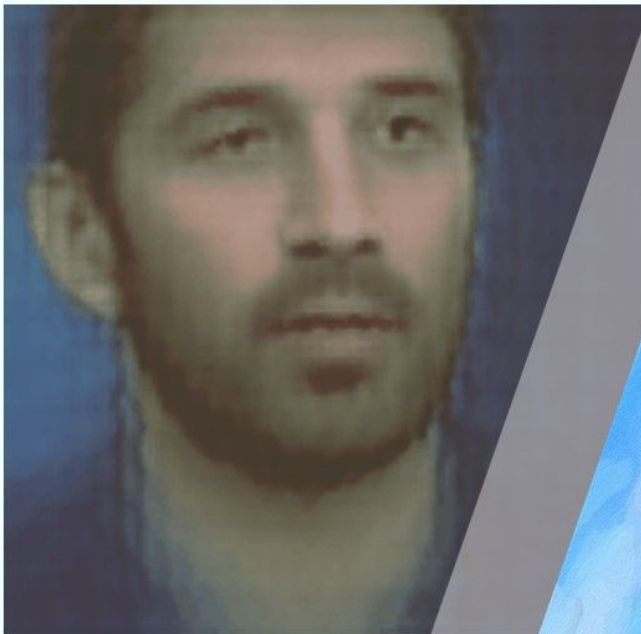


Tobig's 8<sup>th</sup> Conference



# ToBigSay

## LiveGAN

강인구 서석현 이도연 임진혁 전민규

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Why ToBigSay?



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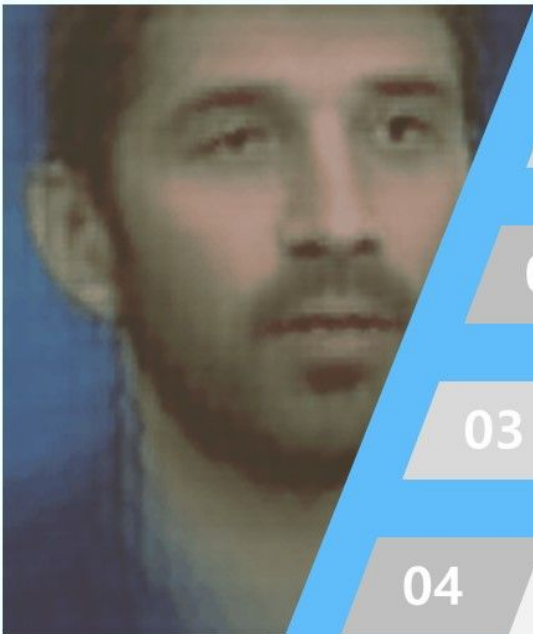
Everything about **LiveGAN**



04

## DEMONSTRATION

Results and Limitation





ToBigSay

LiveGAN



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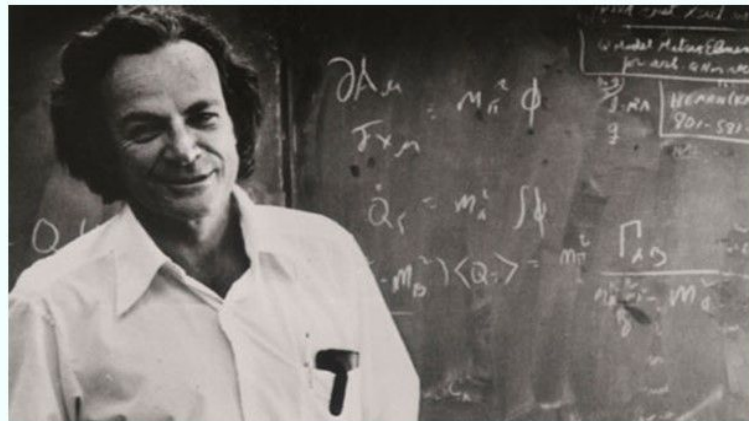
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he day...  
~ 1968,04,04

