MACHINE LEARNING
CAMP JEJU 2017

7/7 2017,230 seminar

Like real
than real

HCI & ML Researcher
Kyuye Song (Rachel)

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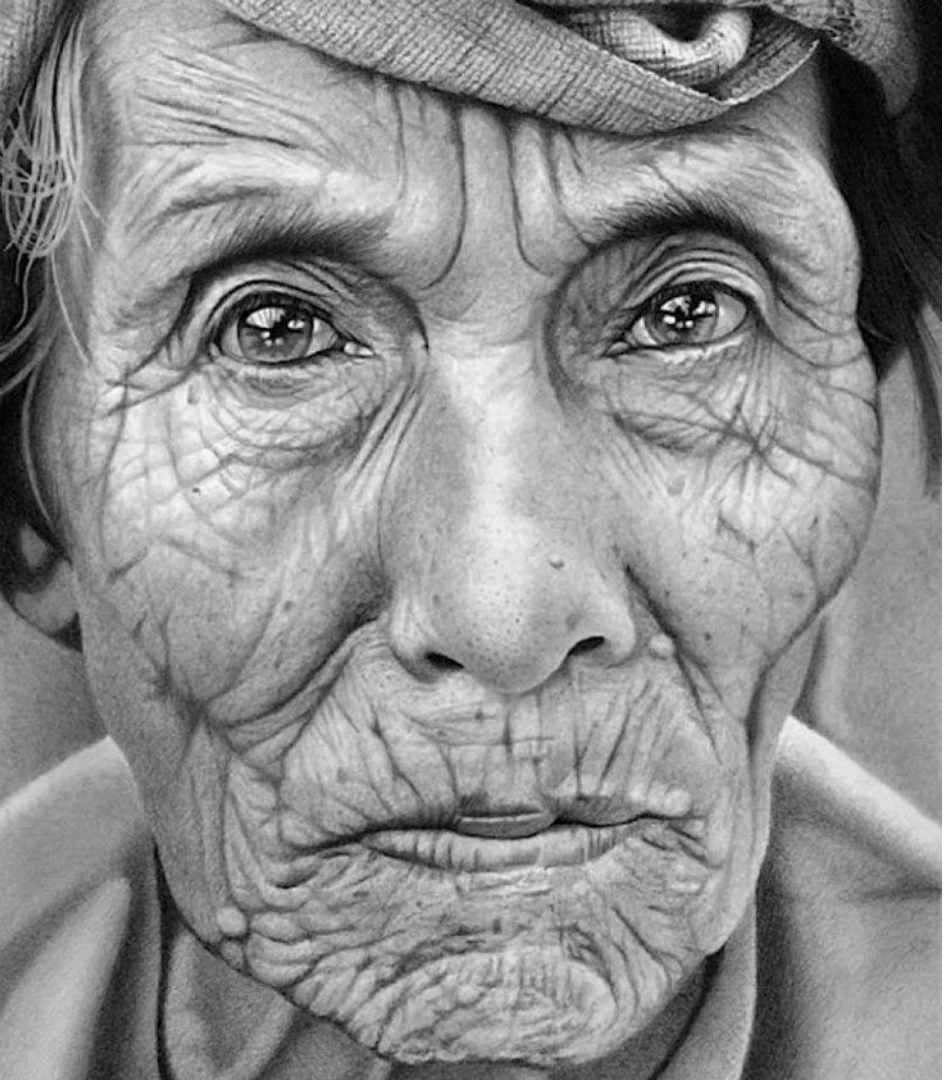


Hyperrealism

Does this image look like photo ?

Surprisingly, this is painting
















Kyu Ye Rachel Song

Kyu Ye Rachel Song 홈 20+

Kyu Ye Rachel Song 타임라인 2017년 7월

따뜻한 감성으로 강인한 변화를 일으킬 준비

한국과학기술연구원-KIST에서 연구원 (Researcher)(으)로 근무했음

고려대학교 일반대학원 총학생회에서 이공계 전문위원으로 근무했음

UST : 과학기술연합대학원대학교에서 Human-computer Interaction & Robotics 전공

서울 거주

서울 출신

2010년 1월에 가입

Kyu Ye Rachel Song
방금 ·

wow awesome!!
i recommend it strongly!
#고집돌식당

좋아요

댓글을

윤상호님이 자신의 댓글에 답글을 남겼습니다.

Jasmine Mae A. Linogon 님이 Maldita With A Heart님의 게시물을 좋아합니다.

