



# **REVOLUTIONISING FASHION INDUSTRY WITH STABLEDIFFUSION**

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# Overview

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Future Work

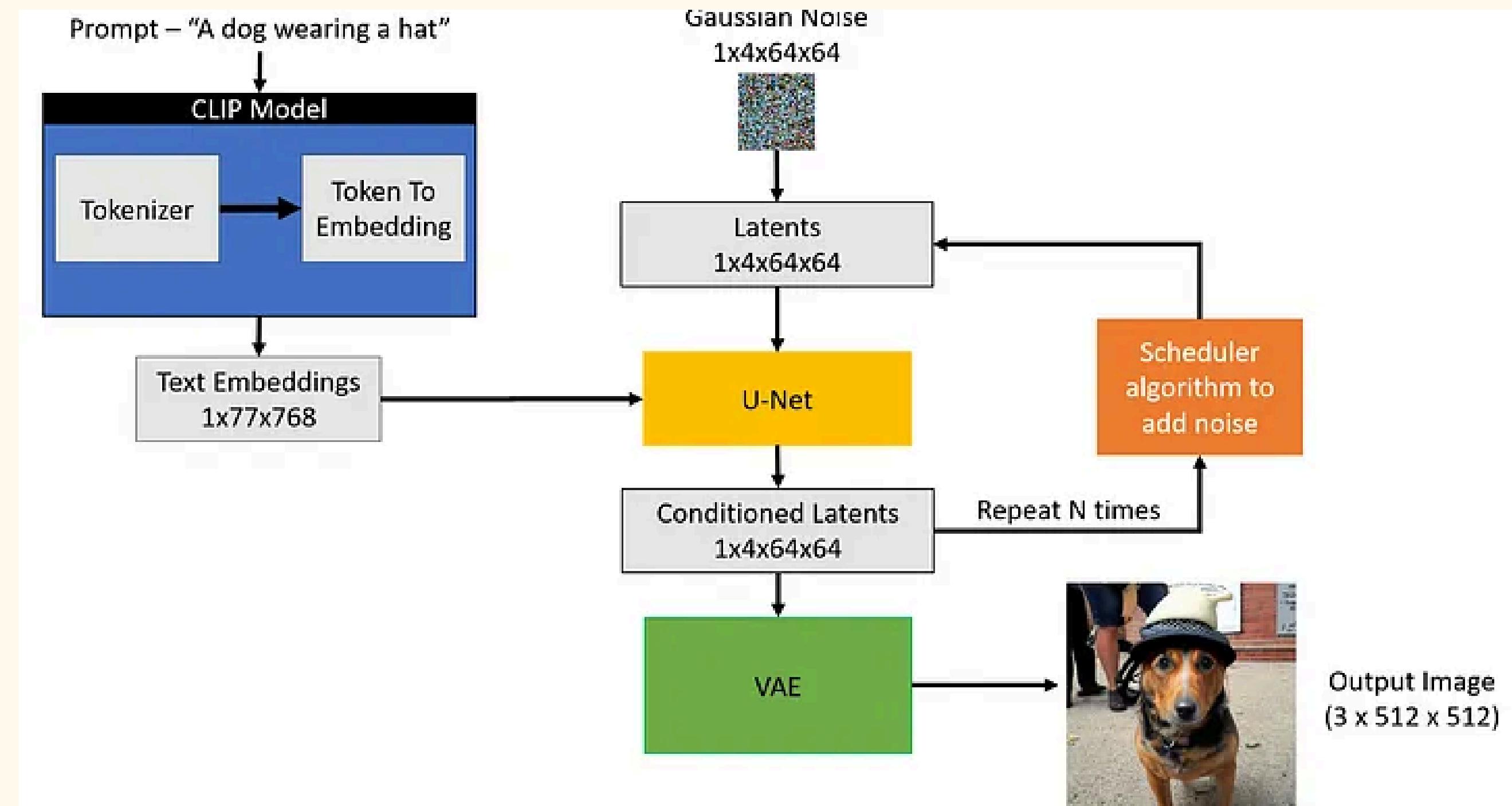
# Introduction

- This project presents a groundbreaking text-to-image generation model specifically designed for the fashion world. We leverage the power of Stable Diffusion, a cutting-edge image creation technology. By fine-tuning it with LoRA, we tailor it to understand the nuances of fashion. But that's not all! A dedicated refiner polishes the generated image, ensuring remarkable accuracy and realism in textures and details. Finally, ControlNet empowers you to control the model's pose, showcasing clothing from any desired angle. This innovative