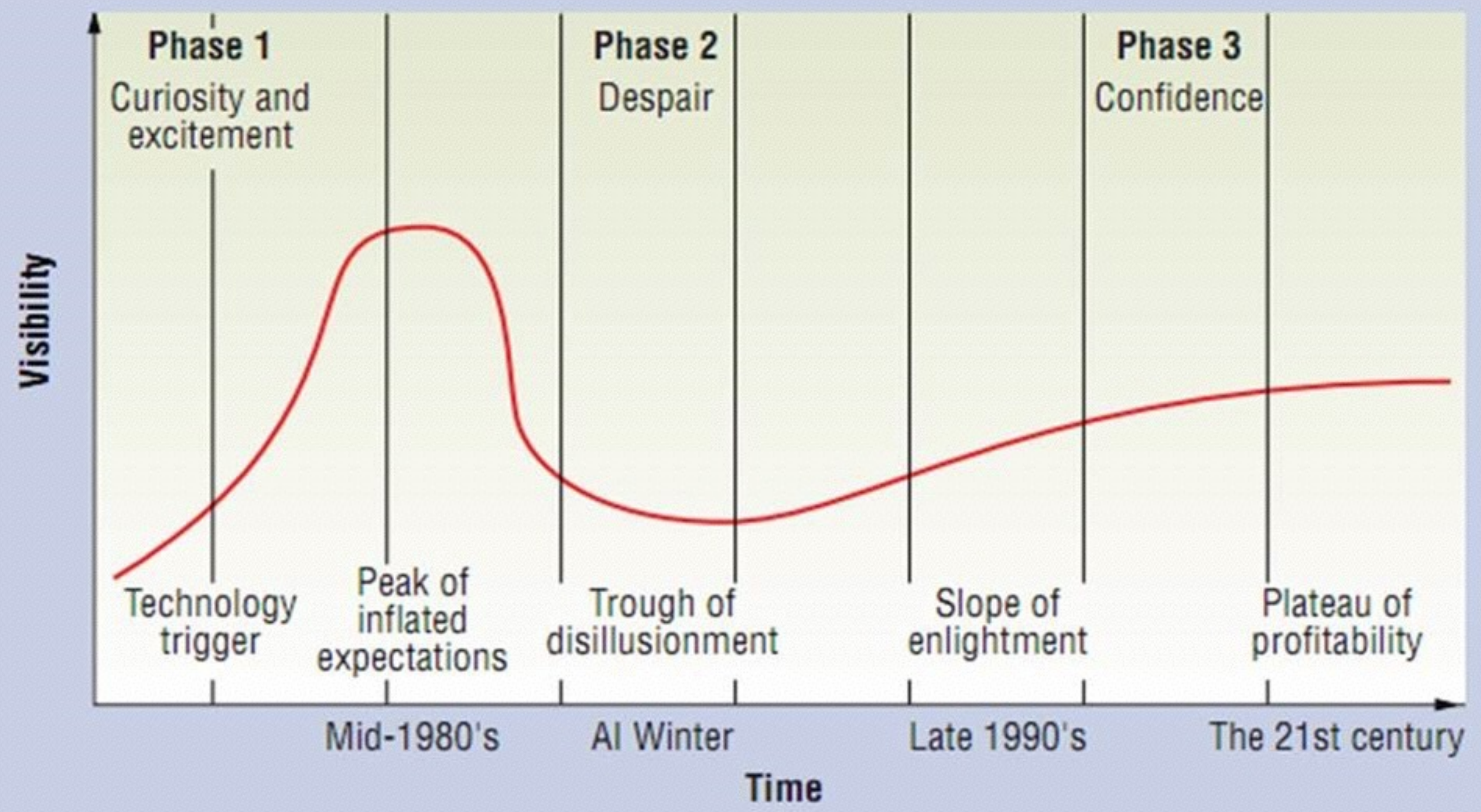


人工智能：趋势 机会和思考

