

AI가 만드는 음악

1520 여준호

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2. GAN 원리
3. 구글 마젠타에
사용된 GANSynth
4. 음악 감상



1. 인공생성망원리
예상 3분
2. GAN 원리
예상 3분
3. 구글 마제단에
사용된 GANSynth
예상 3분
4. 음악 강상
예상 1분

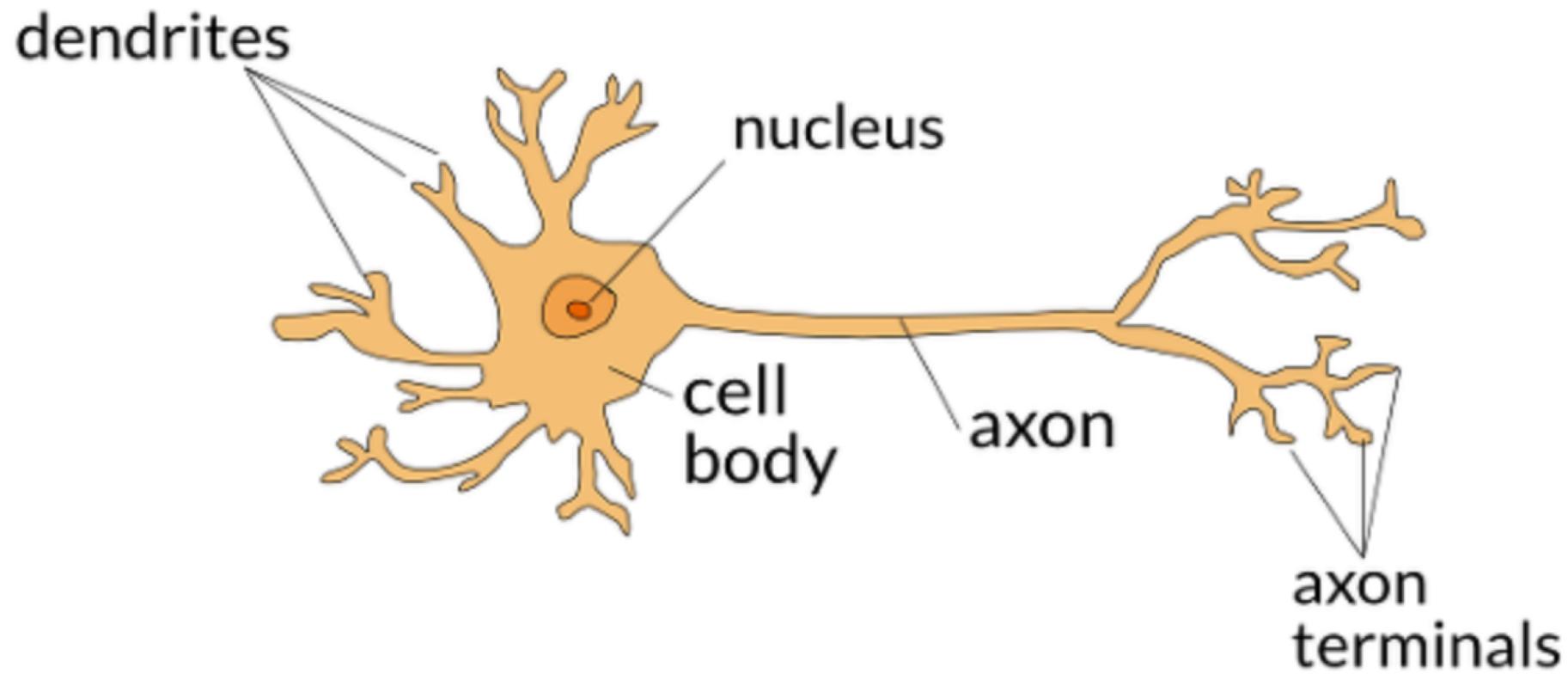