combination allows you to generate high-quality fashion images based on simple textual descriptions, revolutionizing the way we design, develop, and market fashion.

# Objectives

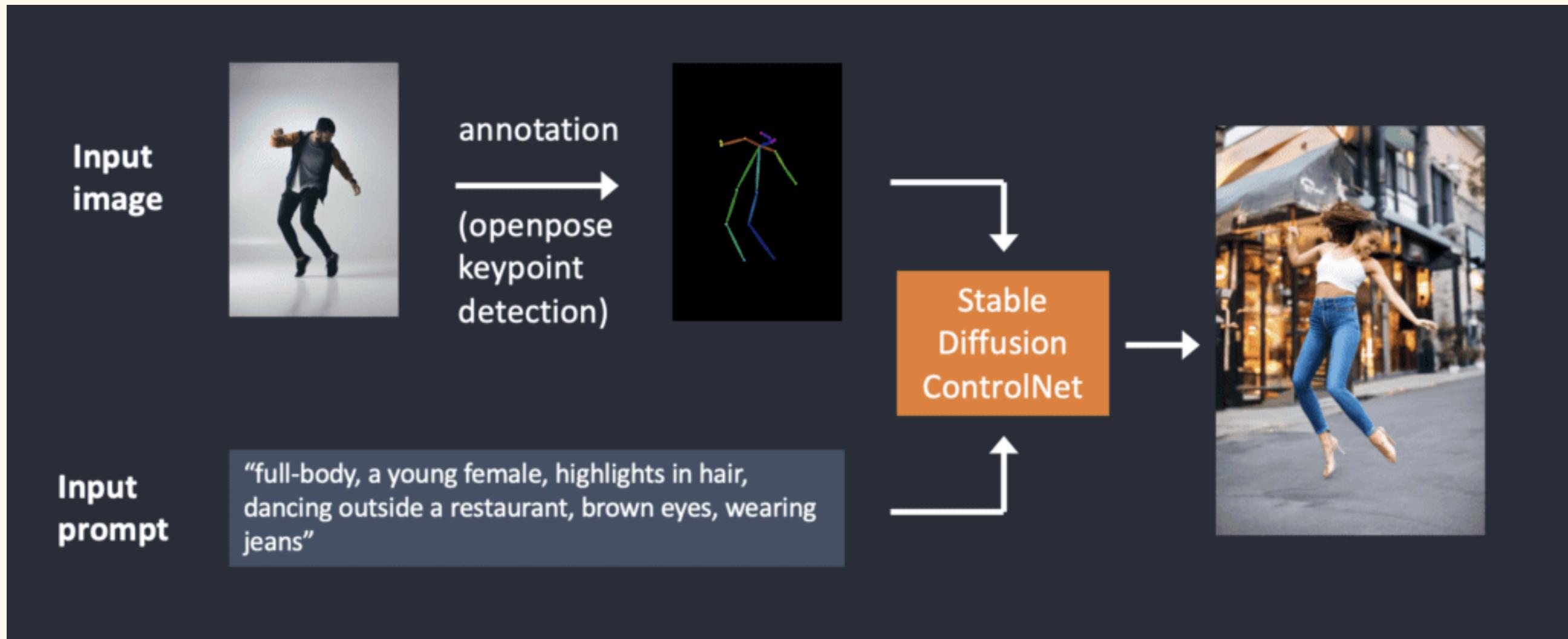
- Develop a text-to-fashion image generation model capable of producing high-quality and realistic images of clothing.
- Leverage Stable Diffusion and fine-tune it with LoRA for efficient domain adaptation to the fashion domain.
- Incorporate a refinement process to enhance the generated image's accuracy, realism, and reduce artifacts.
- Integrate ControlNet to enable precise control over the pose of the model in the generated image.
- Ultimately, provide a user-friendly UI tool for generating diverse and creative fashion images based on textual descriptions.

