

MANGAN

by Felipe Coelho

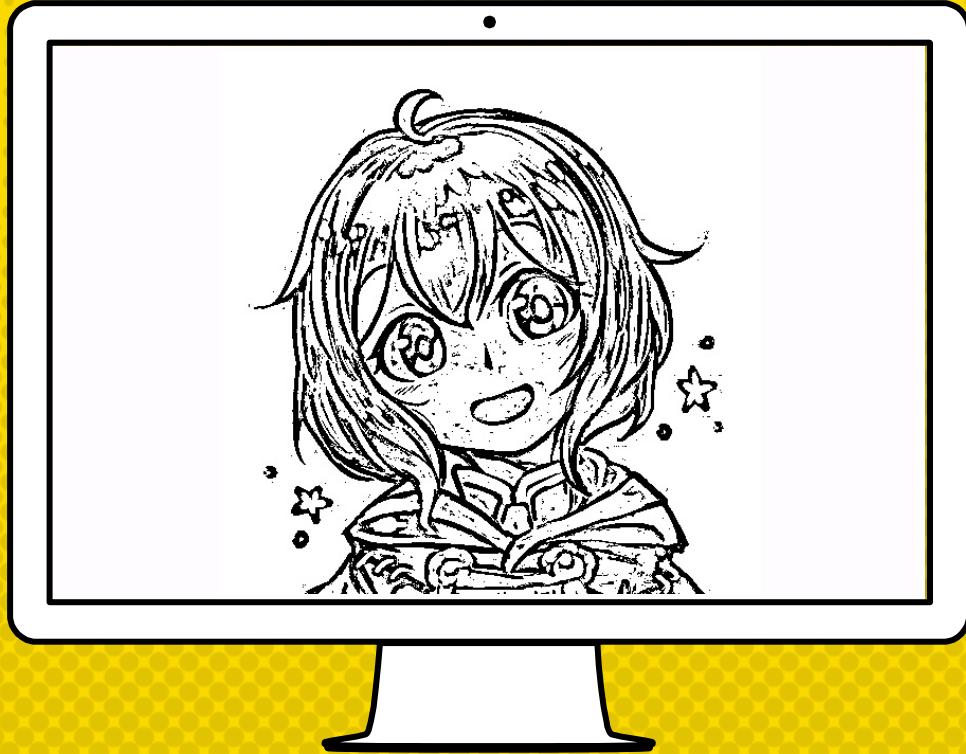
+ Paulo André

+ Hélio Ricardo

+ Ernesto Marujo



**COLORIZATION
IS HARD**



COLORIZATION IS HARD

light

texture

details



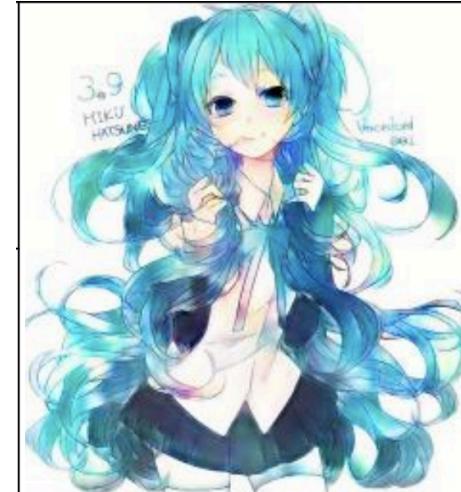
STYLE TRANSFER!



+



=



**NO PRIOR
EXAMPLES!**

**AND WHEN
DESIGNING
FROM
SCRATCH?**

MANGAN:

ASSISTING COLORIZATION
OF MANGA CHARACTERS CONCEPT ART
using Conditional GAN

DATASET: 30K → 13K

Safebooru

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Search

brown_hair

(Supports wildcard *)



Tags

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+ - black neckwear 7121
+ - blonde hair 471058
+ - boots 134914
+ - brown hair 10201



LINE-ART EXTRACTION!

ADAPTIVE
THRESHOLDING



LINE-ART EXTRACTION!

ADAPTIVE THRESHOLDING



COLOR-HINT!

