Your **CARTOON** Is

Lee You Jin

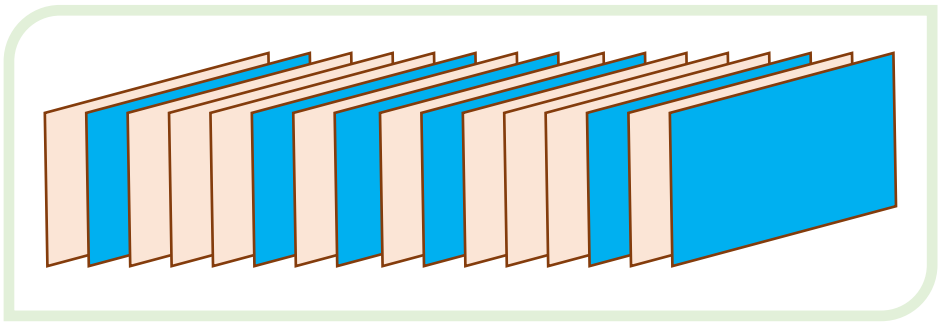
Park Sung Chun

Lee Hyun Soo

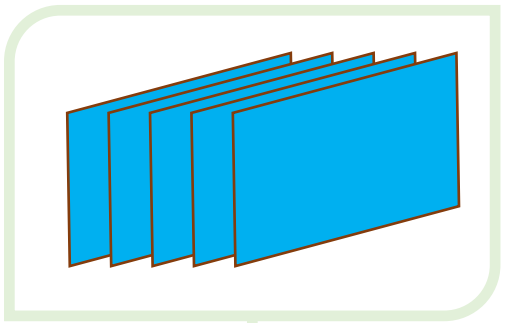
Jang Hyung Joo

Subject

All video Frames

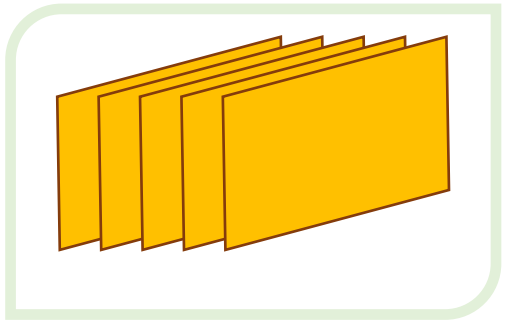


Extract highlight Frames

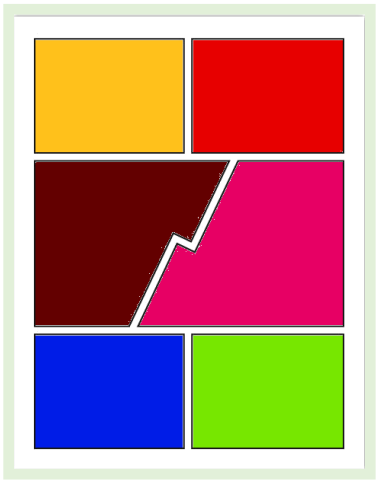


CARTOON GAN

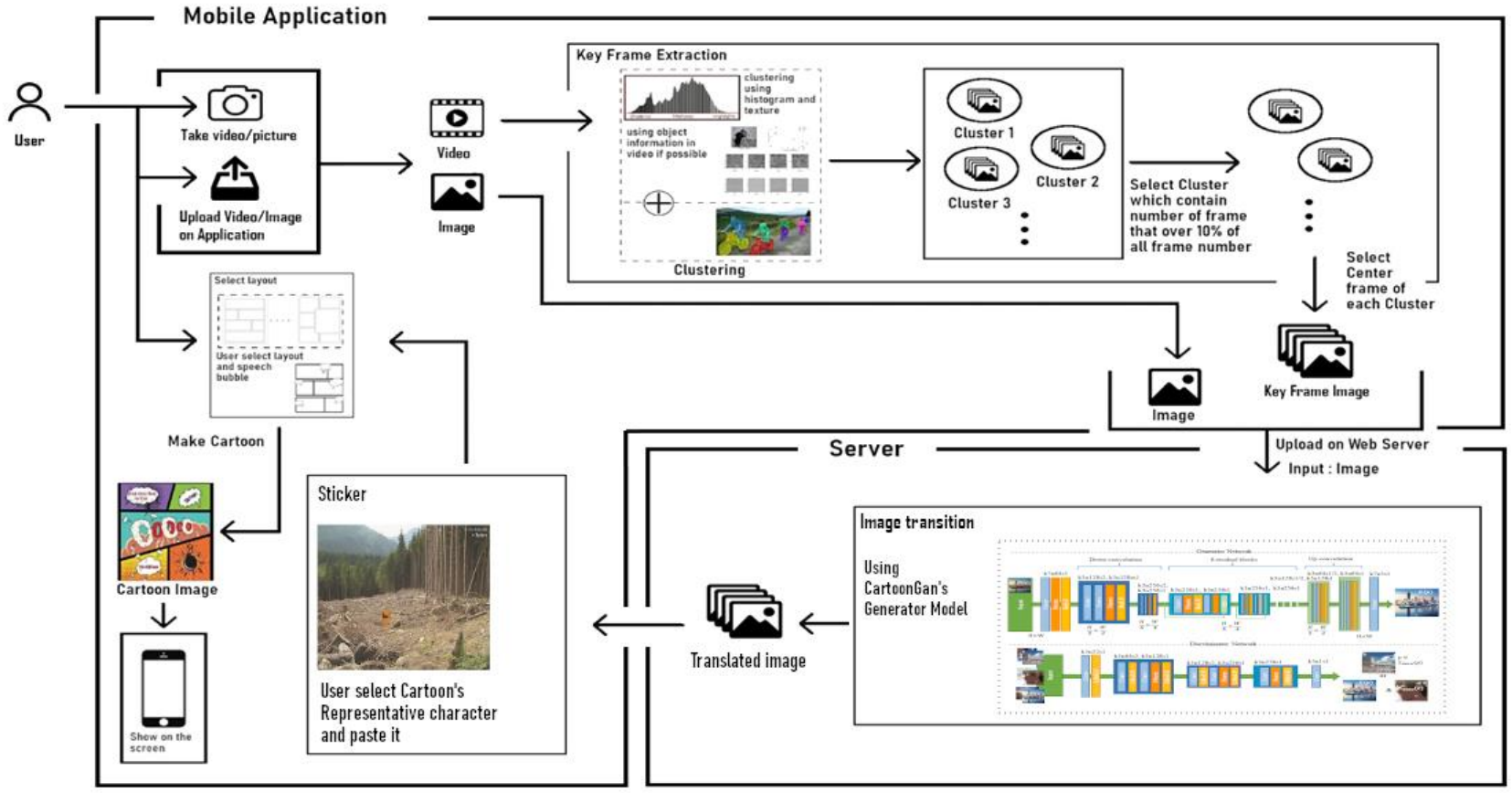
