The state of generative Artificial Intelligence

~ Ismail Bahar

Funda Meetup

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Enjoys experimenting with tech.

icba.dev xyrai xyrai_

My Experience

Studying...
Python
Every. Single. Day.

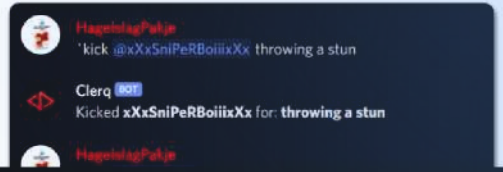
for one year

OVERVIEW

Just a little sneak peek... 👀

Personal Assistant

Ever wanted to have your own personal assistant?
One that you can rely on for appointments, reminders, music,
the weather and much more? Look no further!



Server Management

HOME NEWS ABOUT THE GAME VIDEO GUIDES GUIDES & TOOLS REGISTER LOGIN

WELCOME TO REGNAS

LOOKING FOR INFORMATION ABOUT BLUE PROTOCOL? DISCOVER BLUE PROTOCOL DATABASE, THE FIRST REFERENCE SITE WHERE YOU CAN FIND EVERYTHING YOU NEED TO KNOW ABOUT THE GAME. WE WILL ALWAYS KEEP YOU UP TO DATE WITH THE LATEST NEWS.

JOIN OUR DISCORD

New Video

DEVELOPER LIVESTREAM TRANSLATION

I did didn't
Enjoy all
of it.

What happened?

Enough!

Take a break.

Artificial Intelligence

Bots with a brain 🤖

I participated in a bootcamp:

Xyrai/Minor-AAI

It's unorganized and in Dutch!

ALGORITHM	DESCRIPTION	APPLICATIONS	ADVANTAGES
Linear Regression	A simple algorithm that models a linear relationship between inputs and a continuous numerical output variable	USE CASES 1. Stock price prediction 2. Predicting housing prices 3. Predicting customer lifetime value	1. Explainable method 2. Interpretable results by its output coefficients 3. Faster to train than other machine learning models
Logistic Regression	A simple algorithm that models a linear relationship between inputs and a categorical output (1 or 0)	USE CASES 1. Credit risk score prediction 2. Customer churn prediction	1. Interpretable and explainable 2. Less prone to overfitting when using regularization 3. Applicable for multi-class predictions
Ridge Regression	Part of the regression family — it penalizes features that have low predictive outcomes by shrinking their coefficients closer to zero. Can be used for classification or regression	USE CASES 1. Predictive maintenance for automobiles 2. Sales revenue prediction	1. Less prone to overfitting 2. Best suited where data suffer from multicollinearity 3. Explainable & interpretable
Lasso Regression	Part of the regression family — it penalizes features that have low predictive outcomes by shrinking their coefficients to zero. Can be used for classification or regression	USE CASES 1. Predicting housing prices 2. Predicting clinical outcomes based on health data	1. Less prone to overfitting 2. Can handle high-dimensional data 3. No need for feature selection
Decision Tree	Decision Tree models make decision rules on the features to produce predictions. It can be used for classification or regression	USE CASES 1. Customer churn prediction 2. Credit score modeling 3. Disease prediction	1. Explainable and interpretable 2. Can handle missing values
Random Forests	An ensemble learning method that combines the output of multiple decision trees	USE CASES 1. Credit score modeling 2. Predicting housing prices	1. Reduces overfitting 2. Higher accuracy compared to other models
Gradient Boosting Regression	Gradient Boosting Regression employs boosting to make predictive models from an ensemble of weak predictive learners	USE CASES 1. Predicting car emissions 2. Predicting ride hailing fare amount	1. Better accuracy compared to other regression models 2. It can handle multicollinearity 3. It can handle non-linear relationships
XGBoost	Gradient Boosting algorithm that is efficient & flexible. Can be used for both classification and regression tasks	USE CASES 1. Churn prediction 2. Claims processing in insurance	1. Provides accurate results 2. Captures non linear relationships