AI

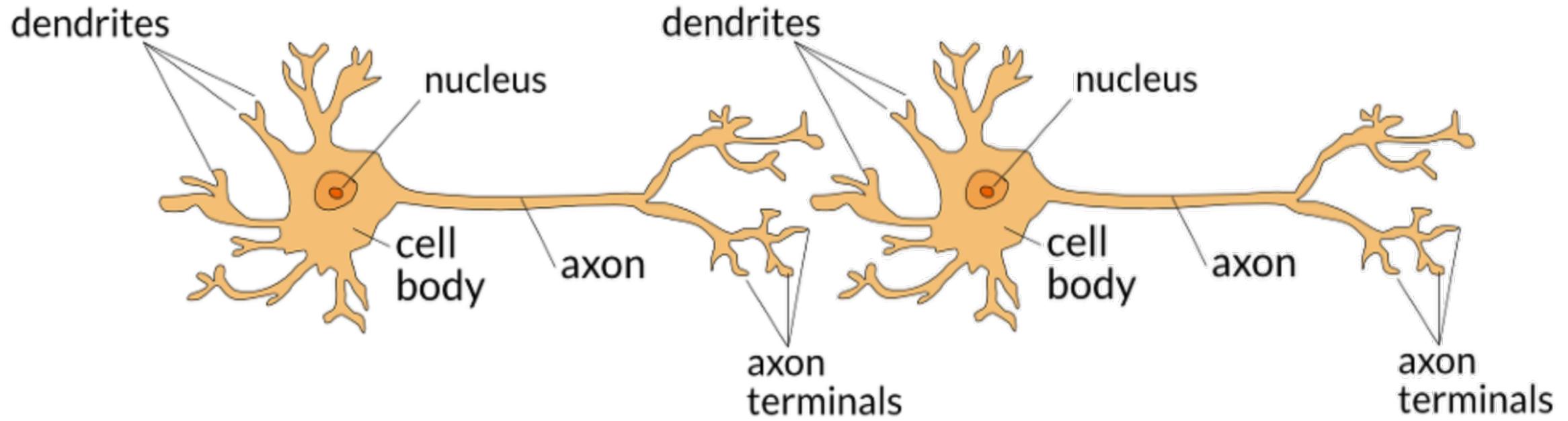
인공지능

ل

신경계를 이루는 세포

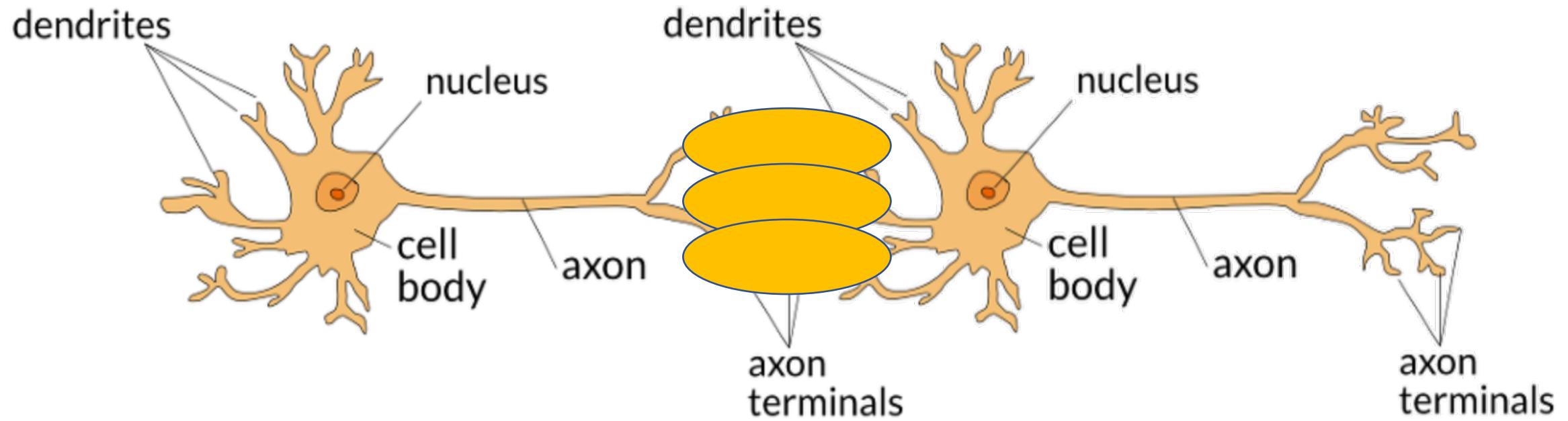
부산



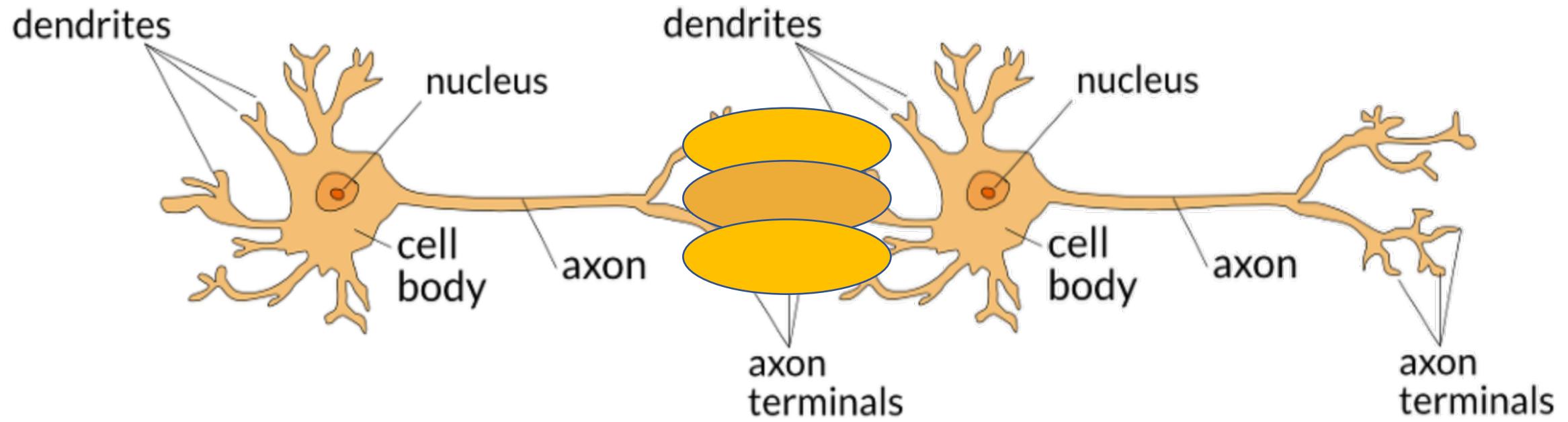


입력 -> 함수 -> 출력

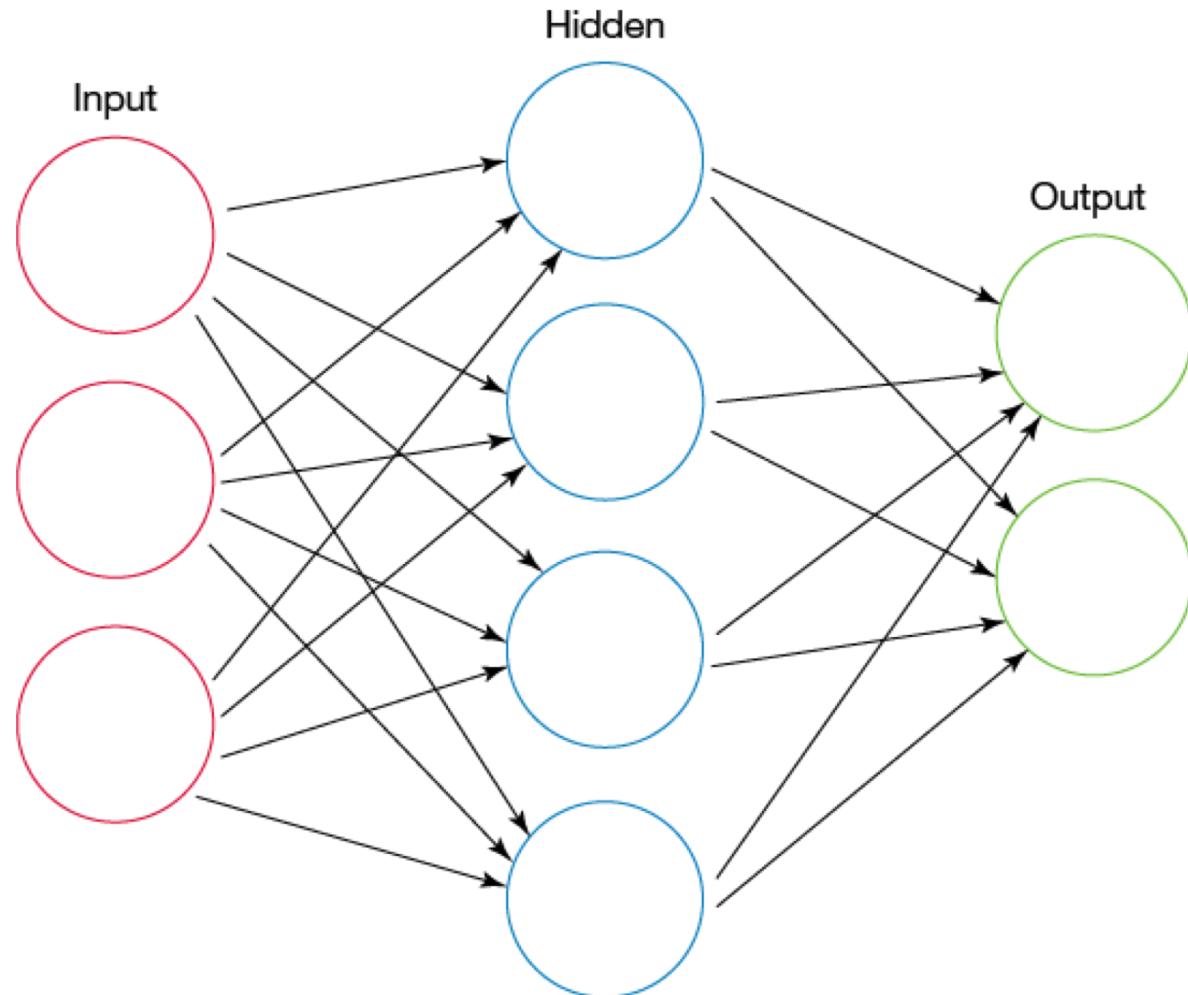
입력 -> 함수 -> 출력