2016.12.16北京

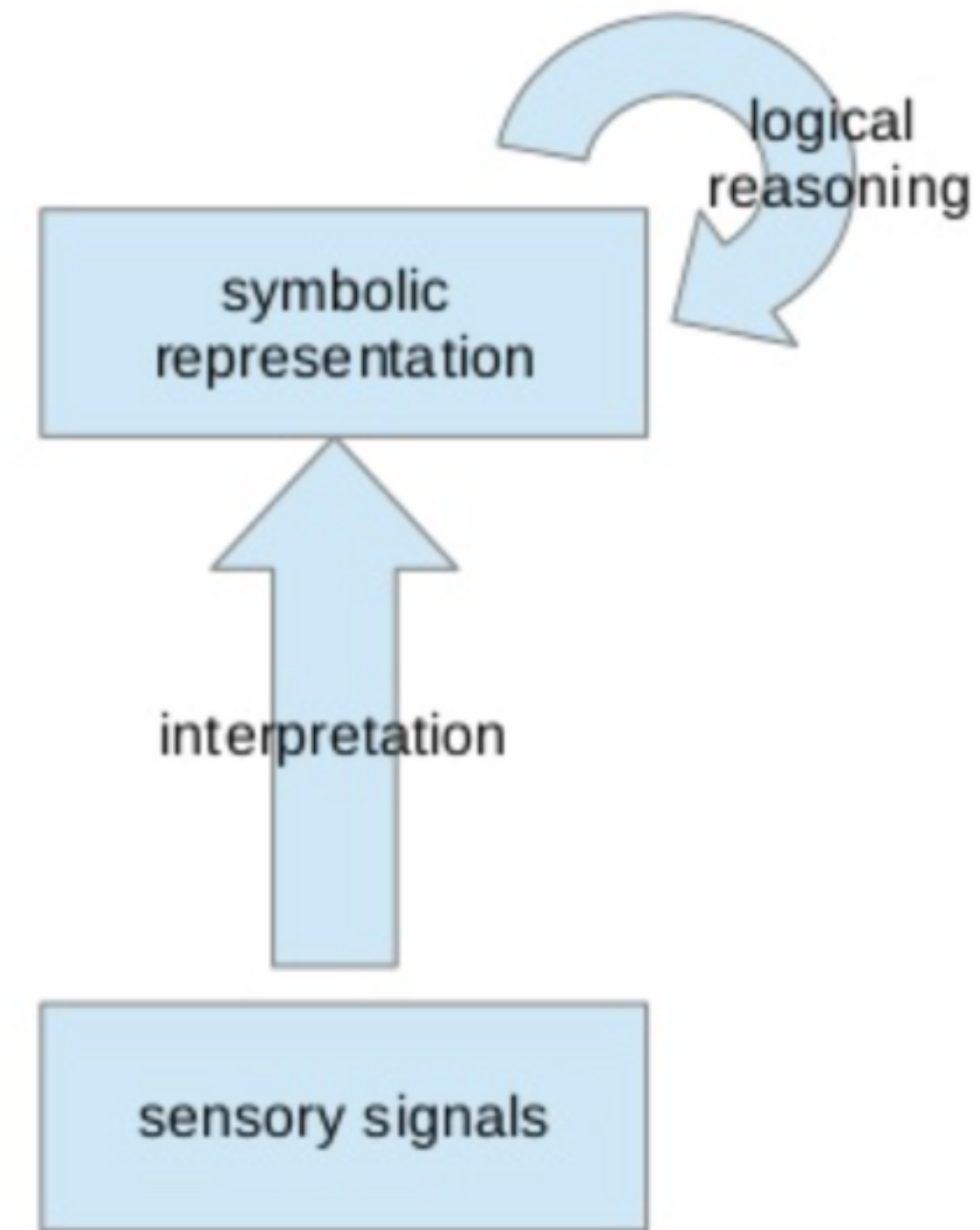
A.I., again?

