(I) Asset Cache Preparation
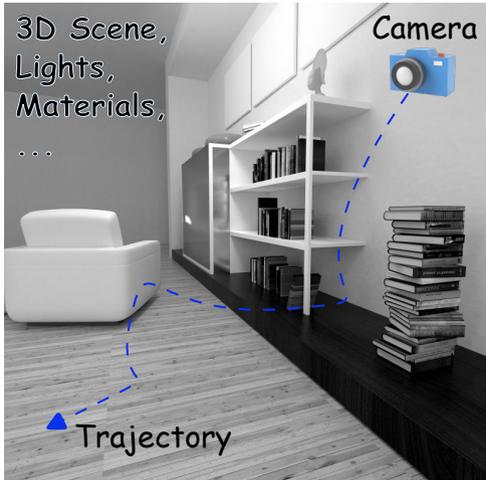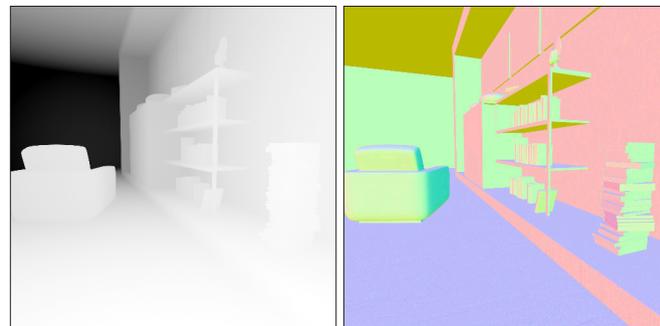
3D Scene, Lights, Materials, ...

Camera

Trajectory

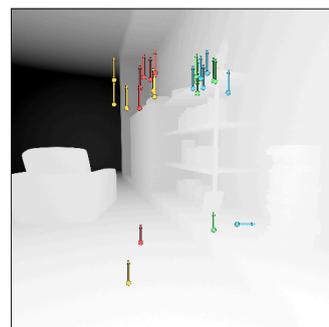Objaverse and Primitive Assets

(II) Preflight Validation

Preflight Attempts

Depth & Normal Maps

Surface Point Normals @ Preflight Candidates

(III) Collision-Aware Sampling & Scaling

A/B Sampling & Scaling

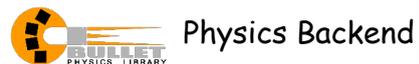Penetration Clearance

Optional: No-Hit Trajectory Obstacles

Backends:

Physics Backend

Rendering Backend

Legend:

Preflight Candidates

A/B Sampling

Surface Normals

Trajectory Overlay

(V) Canonical Rendering & Runtime Metadata

(IV) Task Simulation

Throw Trajectory

Roll Trajectory

Drop Trajectory

Drag Trajectory