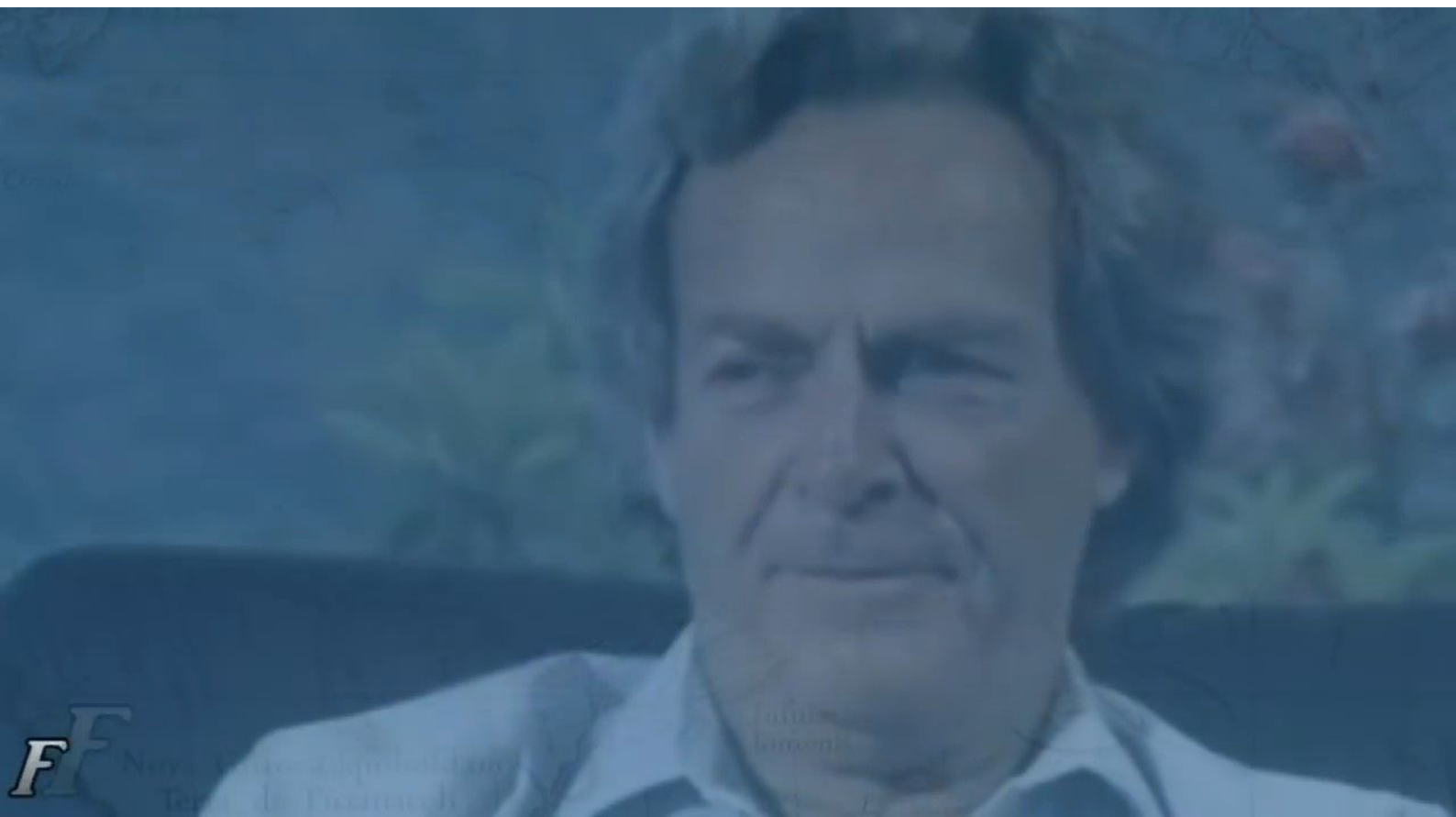


Richard Phillips Feynman 1918.05.11 ~ 1988.02.15



As soon as you trust y  
how to live.

Johann Wolfgang von Goethe



ToBigSay

LiveGAN



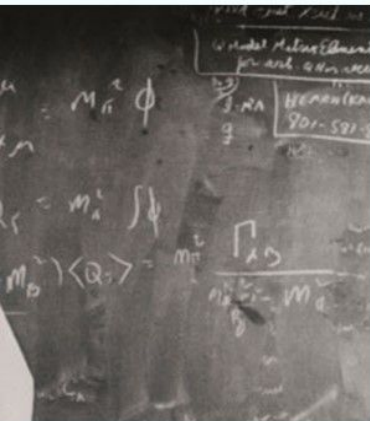
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...05.11 ~ 1988.02.15



As soon as you trust yourself, you will know  
how to live.

Johann Wolfgang von Goethe 1749.08.28 ~ 1832.03.22



If you want to change  
love your family.