# Workflow



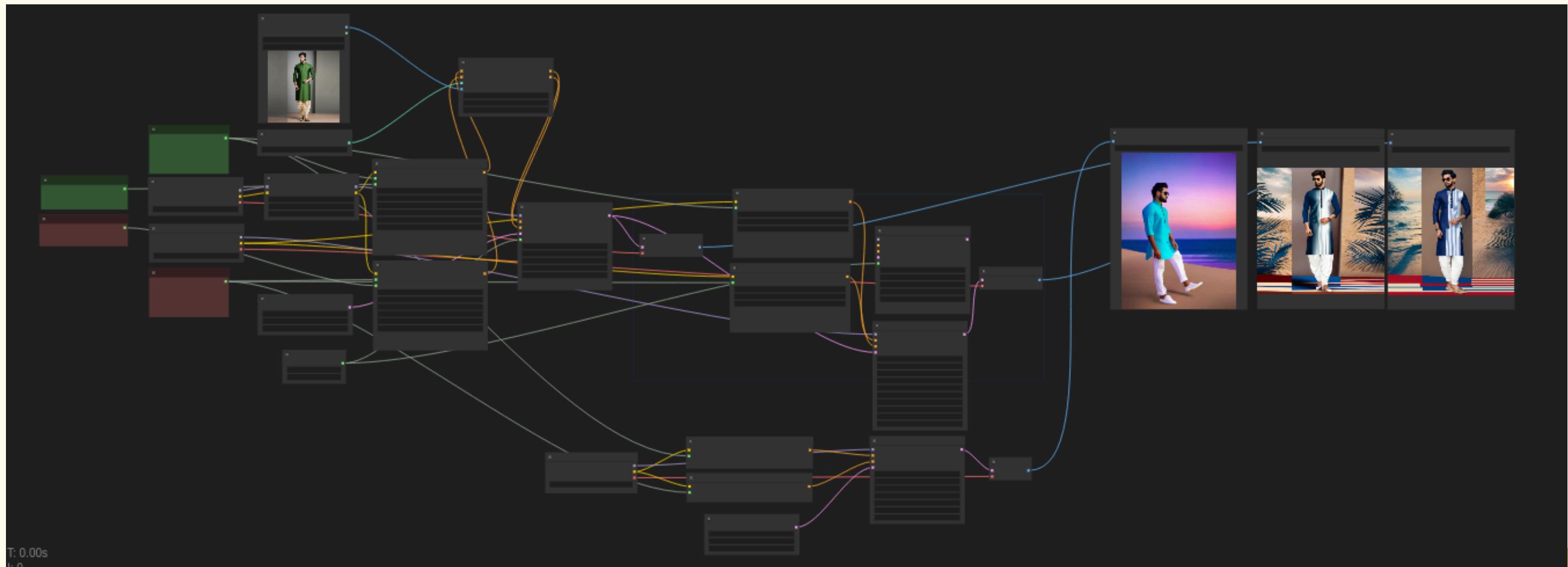
General Workflow of stable diffusion model

# Workflow



Workflow of stable diffusion and control-net

# Workflow



Project\_workflow using Comfyui

# Methodology

## 1. Data Preparation:

- Data Source:
  - A custom-collected data with high resolution images with good cloths and nice background.
  - manually writing custom prompt according the image with details.
- Preprocessing:
  - Text:
    - Clean text descriptions for consistency and accuracy. Removing punctuation, inconsistencies, and standardising terminology (e.g., "long sleeve" vs. "long-sleeved").
    - Tokenize and potentially embed the text descriptions to represent them numerically for the model.
  - Images:
    - Preprocess images for size normalization and potential formatting adjustments. This ensures uniformity during model training.(512 x 512 , 1024x1024)

