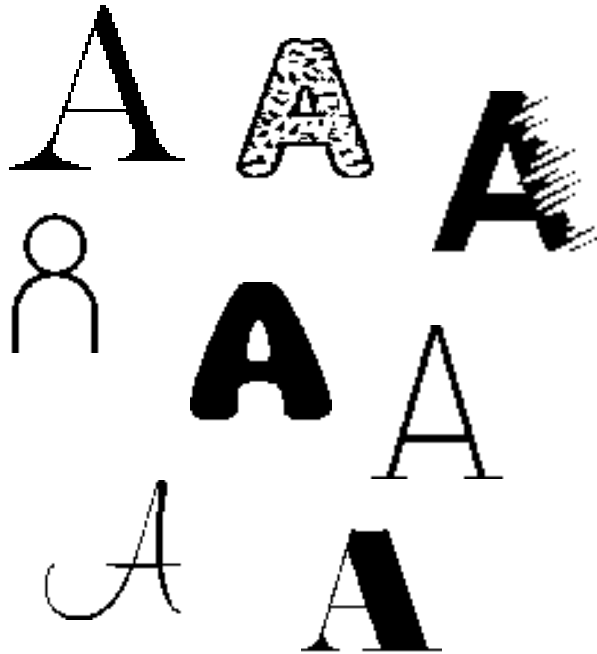


What is font impression??

Fonts have a huge number of variations.



- illegible
- human-like
- elegant

Myfonts dataset is released
with impressions tagged to fonts.

Purpose

Generate Fonts with specific impressions.

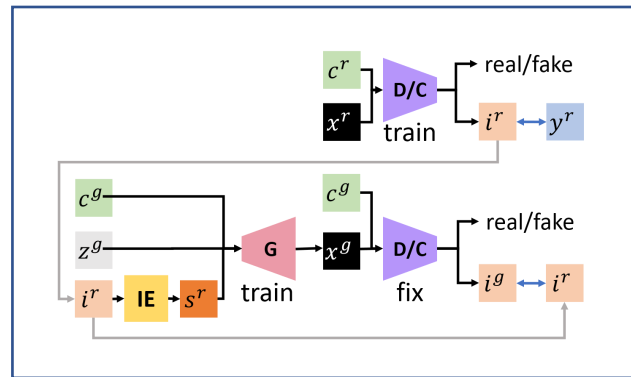
Impression word

elegant

Letter class

'R'

proposed model



generated font

R

We propose **Impressions2Font**

Related Work

Attribute2Font(SIGGRAPH2020)

➡Generate fonts from attribute values

high
'Serif'

37
attributes



Attribute2Font

Synthesized Glyph Images

S I G G R A P H
A t t r i b u t e
t o F o n t

S I

Impressions that can be manipulated are limited.

First Problem

Impression word are inconsistent



Opposite meaning ! !

Why ? → Impression are subjective

selected '*retro*'



Old computer



selected '*modern*'