- 1) GENERIC
- 2) INCOMPLETE

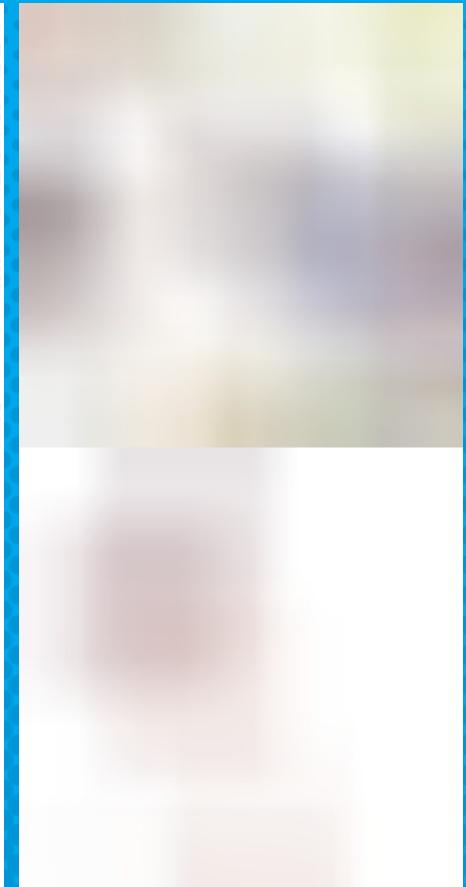
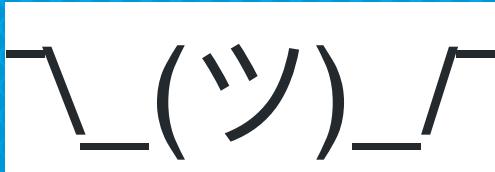
- Remove Patches
- Blur

$$K = \frac{1}{9} \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

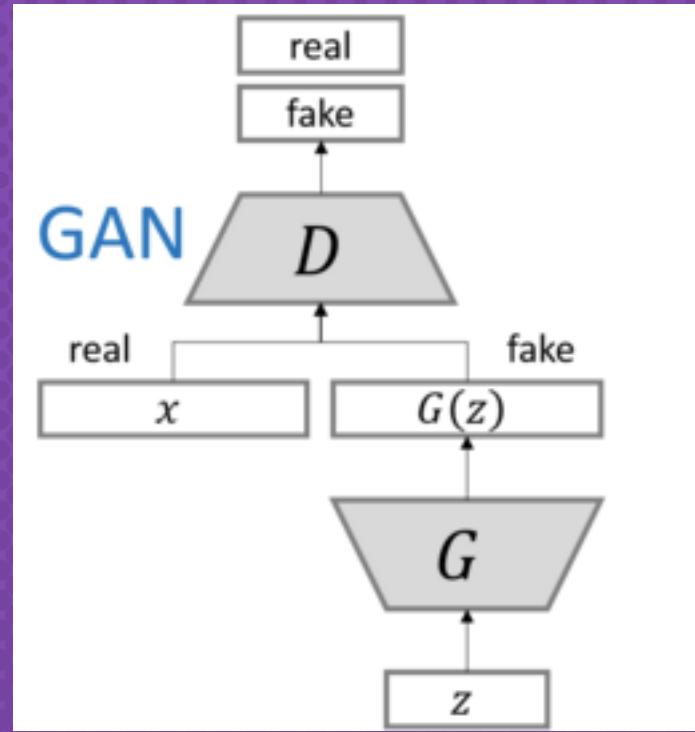


**COLOR HINT
FOR TEST-SET?**

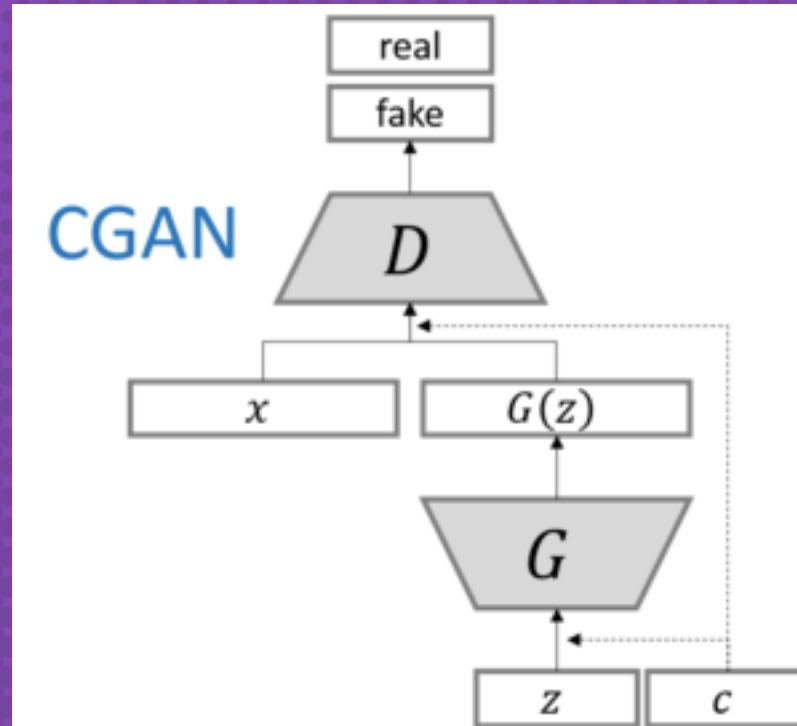
JUST ↳
BLUR IT.