# Methodology

## 2. Stable Diffusion with LoRA Fine-Tuning:

- **LoRA Fine-Tuning:**
  - Define the target domain (**fashion**) for LoRA adaptation.
  - Fine-tune the pre-trained Stable Diffusion model with LoRA using the fashion-specific text-image dataset.
  - LoRA modifies a small subset of the model parameters, focusing on adapting its understanding to fashion-related elements within the text descriptions. This significantly improves the model's ability to generate realistic and accurate fashion images.

## 3. Image Refinement:

- **Model Selection:**
  - Utilized a pre-trained image refinement model specifically designed for enhancing realism and detail in generated images.
  - [here](#) for this project used an **sdxl-refiner** model

## 4. Pose Control with ControlNet:

- **Integration:**
  - Integrate ControlNet into the workflow.
  - We have used an **img2img controlNet model (controlnet-depth-sdXL-1.0)**

# Methodology

## 5. Model Evaluation:

- Qualitative Evaluation:

- Evaluate the generated fashion images based on:
  - Realism and accuracy of clothing details and textures.
  - Consistency with the provided text descriptions (e.g., color, style).
  - Effectiveness of pose control (if applicable).

Prompt : a boy wearing blue designer kurta, beige pant, sunglasses, white shoes, outdoor environment,



SD\_XL\_base \_model



SD\_XL\_model\_with\_LoRa



Refiner\_modelon generated image

# Web UI:

This is the starting page of the web app where we first load the pipeline of the image generation

A screenshot of a browser window titled "app · Streamlit". The address bar shows "sharp-moons-return.localt". The main content area displays a blue circular progress icon followed by the text "Running load\_pipeline() .".

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4 from diffusers import DiffusionPipeline
5 import requests
6 import io
7 import torch
8 from tempfile import NamedTemporaryFile
9
10 API_URL = "https://api-inference.huggingface.co/models/jays
11 headers = {"Authorization": "Bearer hf_RDqEsHduxrtcWzOfQWMm
12
13 def query(payload):
14     response = requests.post(API_URL, headers=headers, json=p
15     return response.content
16
17 @st.cache_resource()
18 def load_pipeline():
19     return DiffusionPipeline.from_pretrained("stabilityai/sta
20
21 if "pipeline" not in st.session_state.keys():
22     st.session_state["pipeline"] = load_pipeline()
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24 pipe = st.session_state["pipeline"]
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26 def generate_image(prompt, num_inference_steps=5):
27     print("world")
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# Web UI :

After loading the pipeline it will consume more than 12Gb of GPU

The screenshot shows a Google Colab interface. On the left, a Jupyter notebook cell displays Python script output. The output includes logs from a script named 'app.py' and a message about sessions. On the right, the 'Resources' tab is active, showing system and GPU RAM usage over time. A message encourages upgrading to Colab Pro for more resources.

app.py

```
jes saved
5:17.981 Beginning script thr
5:17.982 Running script Rerun ↑ ↓ ⌂ ⌂ ⌂ ⌂ ⌂
ID-de4224ebfa6985c9870fa38dc3485051-None"
" a man wearing a blue kurta, blue pant, black shoes, g
ID-9e3ae5e43d364338cc5ee2527ebdfef -None"
ID-d439796f09ffba8597184d8bf8a80f5d-None"
: true
ash='3f41e546893dc64b71aaacad12cad815')
5:17.982 Disconnecting files for session with ID f73771
5:17.982 Sessions still active: dict_keys([])
5:17.982 Files: 1; Sessions with files: 0
5:17.987 Ignoring event from non-current ScriptRunner:
[REDACTED]
version
ion 1.32.2
run app.py &>/content/logs.txt & npx localtunnel --port
22 in 6.361s
```

Comment Share ⚙️

T4 RAM Disk Colab AI

Resources

You are not subscribed. [Learn more](#)

You currently have zero compute units available. Resources offered free of charge are not guaranteed. Purchase more units [here](#).

