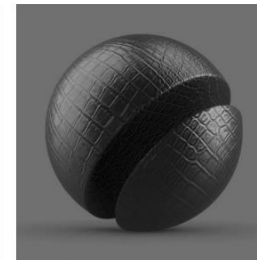
Why?

- Gear towards holistic 3D reconstruction (geometry + material)
- Photorealistic assets for
  - Games
  - Movies
  - Cultural heritage
  - …
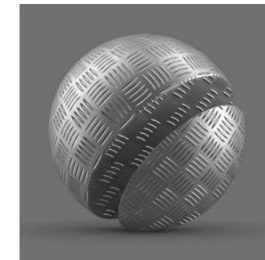- Multi material 3D printing

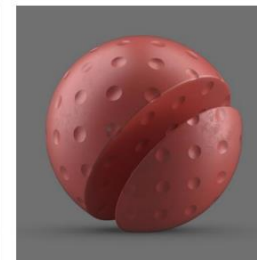fabric   ground   leather   metal

stone-diff   stone-spec   polymer   wood

How?

- Single-Image SVBRDF Capture with a Rendering-Aware Deep Network (Deschaintre et al., 2018)
  - Method based on machine learning and differentiable rendering
  - Dataset of 200000 (artificial) material samples
- Integration of Mitsuba 2 (Nimier-David et al., 2019)
- "Real" renderer enables simulation of
  - Global illumination
  - Transmittance effects

Schedule

1. Download database
2. Acquire testing and training code for the network
   - Contact authors for training code
   - Fallback: Re-implementation
3. Acquire code for Mitsuba 2
   - Not yet officially released
   - Fallback: Use other renderer like render (Li et al., 2018)
4. Get familiar with papers, source code and data
5. Replace rendering layers of the network with Mitsuba 2
6. Evaluation (compare with unmodified method)