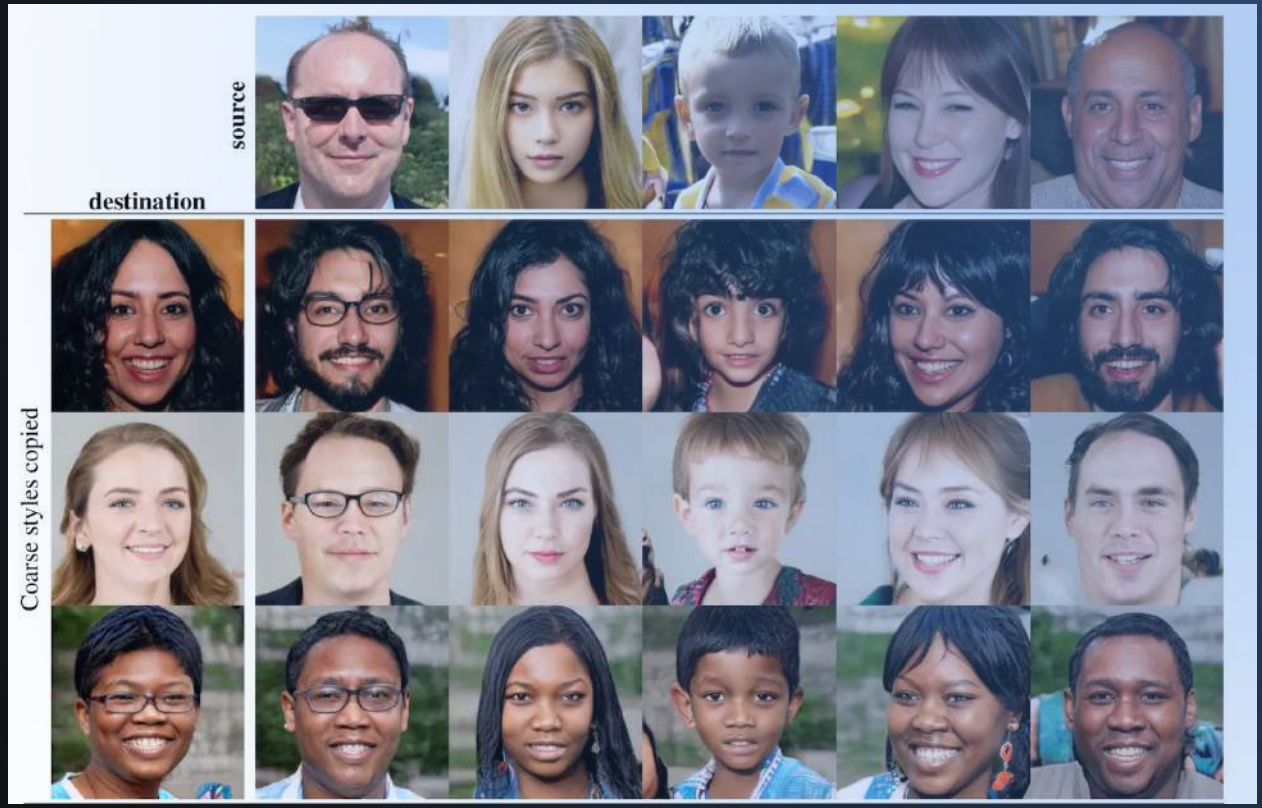
The bootcamp in 4 steps

- Determine the problem
  - Dataset
  - Labels
- Determine the classifier
  - Hyperparameters
- Determine the method
  - Preprocessing of data
  - Classifier comparison
  - Performance metric
- Evaluate the result