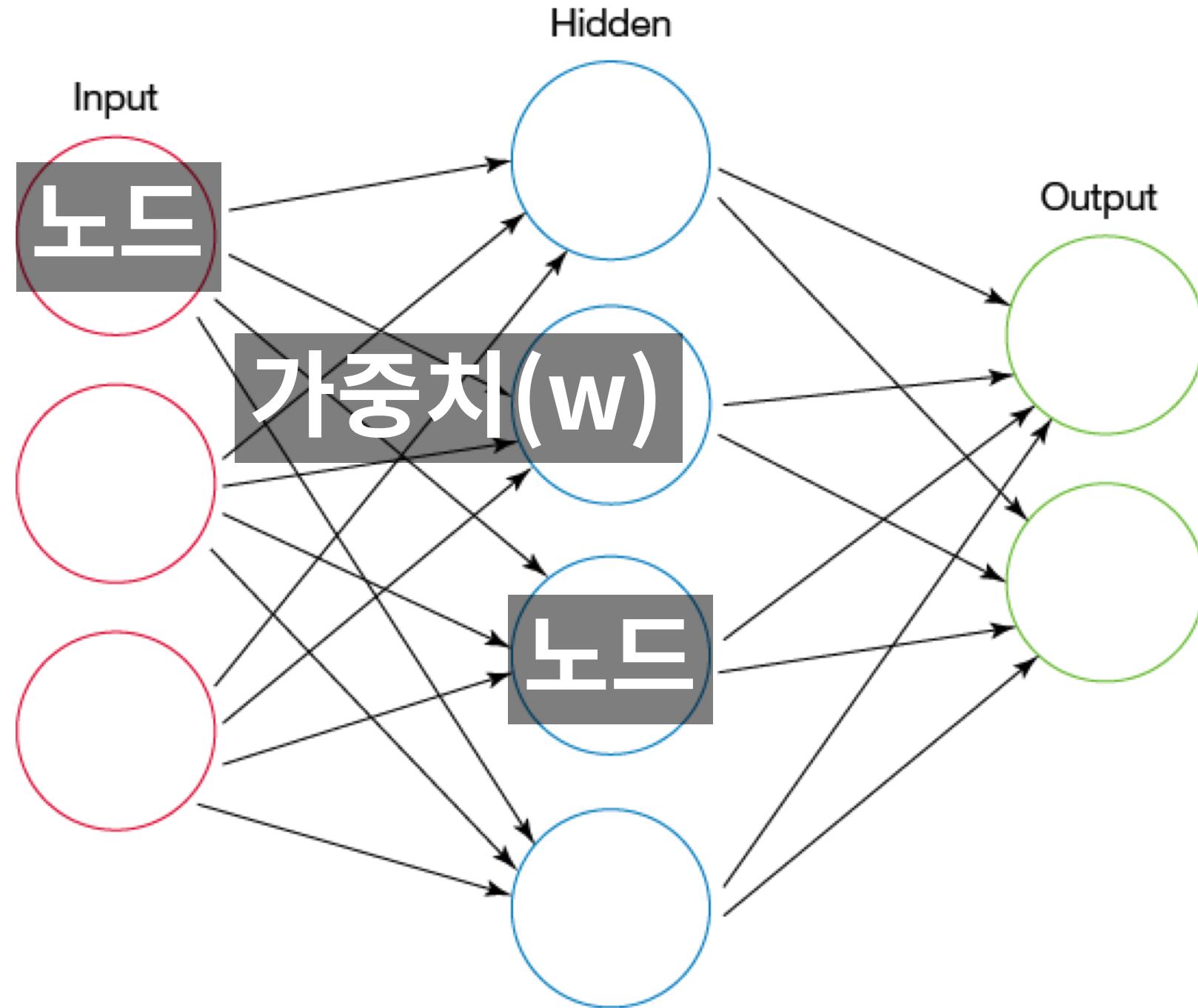
뉴런과 뉴런을 이어주는 시냅스



뉴런-뉴런 사이에 신호가 전달되려면
일정한 값 이상의 전기 신호가 있어야 함
-> 뉴런 간의 연결 강도를 나타내는 가중치가 존재



인공신경망의 구현



네가 머리가 나쁜 건
사실이야. 하지만 그럴수록
더 열심히 공부를 해야지!



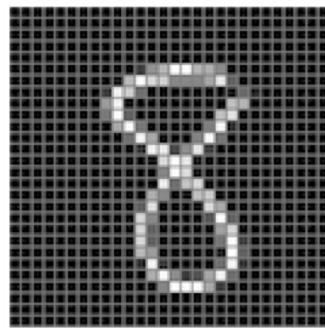
학습

(데이터, 라벨)