Digital watch

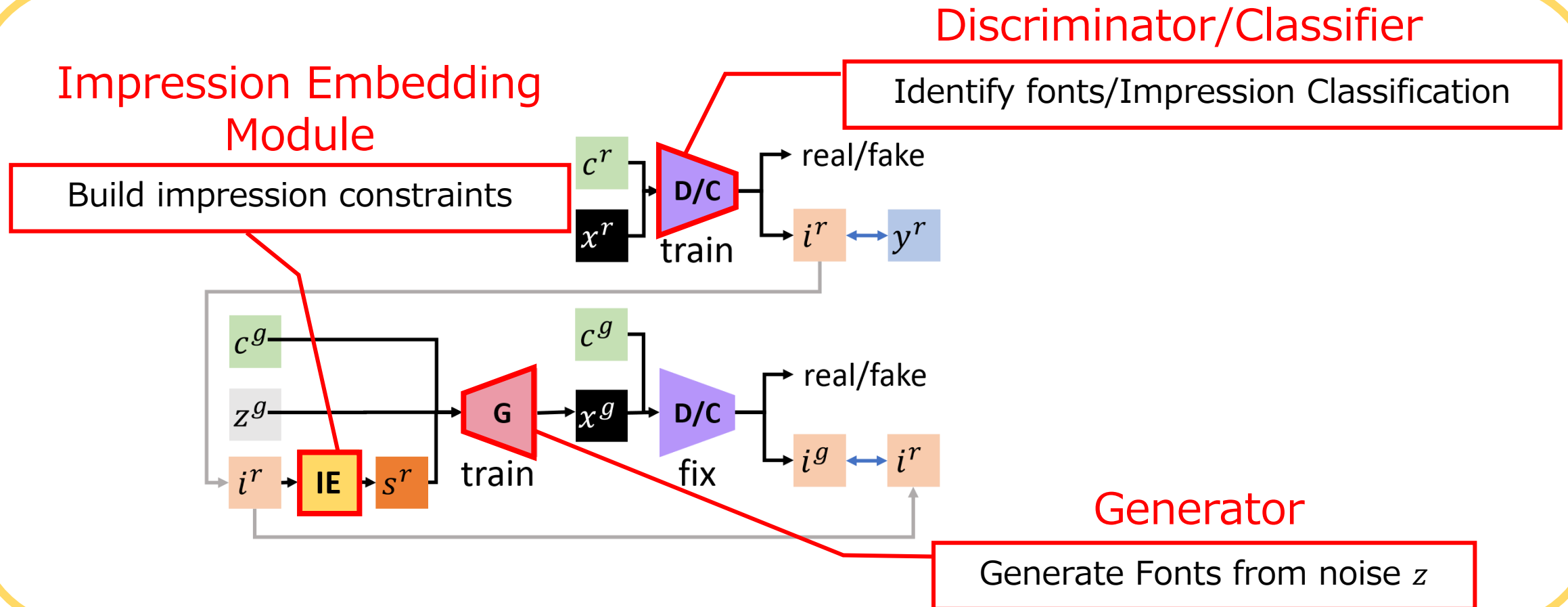


Impressions2Font

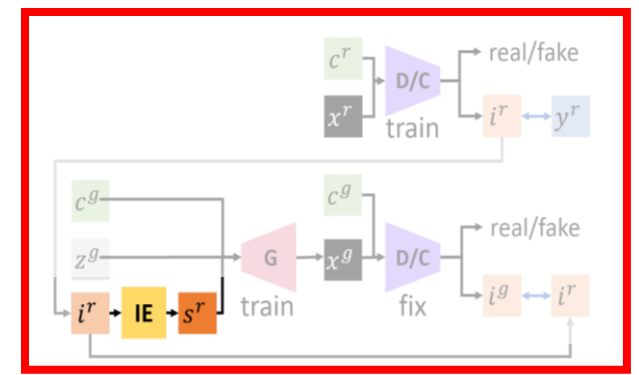
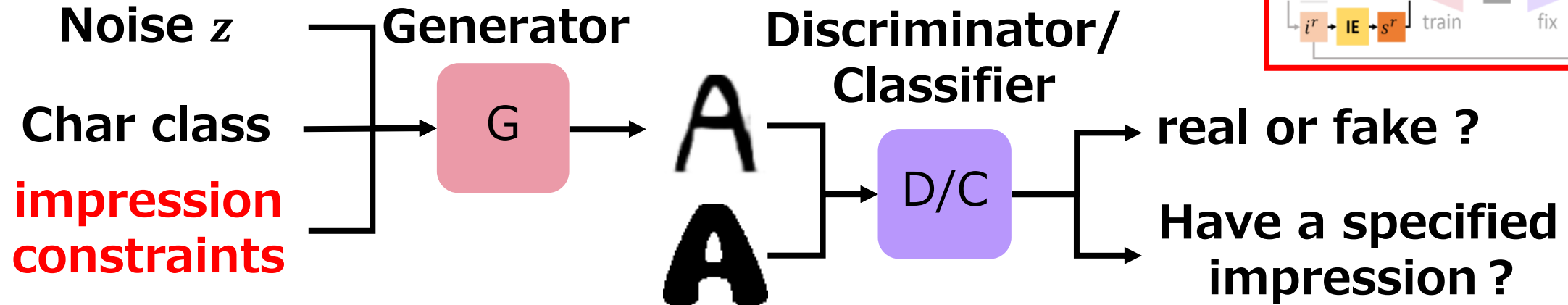
Our model is based on **conditional GANs**.