Cheatsheet

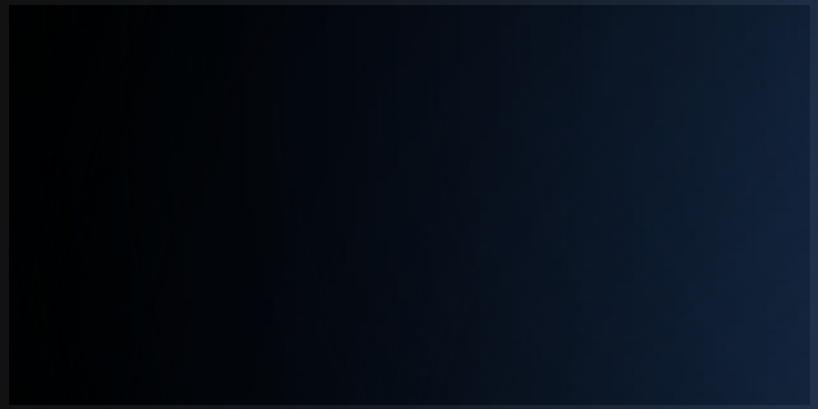
StyleGAN

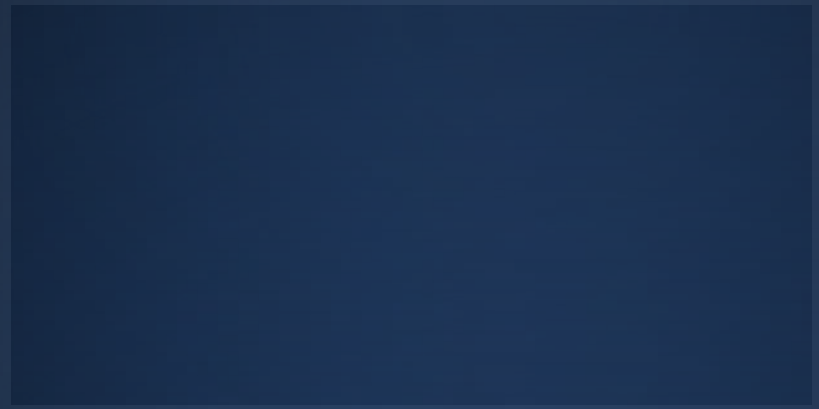
The magical image generator



StyleGAN2 & FOMM

