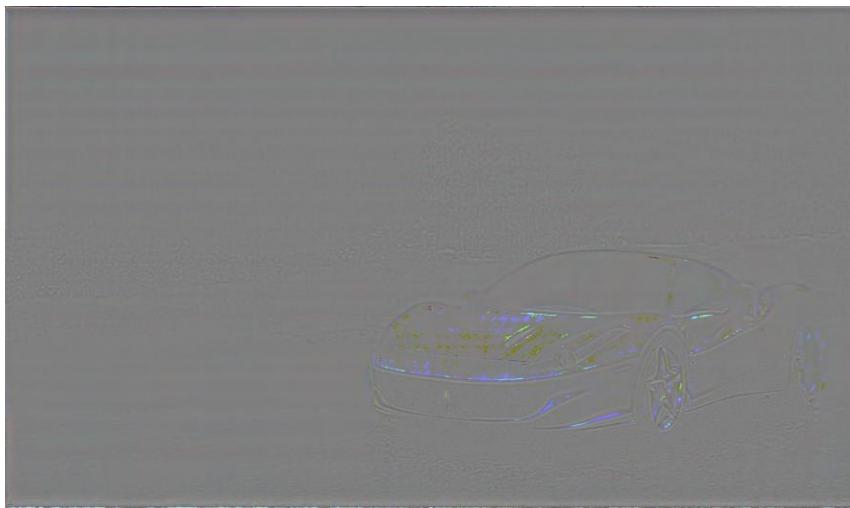


# **Text2Hologram: Describe Your Hologram Here**



Any description?

*Author: Pengze Li  
Supervisor: Dr Kaan Aksit*

# OUTLINE

 *Introduction*

 *Pipeline and related works*

 *Accessibility*

 *Outcomes*

 *Discussion*

# *Introduction*

## Generate pictures from text

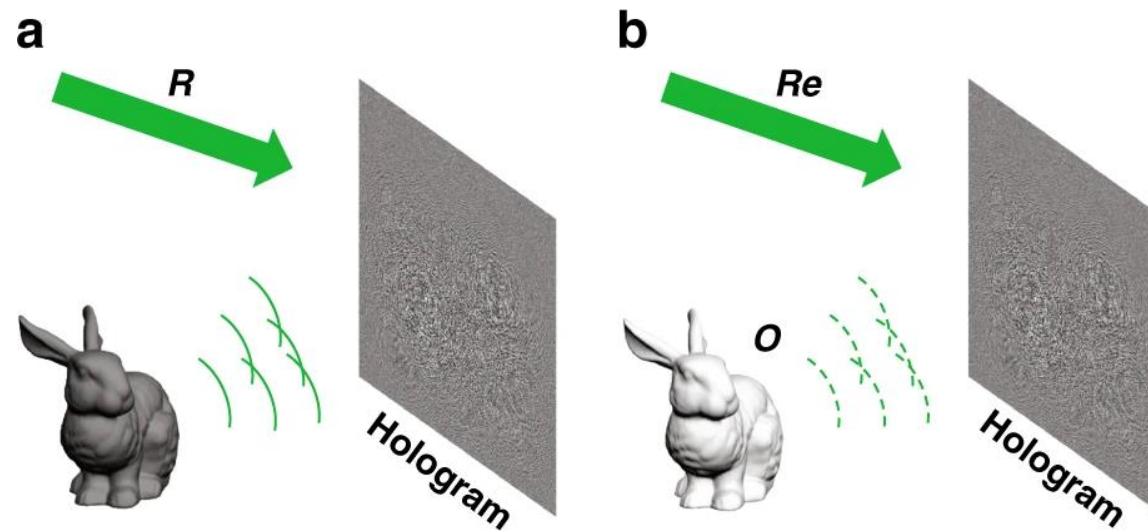


An astronaut riding a horse in photorealistic style.