Mother Teresa 1910.08.26 ~ 1

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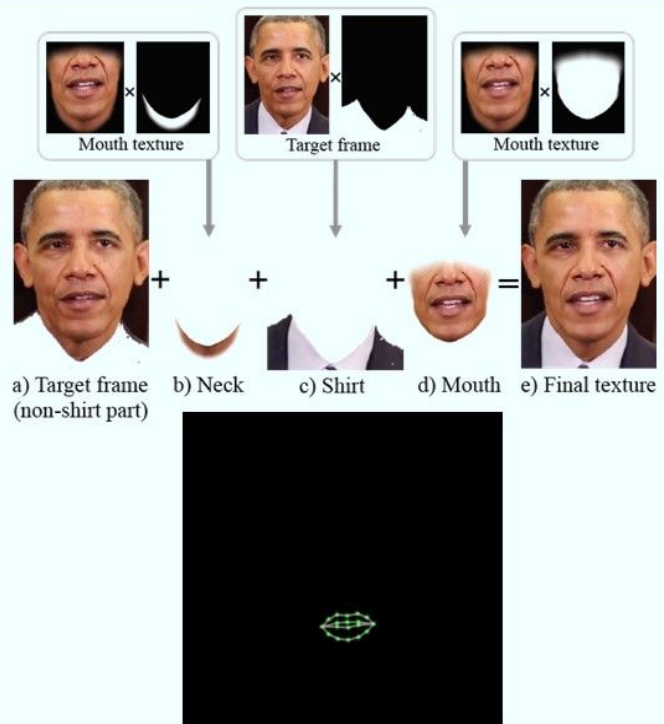
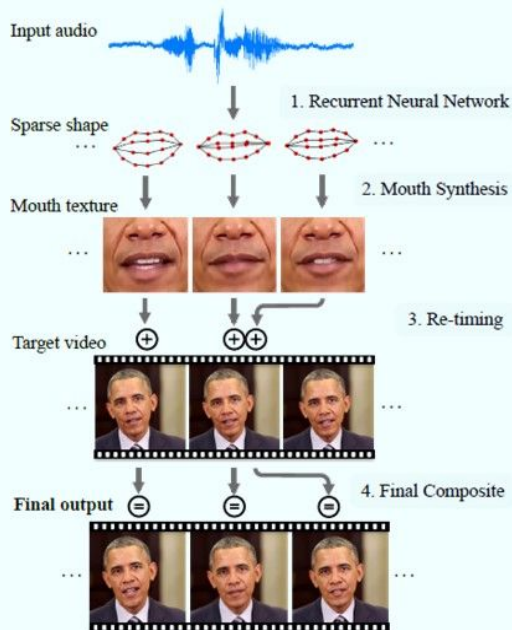
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*ToBigSay*



# Synthesizing Obama





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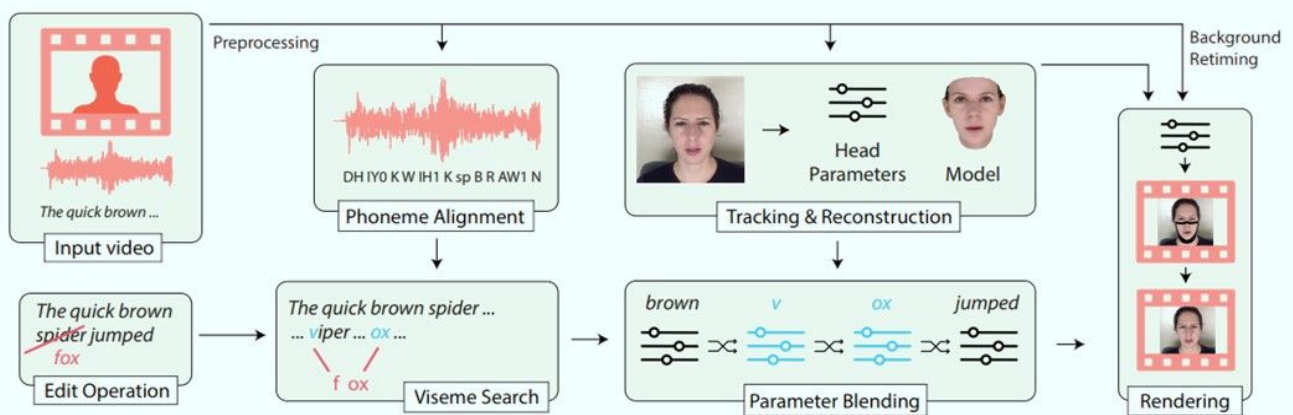
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## Text Based Talking Head



음소 단위 학습 필요

Intro

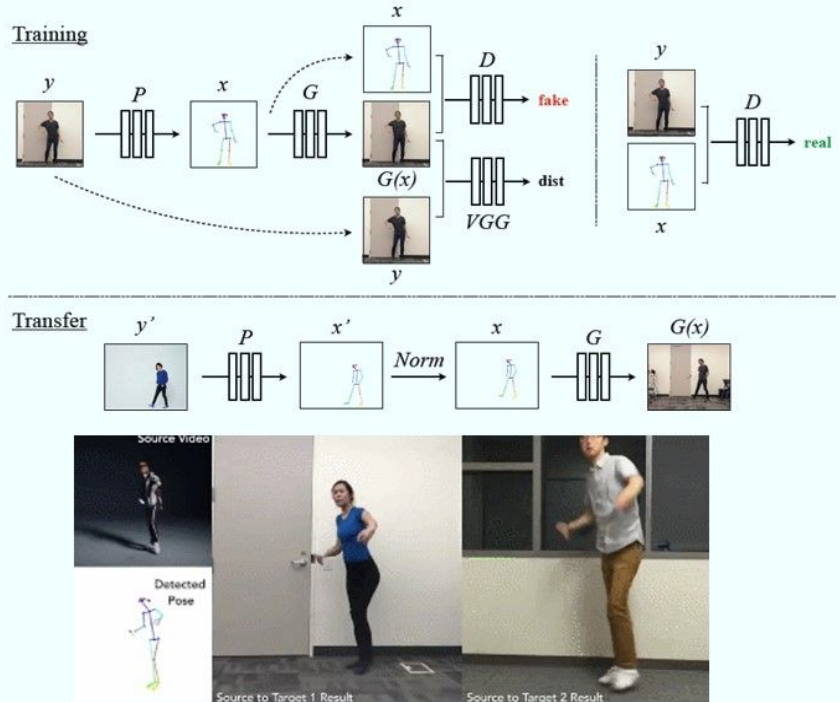
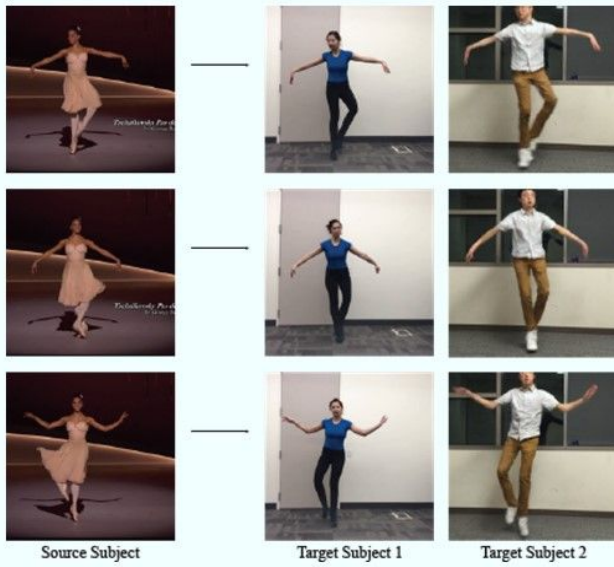
History