Another magical image generator combined with an animator



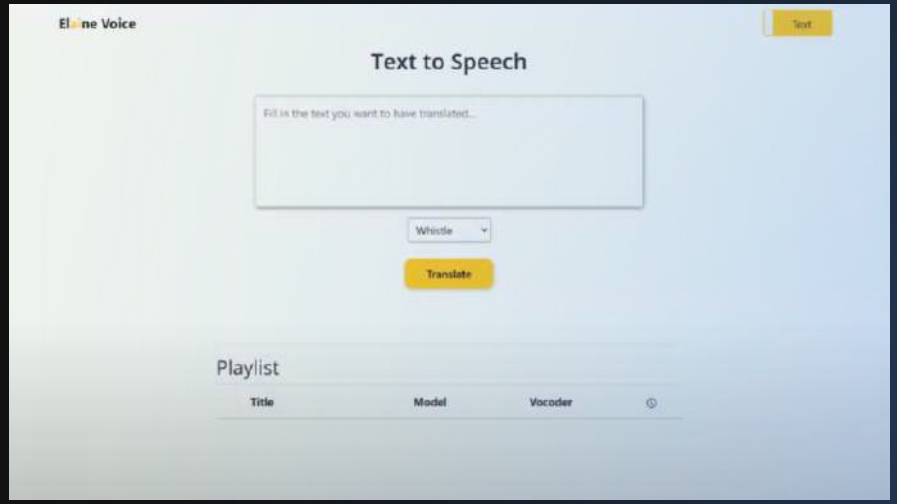


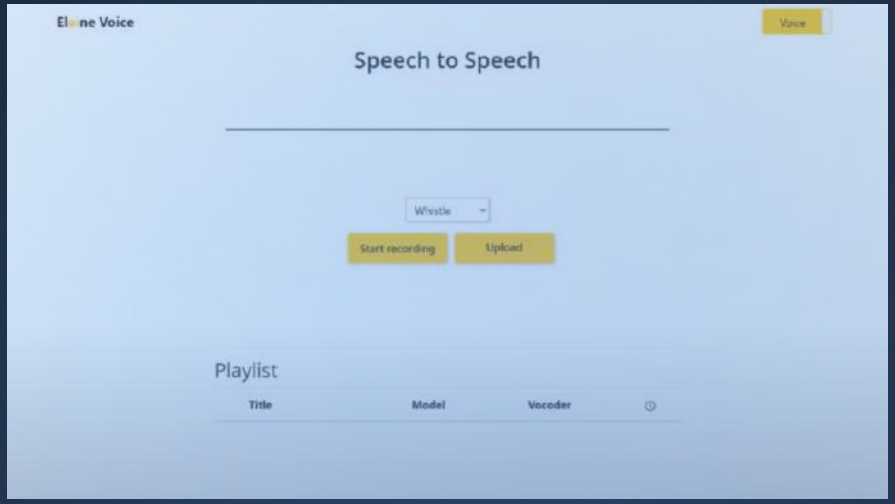
Relative

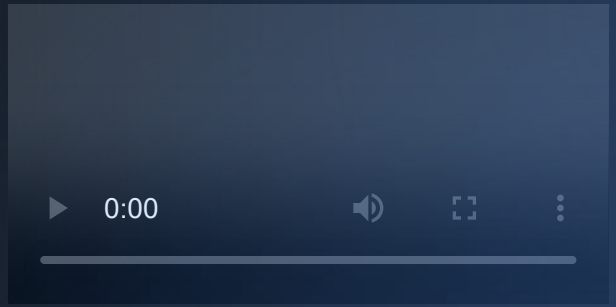