# CGH: Computer Generated **Holography**

"*holos*" (whole)  
"*graphe*" (writing)

amplitude phase of the target

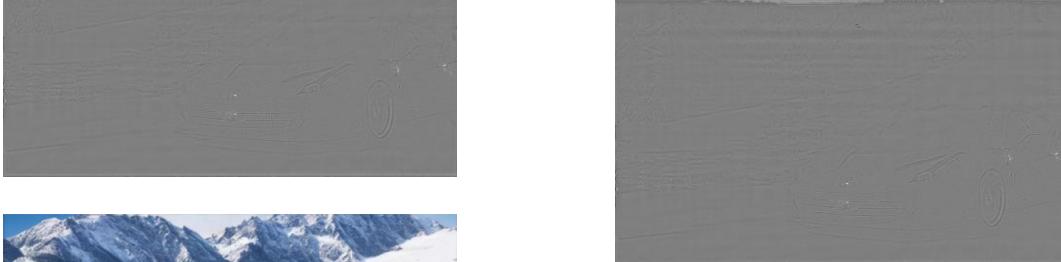


## What Are We Aiming For?

A Ferrari sports car running on snowy mountain.



Bonfire burning in the forest.



Any description you like...

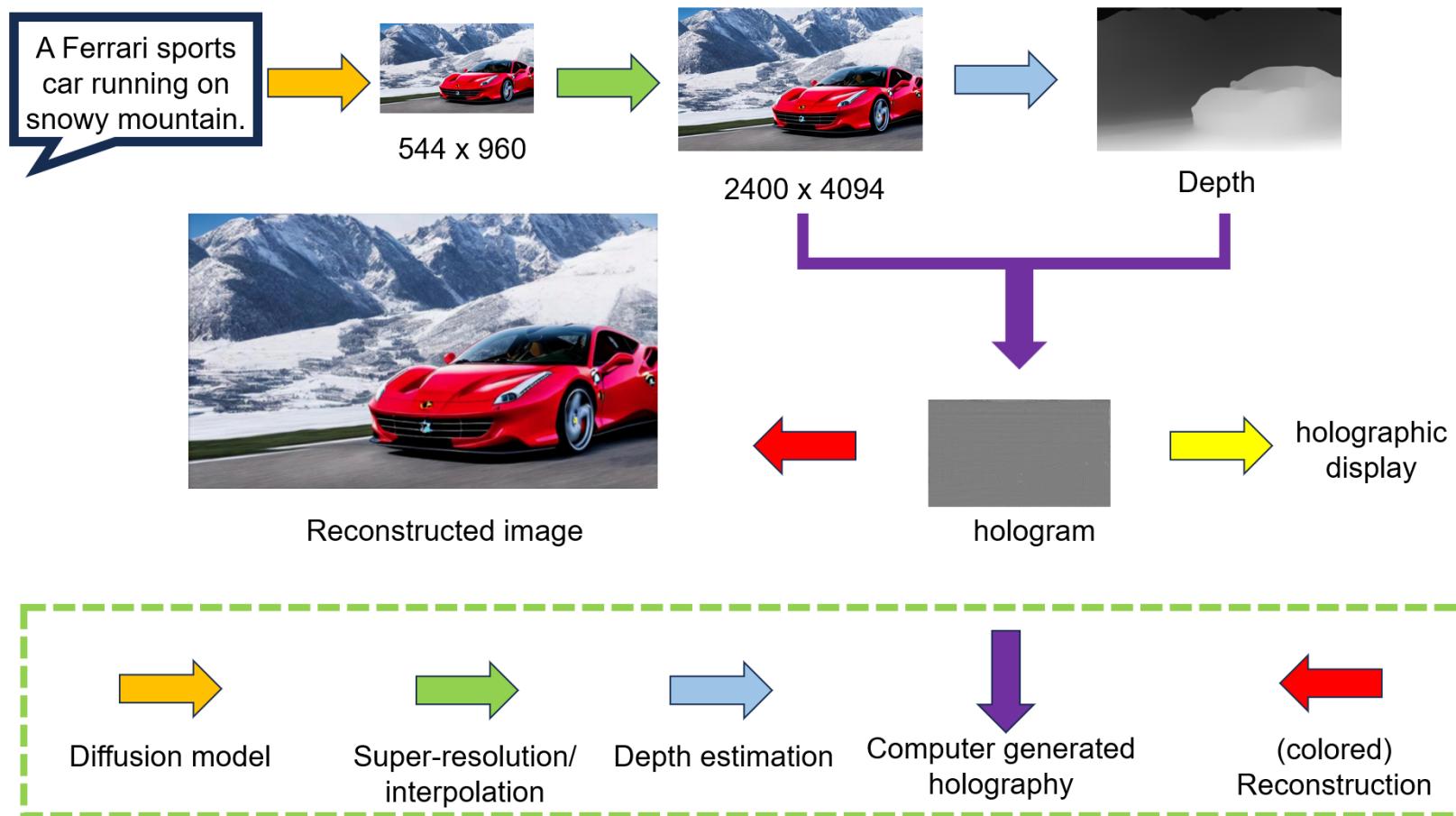


# *Pipeline and related works*

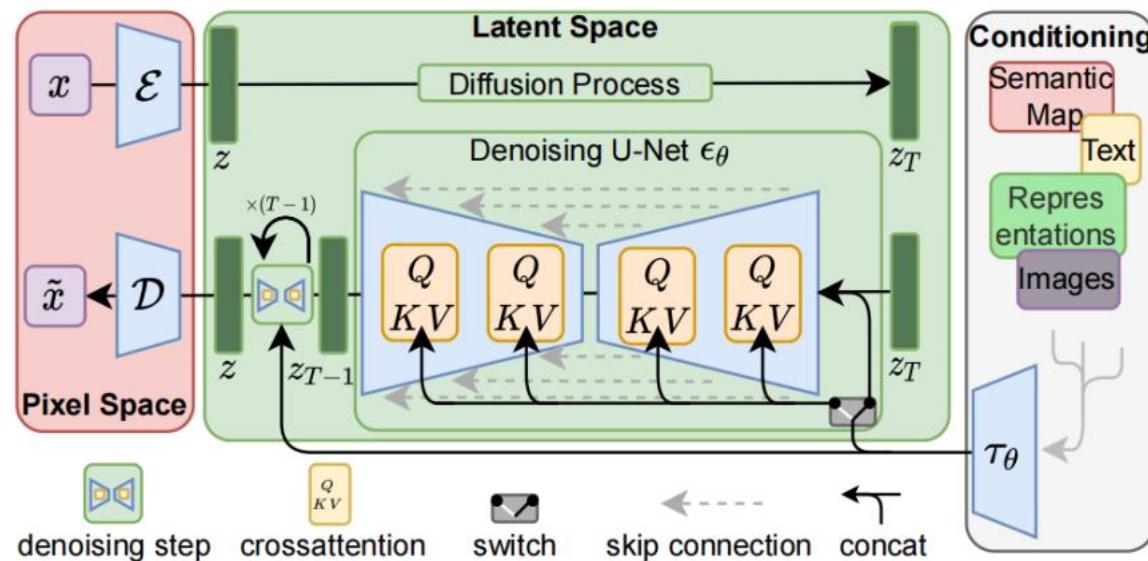
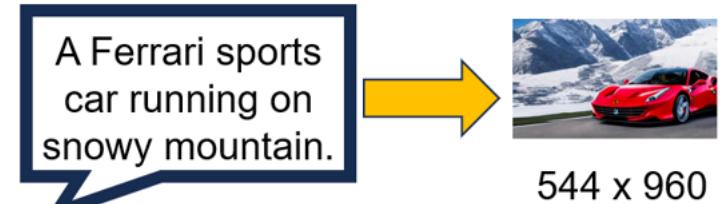
## ***OBJECTIVES***