ARCHITECTURE: GAN



ARCHITECTURE: CGAN?

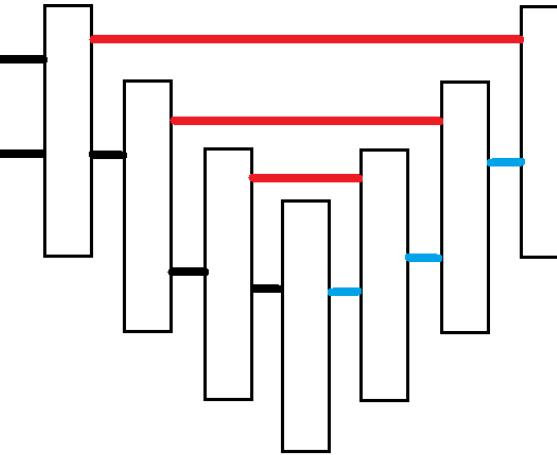


MY ARCHITECTURE

(cGAN)

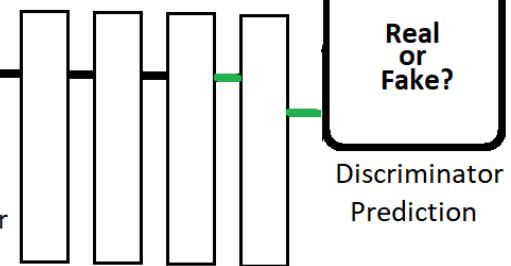


Generator



Generator Output / Discriminator Input

Discriminator

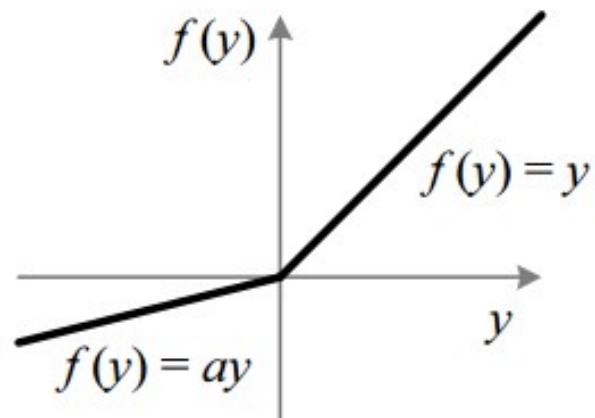
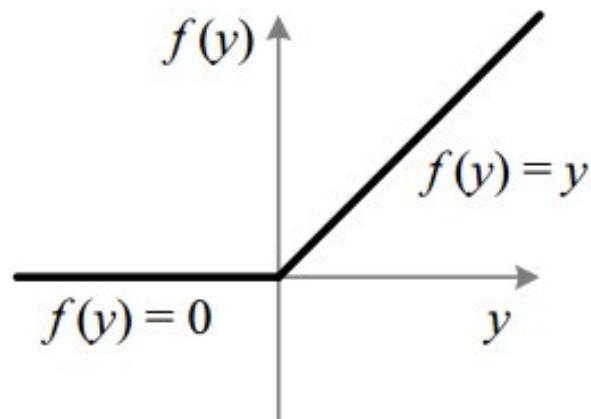