Absolute

Tacotron

A speech synthesis model



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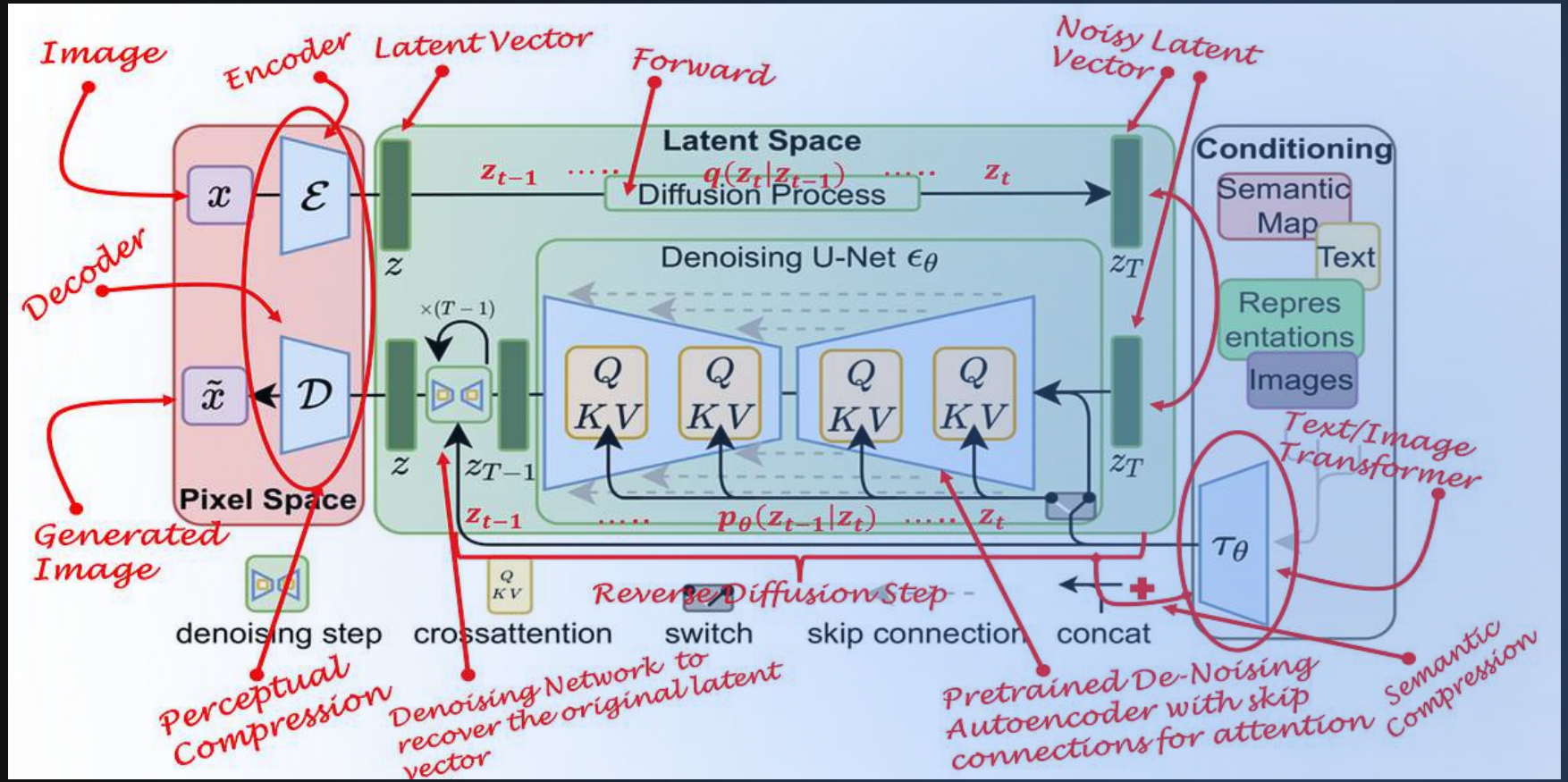
Diffusion Models