➔ Composed of 3 modules

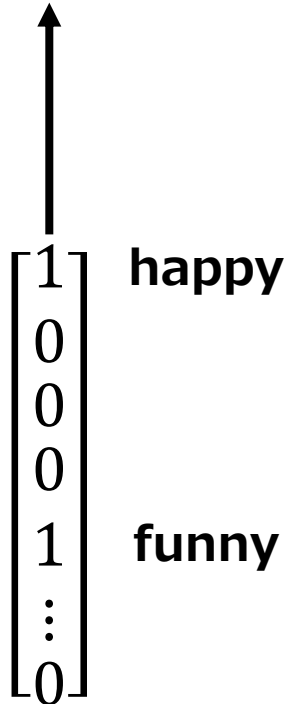
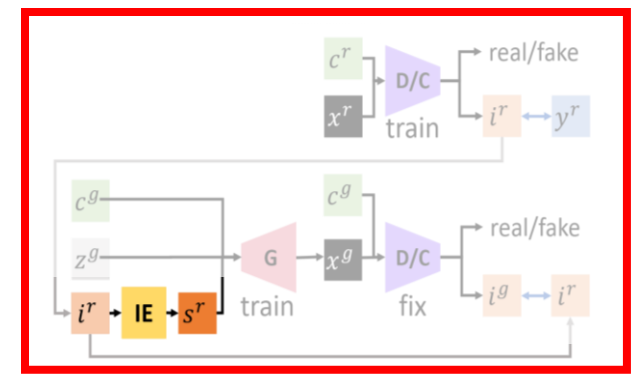
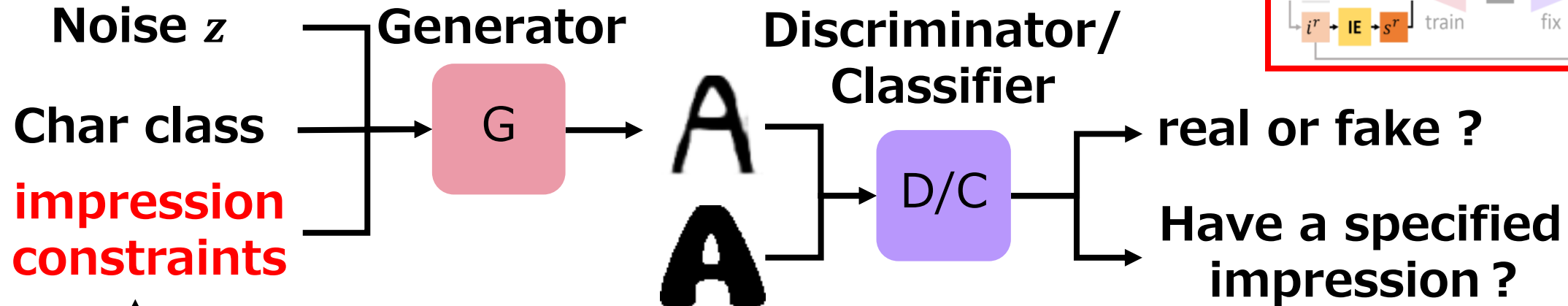
Model Architecture



Why impression Embedding Module??



Why impression Embedding Module??