추광재님과 박서연님이 친구

강신동

Chanwoo Jacob Lee 2시간

Adrien Kim

김성준

정상섭

황상정

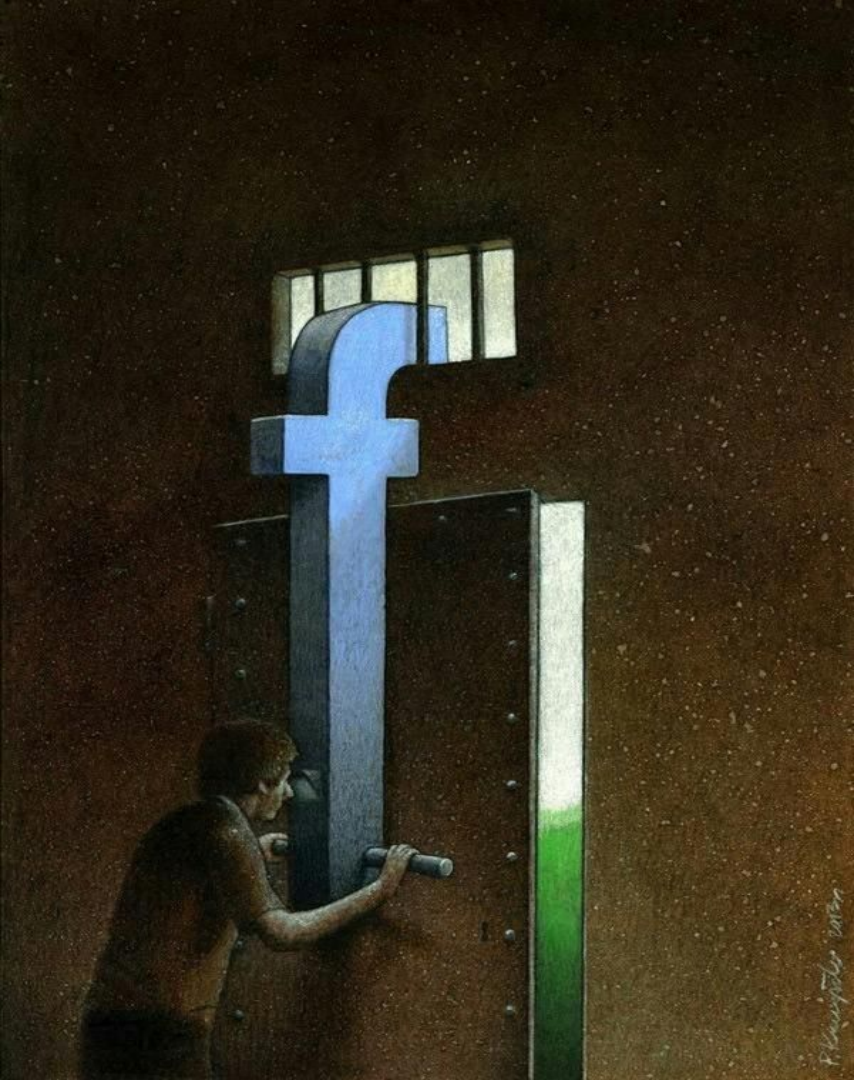
김규태

고요한

Hakku Lee

I found a nice restaurant ! I'd like to post it in FB

→ I'd like to post a contents of nice restaurant. Finally, I found it !



Do you think you are live in real world or fake world?