Cartoonization



Make a cartoon



Architecture



Feature 1 – Key Frame Extraction

Differences with Key Frame Extraction

Existing Unsupervised Clustering :

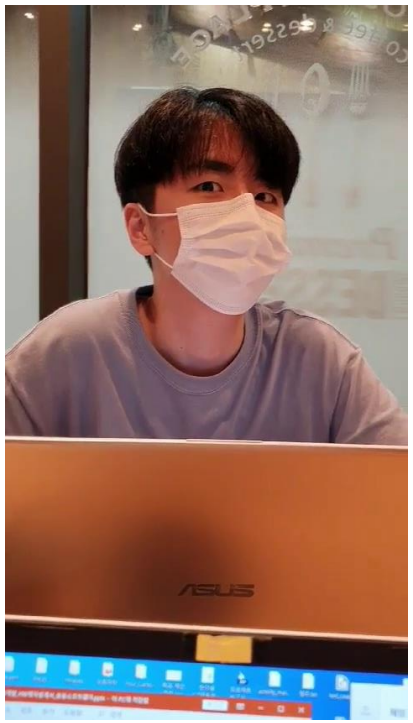
- Depends on the shooting time of the scene
- Can’t distinguish between frames of different temporal order

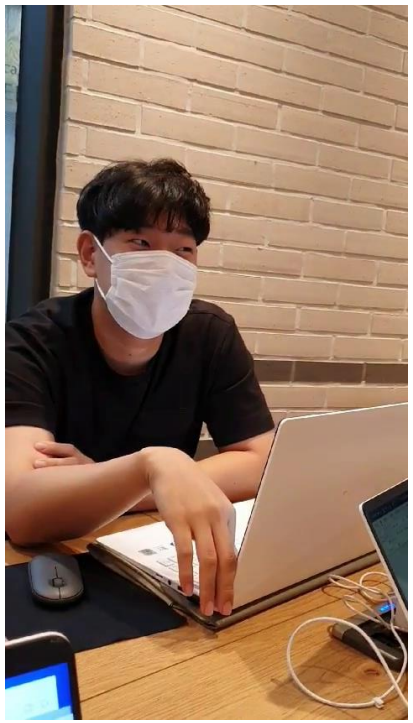
Ours :