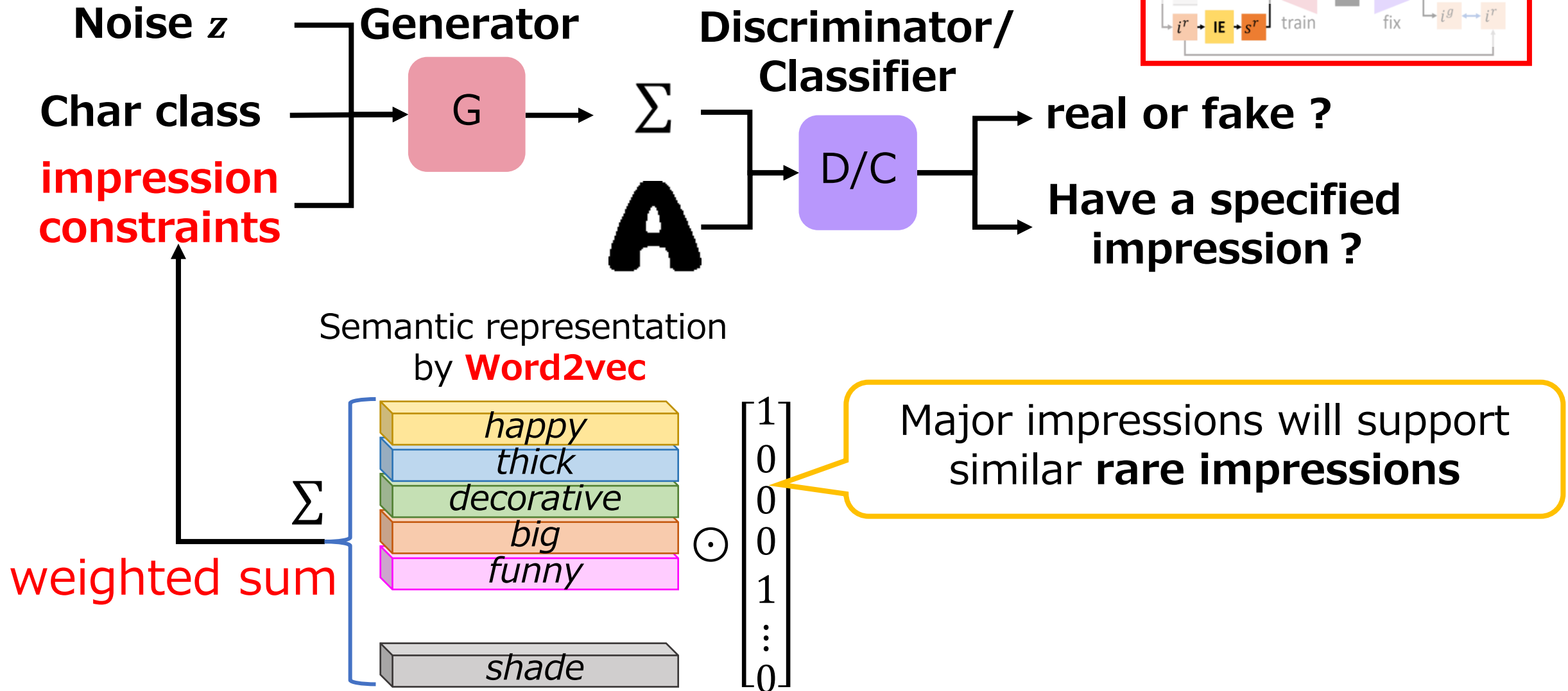


Multi-hot for impression words??