Experiments

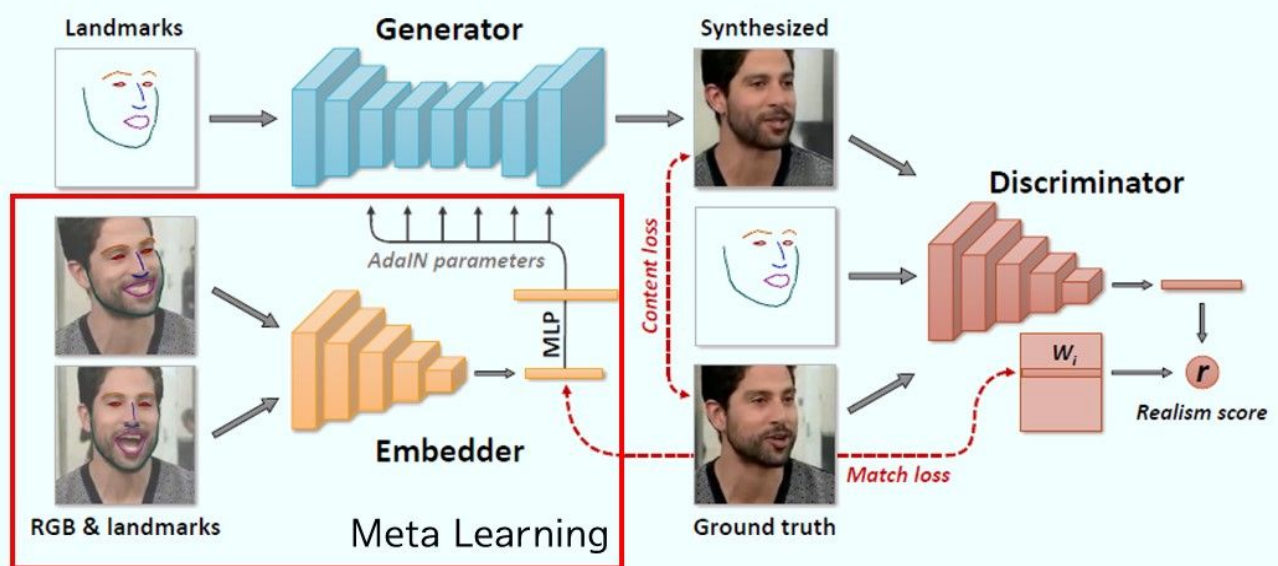
Results

Discussion

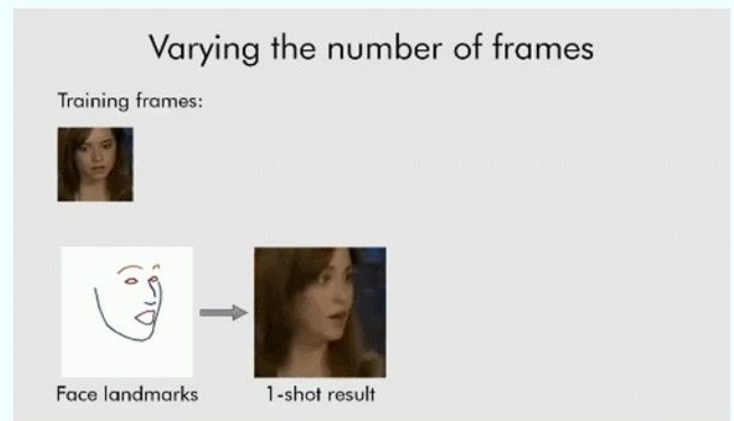
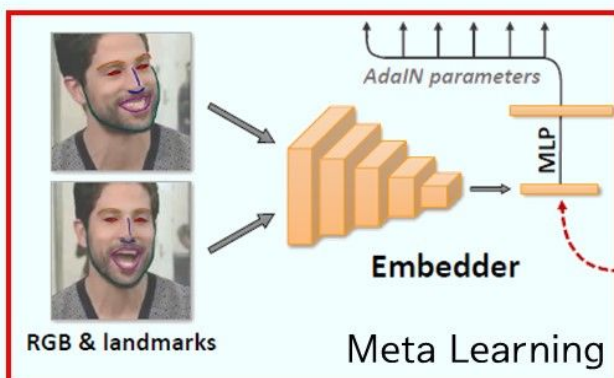
## Everybody Dance Now