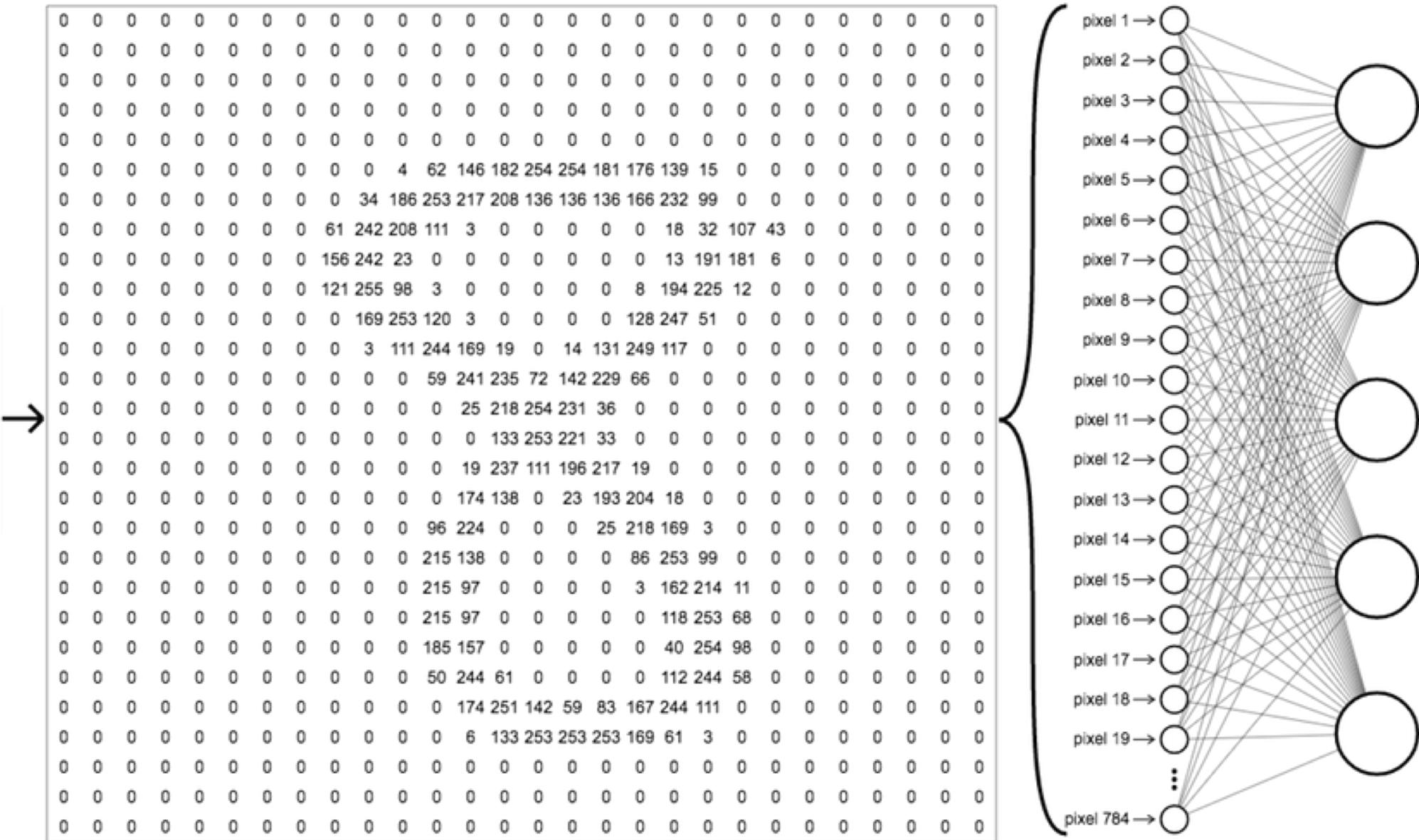
= (문제랑 답)



이건
5라는
숫자야!