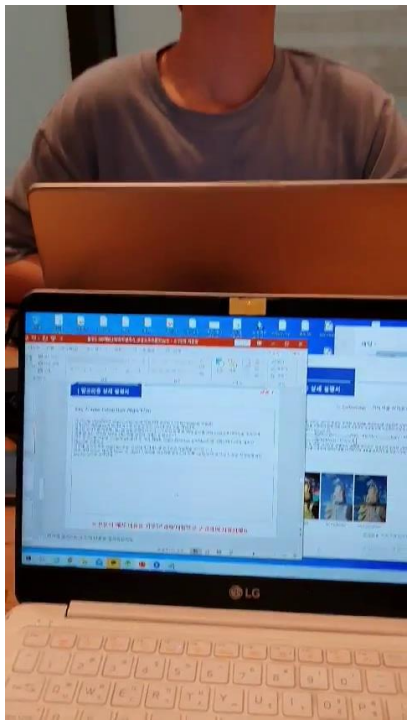
- Depends on the shooting time and object information of the scene (Using YOLO v4)
- Can distinguish between frames of different temporal order

Difference from state of the art

- Example of the original clustering.





Difference from state of the art

- Example of our clustering.

Feature 2 - CartoonGAN

GAN을 기반으로 이미지를 만화 스타일로 변환하는데 초점을 맞춘 이미지 변환 모델

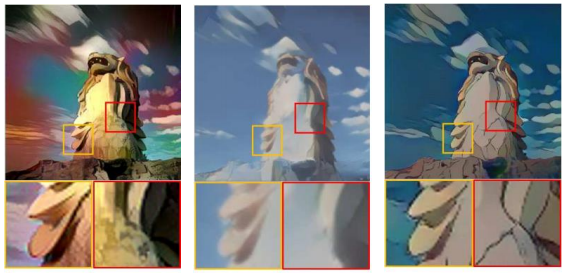
만화 이미지처럼 뚜렷한 윤곽선과 단순화된 면을 갖도록 변환되는 것이 특징

Loss : $L(G,D) = L_{adv}(G,D) + \lambda L_{con}(G,D)$

Adversarial Loss : $L_{adv}(G,D) = \mathrm{E}_{c_i \sim S_{data}(c)}[logD(c_i)] + \mathrm{E}_{e_j \sim S_{data}(e)}\left[\log\left(1 - D(e_j)\right)\right] + \mathrm{E}_{p_k \sim S_{data}(p)}\left[\log\left(1 - D(G(p_k))\right)\right]$

Content Loss : $L_{con}(G,D) = \mathrm{E}_{p_i \sim S_{data}(p)}\left[\left|\left|VGG_l(G(p_i)) - VGG_l(p_i)\right|\right|_1\right]$

가우시안 블러 필터를 사용하여 윤곽선이 흐릿한 만화 이미지를 라벨 0으로 모델의 학습 데이터로 함께 사용한다. 또한 Content Loss에서 사전에 훈련된 VGG 19 Net을 사용하여 변환 시 오브젝트가 뭉개 지지 않고 유지되도록 함.



(a) NST (b) CycleGAN (c) CartoonGAN

Problems in Project

- Not converted properly when converting certain images.

  When images include things like grass, water waves.

Solution

Attempt	Number of train data	Learning ratio of G vs D	Inner network of Cartoon GAN
1st	9000	1:1	VGG 19 net
2nd	9000	1:3	VGG 19 net
3rd	9000	1:2	Inception net v3
4th	20000	1:1	VGG 19 net

Solution

Number of train data : 9,000
Learning ratio of G vs D : 1:3
Inner network of Cartoon GAN : VGG19 net

Solution

Attempt	Number of train data	Learning ratio of G vs D	Inner network of Cartoon GAN
1st	9000	1:1	VGG 19 net
2nd	9000	1:3	VGG 19 net
3rd	9000	1:2	Inception net v3
4th	20000	1:1	VGG 19 net

Solution

Number of train data : 9,000
Learning ratio of G vs D : 1:2
Inner network of Cartoon GAN : Inception v3 net

Solution

Attempt	Number of train data	Learning ratio of G vs D	Inner network of Cartoon GAN
1st	9000	1:1	VGG 19 net
2nd	9000	1:3	VGG 19 net
3rd	9000	1:2	Inception net v3
4th	20000	1:1	VGG 19 net

Solution

Number of train data : 20,000
Learning ratio of G vs D : 1:1
Inner network of Cartoon GAN : VGG19 net

Solution

Differences with Key Frame Extraction

Change hyper parameter, lambda value of content loss function.

$$\mathcal{L}(G, D) = \mathcal{L}_{adv}(G, D) + \omega \mathcal{L}_{con}(G, D),$$

Change filter size of gaussian blur filter used for edge smoothing.