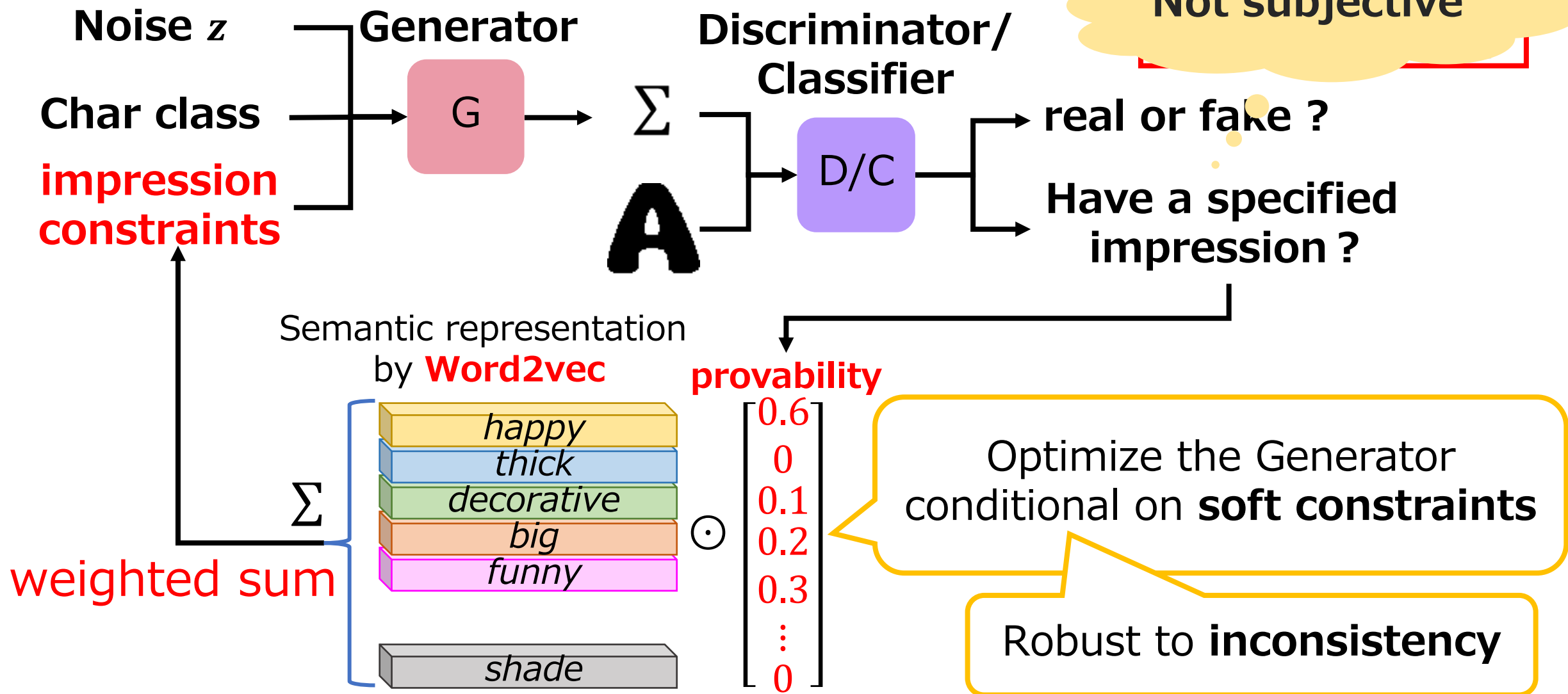
However, two problems exist

- Inconsistent impressions
- rare impressions

Why impression Embedding Module??



Why impression Embedding Module??



Generating from specific impressions

scary



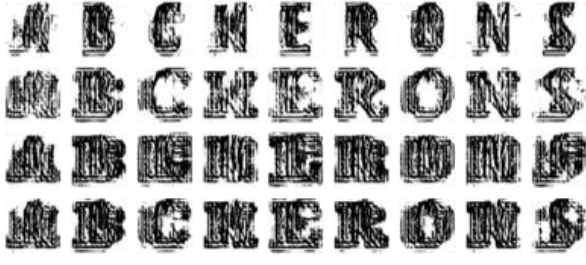
ancient



elegant



shading + big



From unlearned impression

big(learned)

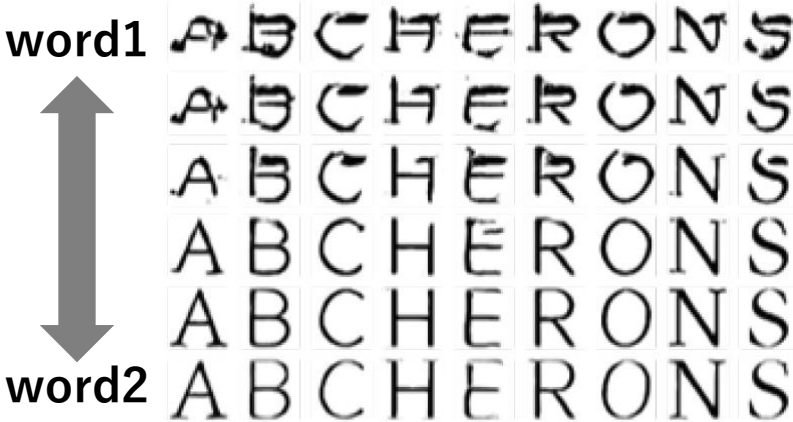


huge(unlearned)