-  ***To develop a text-to-hologram pipeline***
  
-  ***To be accessible to a broader audience***

# Pipeline Overview

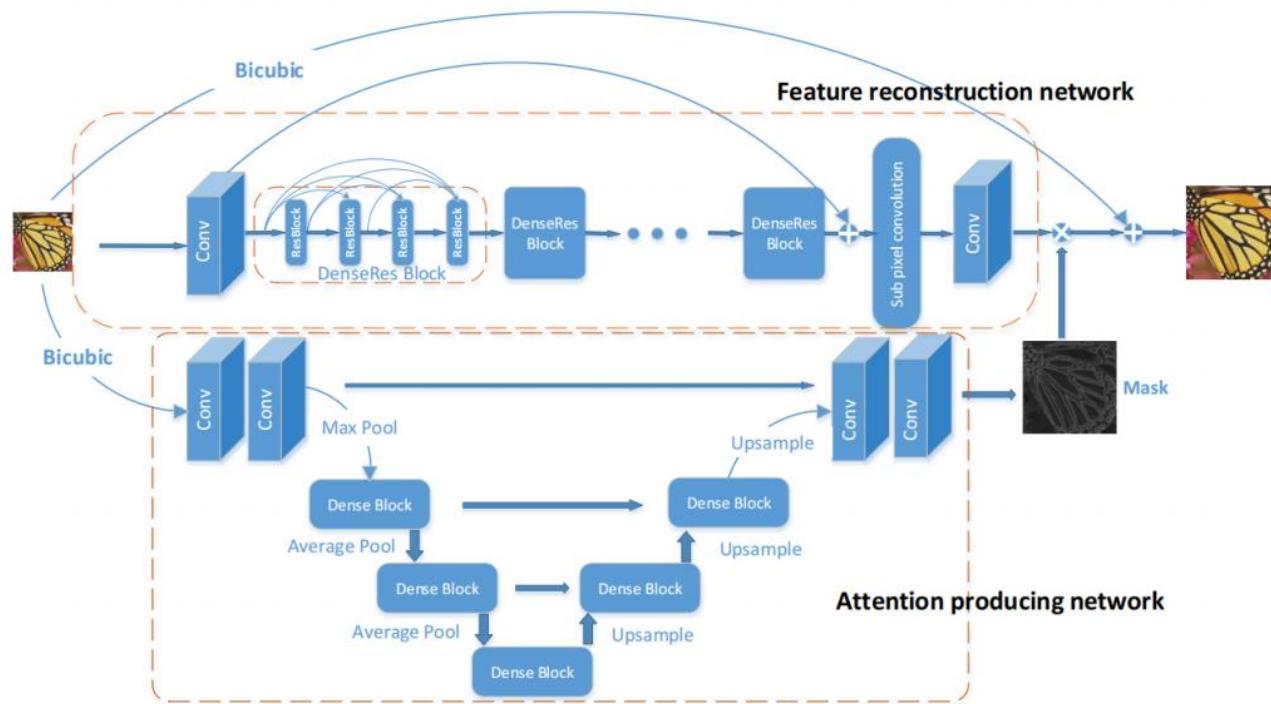


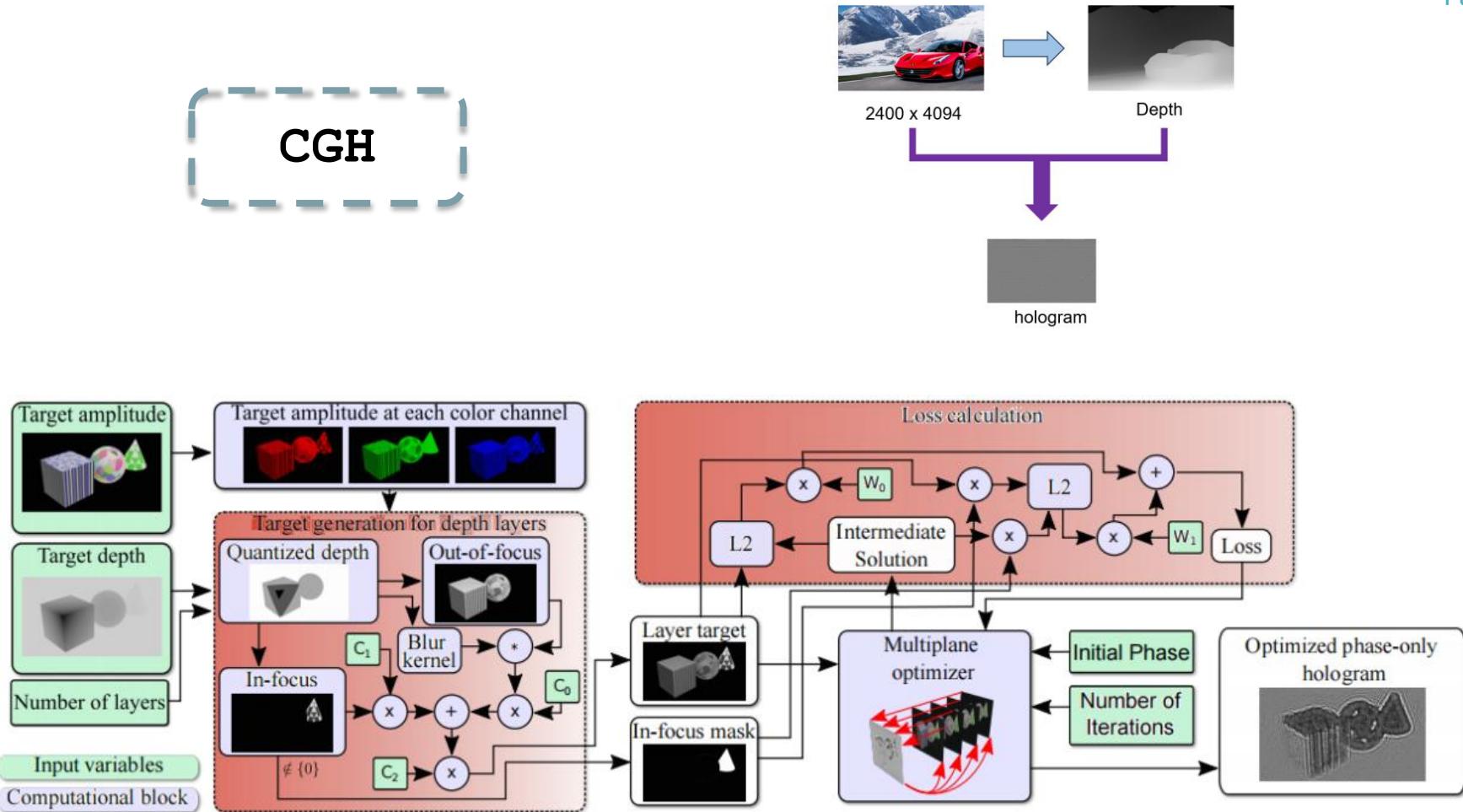
## Image generation



Rombach R, Blattmann A, Lorenz D, et al. High-resolution image synthesis with latent diffusion models[C]//Proceedings of the IEEE/CVF conference on computer vision and pattern recognition. 2022: 10684-10695.

## Super-resolution





Kavaklı K, Itoh Y, Urey H, et al. Realistic defocus blur for multiplane computer-generated holography[C]//2023 IEEE Conference Virtual Reality and 3D User Interfaces (VR). IEEE, 2023: 418-426.