Discriminator Prediction

- Conv
- Deconv
- Residual
- Dense

HOW TO TRAIN YOUR GAN

- LEAKY RELU



HOW TO TRAIN YOUR GAN 2

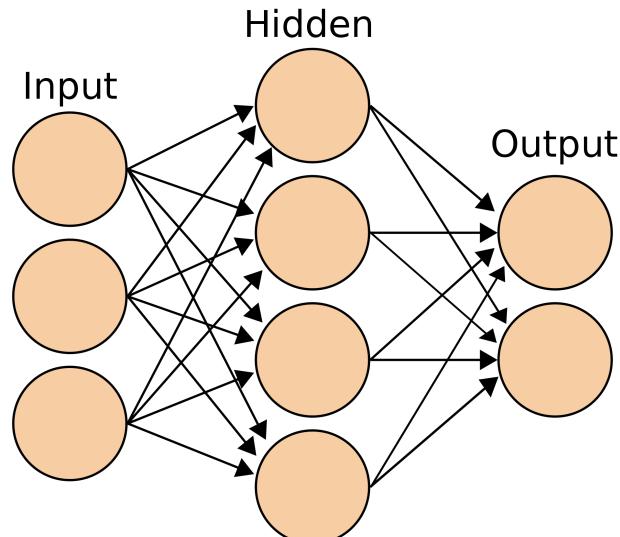
- ONE-SIDED LABEL SMOOTHING

PENALIZE
CONFIDENT
OUTPUT!

[1, 0, 0] -> [0.9, 0, 0]

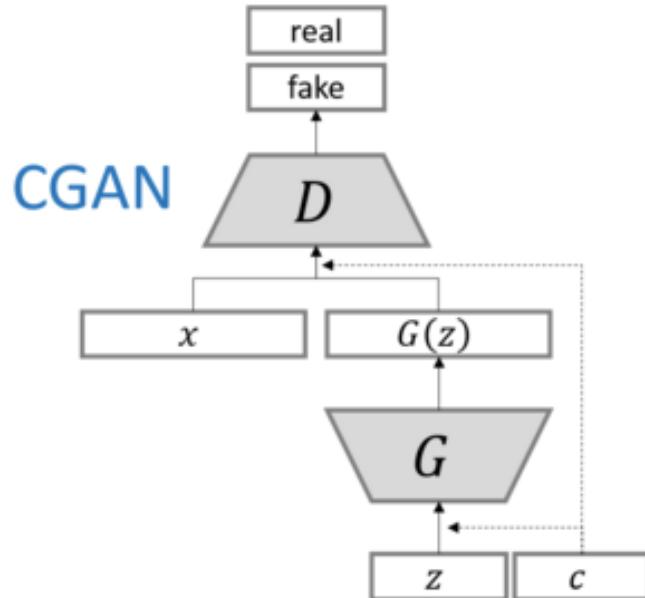
HOW TO TRAIN YOUR GAN 3

-BATCH NORMALIZATION



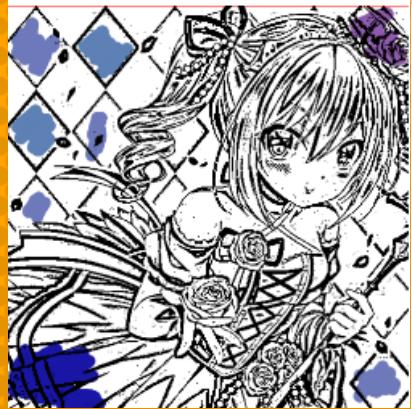
**- AVOIDS
GRADIENT
EXPLOSION**

HOW TO TRAIN YOUR GAN 4

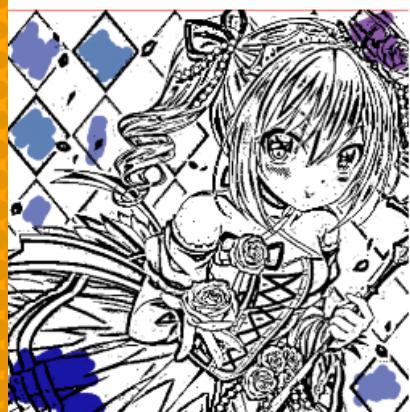


- GENERATED EXAMPLES
- TRUE EXAMPLES
- FAKE EXAMPLES

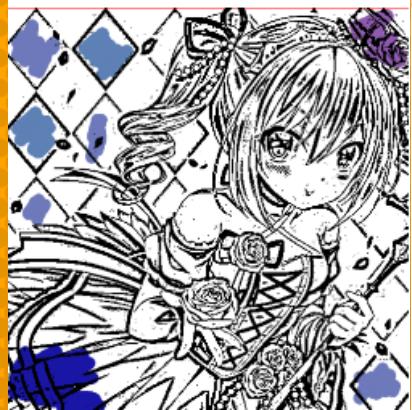
TRAINING RESULTS!