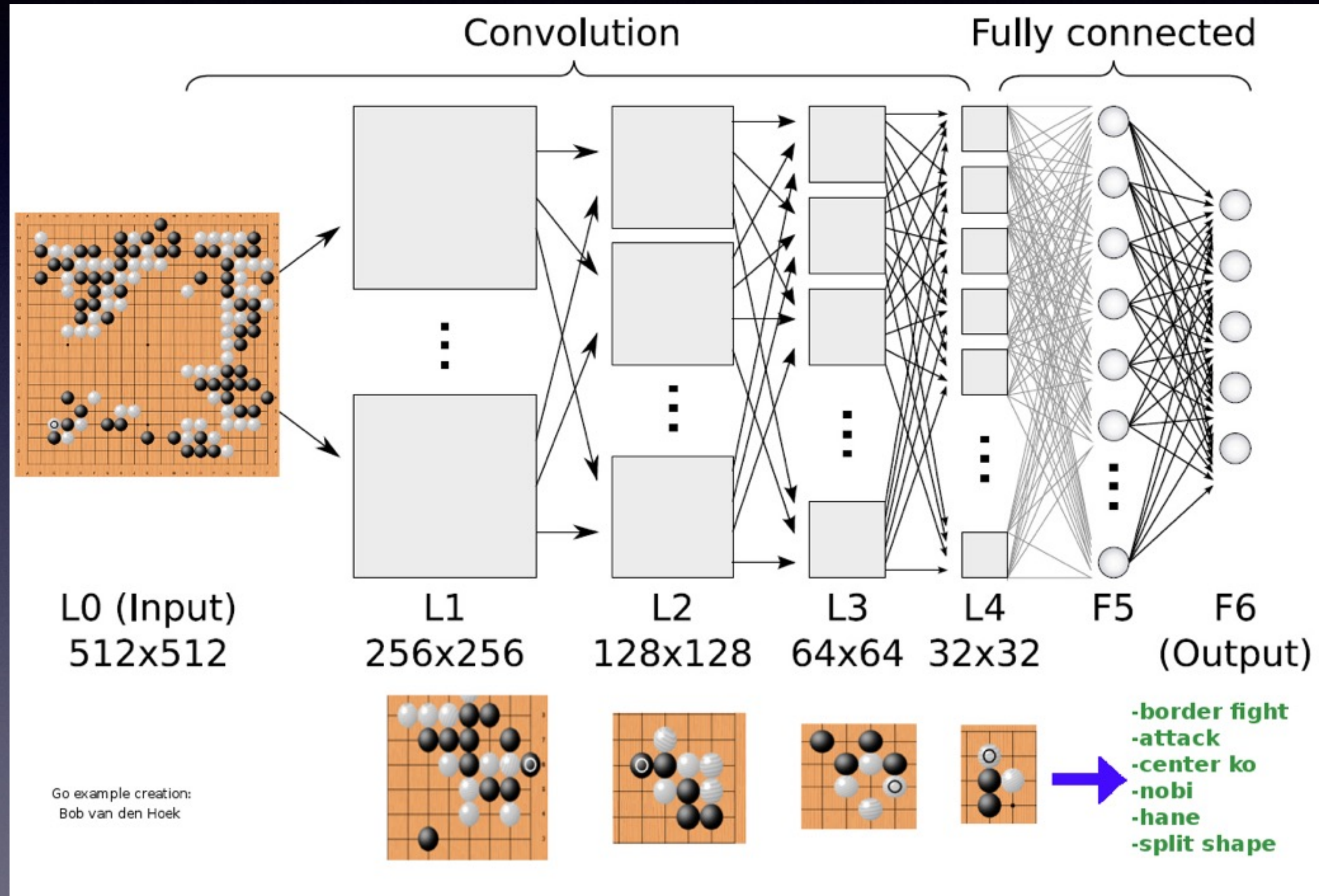
- 人工智能起起伏伏
- 符号主义与连接主义
- 机器学习的兴起
- 深度神经网络一统天下



