Waifu Generator

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1 Introduction

1.1 Goal

Our goal is to generate new anime characters based on drafts drawn by users. For example, users draw a brown hair and blue eyes draft, then our project will generate a new anime character based on users sketch.

1.2 Motivation

To the best of our knowledge, although there are several existing projects working with generating anime characters using GAN, the outputs from those work are not fully personalized; even with sketch-to-image functionality, the models tend to overfit on input quality, i.e. the user sketch has to be professional. Some other models could incorporate users preferences by asking them to specify certain features at the beginning, but the outline of the characters is more or less fixed and only minor personalized items could be played with, such as the color of eyes and color of hair. We see the potential of increasing user participation by even more. Our proposed model allows users to transform their sketch work along to complete anime characters and no professionalism is required. This will be an exciting tool for people like us who are not specialized folks in this area but would like to have their own anime characters. Therefore, we are really impassioned about this project.

1.3 Contributions

- More Flexible inputs: Provide a panel to users and they can draw anything Converting images to data that we can use to train a GAN model.
- Automatic colorization: given color hints, sketches could be automatically colored.
- More accurate models: Combine VAE and GAN to generate results.

Preprint. Under review.

2 Problem formulation

2.1 Dataset

We will use the same dataset called Danbooru `https://www.gwern.net/Danbooru2019#`, this dataset provides a lot of a large-scale anime image database, its enough for us to train a stable GAN model. Specifically, we have 300k cropped anime face images.

2.2 Input

During the training, we split one image into its sketch outline and its color. Then we use the images sketch outlines to train a VAE model. Then we use the results of the VAE model, their color, and original images to train the GAN model. During the test phase, we split one image into its sketch outline and its color. Then we use the images sketch outlines as the input of the trained VAE model. Then we combine the result of the VAE model and its color to generate an image we want.

2.3 Output

Returning an image that best matches the drawing of the user. Show it to the user.

3 Models

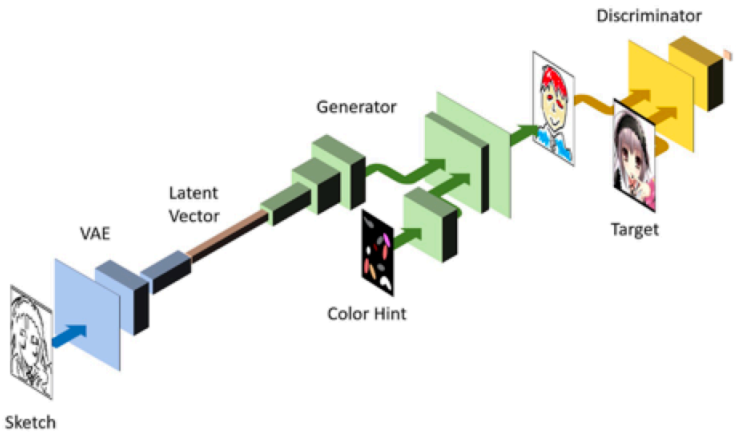

Figure 1: High Level Model

3.1 Components of the model

3.1.1 VAE Model

- Inputs: the sketch outline of the image we want to use
- Outputs: vectors we can use as the input of the GAN model

3.1.2 The color hint: the color of the image we are using

3.1.3 GAN Model

- Inputs of generator: the results of the VAE model, the color hint.
- Outputs of the generator: the image we generate by the generator.
- Inputs of the discriminator: target images, outputs of the generator, and color hints
- Outputs of the discriminator: vectors that use to calculate the loss.

4 Experiments(Currently obtained Results)

4.1 UI

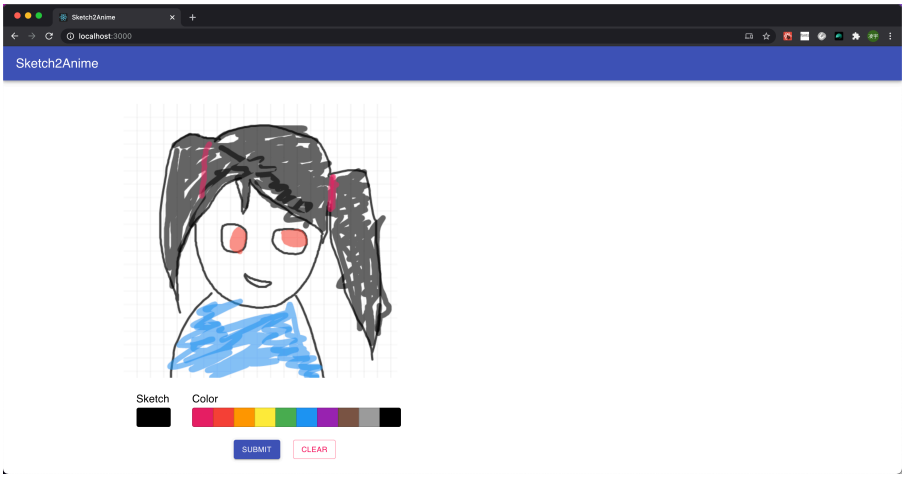

Figure 2: Web Design

4.2 VAE Model

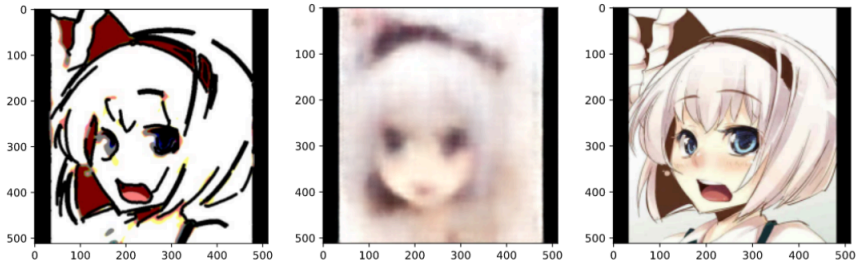

Figure 3: A test output from VAE experiment

input sketch image —> VAE output —> target image

5 Remaining steps

- 11.11 - 11.15: Model training
- 11.16 - 11.20: Find some ways to improve model
- 11.21 - 11.24: Finalizing
- 11.24 - 11.30: Complete documents and final report.

6 Individual contributions

- Hehan Xie: Write documents, Data Preprocess, model building
- Lei Ding: Model building, model testing, Visualization
- Lingyu(Nico) Ge: Model building, model training, front-end design
- Nanchun Shi: Data preprocessing, model and pipeline building
- Tingyi Guo: Write documents, find datasets, model building