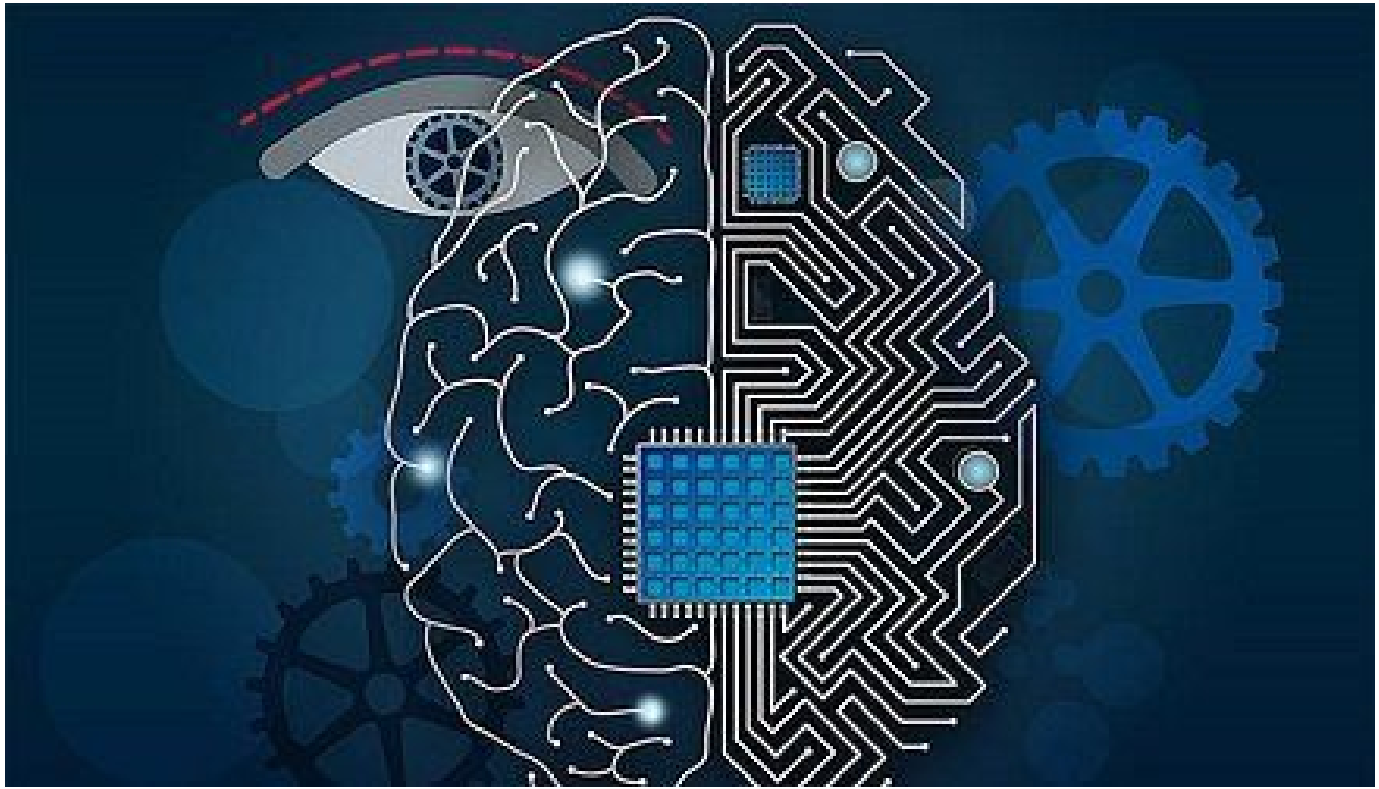
The virtual and Real are reversed

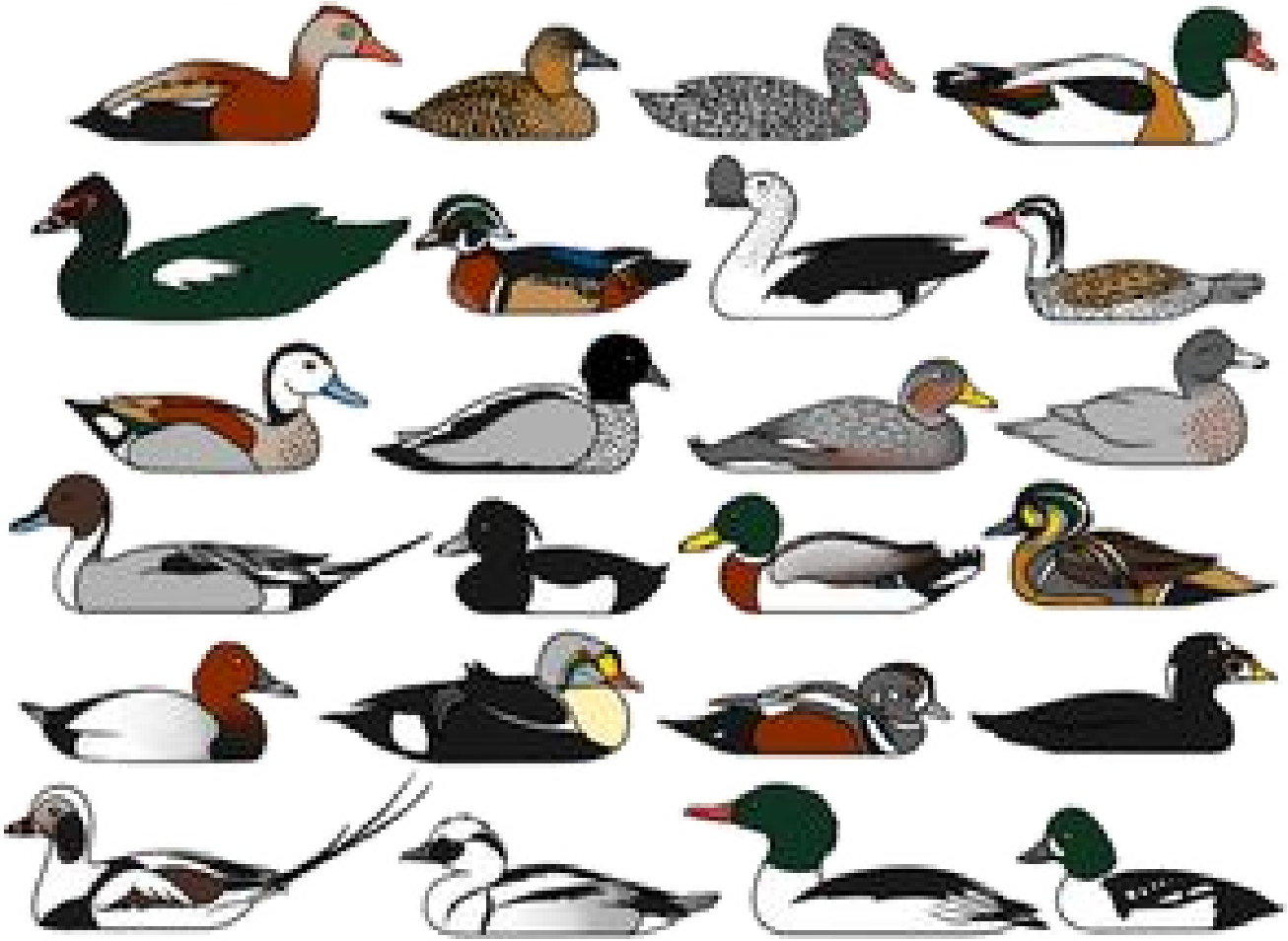
Machine's thinking ability

also would that be?

Visual perception

Human - machine cognition



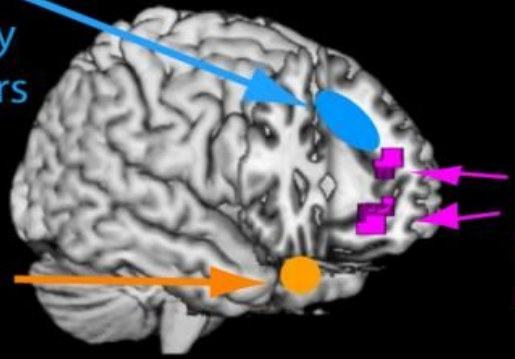


Hypothesis testing

Bayesian inference

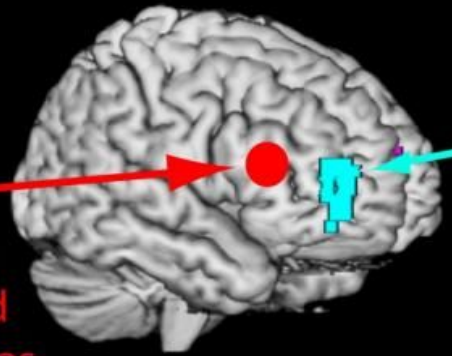
Dorsomedial PFC
detects when the actor strategy becomes unreliable and triggers the creation of new strategies

Ventral striatum
detects when newly created strategies become reliable and confirm them



Medial PFC
monitor the relialiblity of the actor strategy

Medial inferential track



Lateral PFC
detects when one alternative strategy becomes reliable and rejects newly created strategies

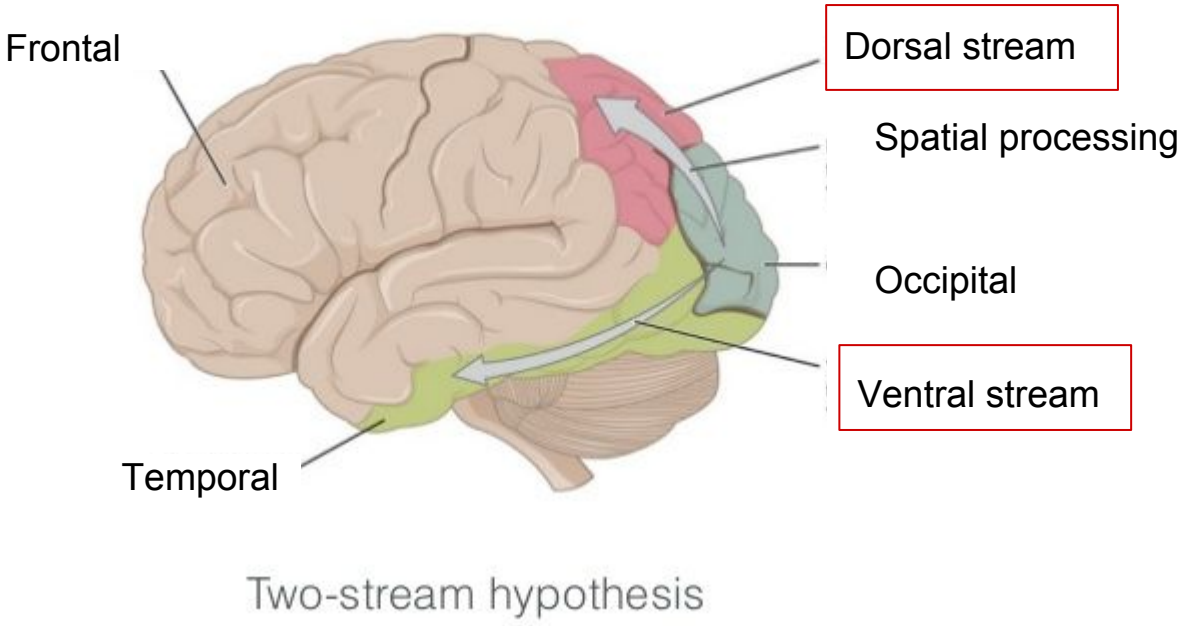
Polar PFC
monitors the relialiblity of alternative strategies

