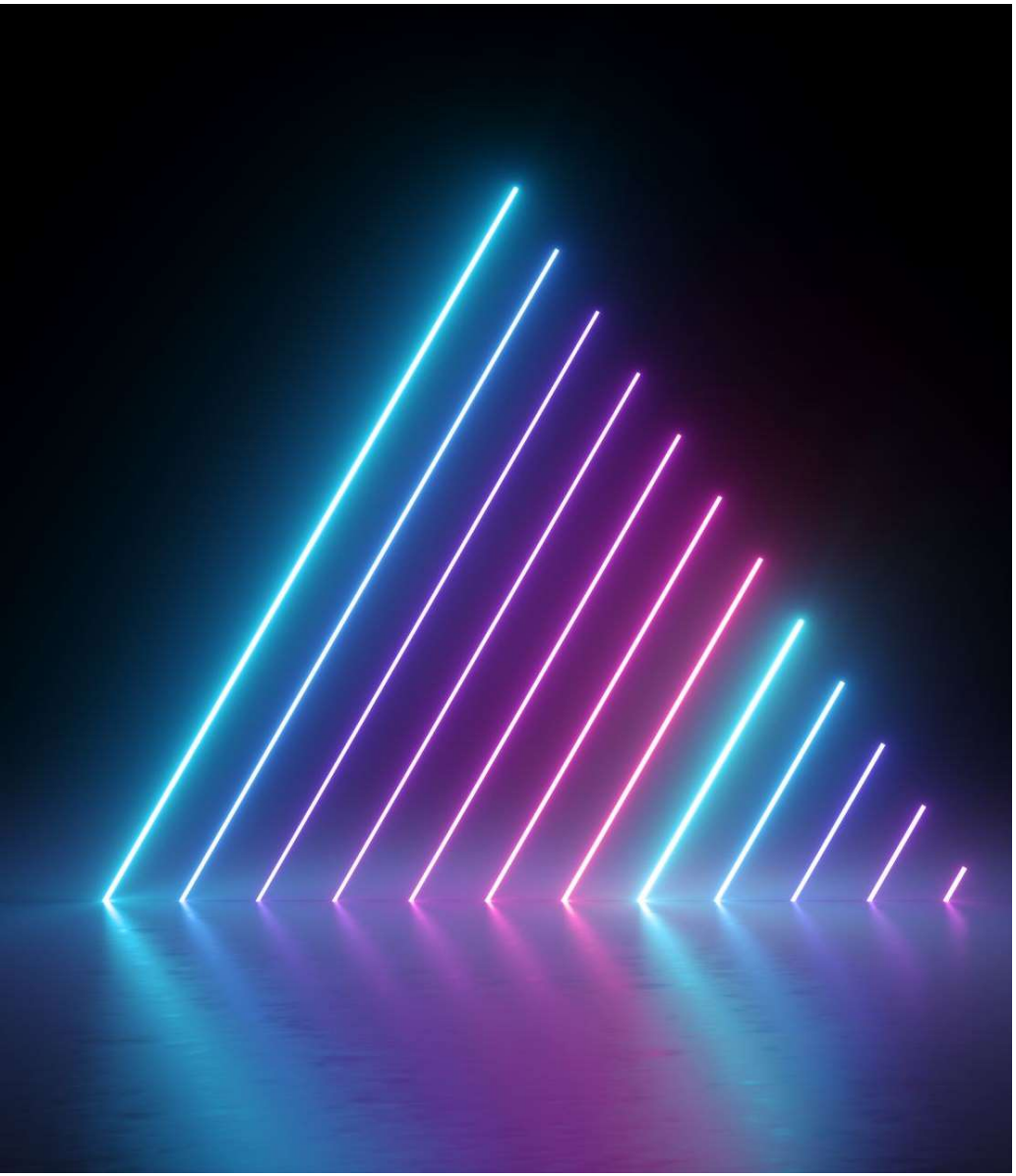


# REAL TIME GLOBAL ILLUMINATION USING IRRADIANCE PROBES

Vigneshwar Jayakumar

CSCI – 711 Global illumination

https://vigneshwarj.github.io/csci711/project/proposal.html

# Objectives

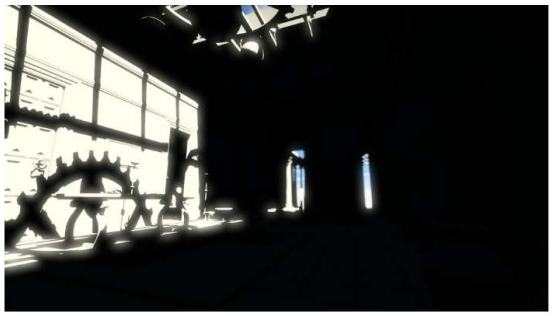
The main objective of my project is to implement Real time Global illumination using DirectX 12 with use of raytraced irradiance probes based on Nvidia paper (Dynamic Diffuse Global Illumination with Ray-Traced Irradiance Fields)

