

# Conditional Generation for Inverse Problems and Class/Text-Based Conditioning

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## I. Text to image Generation

### A. (A)No Prompt

### B. (B-C) 5X3 prompts- Manual evaluation

I implemented a pipeline that will read from a set of prompts, and then use them to generate the images from the diffusers StableDiffusionPipeline module, with the  $\omega CFG = 10$ , num steps = 50,  $eta = 0.0$ , and a fixed seed at 42. The prompts for each image are included in the caption of the figures. The results for the five categories that I chose are:

- Space Exploration

- Simple: Human: 5/10, CLIP: 28.49
- Medium: Human: 8/10, CLIP: 32.65
- Detailed: Human: 9/10, CLIP: 33.75

- Underwater World

- Simple: Human: 9/10, CLIP: 31.39
- Medium: Human: 6/10, CLIP: 32.93
- Detailed: Human: 5/10, CLIP: 30.34

- Ancient Architecture

- Simple: Human: 8/10, CLIP: 29.36
- Medium: Human: 7/10, CLIP: 31.98
- Detailed: Human: 9/10, CLIP: 30.38

- Futuristic City

- Simple: Human: 8/10, CLIP: 33.70
- Medium: Human: 8/10, CLIP: 34.95
- Detailed: Human: 7/10, CLIP: 29.07

- Fantasy Creatures

- Simple: Human: 2/10, CLIP: 25.97
- Medium: Human: 2/10, CLIP: 27.57
- Detailed: Human: 6/10, CLIP: 37.96

### C. (D) Negative Prompts

I chose the prompt: "An astronaut in a spacesuit floating above Earth"



Fig. 1. Space Exploration. Left: Simple - "An astronaut in space" (Human: 5/10, CLIP: 28.49). Center: Medium - "An astronaut in a spacesuit floating above Earth" (Human: 8/10, CLIP: 32.65). Right: Detailed - "A single astronaut in a shiny white spacesuit drifting serenely against the stars in the sky. There is a silent planet below with swirling clouds and blue oceans, with their ship orbiting in the distance" (Human: 9/10, CLIP: 33.75).



Fig. 2. Underwater World. Left: Simple - "A coral reef" (Human: 9/10, CLIP: 31.39). Center: Medium - "A colorful coral reef with tropical fish of and sunlight filtering through the water" (Human: 6/10, CLIP: 32.93). Right: Detailed - "An underwater coral reef that has all sorts of life, with many fish and sharks swimming around. It has bright corals of all colors and shapes, with sunlight filtering through the clear blue water from above." (Human: 5/10, CLIP: 30.34).



Fig. 3. Ancient Architecture. Left: Simple - "A medieval castle" (Human: 8/10, CLIP: 29.36). Center: Medium - "A lively medieval castle surrounded by a moat and lush greenery" (Human: 7/10, CLIP: 31.98). Right: Detailed - "A beautiful german day, with a large castle made of stone, with a few vines climbing up the spires. The village around the castle is full of life, with people walking around the market." (Human: 9/10, CLIP: 30.38).



Fig. 4. Futuristic City. Left: Simple - "A cyberpunk city" (Human: 8/10, CLIP: 33.70). Center: Medium - "A distopian cyberpunk city, with neon lights and flying cars." (Human: 8/10, CLIP: 34.95). Right: Detailed - "A breathtaking cyberpunk megacity that has bustling streets filled with people and vendors. The skyline has many towering skyscrapers, and there are futuristic flying cars." (Human: 7/10, CLIP: 29.07).



Fig. 5. Fantasy Creatures. Left: Simple - "A cat with a bird body" (Human: 2/10, CLIP: 25.97). Center: Medium - "A chimera with the body of a cat, wings of a bird." (Human: 2/10, CLIP: 27.57). Right: Detailed - "A beautiful chimera creature that has the body of a maine coon cat, with large majestic wings of an eagle." (Human: 6/10, CLIP: 37.96).