28 x 28
784 pixels





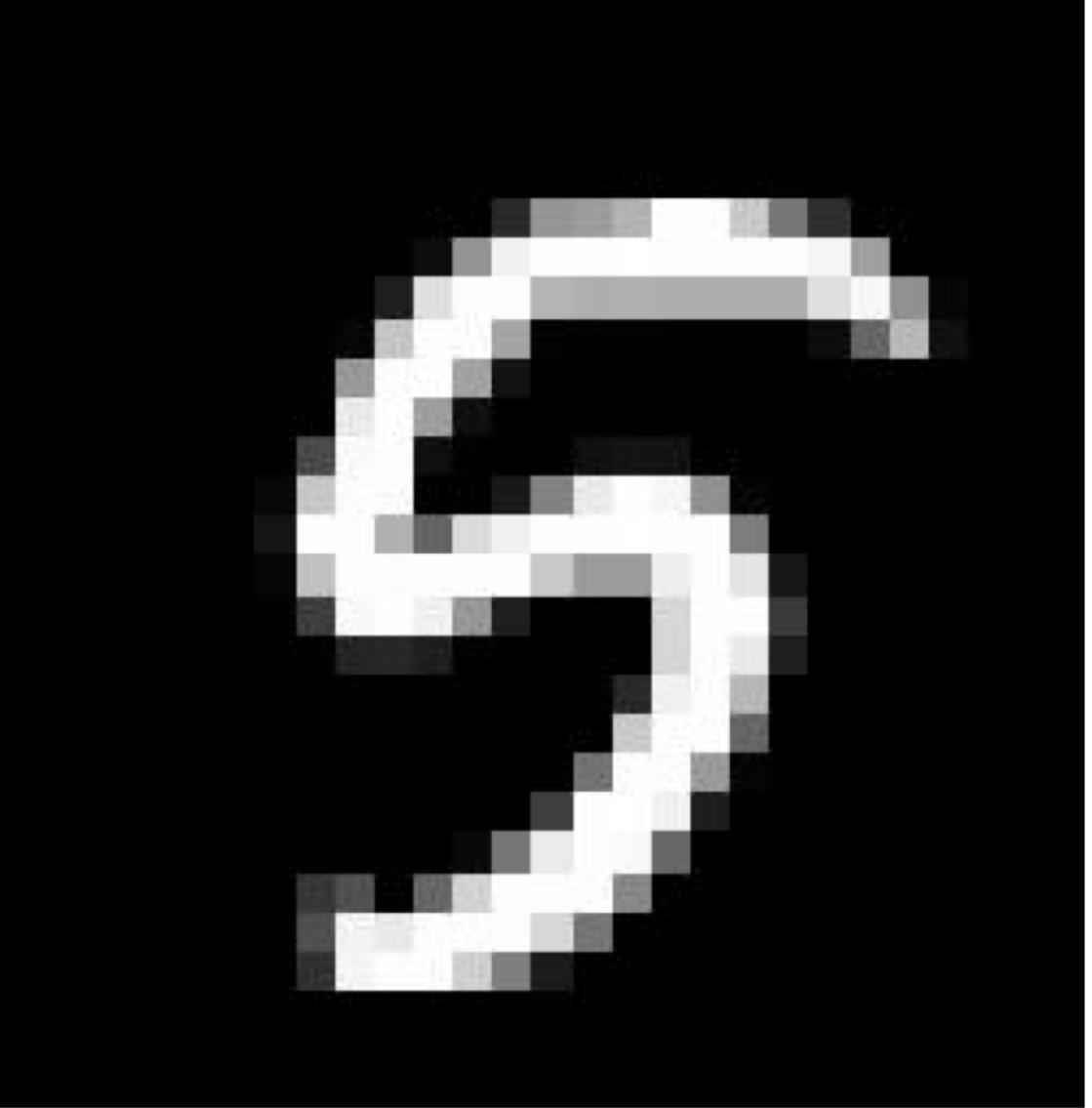
라는 입력이 들어왔을 때
출력이 5가 나오도록 가중치를 조정

계속 이와 같은 학습을 반복한다면?
주어진 문제를 해결할 수 있는
가중치들을 구할 수 있음



하지만
언제나 조져지는 건
나였다

테스트



**애도
5인 것
같네!**

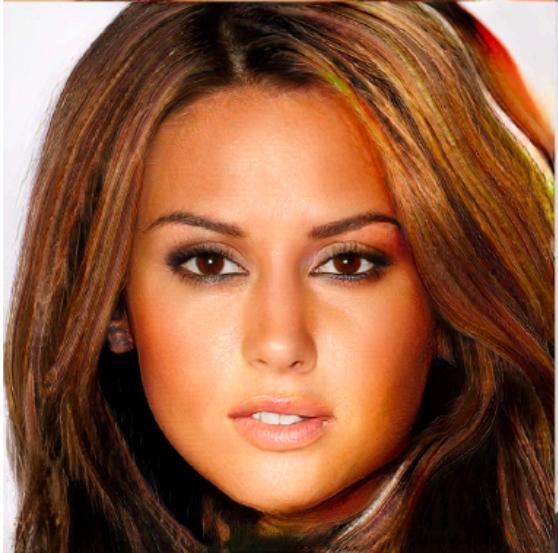
라벨 없이 (학습에 사용되지 않은)
테스트 데이터셋을 넣어서
얼마나 정확히 예측하는지 시험

기본적인 인경신경망 끝!

그럼 이걸로

무언가를 만들 순 없을까?

진짜 사람을 찾아보세요
맞히면 매점 사드림



사실 다 가짜임

GAN

(생산적 적대 신경망)



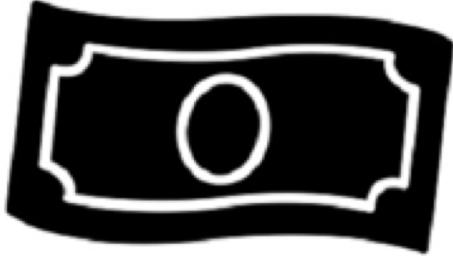
위조지폐범 vs 경찰



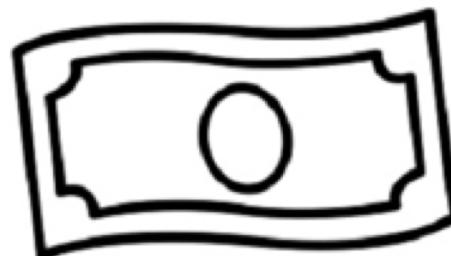


Generator

생성자: 가짜 데이터를 생성



Fake data



Real data



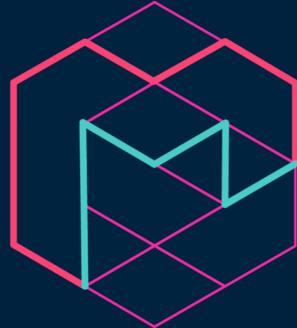
Discriminator



분류자: 가짜 데이터인지
진짜 데이터인지 맞추기

생성자와 분류자,
두 개 모델을 교차로
경쟁시키면서 학습시킴

AI가 만드는 음악,



magenta

1520 여준호

구글 마젠타 프로젝트

구글의 AI 예술 창작 프로젝트

SKETCH RNN

A recurrent neural network (RNN) able to construct stroke-based sketches. The model is trained on thousands of crude human-drawn image samples.

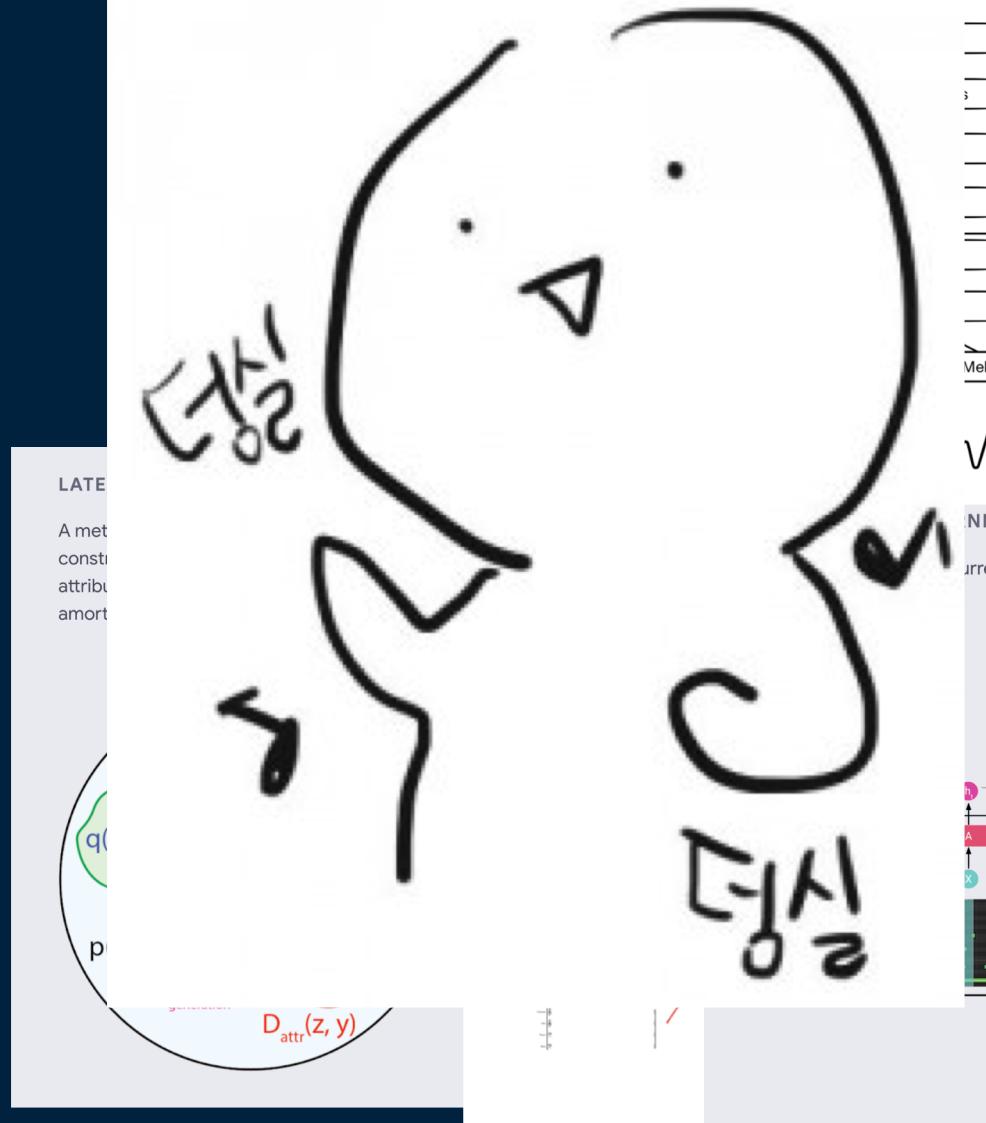


NSYNTH

A powerful new WaveNet-style autoencoder model that conditions an autoregressive decoder on temporal codes learned from the raw audio waveform.