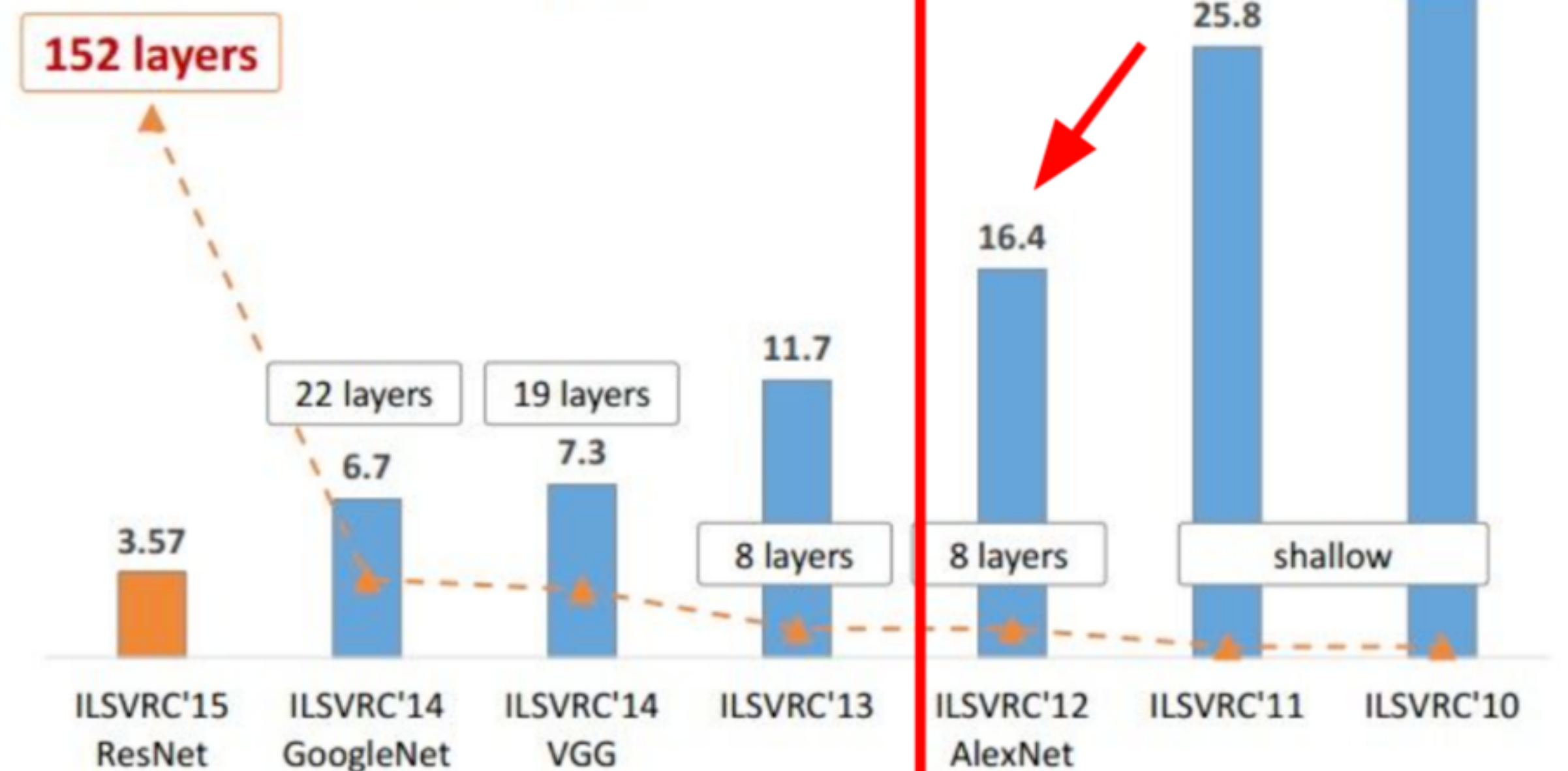
Symbolic AI

- Cognition involves operations over symbolic representations.
- “Perception” is the process abstracting symbolic representations from sensory signals.
- Mostly, the symbolic representation is the product of human design and choice.
- → problem when we go away from the domain of human experience (ie, “semantic gap”)





Revolution of Depth



ImageNet Classification top-5 error (%)