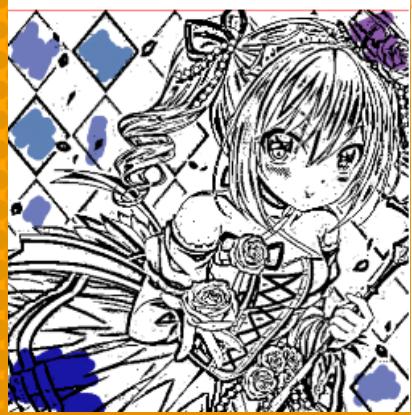
TRAINING RESULTS!



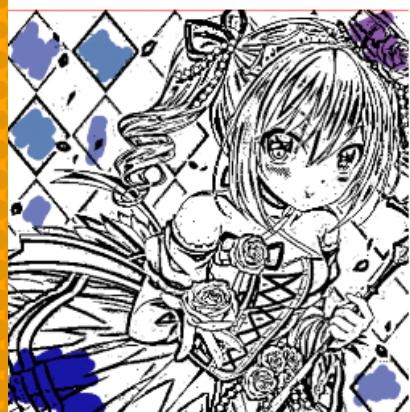
TRAINING RESULTS!



TRAINING RESULTS!



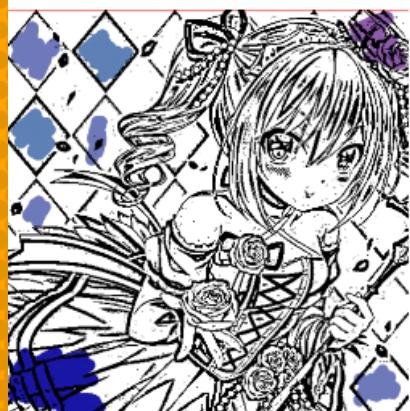
TRAINING RESULTS!



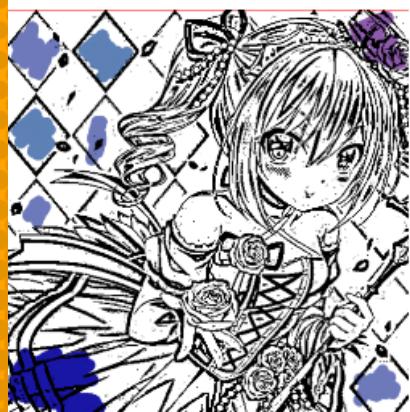
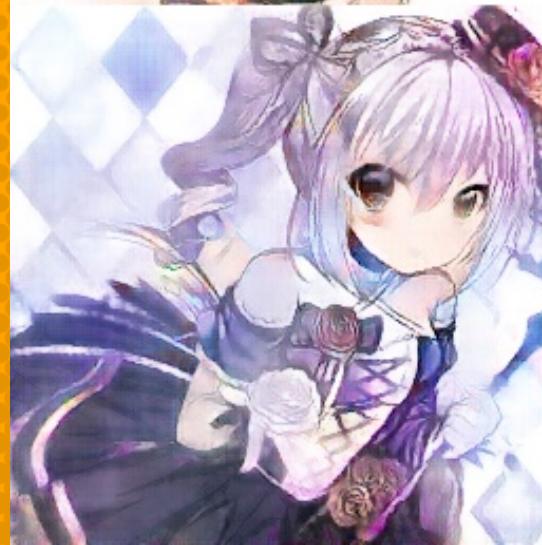
TRAINING RESULTS!



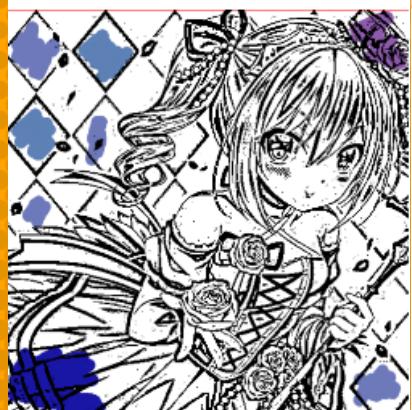
TRAINING RESULTS!