Lateral inferential track

PFC: prefrontal cortex

Convolutional Neural Network mimics Human visual perception

Human : Visual perception

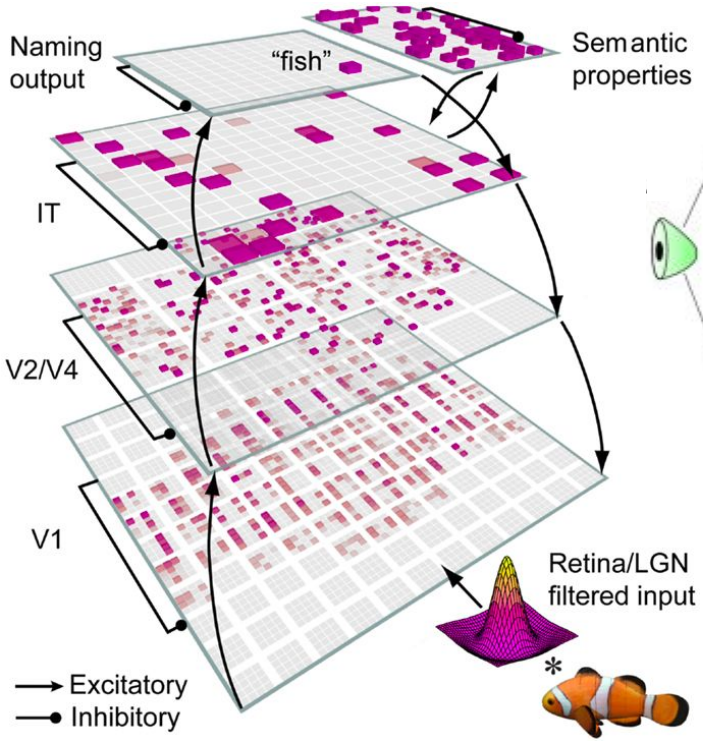


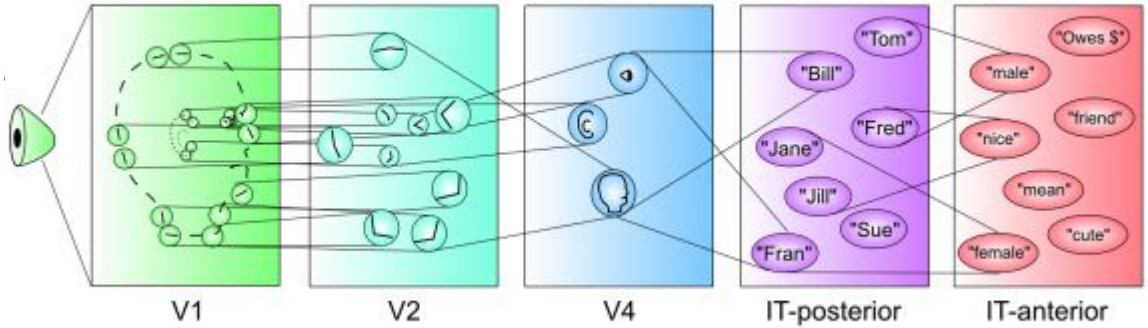
color
texture
pictorial detail
shape
size

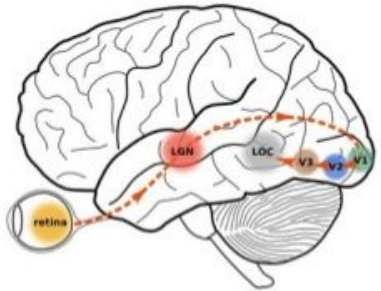
location
movement
spatial transformations
spatial relations

(Milner and Goodale, 1995)

Ventral stream “What”







Dorsal stream

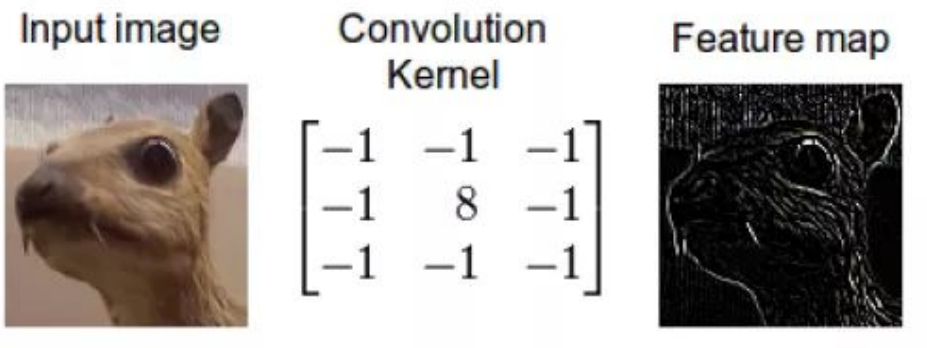
“where” action

- Visual guided action
- Recognition where objects are

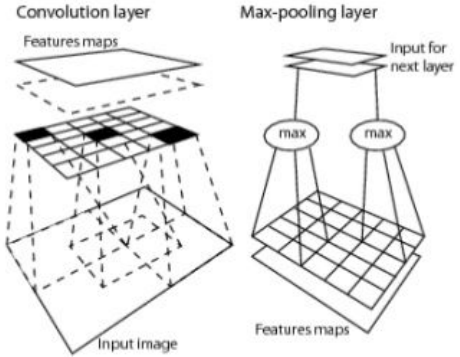
How about machines?

Convolutional Neural Network mimics Human visual perception

Machine : Convolutional Neural Network

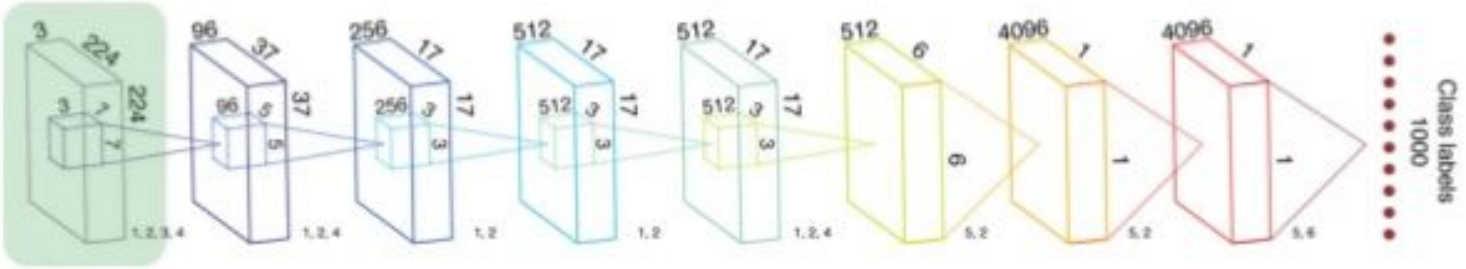


Convolutional Kernel(filter)



