

# Two-stage training procedure

**Stage 1: Pre-training for Feature Alignment.** Sample one of the questions below. Use caption as the ground truth generation.

- "Describe the image concisely."
- "Provide a brief description of the given image."
- "Offer a succinct explanation of the picture presented."
- "Summarize the visual content of the image."
- "Give a short and clear explanation of the subsequent image."
- "Share a concise interpretation of the image provided."
- "Present a compact description of the photo's key features."
- "Relay a brief, clear account of the picture shown."
- "Render a clear and concise summary of the photo."
- "Write a terse but informative summary of the picture."
- "Create a compact narrative representing the image presented."

trainable parameters  $\theta = W$  (the projection matrix)

## Two-stage training procedure

**Stage 2: Fine-tuning End-to-End.** We always keep the visual encoder weights frozen, and continue to update both the pre-trained weights of the projection layer and LLM in LLaVA; i.e., the trainable parameters are  $\theta = \{W, \phi\}$

**Data:** We collect 158K unique language-image instruction-following samples in total, including 58K in conversations, 23K in detailed description, and 77k in complex reasoning, respectively.



User

What are the meals that I can cook with these?

With the variety of food items stored in the refrigerator, you can prepare several meals. For example, you can create a fruit salad using the strawberries, blueberries, and carrots. Additionally, you can make a delicious smoothie using the fruits and vegetables, which would be a healthy and nutritious snack or breakfast option. The milk and eggs can be used to create various dishes, such as a milk-based smoothie, a baked casserole, or scrambled eggs. The juice can also be used to make a fresh fruit and juice mix or as a refreshing homemade popsicle. The possibilities are vast, and the meals you can create will depend on your preferences and dietary needs.

I would like to do the fruit salad. Show me the recipe.



User

Certainly! Here's a simple fruit salad recipe using the items in your refrigerator:

Ingredients:

- 2 cups fresh strawberries, sliced
- 1 cup fresh blueberries
- 1 large carrot, grated
- Juice of half a lemon
- A handful of chopped fresh parsley or mint
- A few ice cubes
- Optional: honey or maple syrup (adjust to taste)

Instructions:

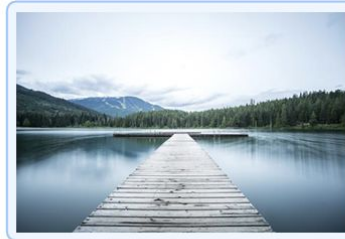
1. In a large bowl, combine the sliced strawberries, blueberries, and carrot. Gently toss them together to mix.
2. Drizzle the juice of half a lemon over the fruit and vegetables to prevent them from oxidizing and add a refreshing citrus flavor.
3. Sprinkle the chopped fresh parsley or mint over the fruit and gently toss once more.
4. If desired, add a drizzle of honey or maple syrup for a touch of sweetness. Adjust the amount according to your taste preferences.
5. Cover the bowl and refrigerate the fruit salad for at least 30 minutes or up to a few hours. This allows the flavors to meld and creates a more refreshing salad.
6. Serve the fruit salad in cups or bowls, garnished with a sprinkle of fresh parsley or mint, if desired.



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User

What are the things I should be cautious about when I visit here?

When visiting this peaceful location with a pier extending over a serene lake, surrounded by mountains, there are several things to be cautious about. First, pay attention to the weather conditions, as sudden changes in weather, especially strong winds or storms, can cause the water to become rough and pose risks to the stability of the pier. Second, be mindful of the structural integrity of the pier; avoid overloading it with too many people or excessive weight, as this could potentially damage the pier or cause it to collapse. Additionally, be aware of the surrounding wildlife and respect their space; do not harm or disturb them in any way. Finally, if you decide to go fishing, ensure that you adhere to any local fishing regulations and use appropriate fishing techniques to keep the lake ecosystem healthy and maintain the balance of the food chain.

Compose an engaging travel blog post about my trip to this place, highlighting the beautiful sceneries, joyful experiences, and include possible anecdotes.

Traveling to this picturesque location with a serene lake and mountains in the background was a refreshing and rejuvenating experience. The pier extending over the calm water provided an excellent vantage point from which to appreciate the breathtaking scenery. As I stood on the pier, I couldn't help but feel a deep connection with nature, taking a moment to soak in the peaceful atmosphere.

One of the highlights of my trip was undoubtedly the fishing experience. The area is teeming with life, and I was thrilled to land a sizeable catch, despite the modest size of the lake. The joy of fishing in such a beautiful setting was truly rewarding, and it allowed me to take a break from my busy life and truly immerse myself in the tranquility of nature.

While exploring the surrounding area, I came across a family of birds that had built a nest close to the pier, adding to the charm of the location. Interacting with the wildlife and observing their behavior was an enriching experience that I'll cherish for years to come.

In conclusion, this idyllic destination provided me with an opportunity to unwind and recharge, surrounded by mesmerizing natural beauty and the gentle sounds of water and wildlife. If you're looking for a serene escape from the hustle and bustle of everyday life, this pier overlooking the lake is the perfect place to find solace and reconnect with nature.



User