Timely Rays: using data-flow to accelerate rendering

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U. of Cam
Introduction
What is a RayTracer?

Photorealistic      Easy to understand      Slow
How do they work?
Timely Dataflow
What is a Timely Dataflow?

Timely dataflow is a low-latency cyclic dataflow computational model.

Nat’s description was lovely, thank you.

Jesse’s presentation from week 3 was excellent, refer to that.
Flowing rays

- Pixels
  - Introduce rays
  - Bounce engine
  - Hit a light?
    - Yes
      - Light
      - Image
    - No
      - Not light

Rays flow through the system, determining if a light is hit and creating the final image.
Progress Report
Single scene

It looks like this:
Only implemented a single shape, a single internally-illuminated material, and a single scene.

```cpp
enum Hittable {
  Sphere(Sphere),
  // Rect(Rect),
  // Ngon(Ngon), // Hybrid modes!
  // RichardSpencer() // is a Hittable
}
```
let captured = timely::example(move |scope| {
    pixlocs.to_stream(scope)
        .map(move |loc| {
            (loc, get_color(loc))
        })
        .accumulate(EMPTYIMG,
            |IMG, data| {
                IMG[locs] += data;
            })
        .capture()
});

Early days yet! Perhaps this will be the next Cycles.
Thank you!