Convolutional Layer

Convolutional Neural Network mimics Human visual perception



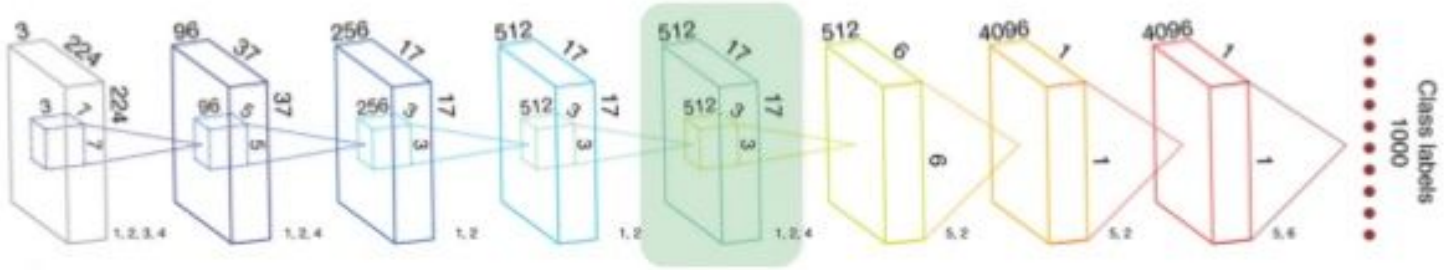
Layer 1

[1] convolution, [2] rectification,
[3] local response normalization,
[4] max pooling, [5] inner product, [6] softmax

IMAGENET

Matthew D. Zeiler, Rob Fergus **Visualizing and Understanding Convolutional Networks** 2013

Convolutional Neural Network mimics Human visual perception



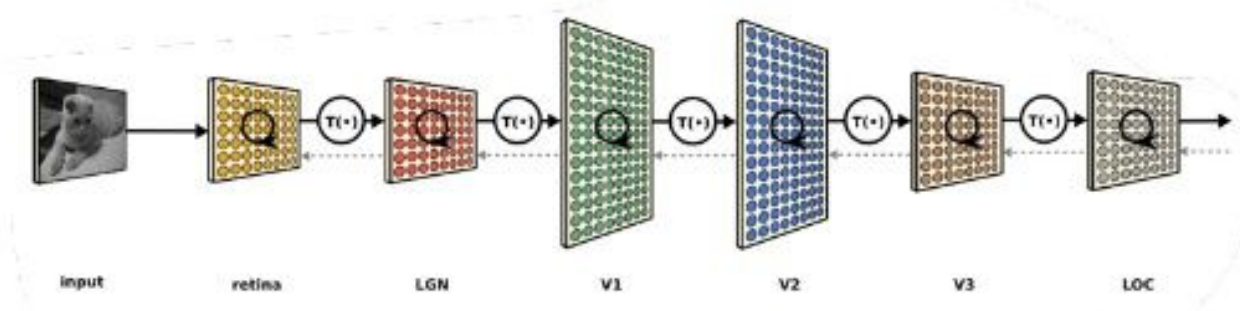
[1] convolution, [2] rectification,
[3] local response normalization,
[4] max pooling, [5] inner product, [6] softmax

IMAGENET

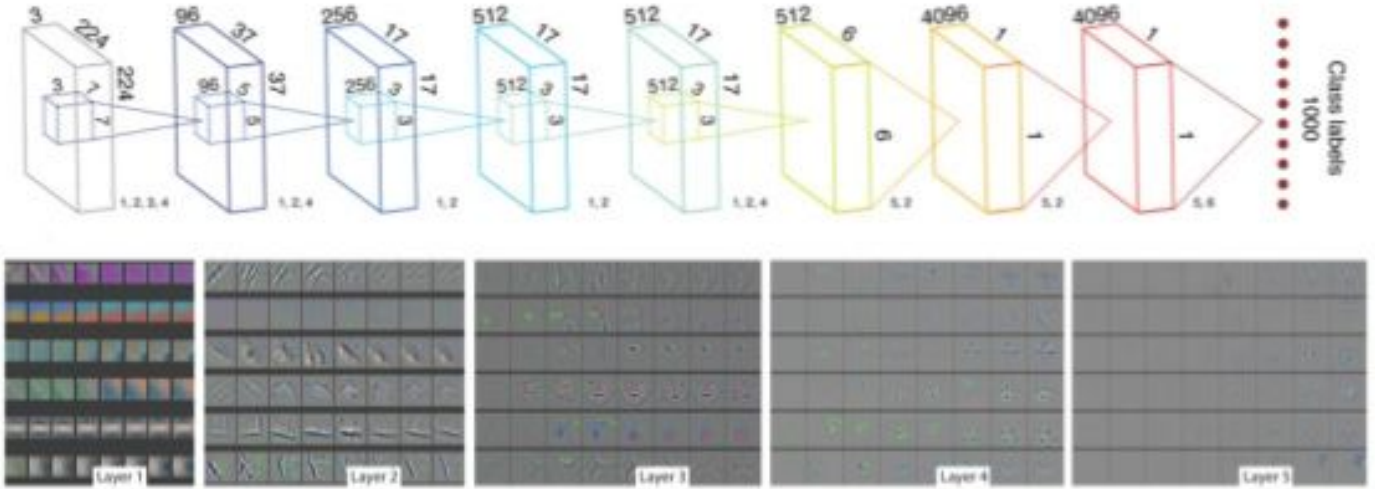
zing and Understanding Convolutional Networks 2013