# *Accessibility*

# Ease-of-use Focus

The screenshot shows a project page for 'text2hologram' on a platform with a blue-themed interface. At the top, there's a navigation bar with a search bar, help links, and user authentication options. The main title 'text2hologram 0.1.5.3' is displayed prominently, along with a green button for the 'Latest version'. Below the title, there's a command-line install instruction ('pip install text2hologram') and a release date ('Released: Sep 1, 2023'). A brief description follows: 'Generate holograms from text'. The left sidebar contains sections for 'Navigation' (with 'Project description' selected), 'Release history', 'Download files', 'Project links' (including a 'Homepage' link), and 'Statistics' (showing GitHub stats: 1 star and 0 forks). The right side of the page is dedicated to the 'Project description' of 'text2hologram', which is described as a Python package for generating holograms from text. It supports Python 3.9 and above, and its source code is available on GitHub. Installation instructions are provided, including the pip command shown in a code block.

Search projects

Help Sponsors Log in Register

text2hologram 0.1.5.3

pip install text2hologram

✓ Latest version

Released: Sep 1, 2023

Generate holograms from text

Navigation

Project description

Release history

Download files

Project links

Homepage

Statistics

GitHub statistics:

Stars: 1

Forks: 0

text2hologram

text2hologram is a Python package designed to generate holograms from text. It's built on top of the odak, timm, transformers, diffusers, accelerate, and torch libraries.

text2hologram supports Python 3.9 and above.

The project's source code is available [here](#).

Installation

To install the package, use the following pip command:

```
pip install text2hologram
```

```
>pip install text2hologram
```

## Ease-of-use Focus

```
C:\Users\lipengze>pip show text2hologram
Name: text2hologram
Version: 0.1.5.3
Summary: Generate holograms from text
Home-page:
Author:
Author-email: Pengze Li <linsongng@163.com>
License:
Location: f:\programs\python\lib\site-packages
Requires: accelerate, diffusers, odak, openvino, timm, torch, transformers
Required-by:
```

Name: text2hologram  
Version: 0.1.5.3

- 
- ◆ *Diffusers: Diffusion model*
  - ◆ *Openvino: Super resolution*
  - ◆ *Odak: Optical scientific computing*
  - ◆ *Torch, Accelerate, Timm...*

# Simple Mode

## ▶ Simple Mode



prompt: "A guitarist playing near a hot-air balloon at sunset."



# Custom Mode

## ▶ Custom Mode



prompt: "A cyberpunk waterfall"

For generative model:

inference\_steps: 40

output\_directory: "CGH\_output/

For computer generated holography:

number\_of\_planes: 5

cgh\_iterations: 200

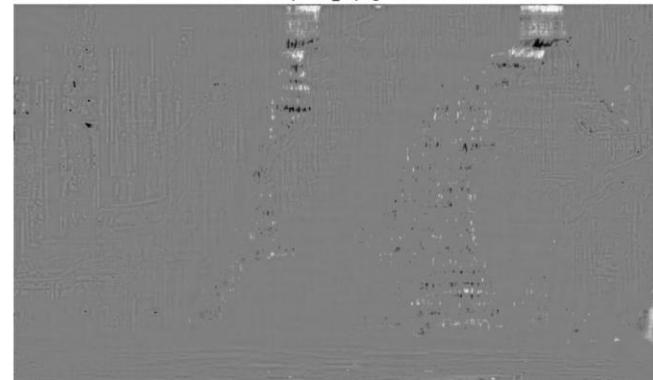
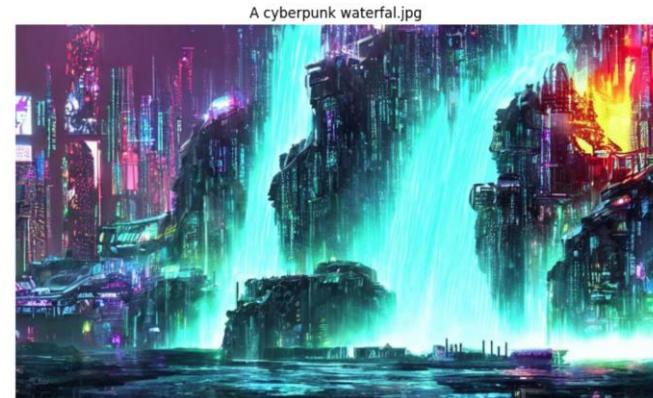
Display options:

display\_generated\_image:

display\_depth\_planes:

display\_phase\_only\_hologram:

display\_colored\_reconstruction:



# Researcher Mode

- ▶ Researcher Mode - Setups
- ▶ Researcher Mode - Pipeline - image generation
- ▶ Researcher Mode - Pipeline - super-resolution
- ▶ Researcher Mode - Pipeline - depth estimation
- ▶ Researcher Mode - Pipeline - computer generated holography
- ▶ Researcher Mode - Pipeline - reconstruction
- ▶ Researcher Mode - Pipeline - display

Functionality	Simple Mode	Custom Mode	Researcher Mode
Text Prompt	✓	✓	✓
Inference Steps		✓	✓
Output Directory		✓	✓
Number of Planes		✓	✓
CGH Iterations		✓	✓
Display Options		✓	✓
Advanced Settings			✓
Model Switching			✓

# *Outcomes*

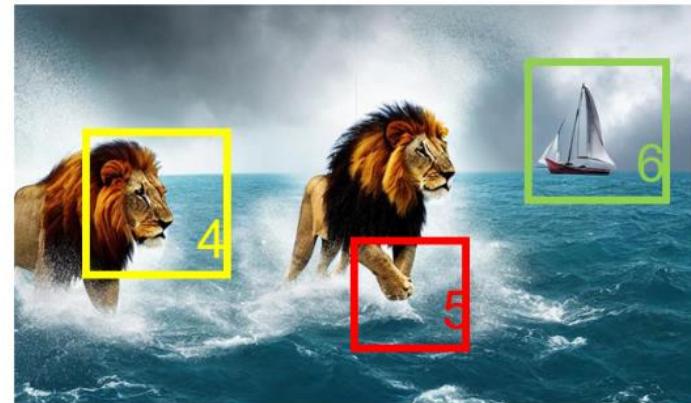
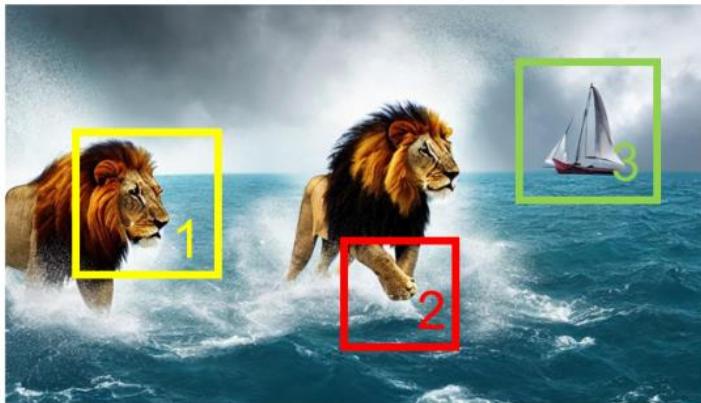
## Text-to-image

```
# Generate images
image_path, images = generate_images(pipe, prompt, settings, device)
```

A cyberpunk waterfall.