AI Landscape

Players

- ~10K Companies
- Big players



- Second tier/"New" comer



Machine Intelligence LANDSCAPE

CORE TECHNOLOGIES

ARTIFICIAL INTELLIGENCE



DEEP LEARNING



MACHINE LEARNING



NLP PLATFORMS



PREDICTIVE APIS



IMAGE RECOGNITION



SPEECH RECOGNITION



RETHINKING ENTERPRISE

SALES



SECURITY / AUTHENTICATION



FRAUD DETECTION



HR / RECRUITING



MARKETING



PERSONAL ASSISTANT



INTELLIGENCE TOOLS



RETHINKING INDUSTRIES

ADTECH



AGRICULTURE



EDUCATION



FINANCE



LEGAL



MANUFACTURING



MEDICAL



OIL AND GAS



MEDIA / CONTENT



CONSUMER FINANCE



PHILANTHROPIES



AUTOMOTIVE



DIAGNOSTICS



RETAIL

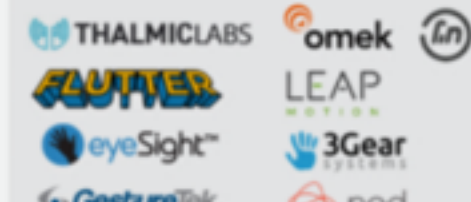


RETHINKING HUMANS / HCI

AUGMENTED REALITY



GESTURAL COMPUTING



ROBOTICS



EMOTIONAL RECOGNITION



SUPPORTING TECHNOLOGIES

HARDWARE



DATA PREP



DATA COLLECTION



Machine Intelligence LANDSCAPE

CORE TECHNOLOGIES

ARTIFICIAL INTELLIGENCE



DEEP LEARNING



MACHINE LEARNING



NLP PLATFORMS



PREDICTIVE APIS



IMAGE RECOGNITION



SPEECH RECOGNITION



RETHINKING ENTERPRISE

SALES



SECURITY / AUTHENTICATION



FRAUD DETECTION



HR / RECRUITING



MARKETING



PERSONAL ASSISTANT



INTELLIGENCE TOOLS



RETHINKING INDUSTRIES

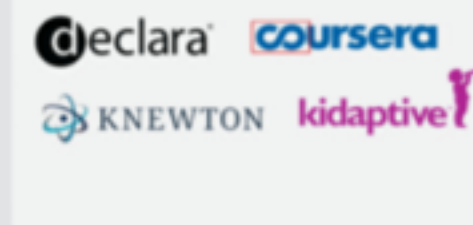
ADTECH



AGRICULTURE



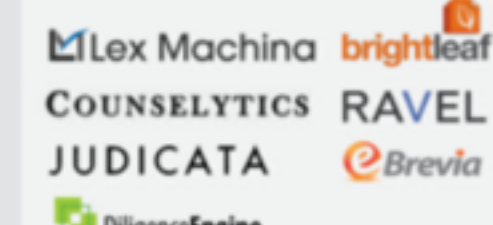
EDUCATION



FINANCE



LEGAL



MANUFACTURING



MEDICAL



OIL AND GAS



MEDIA / CONTENT



CONSUMER FINANCE



PHILANTHROPIES



AUTOMOTIVE



DIAGNOSTICS



RETAIL



RETHINKING HUMANS / HCI

AUGMENTED REALITY



GESTURAL COMPUTING



ROBOTICS



EMOTIONAL RECOGNITION



SUPPORTING TECHNOLOGIES

HARDWARE



DATA PREP



DATA COLLECTION



MACHINE INTELLIGENCE 2.0

AGENTS

PROFESSIONAL	PERSONAL	OS INTERFACES
Howdy! x.ai clara KASIST DigitalGenius OVERLAP.CC meekan fuse machines PRIMER	facebook XIAOICE large assistant.ai nestor @awesome Magic	Siri Cortana VIV maluuba api.ai CogNEA Google Now

AUTONOMOUS SYSTEMS

AIR	GROUND	SEA	INDUSTRIAL
3DR dji PROJECT LOON Google VERTICAL DroneDeploy AIRDOG SKYCATCH SKYDIO Airware LILY	Google UBER TESLA CRUISE MOBILEYE COMMA AdasWorks	LIQUID ROBOTICS bluefin data OPENREV BluHaptics	KIVA Systems fetch HARVEST CLEARPATH AVIDBOTS ENERGID rethink robotics GREYORANGE OSARO

ENTERPRISE

SECURITY / FRAUD	HR / RECRUITING	SALES	MARKETING	CUSTOMER SUPPORT	INTERNAL INTEL	MARKET INTEL
Sentinel graphistry BITSIGHT feedzai AREA1 drawbridge sift science CYLANCE Brighterion	textio hiQ gild SpringRole entelo unitive GIGSTER	sense infer people pattern Preact Prism AVISO Vidora sentient salespredict Gainsight	LiftIgniter RADIUS brightfunnel retention AIRPR	CLARABRIDGE QUANTIFIND Wiseio ACTIONIQ FRAMED DigitalGenius	Alation ADATAO Palantir sapho lucid Rainbird SKIPFLAG agolo Digital Reasoning Narrative Science	Quid mattermark DataFox bottlenose PREMISE enigma CB INSIGHTS