The Golden Era of A.I.

What is a diffusion model?



Stable Diffusion

Basic Setup

Fooocus by lllyasviel

Make sure to have the required dependencies installed (see: environment.yaml)

What is Foooocus?

An improved user experience on top of Stable Diffusion XL inspired by Midjourney

Album Covers






Fantasy / Anime

Twitch Emotes (Stickers)




Architecture

Demo

Must Knows 🍀

1. Checkpoints

Checkpoint of the model you will be using.

2. Low-Rank Adaptation (LoRA)

Fine-tuning diffusion models, these are used to make small styling adjustments.

I call them "tiny models" 🧌

3. Prompts

Positive: What do you want to generate?

Negative: What do you NOT want to generate?

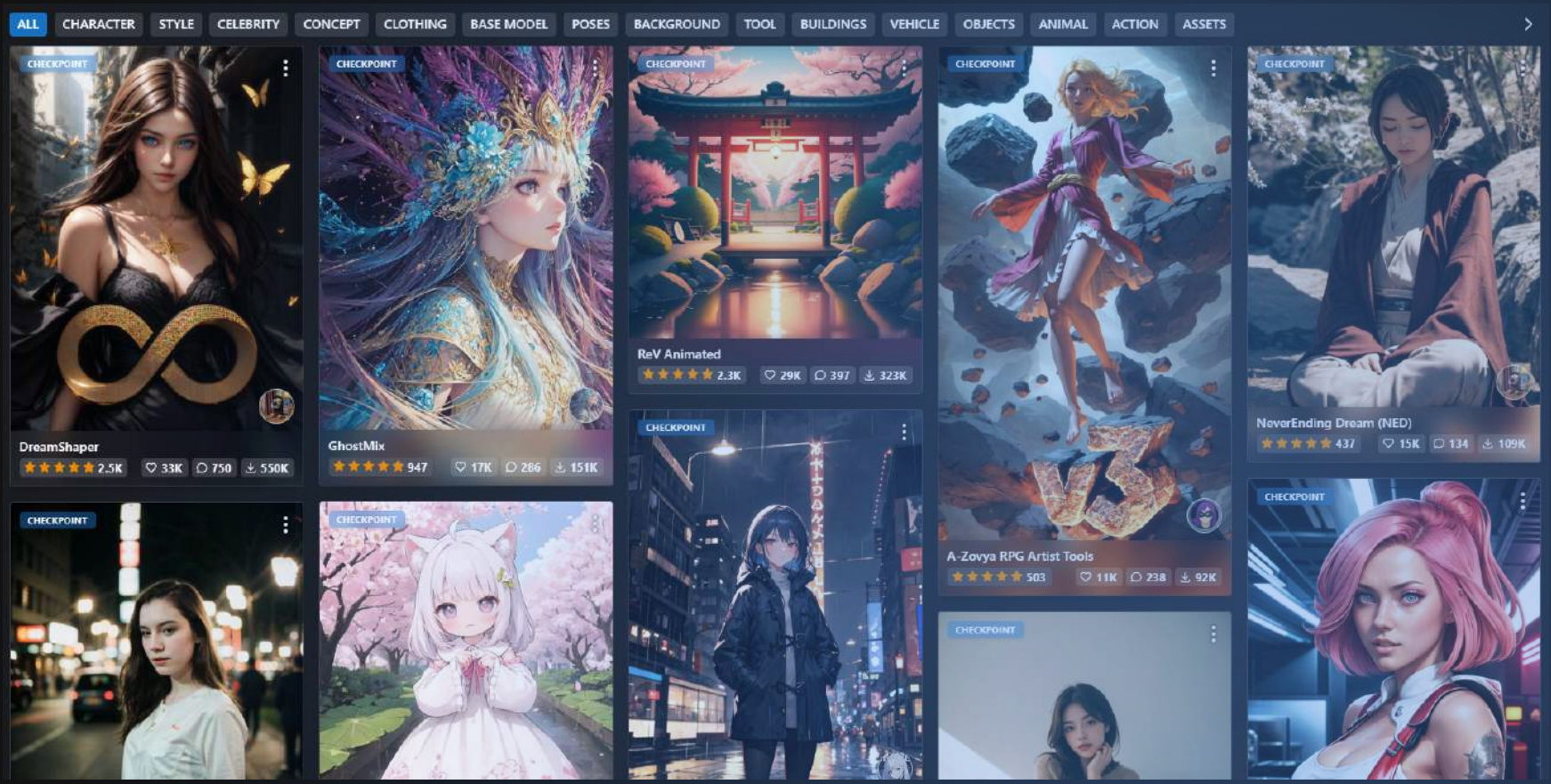
```
{
  "name": "Default (Slightly Cinematic)",
  "prompt": "cinematic still {prompt} . emotional, harmonious, vignette,
    highly detailed, high budget, bokeh, cinemascope, moody, epic, gorgeous, film grain, grainy",
  "negative_prompt": "anime, cartoon, graphic, text, painting, crayon,
    graphite, abstract, glitch, deformed, mutated, ugly, disfigured"
}
```

4. Weights

The importance of a certain criteria.

Want to use another model?

Make sure to visit CivitAI or create your own.



Advanced Setup

Stable Diffusion Web UI by AUTOMATIC1111

Make sure to have the required dependencies installed (see: environment-wsl2.yaml)

Use the following command if running webui-user.bat does not work:

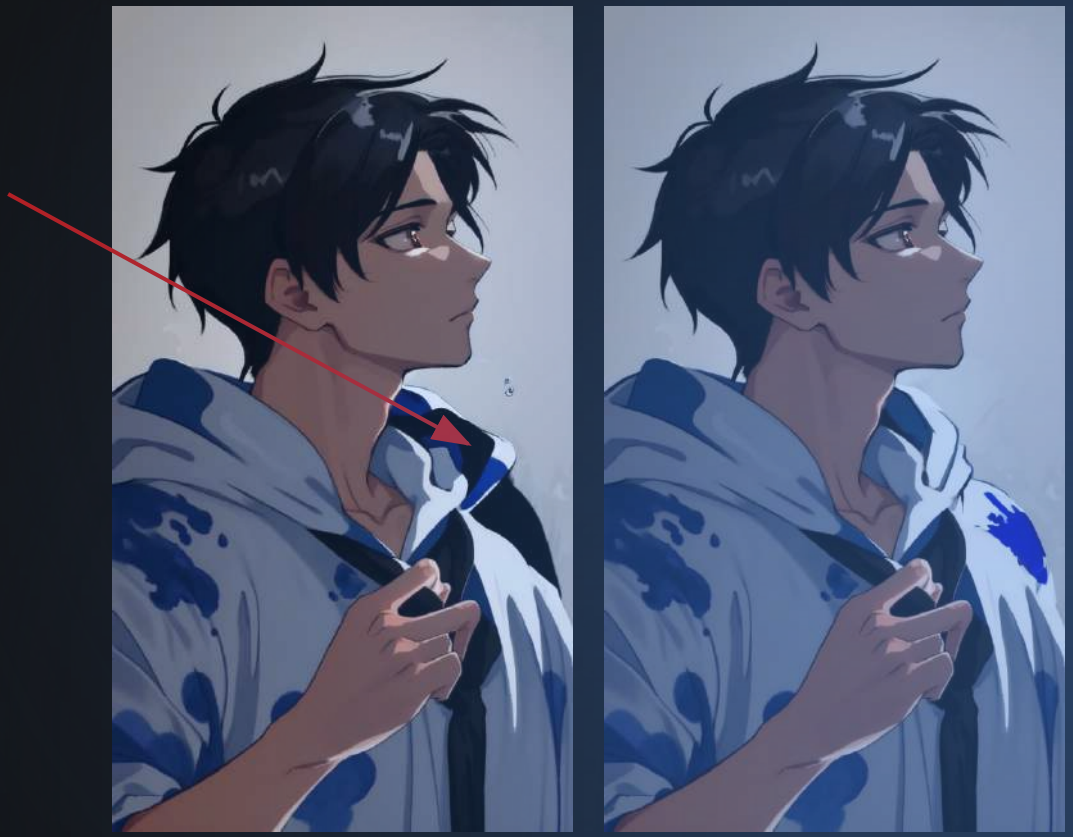
```
pip install -r requirements.txt
```

What is Stable Diffusion Web UI?

A web interface built for Stable Diffusion models with a lot of settings.