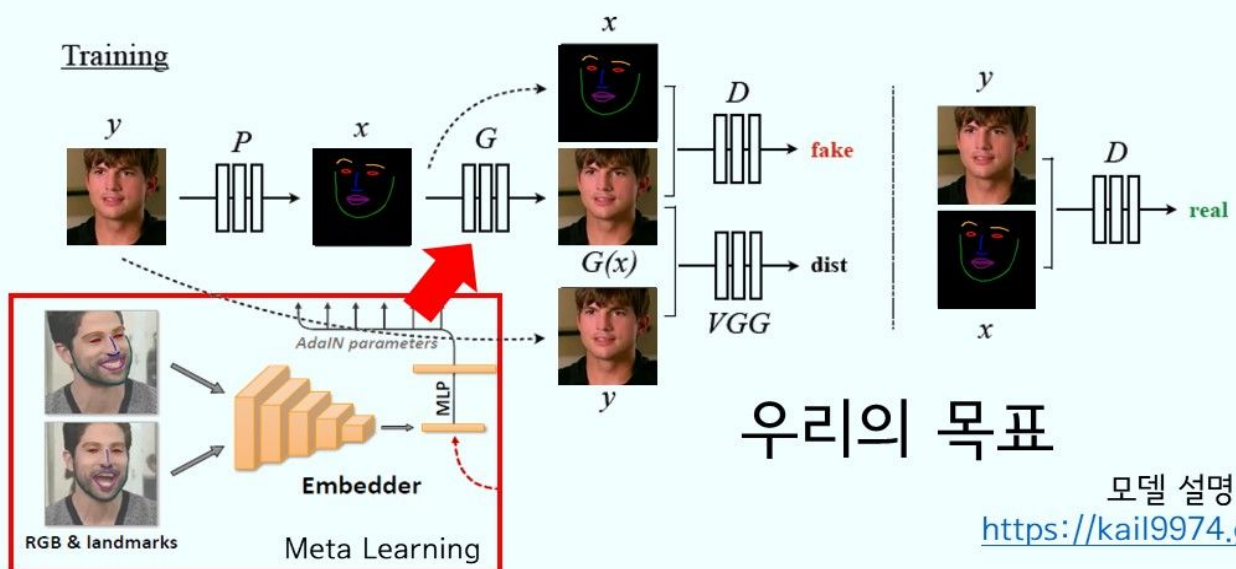
## Few Shot Talking Head



## Few Shot Talking Head



## Everybody Dance Now + Few Shot



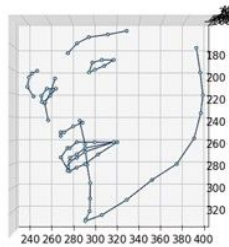
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# Experiments

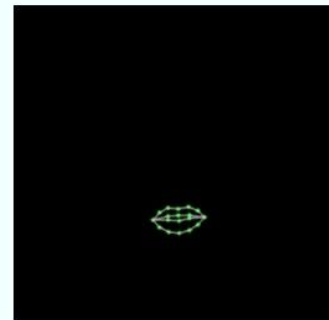
중간 과정 & 중간 결과



## Synthesizing Obama

입만 학습하는 것

부자연스러운 부분이 많다.



## Deep Fake

자연스럽지만 얼굴만 적용된다.

얼굴과 더불어 몸 등 다양하게 적용하고자 사용X

Comparison to Deep Video Portraits (Kim et al. [2018])



Kim et al. 18  
(their input, using our generator)