PLATFORMS

RESEARCH / AGI	FULL STACK	MACHINE LEARNING	INDUSTRIAL IOT	AUDIO	VISION	DATA ENRICHMENT
OpenAI vicarious GoogleDeepMind Numenta Cycorp nnaisense SCALED INFERENCE 格CURIOUS GEOMETRIC INTELLIGENCE	context relevant CognitiveScale NVIDIA TERADEEP QUALCOMM nervana SYSTEMS	Dato rapidminer cortical.io AYASDI amazon web services Azure Machine Learning nara logics PredictionIO SKYTREE bigml blueyonder	ThingWorx UPTAKE IMUBIT Preferred Networks Alluvium xively PLANET OS	Gridspace TalkIQ nexidia vocaliq NUANCE Expect Labs popUP archive	ORBITAL INSIGHT Descartes Labs DEXTRO cortica clarifai PLANET LABS MetaMind	diffbot Paxata TRIFACTA iDIBON WorkFusion loopai CrowdFlower

INDUSTRIES

ADTECH	AGRICULTURE	FOR GOOD	RETAIL FINANCE	LEGAL	MATERIALS & MFG	HEALTHCARE
ADTHEORET dstillery BEYONDVERBAL METAMARKETS TAPAD rocketfuel affectiva	BLUE RIVER tule TerraAvion mavrx THE CLIMATE CORPORATION CERES TECHNOLOGIES HONEYCOMB	Conservation Metrics DataKind DATA POP thorn BAYES IMPACT	inVenture affirm earnest MIRADOR Lendo zest finance LendUp	Everlaw RAVEL LEGAL ROBOT Sseal BEAGLE ROSS Lex Machina	zymergen AUGMATE GINKGO BIOWORKS ITRINE SIGHT MACHINE TECHNOLOGIES CALCULARIO Eigen Innovations	deep genomics 3SCAN enlitic Calico BUTTERFLY RECOMBINE color Atomwise RECOMBINE color METABIOTA GRAND ROUNDS Google Life Sciences IBM Watson Health

INDUSTRIES (CONT'D)

EDUCATION	TRANSPORT & LOGISTICS	INVESTMENT FINANCE	DATA SCIENCE	MACHINE LEARNING	OPEN SOURCE
KNEWTON coursera turnitin gradescope UUDACITY KHANACADEMY	NAUTO taleris PRETECKT clearmetal	Bloomberg Quantopian Dataminr KENSHO ISENTIUM NEURENSIC alphasense	DOMINO kaggle Sentenai sense yseop Outlier yhat DataRobot	Cortana Analytics AlchemyAPI glowfl.sh IBM Watson Platform Anodot MonkeyLearn (h[s]) HyperScience fuzzy.io SIGOPT OxdataH2O SPARKBEYOND indico	SKYMINND TensorFlow seldon Caffe theano Spark MLlib Microsoft PM spaCy DL4J SciKit CGT

ENTERPRISE INTELLIGENCE

VISUAL

Orbital Insight planet
clarifai DEEPVISION
cortica Igocon
SPACE_KNOW Captricity
netra deepomatic

AUDIO

Gridspace TalkIQ
nexidia twilio
CAPIO Expect Labs
Clover Mobvoi
Curious.AI popUP archive

SENSOR

PREDIX GIoT MAANA
Sentenai PLANET OS
UPTAKE IMUBIT Preferred Networks
thingworx KONUX Alluvium

INTERNAL DATA

PRIMER IBM WATSON
Cycorp Palantir ARIMO
Alation Sapho Outlier
Digital Reasoning

MARKET

mattermark Quid
DataFox PREMISE
Bottlenose MOTIVA
enigma CB INSIGHTS
Tracxn predata

ENTERPRISE FUNCTIONS

CUSTOMER SUPPORT

DigitalGenius Kasisto
ELOQUENT Wiseio
ACTIONIQ zendesk
Preact CLARABRIDGE

SALES

collective sense
fuse machines AVISO
salesforce INSIDE SALES
Zensight .COM clari

MARKETING

MINTIGO Lattice RADIUS
LiftIgniter [PERSADO]
brightfunnel retention
COGNICOR AIRPR msigal

SECURITY

CYLANCE DARKTRACE
ZIMPERIUM deepinstinct
Sentinel DEMISTO
graphistry drawbridge
SignalSense AppZen