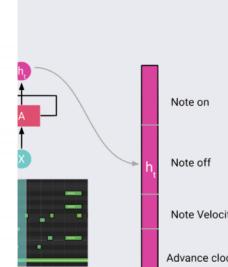
ONSETS AND FRAMES

We advance the state of the art in polyphonic piano music transcription by training a neural network which is trained to jointly predict onsets and frames.



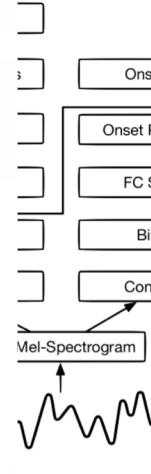
NN

A recurrent neural netw



MUSIC VAE

A hierarchical latent vector model fo



WAVE2M

A new pro
structure

WAVE2M

A new pro
structure

Papers

- Learning to

Blog Posts

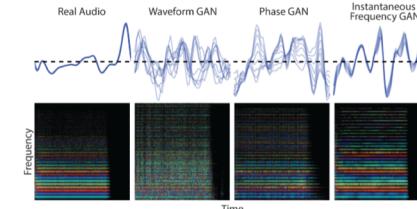
- Performance RNN
- Expressive Transcription
- Real-time Pe

Colab Notebooks

- Performance RNN

GANSYNTH

A method to synthesize high-fidelity audio with GANs.



Papers

- GANSynth: Adversarial Neural Audio Synthesis

Blog Posts

- GANSynth: Making music with GANs

Colab Notebooks

- GANSynth

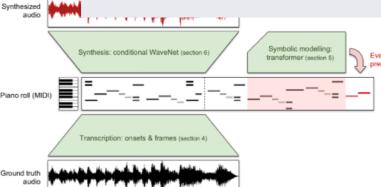


Papers

- Music Transformer: Generating Music with Long-Term Structure

Blog Posts

- Music Transformer: Generating Music with Long-Term Structure



Blog Posts

- Enabling Factorized Piano Music Modeling and Generation with the MAESTRO Dataset