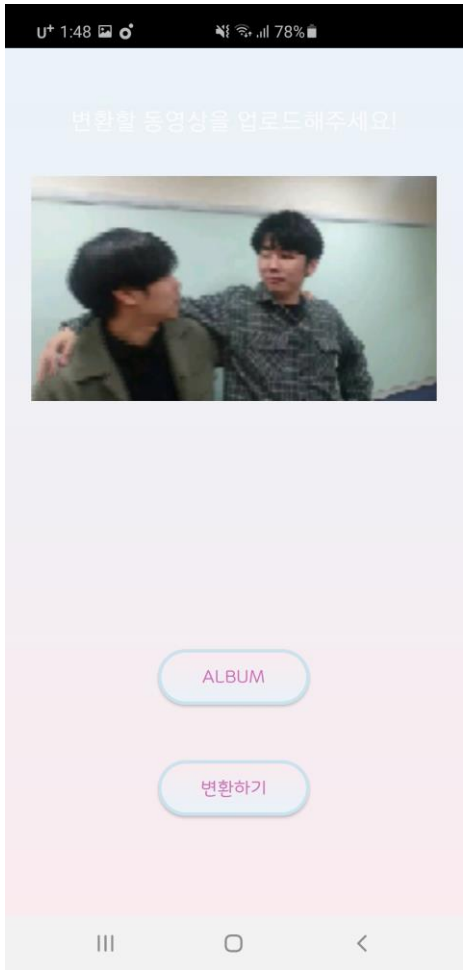
(a) A cartoon image c_i

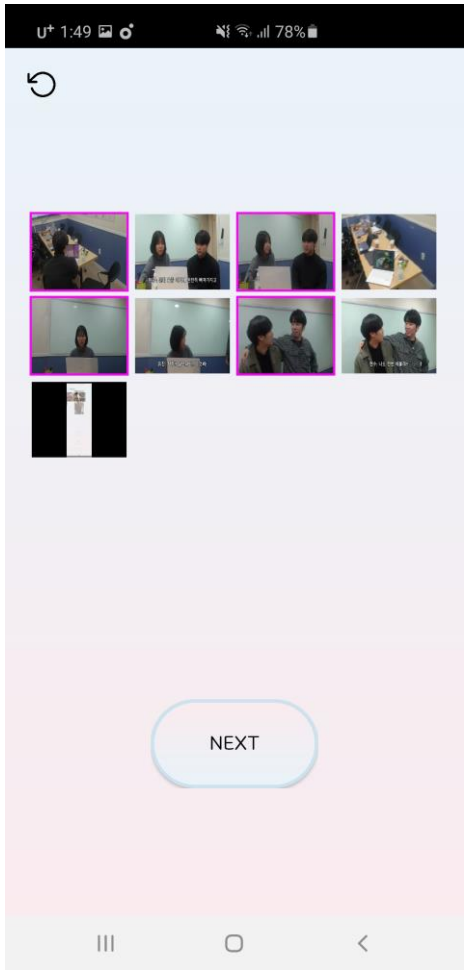
(b) The edge-smoothed version e_i

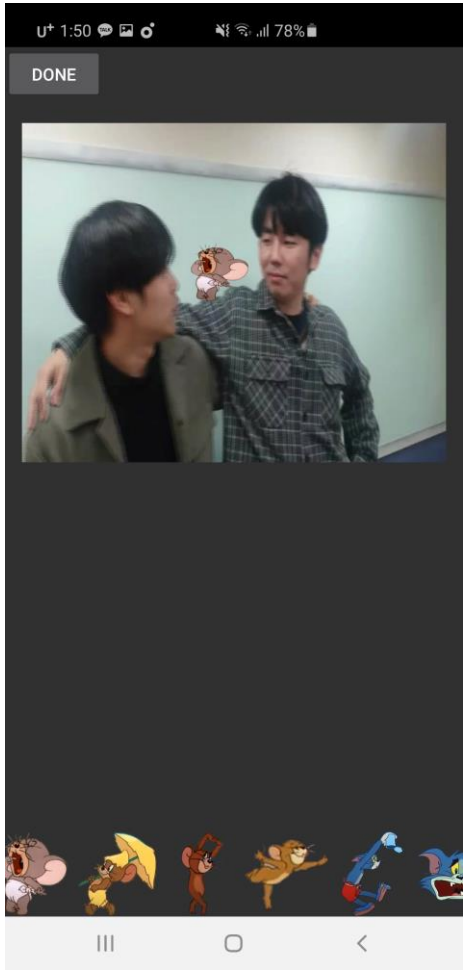
Feature 3 – Layout & Sticker

Result


1:45
79%
사진을
변환하고 싶으시다면?
사진변환
영상을
변환하고 싶으시다면?
영상변환


1:48
78%
변환할 동영상을 업로드해주세요!
ALBUM
변환하기


1:49
78%
NEXT


1:50
78%
DONE


2:00
78%

THANK YOU