RECRUITING

textio entelo
Wade & Wendy hiQ
unifive SpringRole
GIGSTER HireVue

AUTONOMOUS SYSTEMS

GROUND NAVIGATION

drive.ai AdasWorks
ZOOX MOBILEYE
UBER Google TESLA
nuTonomy Auto Robotics

AERIAL

SKYDIO SHIELD AI
Airware DJI LILY
DroneDeploy
pilot.ai SKYCATCH

INDUSTRIAL

JAYBRIDGE OSARO
CLEARPATH fetch
KINDRED
HARVEST rethink robotics

AGENTS

PERSONAL

amazon alexa
Cortana Allo
facebook
Siri Replika

PROFESSIONAL

butter.ai pogo SKIPFLAG
clara x.ai slack
talla Zoom sudo

INDUSTRIES

AGRICULTURE

BLUE RIVER mavrX
tule TRACE Pivot Bio
Terrovision AGRI-DATA
Deercartes Labs udio abundant

EDUCATION

KNEWTON volley
gradescope
CTI coursera
UDACITY alt school

INVESTMENT

Bloomberg sentient
ISENTIUM KENSHO
alphasense Dataminr
CEREBELLUM CAPITAL Quandl

LEGAL

blueJ BEAGLE
Everlaw RAVEL
seal ROSS
LEGAL ROBOT

LOGISTICS

NAUTO Acerta
PRETECKT
Routific clearmetal
MARBLE PITSTOP

INDUSTRIES CONT'D

MATERIALS

zymergen Citrine
Eigen Innovations
SIGHT MACHINE
GINKGO BIOWORKS nanotronics
CALCULARIO

RETAIL FINANCE

TALA zest finance
Lendo earnest
affirm MIRADOR
wealthfront Betterment

HEALTHCARE

PATIENT

PULSE CareSkore
ZEPHYR HEALTH IBM Watson Health
OncoData SENTRIAN
Atomwise Numerate

IMAGE

BUTTERFLY 3SCAN
ARTERYS enlitic
BAYLABS imagia
Google DeepMind

BIOLOGICAL

iCarbonX color GRAIL
deep genomics RECURSION
LUMINIST Numerate
Atomwise verily WHOLE BIOME

TECHNOLOGY STACK

AGENT ENABLERS

OCTANE.AI howdy. Maluuba KITT.AI
OpenAI Gym Kasisto AUTOMAT
semantic machines

DATA SCIENCE

DOMINO SPARKBEYOND rapidminer
kaggle DataRobot yhat AYASDI
data iku seldon yseop bigml

MACHINE LEARNING

CognitiveScale GoogleML context relevant
Cycorp HyperScience nora logics minds.ai H2O.ai
SCALED INFERENCE spark cognition loop GEOMETRIC INTELLIGENCE
deepsense.io reactive skymind bonsai

NATURAL LANGUAGE

agolo AYLIEN LEXALYTICS
Narrative Science loop spaCy LUMINOSO
cortical.io MonkeyLearn

DEVELOPMENT

SIGOPT HyperOpt fuzzyio okite
rainforest lobe Anodot
Signifai LAYER 6 bonsai

DATA CAPTURE

CrowdFlower diffbot CrowdAI import io
Paxata DATASIFT amazon mechanical turk enigma
WorkFusion DATALOGUE TRIFACTA parsehub

OPEN SOURCE LIBRARIES

Keras Chainer CNTK TensorFlow Caffe
H2O DEEPLARNING4J theano torch
DSSTNE Scikit-learn AzureML neon
MXNet DMTK Spark PaddlePaddle WEKA

HARDWARE

KNUPATH TENSTORRENT Cirrascale
NVIDIA intel nervana Movidius
tensilica GoogleTPU 10²⁴ Labs Qualcomm
Cerebras Isesemi