## PRIMARY GOALS

- Deferred Renderer with multipoint lighting
- Implement radiance probes and irradiance fields
- Implement DDGI (dynamic diffuse global illumination
- Display the infamous Sponza Base Scene

(if time permits)

Implement Glossy GI using raytracing to complete a proper global illuminated renderer.



*Direct Illumination*

*+DDGI*

# Dynamic Diffuse Global illumination

Dynamic diffuse global illumination (DDGI) is a technique to render realistic indirect lighting in scenes with dynamic objects and lighting.

DDGI uses light probes, which are small spheres that capture the incoming light from all directions at a fixed location.

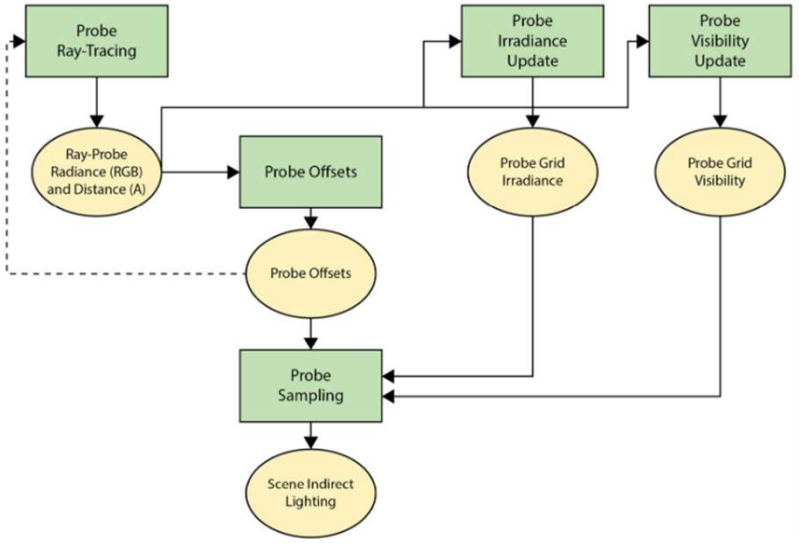
Perform ray tracing for each probe and calculate the radiance and distance.

Update the irradiance of all probes with the radiance calculated while applying some hysteresis.

Update the visibility data of all probes with the distance calculated in the ray tracing pass, again with some hysteresis.

(Optional) Calculate the per-probe offset position using the ray tracing distance.

Calculate indirect lighting by reading the updated irradiance, visibility, and probe offsets




https://subscription.packtpub.com/book/game-development/9781803244792/17/ch17lvl1sec98/introduction-to-dynamic-diffuse-global-illumination-ddgi

# My Work progress

## WORK DONE TILL NOW

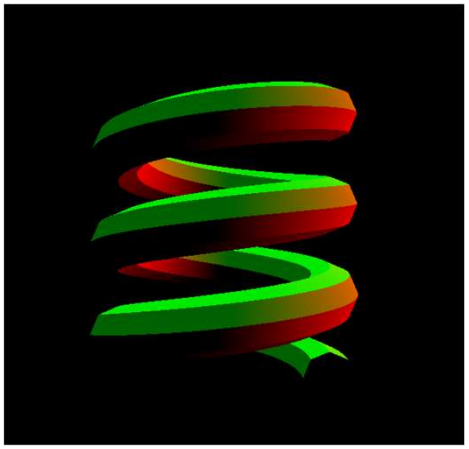
- Created a Dx12 Renderer
- Added Deferred rendering support using G buffer
- Added multiple light source and raytracing shader support
- Added obj model loading support

## REMAINING WORK TO DO

- Add support for light probes and irradiance volumes
- Implement Direct Diffuse Global Illumination with ray tracing.
- Project Report and explanation.

# Screenshots from the work

SIMPLE OBJ FILE LOADED WITH 3 POINT LIGHTS



QUICK SAMPLE BREAKDOWN OF G BUFFER