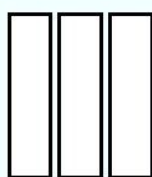
Ours



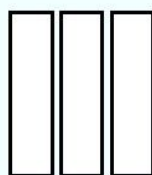
Ground Truth

# Everybody Dance Now

## Our Task



## Original Work Flow



Head  
extract



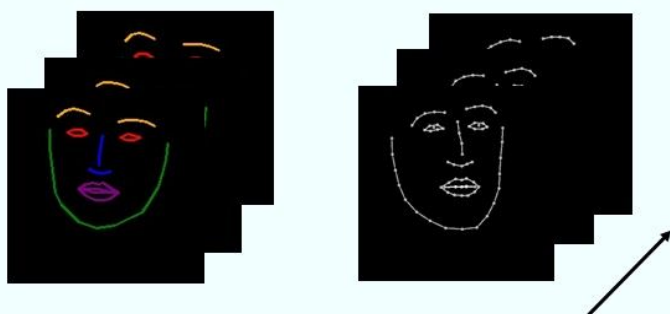
Face Gan

Make a shortcut



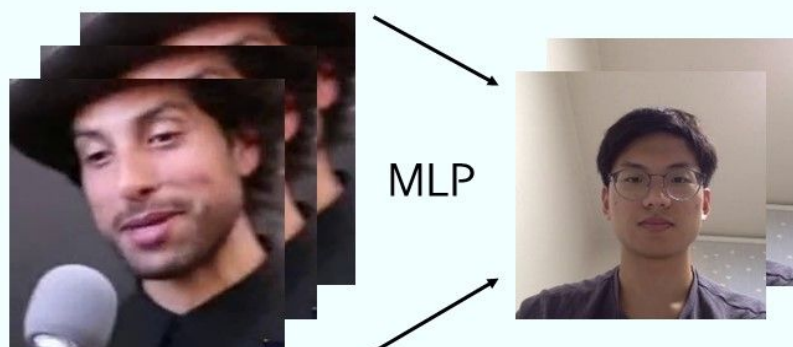
## Few Shot

2 Way Data input



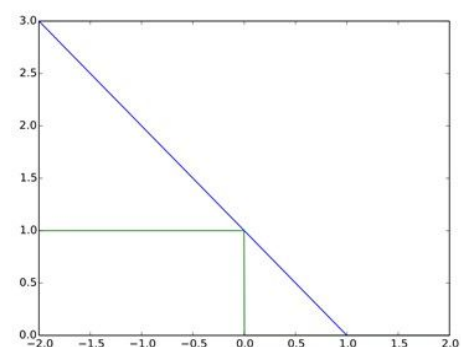
Limitation:  
Only learn One dataset

## Few Shot

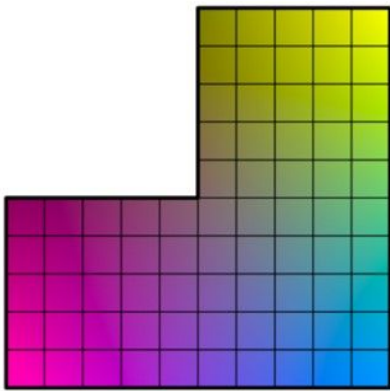


Hinge loss

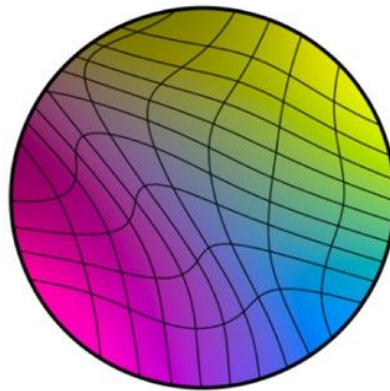
$$l(y) = \max(0, 1 - t \cdot y)$$



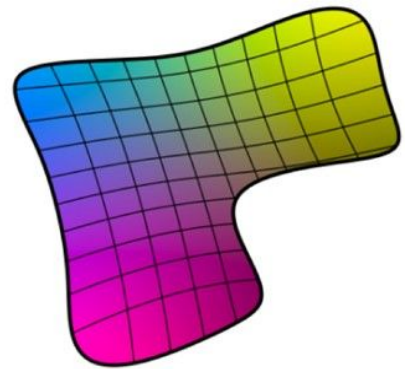
## Few Shot



(a) Distribution of features in training set

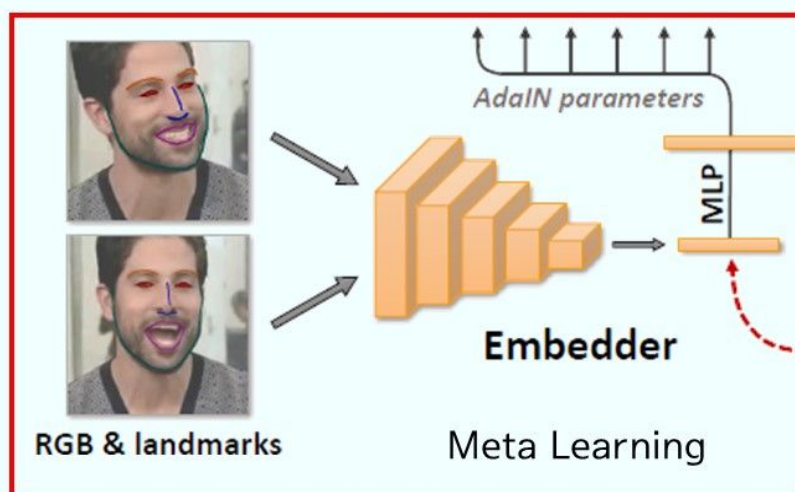


(b) Mapping from  $\mathcal{Z}$  to features

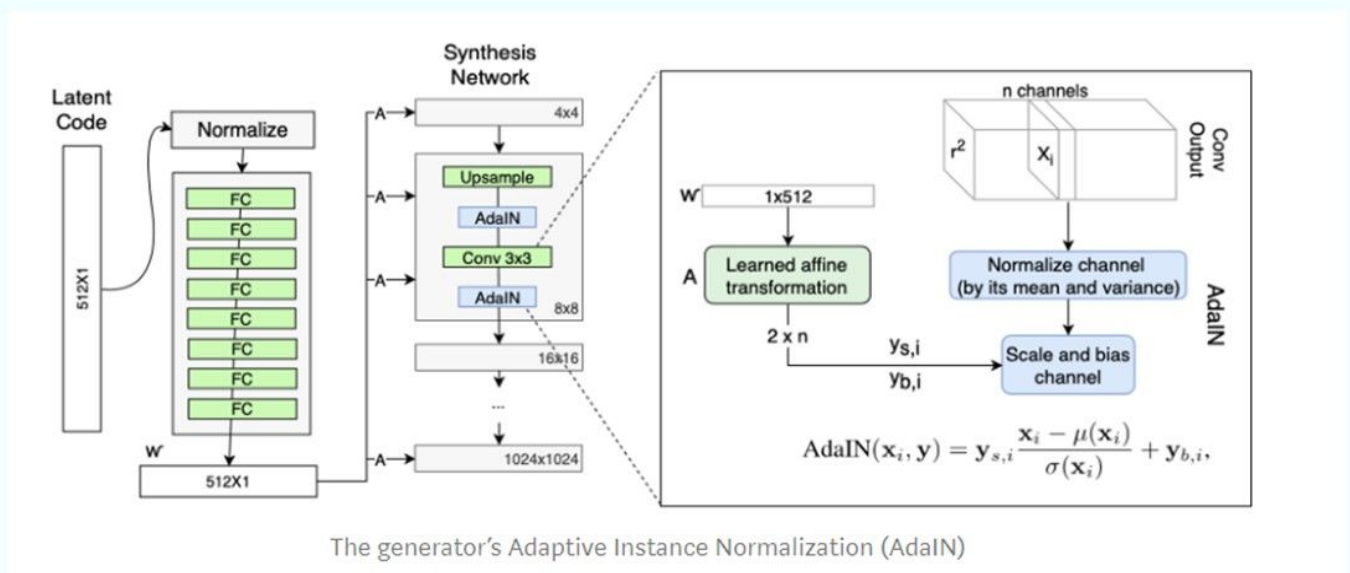


(c) Mapping from  $\mathcal{W}$  to features

## Few Shot



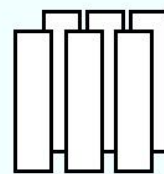
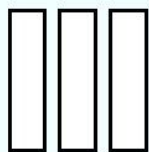
## Few Shot



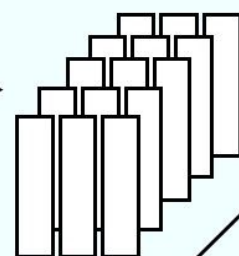
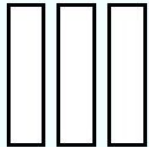


## Few Shot

Original



Our task



Increase the D

## Everybody Dance Now + 2D Face Alignment



Source  
얼굴 정보



Target  
표정 정보



Result

## Everybody Dance Now + 3D Face Alignment



Source  
얼굴 정보



Target  
표정 정보



Result

# Few Shot Talking Heads

## Description

This project is a PyTorch implementation of [Few-Shot Adversarial Learning of Realistic Neural Talking Head Models](#). In this paper, a GAN has been designed and trained to generate realistic talking head models from a only a few head-shots (potentially just one) and the face landmarks to reproduce.