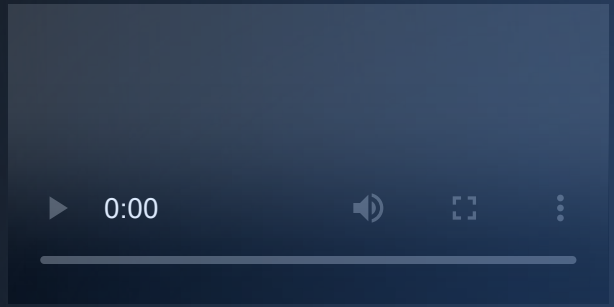
Instagram Model

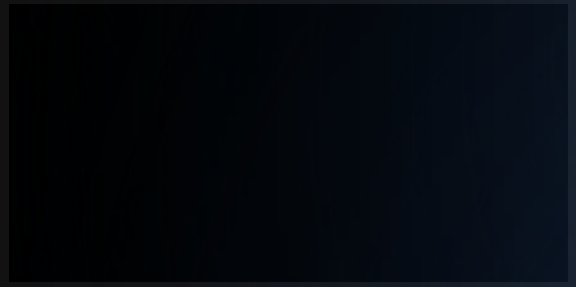
Inpainting



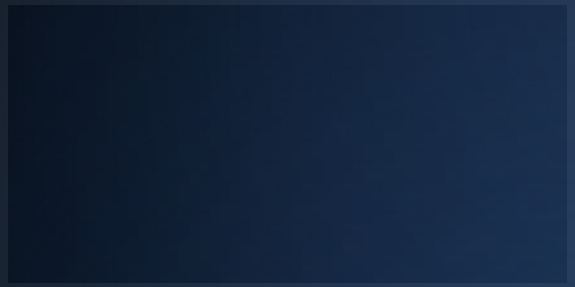
Demo

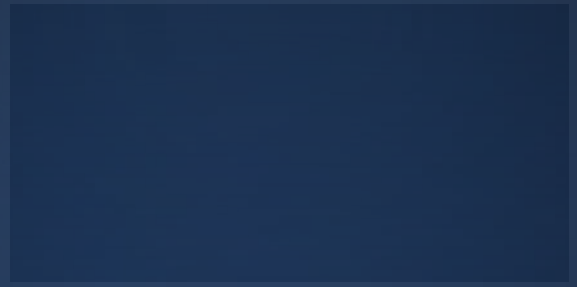
Videos with Deforum





without ControlNet





with ControlNet

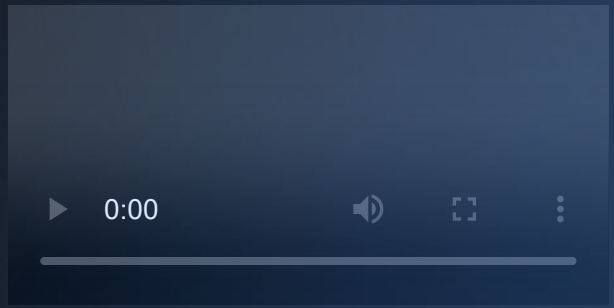
ControlNet

A neural network to control diffusion models

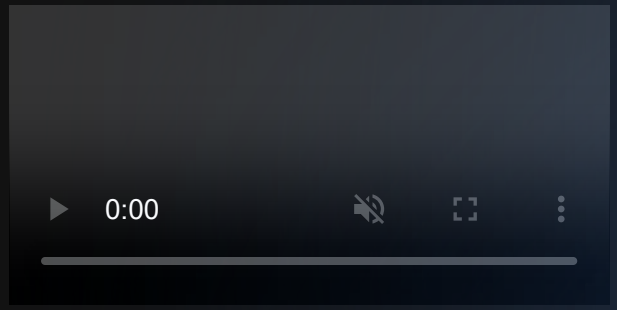
Installation Guide:

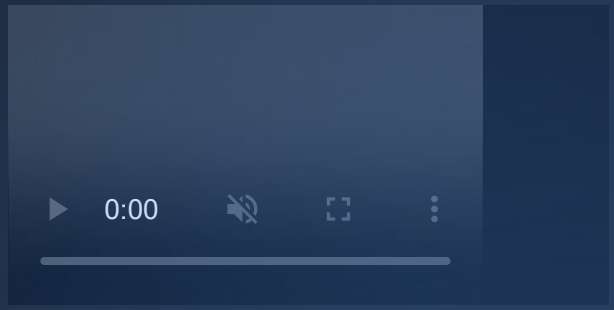
- Open the **Extensions** tab in Stable Diffusion Web UI
  - Open the **Available** tab
  - Press the **Load from** button
  - Install `sd-webui-controlnet`
- Install ControlNet Models
  - Great ones are: depth, canny, openpose, lineart_anime
- Place the installed models in your folder ControlNet extension folder
  - Path: `WebUI -> extensions -> sd-webui-controlnet -> models`
  - If this doesn't work, then place them in: `WebUI -> models -> ControlNet`

Tears for Fears - Everybody Wants To Rule The World



Tears for Fears - Everybody Wants To Rule The World





Want "better" videos?

Have a look at the following methods and projects:

- The TokyoJab Grid Method
- TemporalKit + TemporalNet
- Runway ML

Real World Applications

- Linkin Park - Lost (Music Video)
- Lumi_N0va (A.I. Virtual Character)
- Interior AI
- and many more...

Want to learn more on your own?

Here are some YouTube channels I can highly recommend:

- Sebastian Kamph
- Albert Bozesan
- bycloud
- Jarods Journey

Key Takeaways

- Study Python 🐍
- Create bots 🤖
- Create even more bots 🤖🤖
- Get tired of creating bots 😴
- Dive into creating bots with a 🧠
- Have fun!

Thank You!

Slides are on icba.dev and GitHub