Colab Notebooks

- The MAESTRO Dataset and Wave2Midi2Wave

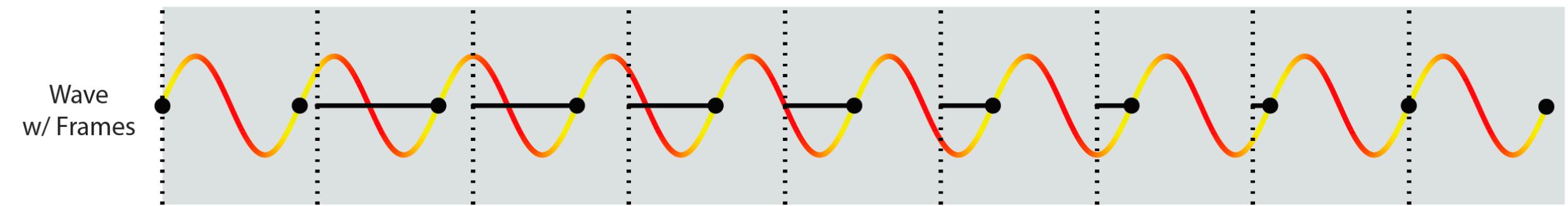
GAN으로 고퀄 음악 만드는

GANSynth

음악: 연속적인 데이터

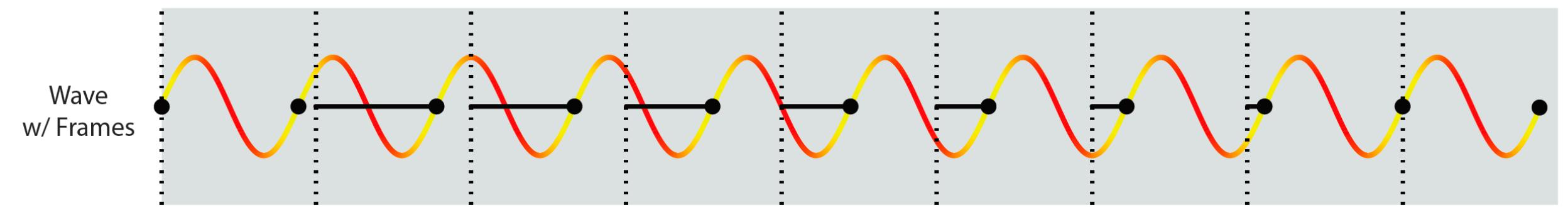
음악이 이어져야 함

프로그래시브 GAN

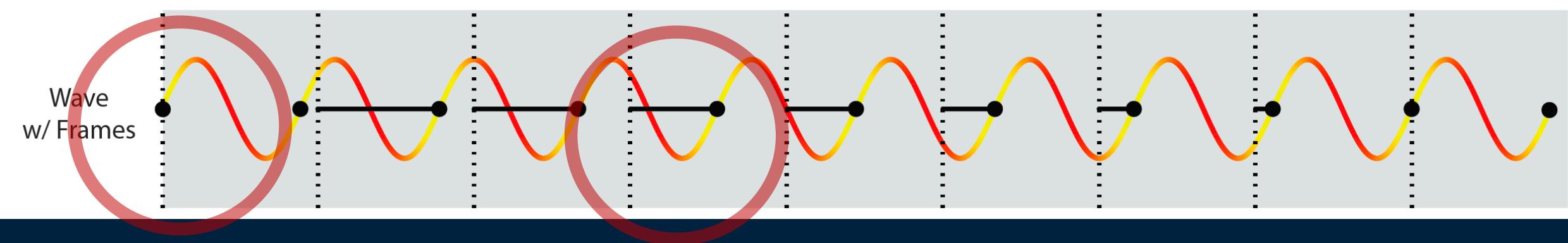


단일 벡터에서 전체 사운드로
점진적으로 샘플링

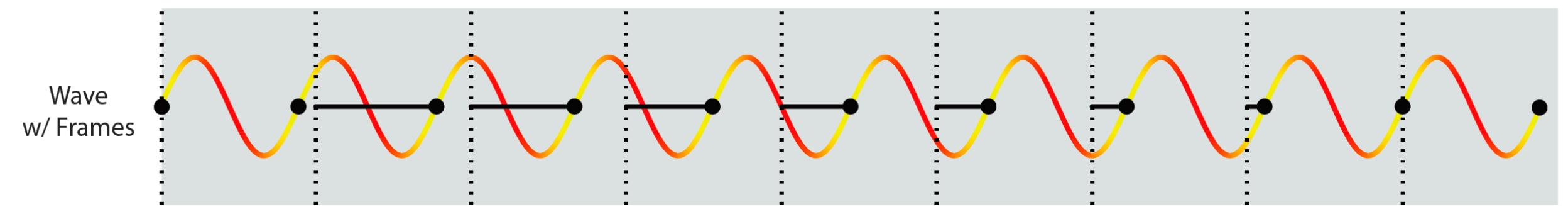
각 파동의 시작에 검은 점이 있음



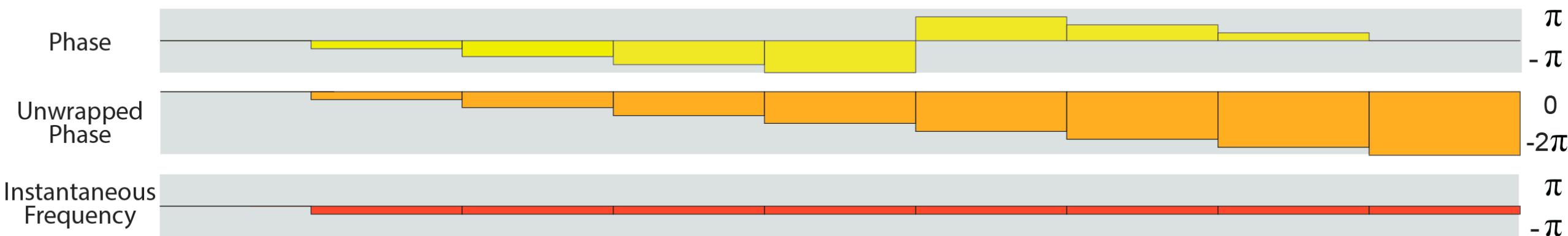
주기적인 프레임(검정 점선)으로
신호를 모델링하면
시간의 경과에 따라 점의 시작이 바뀜