Human visual system & CNN

Human



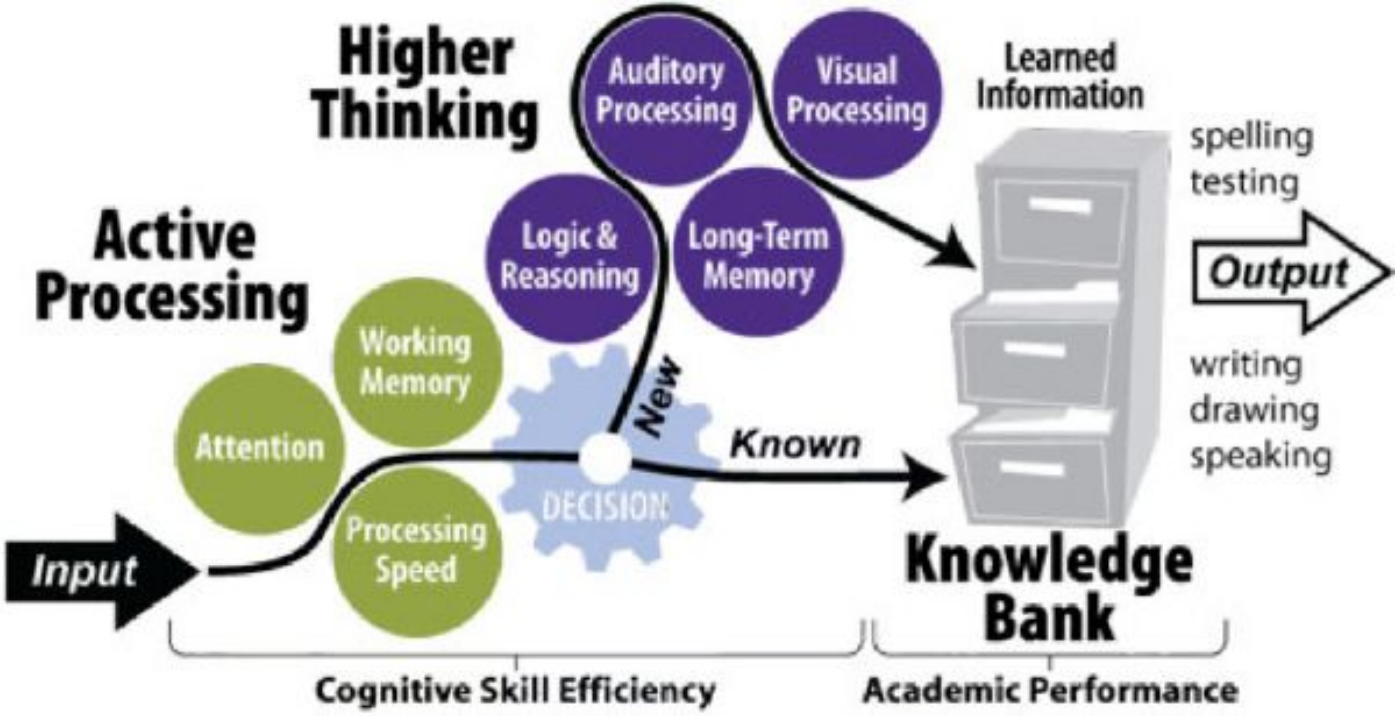
CNN



Relation reasoning

Relation Network mimics human reasoning

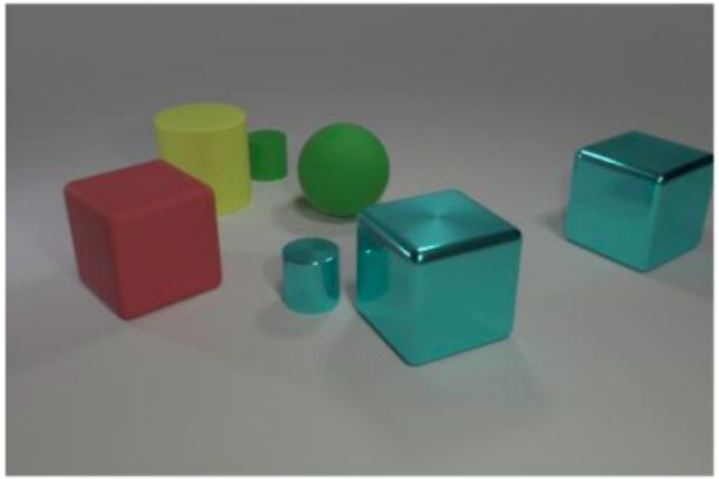
Human’s reasoning



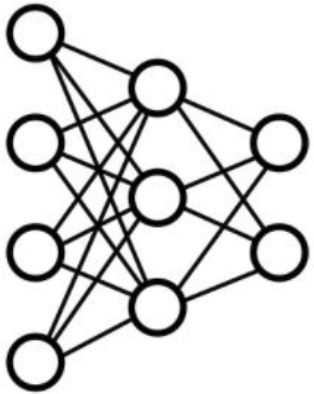
How about machines?

Relation Network mimic human reasoning

Machine : Relation network

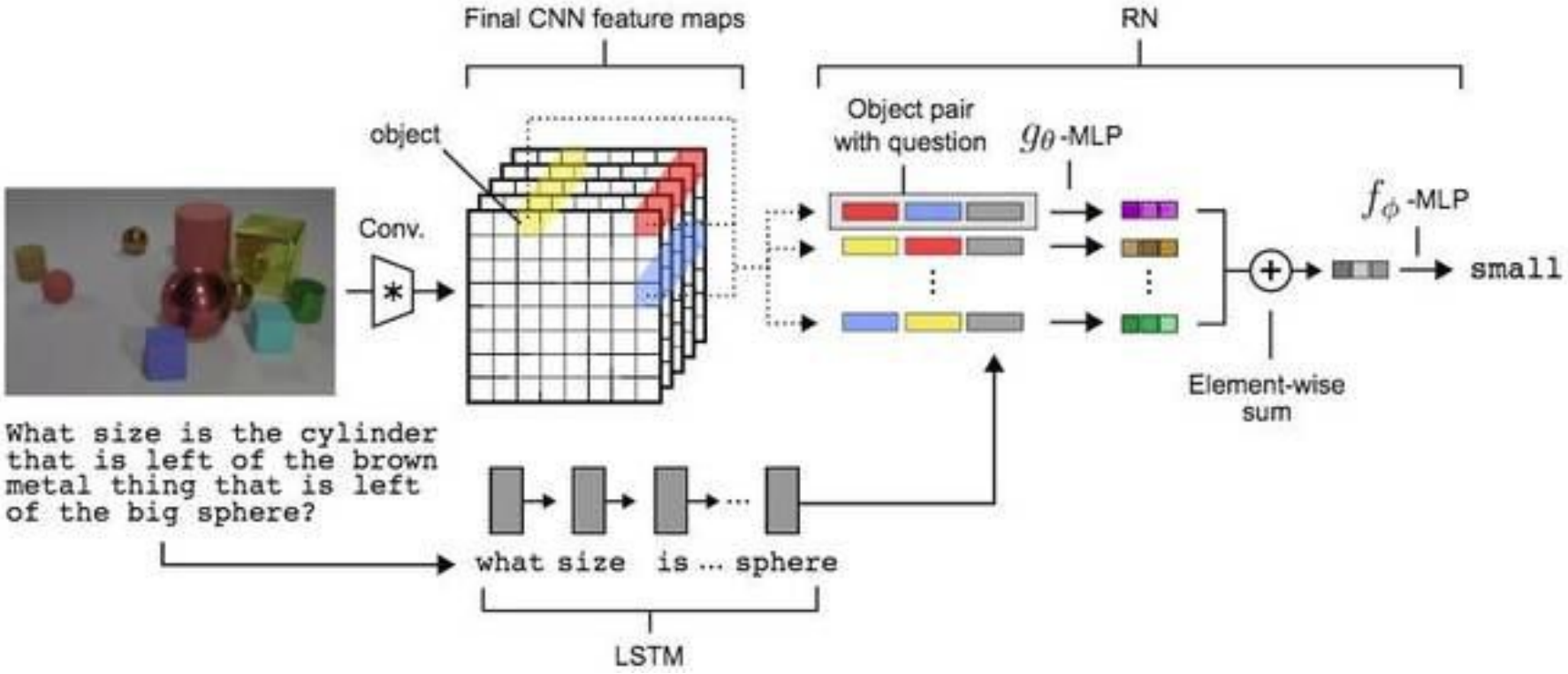


What color is the thing with the same size as the blue cylinder?