RESEARCH

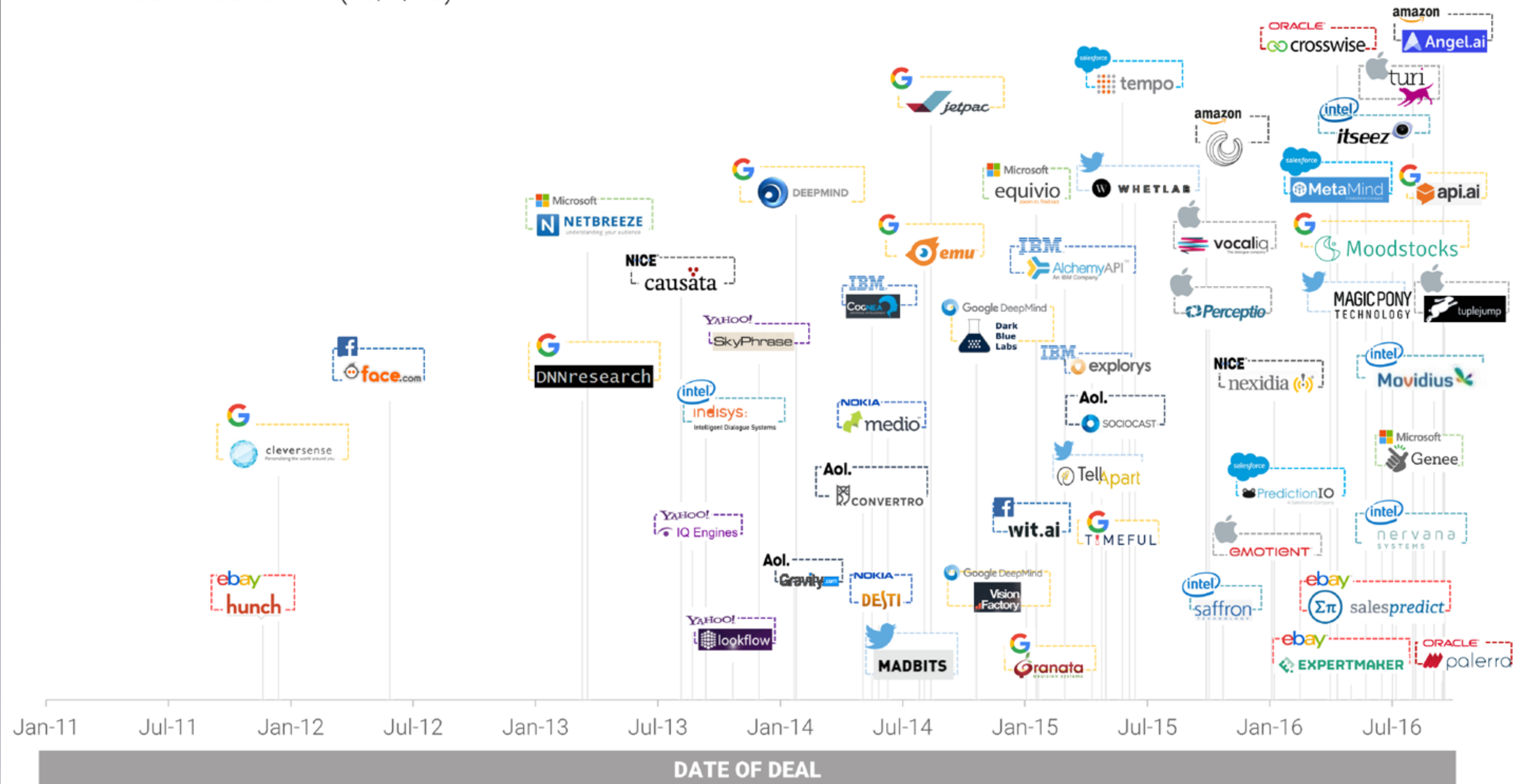
OpenAI maaisense ELEMENT^{AI} vicarious
KNOGGIN Numenta Kimera Systems Cogital

AI Opportunities



RACE FOR AI: MAJOR ACQUIRERS IN ARTIFICIAL INTELLIGENCE

2011 - 2016 YTD (10/7/16)





60+ STARTUPS USING DEEP LEARNING

CORE AI: COMPUTER VISION



CORE AI: OTHER



BI, SALES & CRM



CORE AI: VOICE INTERFACE



ROBOTICS & AUTO



HEALTHCARE



SECURITY



OTHER



E-COMMERCE



ACQUIRED (2014-2016YTD)



istock.com/a-image

强 AI / 弱 AI ?



—Johnny Appleseed

人工智能 = 人工 + 智能?

—Johnny Appleseed

人工智



智能?