## Super-resolution



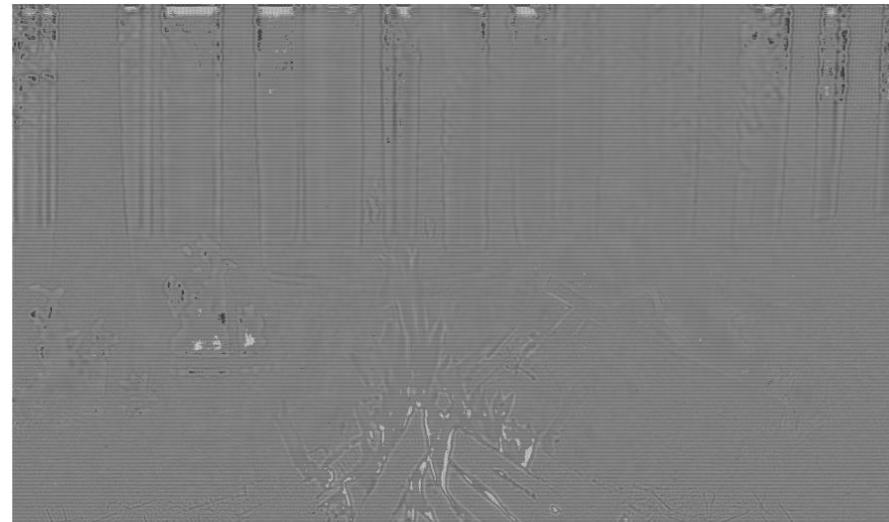
## Computer Generated Holography



(a) The 4k image.



(b) The depth map.



(c) Hologram

A Ferrari sports car running on snowy mountain.



## Reconstruction



# *Discussion*

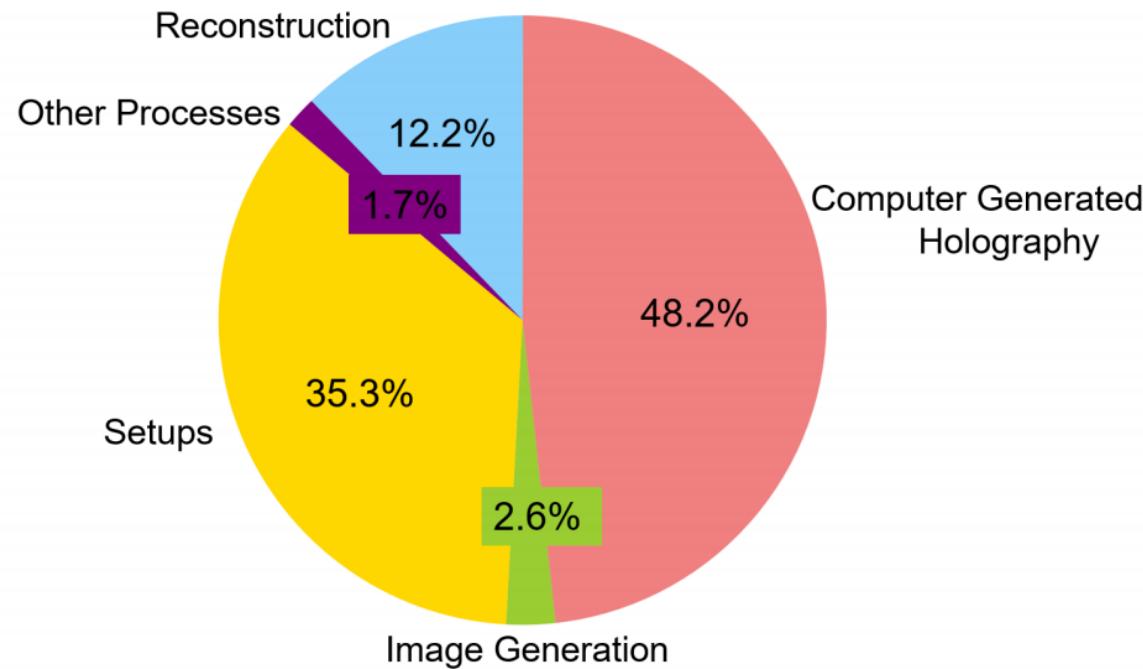
# Future development?

 *Memory requirements*

 *Better text-to-image model*

 *Time consuming*

# Time consuming?



**Thanks!**