At your current usage level, this runtime may last up to 2 hours 20 minutes.

Manage sessions

Want more memory and disk space? [Upgrade to Colab Pro](#) X

Python 3 Google Compute Engine backend (GPU)  
Showing resources from 14:20 to 14:36

System RAM	GPU RAM	Disk
2.7 / 12.7 GB	12.2 / 15.0 GB	34.5 / 78.2 GB

Change runtime type

# Web UI :

**Text to Image Generation**

Describe the image you want:

a man wearing a blue designer suit, sitting, black shoes, sunglasses, (Full body)

add negative prompt

cartoon, animated, nsfw, half body, (bad anatomy), (bad hands)

Select a value for inference steps:

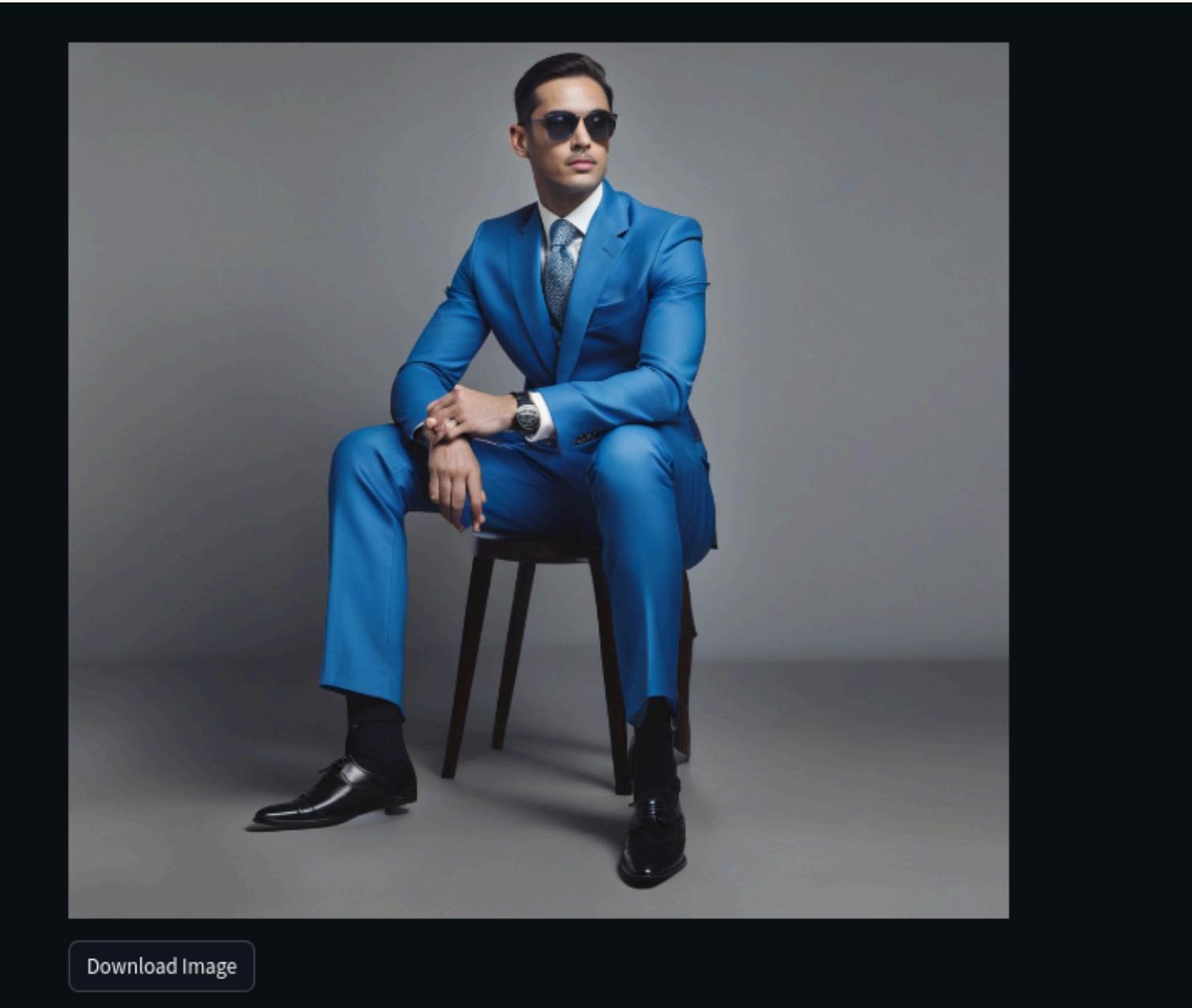
1      100

You selected: 100

Image size

1024x1024

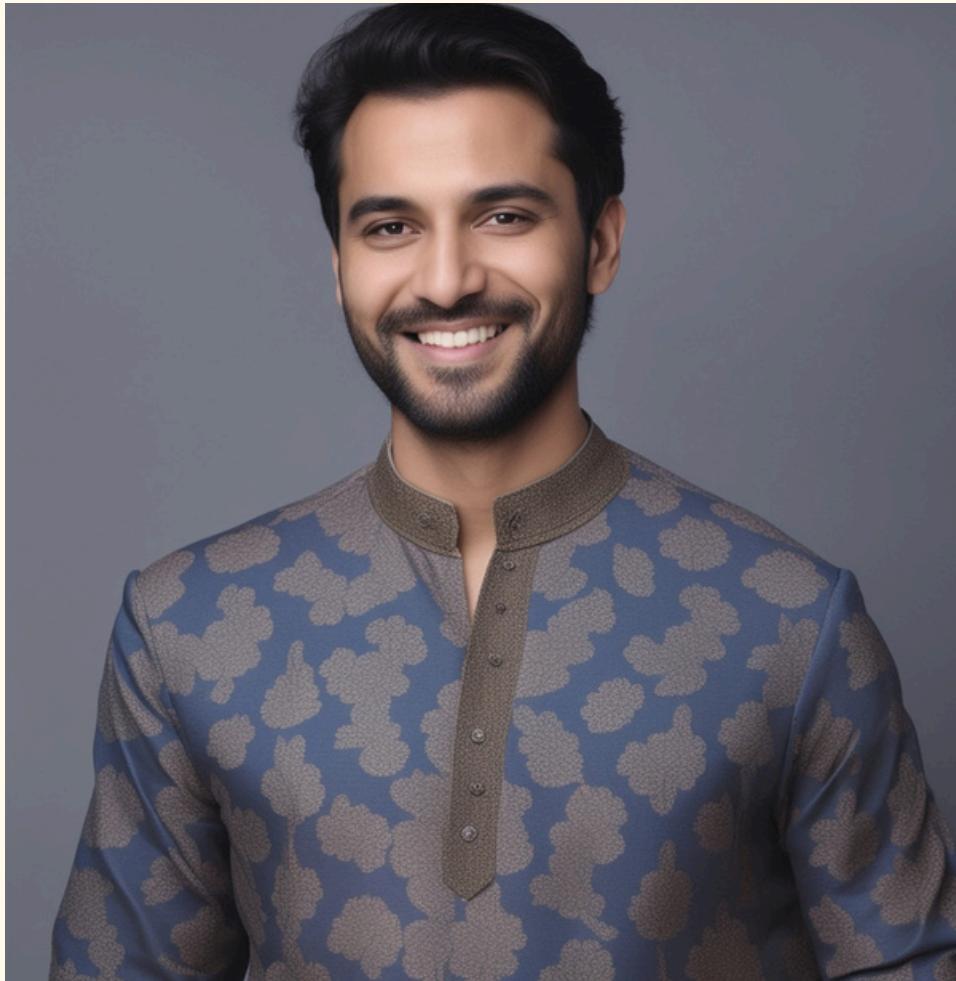
Generate Image



# Results :



**Prompt**: a man wearing a green kurta with golden design, red sky sunset, beach water background  
No. inference step : 20