Green

Relation Network mimic human reasoning



Relation Network mimic human reasoning

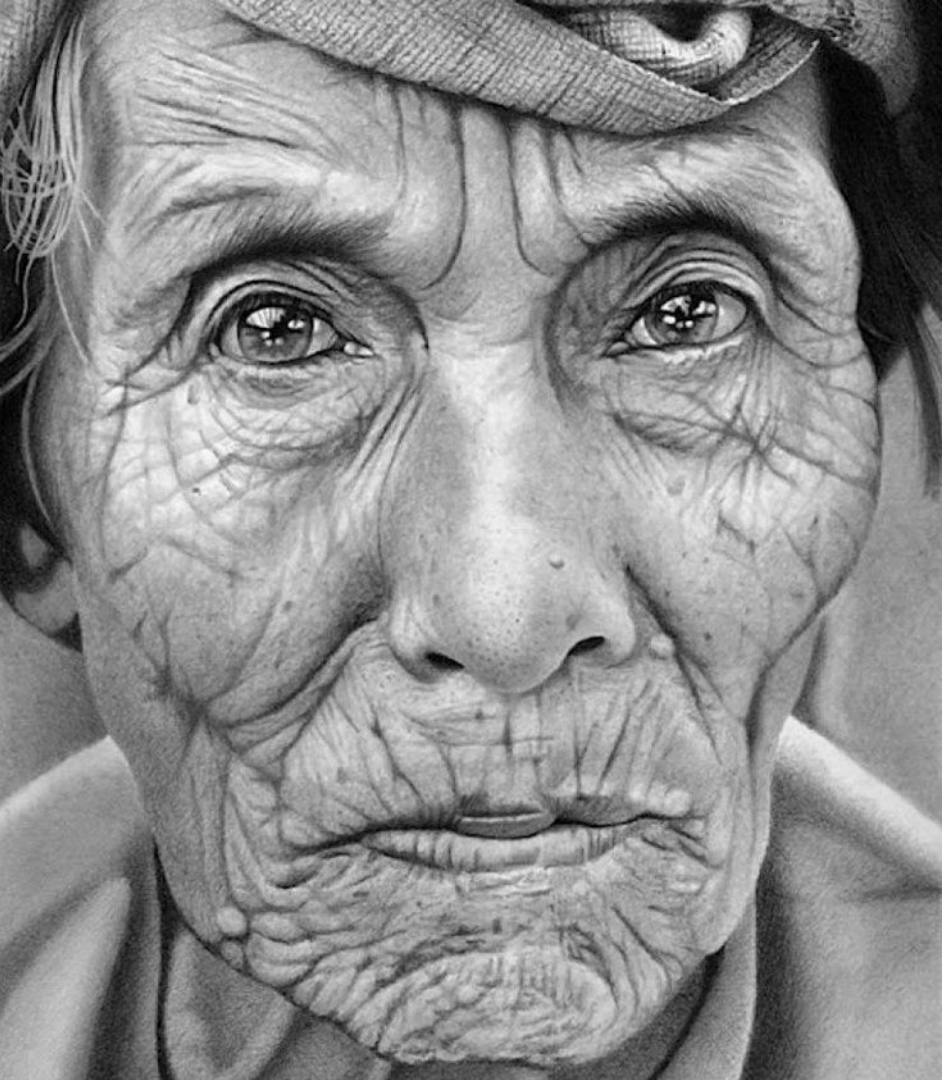
bAbI Dataset

Relation Network

CNN+LSTM+RN performance is better than humans' in reasoning field

Model	**Overall**	Count	Exist	Compare Numbers	Query Attribute	Compare Attribute
Human	92.6	86.7	96.6	86.5	95.0	96.0
Q-type baseline	41.8	34.6	50.2	51.0	36.0	51.3
LSTM	46.8	41.7	61.1	69.8	36.8	51.8
CNN+LSTM	52.3	43.7	65.2	67.1	49.3	53.0
CNN+LSTM+SA	68.5	52.2	71.1	73.5	85.3	52.3
CNN+LSTM+SA*	76.6	64.4	82.7	77.4	82.6	75.4
CNN+LSTM+RN	**95.5**	**90.1**	**97.8**	**93.6**	**97.9**	**97.1**

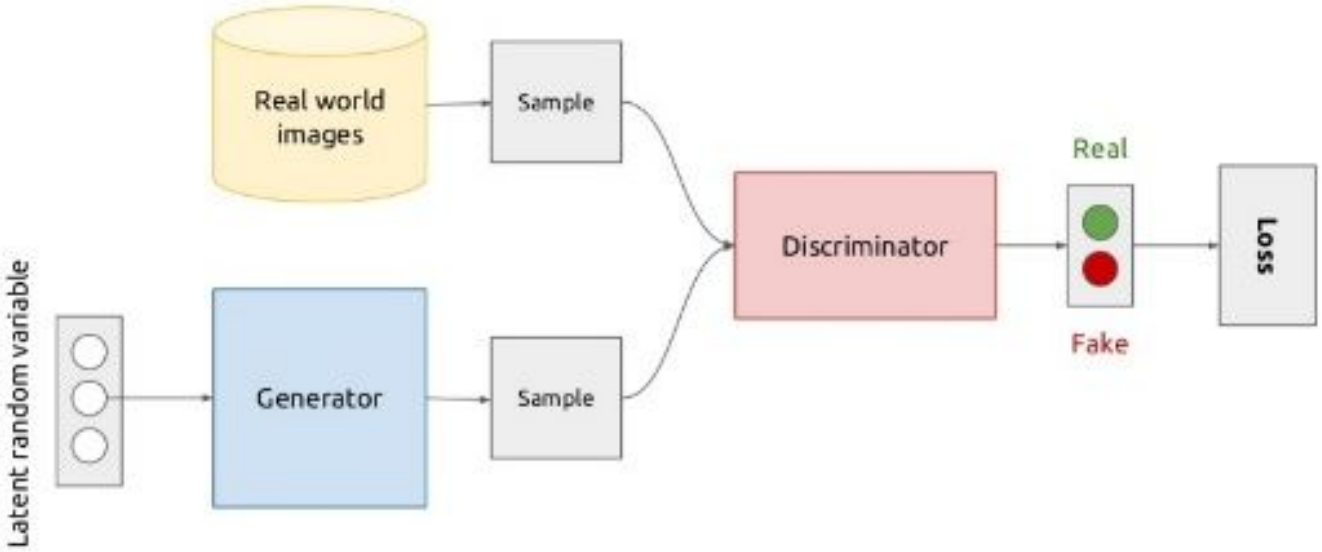
* Our implementation, with optimized hyperparameters and trained fully end-to-end.