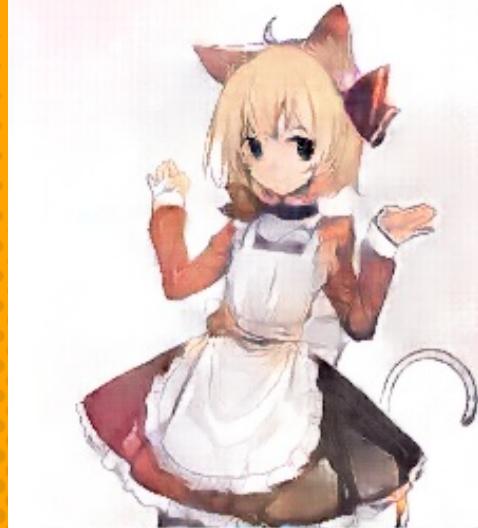
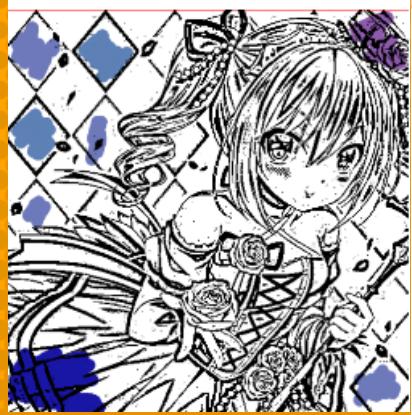
TRAINING RESULTS!



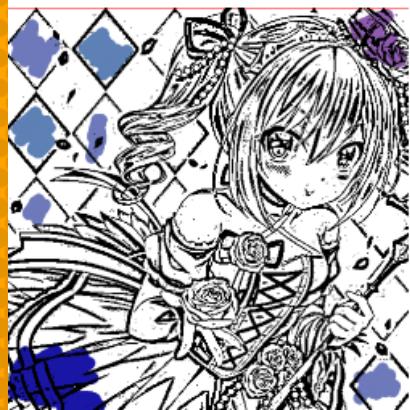
TRAINING RESULTS!



TRAINING RESULTS!



TRAINING RESULTS! (FINAL)





Raw Color Hint



DeepColor



PaintsChainer



ManGAN (Ours)



Original



SURVEY!

Image 1/8



1



2



3



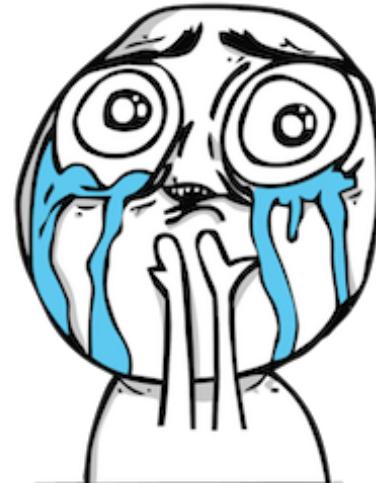
4

Please order the images according to the colorization quality, from best to worst. (example: 1, 3, 4, 2)

Short answer text

RESULTS!

COMPARISON	MANGAN (OURS) PREFERRED
ORIGINAL	8.98%
DEEPCOLOR	88.67%
PAINTSCHAINER	81.64%



CONCLUSIONS!

- GREAT FOR TESTING COLORS
- BETTER THAN OTHERS
- STILL MAKES MANY MISTAKES

FUTURE WORK!

- MULTI-STEP PROCESS
- ARCHITECTURES
- OTHER METHODS FOR HINTS

REFERENCES!

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- [2] L. ZHANG, Y. JI, AND X. LIN, "STYLE TRANSFER FOR ANIME SKETCHES WITH ENHANCED RESIDUAL U-NET AND AUXILIARY CLASSIFIER GAN," CORR, VOL. ABS/1706.03319, 2017.
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- [7] A. L. MAAS, A. Y. HANNUN, AND A. Y. NG, "RECTIFIER NONLINEARITIES IMPROVE NEURAL NETWORK ACOUSTIC MODELS," IN PROC. ICML, VOL. 30, NO. 1, 2013, P.

THANKS!

I AM *FELIPE*



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