Impression interpolation

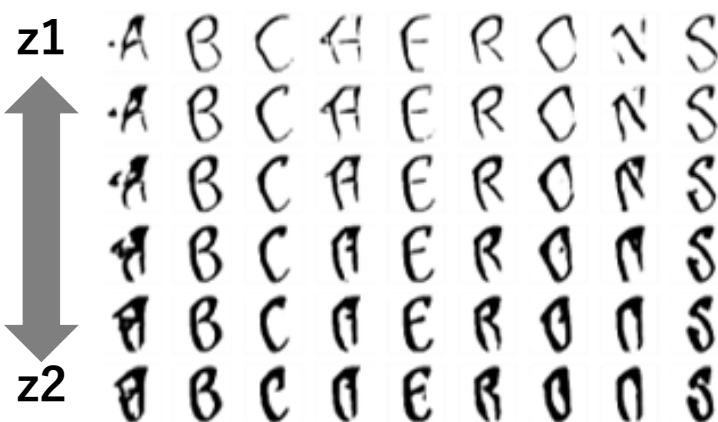
ugly



beautiful

Impression interpolation

ghost



ghost

fake image



real image



elegant

fake image

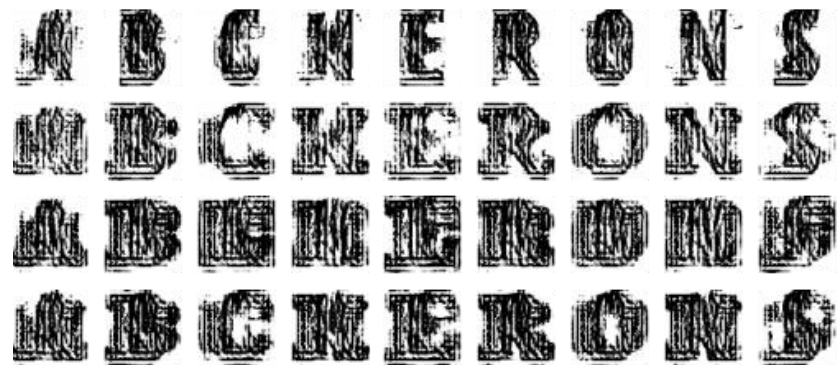


real image



shading + big

fake image

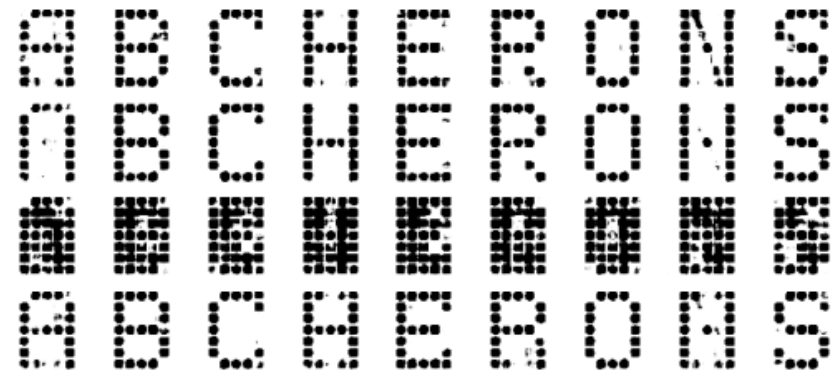


real image



lcd + ancient

fake image



real image



interpolate between different fonts

Interpolation impression

$$\alpha\phi(w_1) + (1 - \alpha)\phi(w_2) \quad (0 \leq \alpha \leq 1)$$

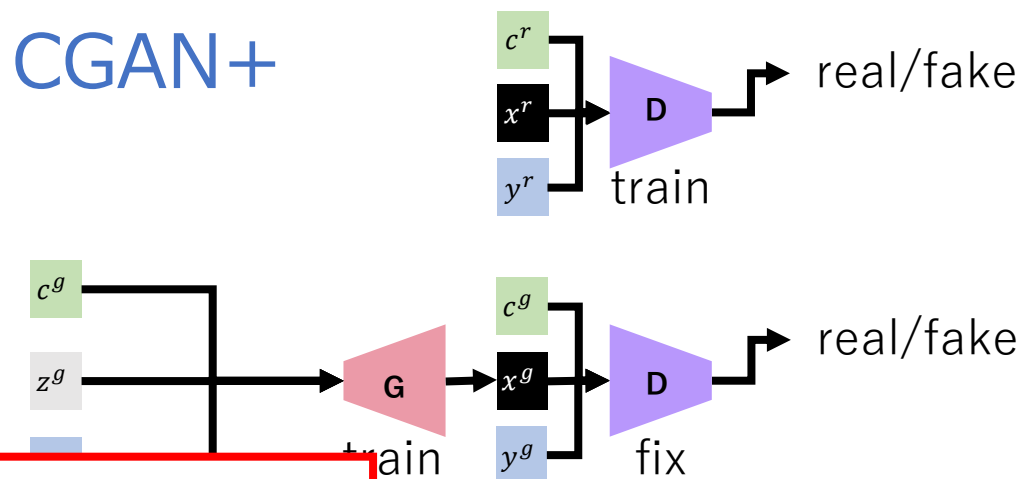
	<i>italic</i>	<i>square</i>	<i>ugly</i>
word1	A B C H E R O N S	A B C H E R O N S	A B C H E R O N S
↕	A B C H E R O N S	A B C H E R O N S	A B C H E R O N S
word2	A B C H E R O N S	A B C H E R O N S	A B C H E R O N S
	<i>normal</i>	<i>round</i>	<i>beautiful</i>