The paper explains the architecture of the model, but a lot of details are missing, and no official implementations or trained models have been released. Therefore, we are trying to recreate the model as best as we can, and to explain the missing details here. **We need your help in order to finish this, please, contribute!**

<https://github.com/grey-eye/talking-heads>

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# Results

최종 결과

## Few-Shot GAN

### Few-Shot Adversarial Learning of Realistic Neural Talking Head Models

Egor Zakharov<sup>1,2</sup> Aliaksandra Shysheya<sup>1,2</sup> Egor Burkov<sup>1,2</sup> Victor Lempitsky<sup>1,2</sup>

<sup>1</sup>Samsung AI Center, Moscow <sup>2</sup>Skolkovo Institute of Science and Technology



구현 성공!!

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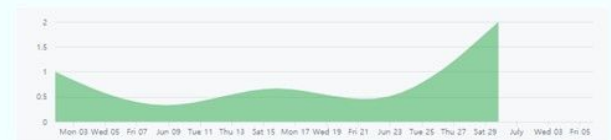
## Few-Shot GAN

MrCaracara Merge pull request #15 from JeonMinkyu/develop_minkyu	
dataset	Readme + few comments added
network	edit nn -> F(relu in D_loss)
.gitignore	config.py ignored
LICENSE	Initial commit
README.md	README updated
config.py	Readme + few comments added
requirements.txt	All files added
run.py	Update run.py to save some memory

Jun 2, 2019 – Jul 6, 2019

Contributions: Commits

Contributions to master, excluding merge commits



구현 성공!!  
BaseLine Code에 Commit



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## Few-Shot GAN

Source

얼굴의 정보



Target

표정의 정보



1 shot



4 shot



8 shot



16 shot



64 shot

## Few-Shot GAN – Fine Tuning

Source

얼굴의 정보



Target

표정의 정보



Result

모자가 표현되려 함

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# Discussion

한계점 & 추후 발전 방향

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# Limitation

1. 뼈대가 제대로 되지 않으면 제대로 생성되지 않는다.