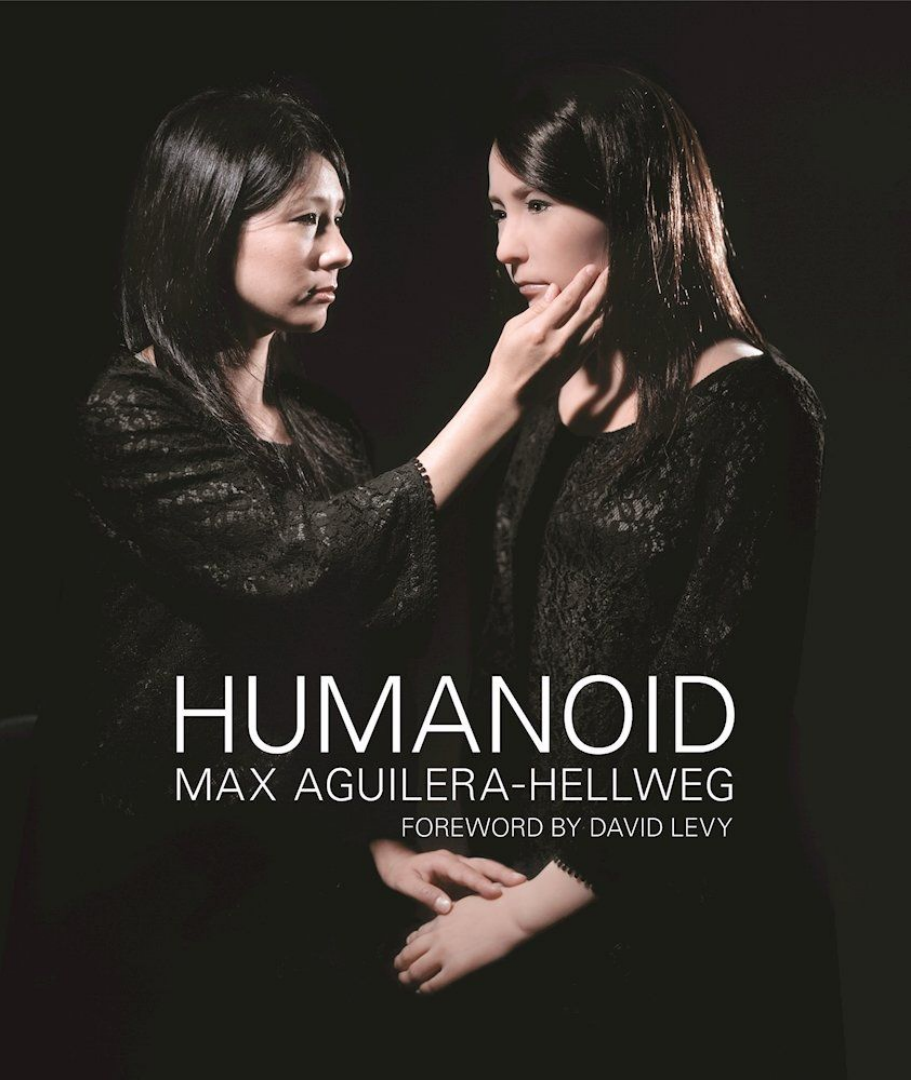
You remember this?

Generative Adversarial Network

simple mechanism



http://www.slideshare.net/xavigiro/deep-learning-for-computer-vision-generative-models-and-adversarial-training-upc-2016



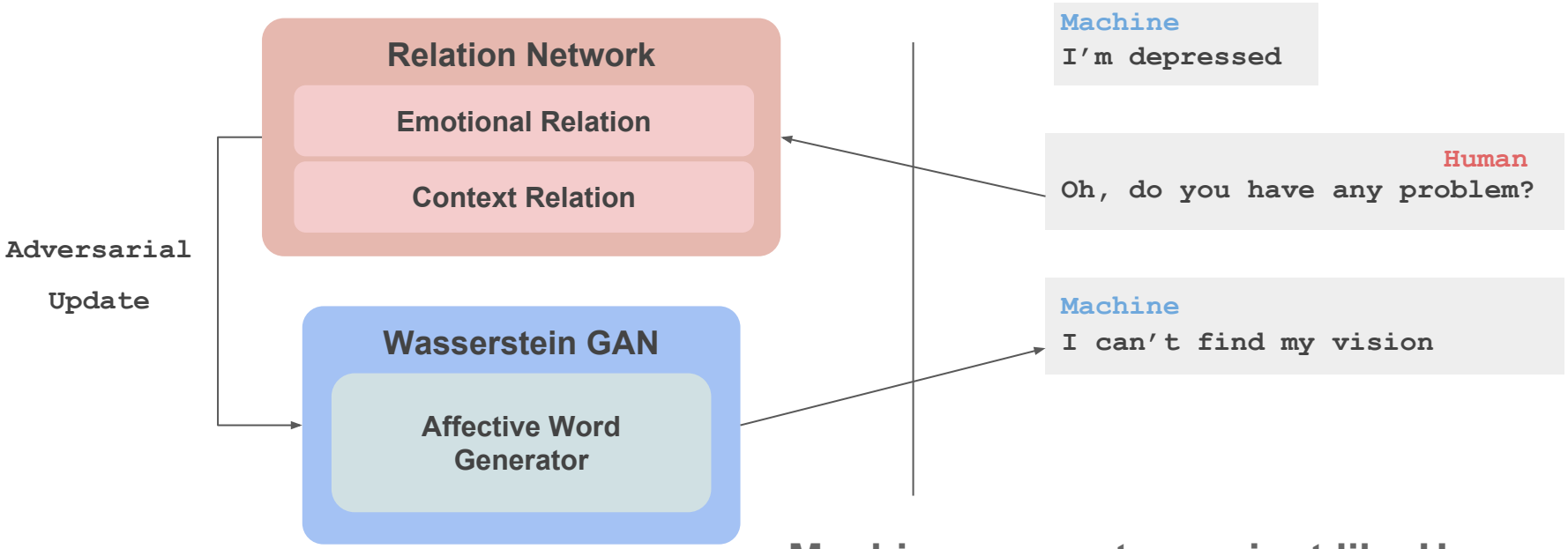
Someday,
GAN included Relation network makes more realistic data than real data

https://www.amazon.com/Humanoid-Max-Aguilera-Hellweg/dp/0922233470

Don’t be afraid

My project

Generated affective sentence by the generator can be used
dialog-psychotherapy



Machine comes to say just like Human

Conclusion

Can machines make people happy?

They can

If we want.