Interpolation noise

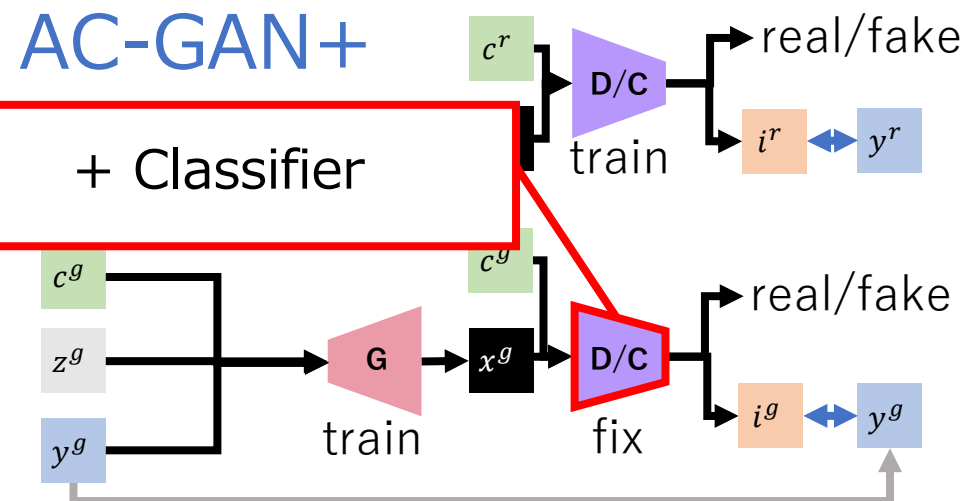
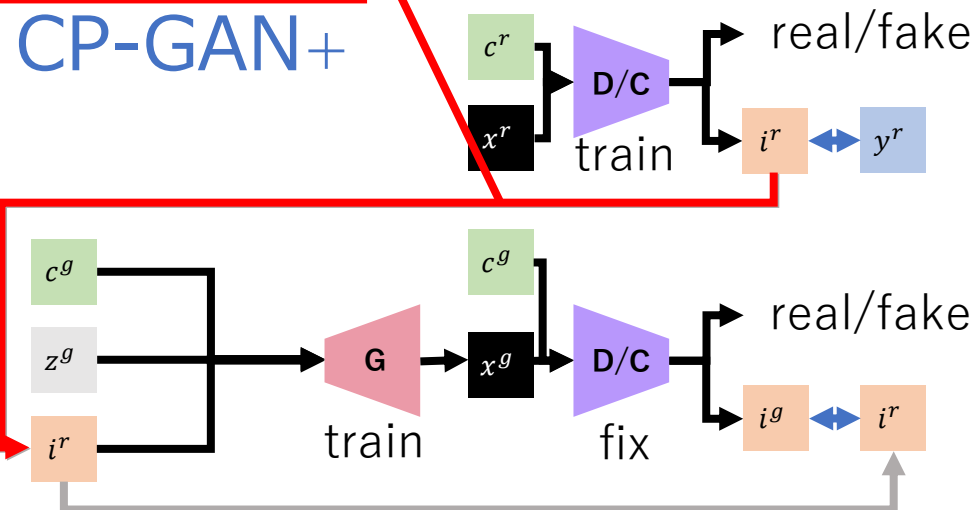
$$\alpha\phi(z_1) + (1 - \alpha)\phi(z_2) \quad (0 \leq \alpha \leq 1)$$

	<i>corporate</i>	<i>ghost</i>	<i>thick</i>
z1	ABCHERONS	A B C H E R O N S	ABCHERONS
↕	ABCHERONS	A B C H E R O N S	ABCHERONS
	ABCHERONS	A B C H E R O N S	ABCHERONS
	ABCHERONS	A B C H E R O N S	ABCHERONS
	ABCHERONS	A B C H E R O N S	ABCHERONS
z2	ABCHERONS	A B C H E R O N S	ABCHERONS