검정색 선을 위상이라고 함



위상은 각 프레임마다 일정한 양만큼 감소

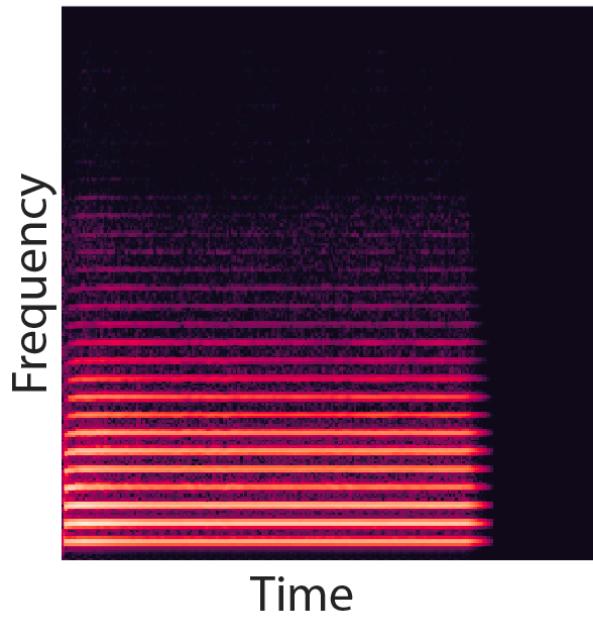


주파수의 정의

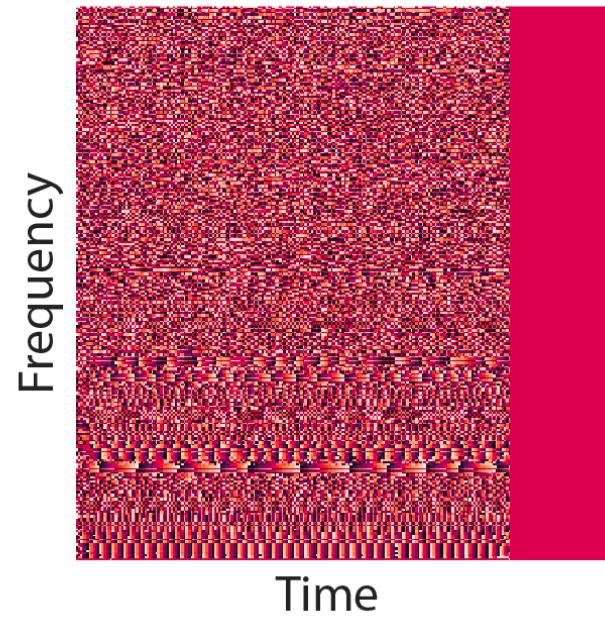
=시간상의 변화

위상 = 순간 주파수

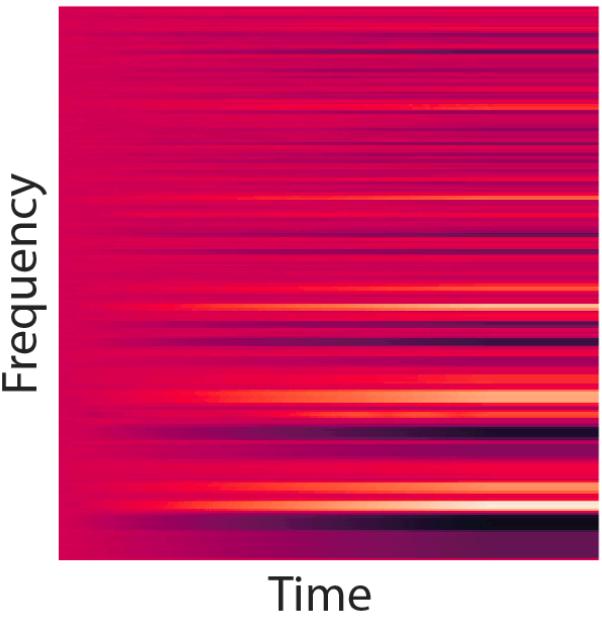
Log Magnitude



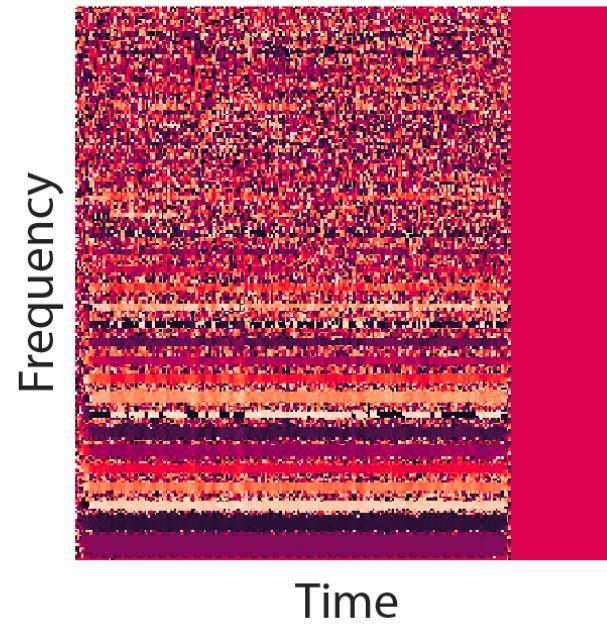
Phase



Unwrapped Phase

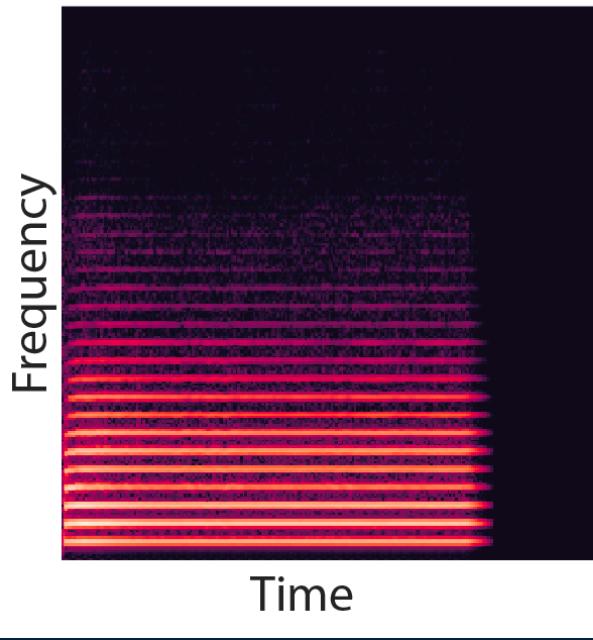


Instantaneous Frequency

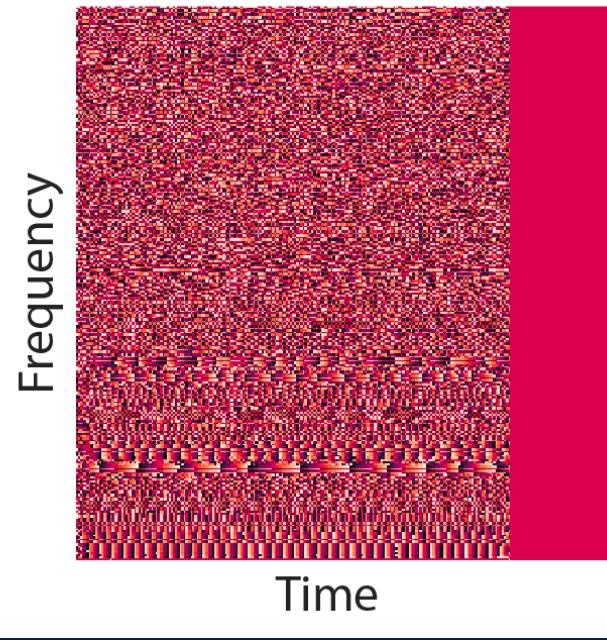


순간 주파수(IF)를 이용해서 패턴을 생성할 때
일관된 주기성이 반영되는
파형을 생성할 수 있음

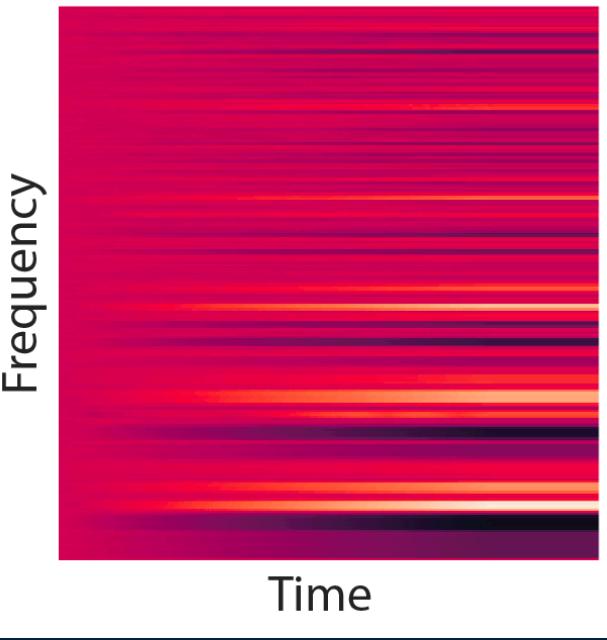
Log Magnitude



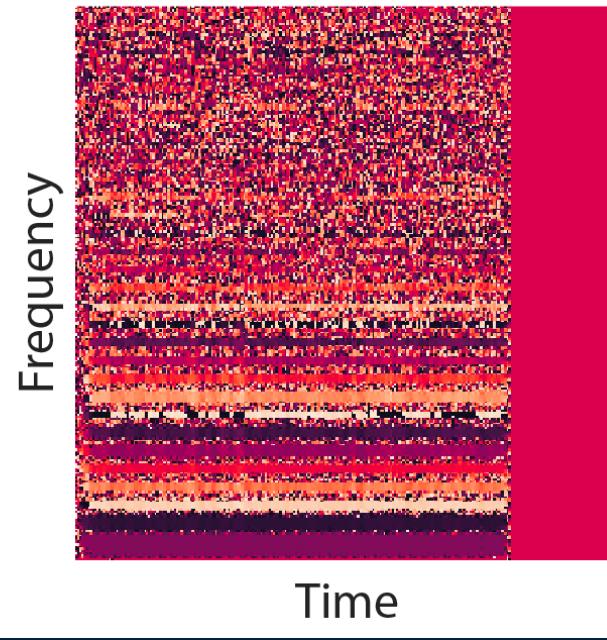
Phase



Unwrapped Phase



Instantaneous Frequency



순간 주파수(IF)를 이용해서 패턴을 생성할 때
일관된 주기성이 반영되는
파형을 생성할 수 있음

<https://www.youtube.com/watch?v=qFBQDfPyjoE>





스피드웨건은
쿨하게 가도록
하지

감사합니다