**Prompt**: a man wearing a blue kurta with golden flower design, potrait image, grey background, photoshoot  
No. inference steps : 50

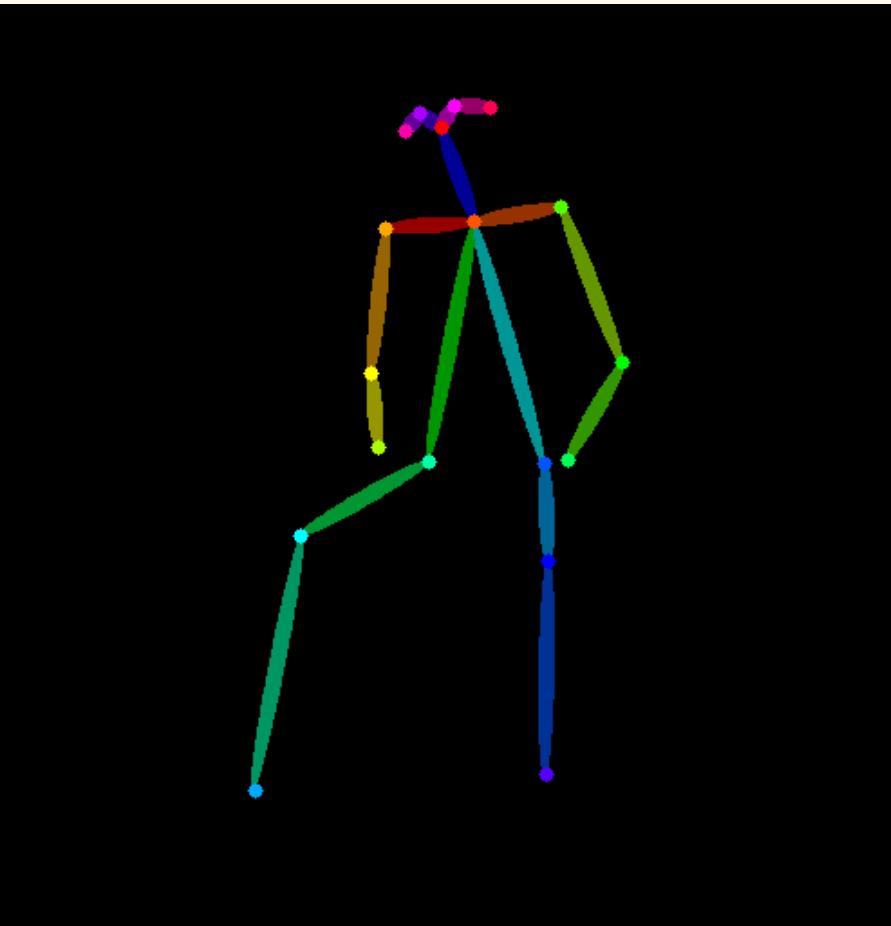


**Prompt**: a man wearing a blue kurta with golden flower design, potrait image, outdoor environment background, photoshoot  
No. inference steps : 50

# Results :

Here is the result of using a controlNet model

As we can see that it extract the pose from the given image and generate a new image but that image is not perfectly generated because of that pose



# Challenges in Fashion Image Generation

- Capturing the Essence of Fashion
- Need for precise pose control to showcase garments effectively
- Importance of realism and accuracy in portraying clothing textures and details



Prompt : A men wearing an green color print designer kurta, with white shoes, black sunglasses, potrait photography, grey background

## Future Work

- Style Preference: Choose from various style options (e.g., "vintage," "streetwear," "high fashion") to further refine the generated image.
- Multiple Image Generation: Generate a collage of variations based on your initial description, providing you with a selection of creative interpretations.

Are there any questions ?

Thank  
You