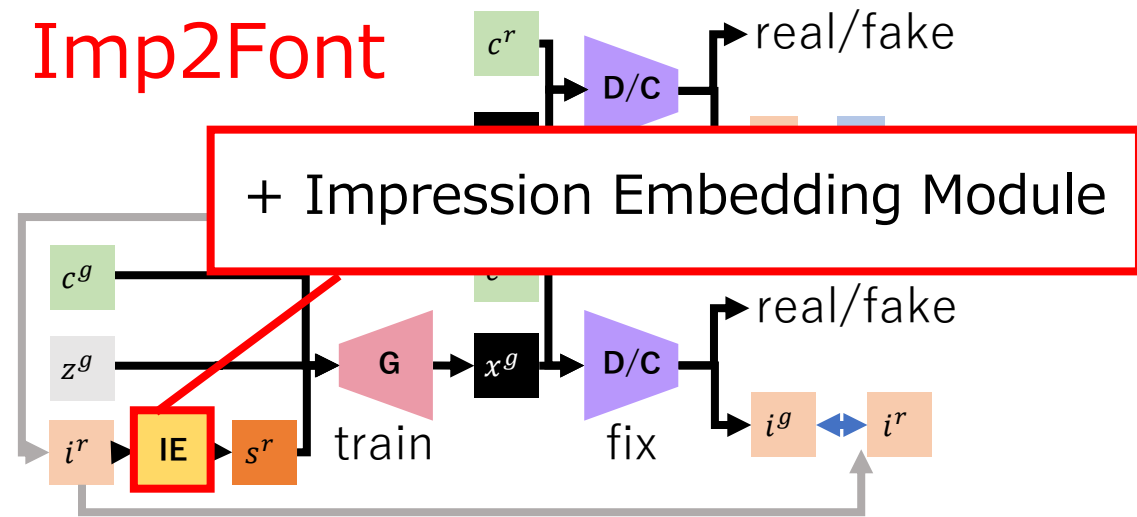
Quantitative evaluations



+ soft constraints



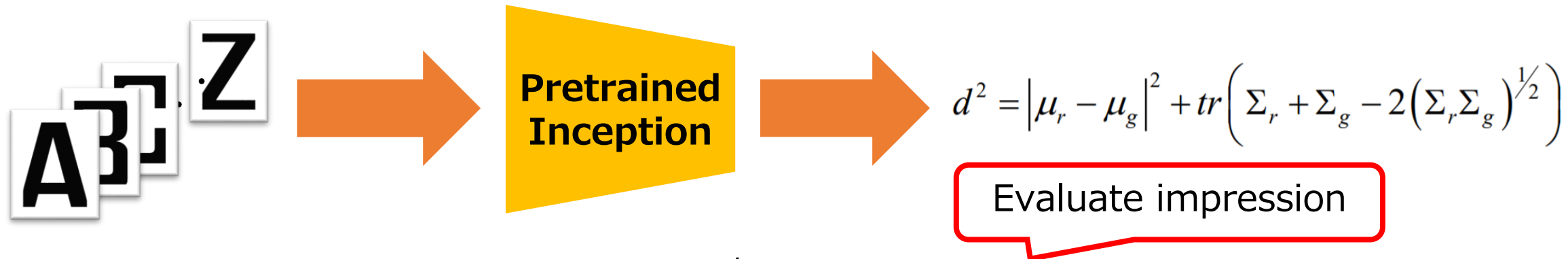
Imp2Font



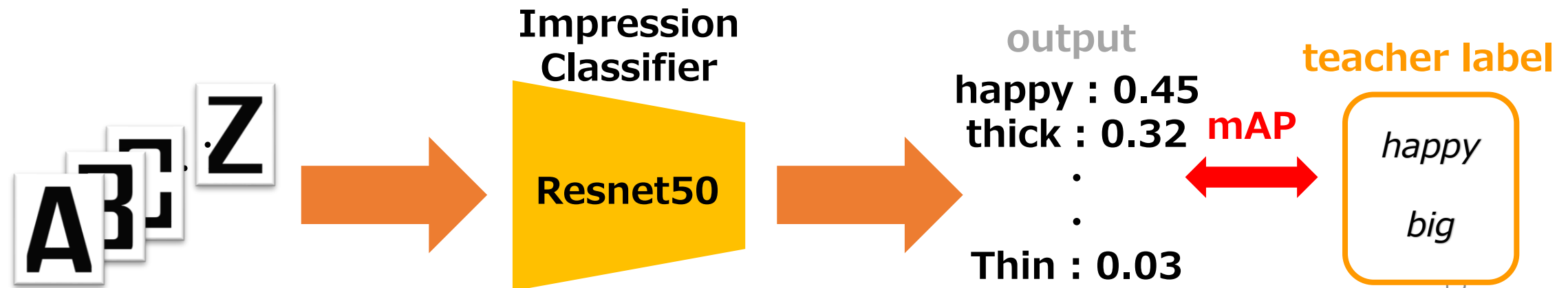
Quantitative evaluations

Evaluate **Diversity & Quality**

1. **FID** · · Compare the distribution of the generated image with the distribution of the actual image



2. ① **mAP-train** · · train: fake data/test: real data
② **mAP-test** · · train: real data/test: fake data



Quantitative evaluations

C-GAN+ · · General Conditional GANs
AC-GAN+ · · + Classifier
CP-GAN+ · · + soft constraints
Imp2Font · · + Impression Embedding Module

	C-GAN+	AC-GAN+	CP-GAN+	Imp2Font
↓ FID	39.634	39.302	33.667	24.903
↑ mAP-train	1.524	1.157	1.823	1.765
↑ mAP-test	1.155	1.158	1.600	1.708

- ✓ Imp2Font greatly improves FID
- ➡ High quality and diversity compared to other methods
- ✓ Imp2Font and CP-GANs+ greatly improves mAP-train/test
- ➡ Impression Embedding Module is very effective.