## 2. Base Code가 미완성 상태라 개발에 오래 걸림

### Talking Heads

---

#### Description

---

This project is a PyTorch implementation of [Few-Shot Adversarial Learning of Realistic Neural Talking Head Models](#). In this paper, a GAN has been designed and trained to generate realistic talking head models from a only a few head-shots (potentially just one) and the face landmarks to reproduce.

The paper explains the architecture of the model, but a lot of details are missing, and no official implementations or trained models have been released. Therefore, we are trying to recreate the model as best as we can, and to explain the missing details here. **We need your help in order to finish this, please, contribute!**

### 3. 부족한 컴퓨팅 환경...





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# DEV. Possibility

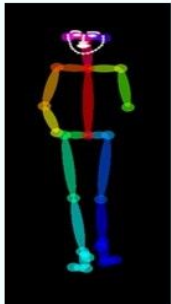
## 메신저 (ex. Line, Kakaotalk)

- 본인의 사진으로 표정 GIF 만들기
- 이모티콘 대신 사용가능!



## 마이클 잭슨이 다시 춤을 춘다면?

- 다시 한 번 빌리진을 추는 모습 재현 가능
- 더 나아가 마이클 잭슨이 TT를 출 수 있음



얼굴 랜드마크를 바탕으로 한 명언 뿐만 아니라  
몸으로 하는 것 등 다른 것들도 생성 가능



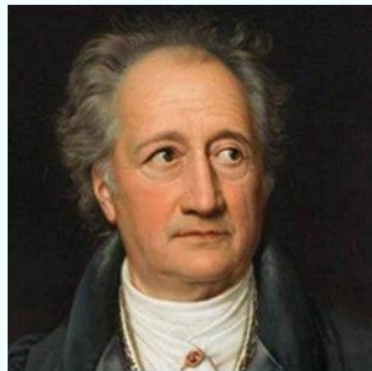
Voice gan과 연동하여, 목소리를 생성하고 말하는 영상에 합성



**As soon as you trust yourself, you will know  
how to live.**

Johann Wolfgang von Goethe 1749.08.28 ~ 1832.03.22





[https://github.com/kynk94/11th\\_project](https://github.com/kynk94/11th_project)

## Team Member

# TobigSay

강인구 - Tobig's 10기  
완벽히 사람처럼 보이는 휴머노이드를 만들고픈 기계 매드 사이언티스트

서석현 - Tobig's 9기  
serereuk 누워있는 것을 좋아함

이도연 - Tobig's 11기  
TI 공학전공 인공지능 개발 꿈나무

임진혁 - Tobig's 10기  
욕심쟁이라 뒷페이지 내꺼

전민규 - Tobig's 9기  
Major in Statistics & Computer Science  
Interested in novelty detection / generative model  
Machine learning research engineer intern in Makinarocks





## Team Member

### 임진혁 - Tobig's 10기

# TobigSay

별일없이 사는 25살.

국민대에서 빅데이터 경영통계라는 3가지 전공이 합쳐진 키메라학과에서 4학년 재학중입니다.

A/B 테스트 검증 중독자입니다.

투빅스 면접에서 감명 깊게 읽은 책이 무엇이나는 질문을 받고 <빅데이터는 거품이다>라고 답해서 떨어질 줄 알았지만 결국 합격해서 1년간 즐거운 활동을 하였습니다.

좋아하는 영화로는 <A.I.>나 <혹성탈출>같은 디스토피아 SF영화, <싱 스트리트>같은 음악영화, <미스 리틀 선사인> 같은 B급 감성 영화를 좋아하는 '영화충'입니다.

이 쪽 분야가 적성에 맞는 거 같지만 저력이 있는 삶을 꿈꾸기에 진로를 많이 고민하고 있습니다. 언젠가 완성하고 싶은 프로젝트로는

1. 음악을 악보화 해주는 딥러닝
2. 누구나 진짜 사람이라고 믿을 GAN으로 만드는 Fake SNS 인플루언서 1만 팔로워 달성
3. 젠트리피케이션 문제를 예측하고 해결하는데 소상공인에게 도움을 줄 수 있는 분석과제.
4. 실종아동의 현재 몽타주 생성 딥러닝
5. 여행가서 모르는 사람한테 사진 부탁 하지 않아도 되는 "알리바이 사진" 생성
6. 음치 맞춤 노래방 반주 키 조절

하고 싶은 게 너무나 많지만 능력이 부족하니 도와줘요~~



## LiveGAN