Artificial Intelligence in Finance

at

Hong Kong University of Science and Technology

MAFS 6010U: Artificial Intelligence in Finance

Module Description	Course Focus
This course explores the basic concepts and underlying principles of artificial intelligence (AI), delving into the **fundamentals of machine learning** with insights from **case studies** of relevant technologies. Allowing for the **experimentation of applications** of machine learning, this course is designed to encourage students to devise creative ways to **put readily-available AI technologies to use to tackle problems in real life**.	The module aims to provide students with an understanding of artificial intelligence through: • Examining the history as well as **key concepts and theories** of AI and the enablers of the technology • Reviewing various types of neural networks, and analyzing the relevant use cases of AI **across industry verticals**, including robotic process automation, finance, cybersecurity, computer vision, and autonomous driving

"We're looking for someone with your exact qualifications, but a mechanical version."

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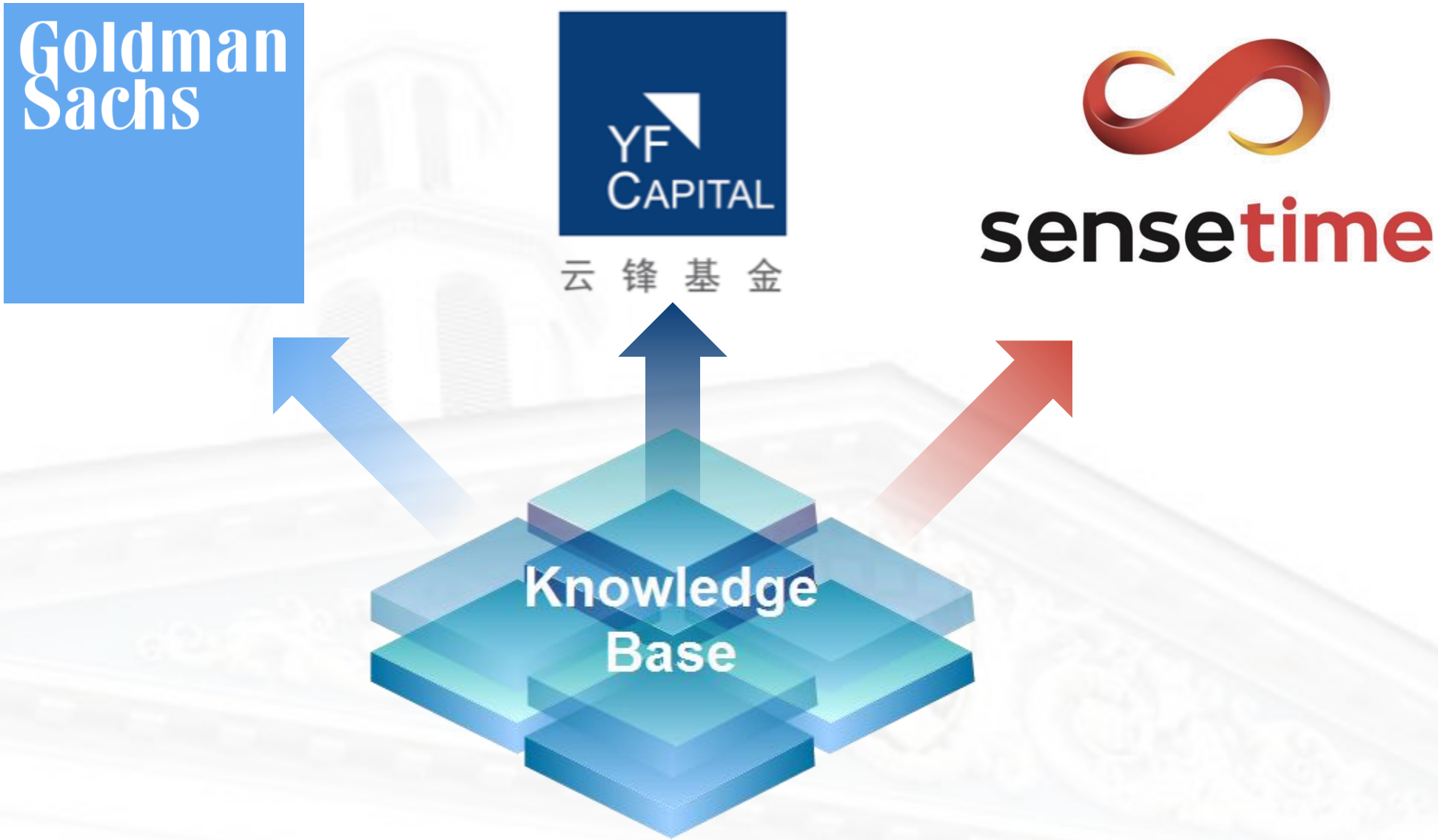
Course Schedule

Session	Date	Topic	Application & Case Study	In-Class Activity
1	Feb 1	– History and Overview of Artificial Intelligence	– Google Experiments: Draw!	– Kahoot
2	Feb 15	– Supervised & Unsupervised Learning – Classification vs. Regression	– Google Experiments: Vision Sensing – Case study: WorkFusion (Robotic Process Automation)	– Class survey and group formation – Kahoot
3	Feb 22	– Decision Trees & Random Forests – Clustering	– Chatbots	– Kahoot
4	Mar 1	– Neural Network Basics – Perceptrons	– Credit analysis – Case study: Clover (Temporal Unfolding)	– Kahoot
5	Mar 8	– Deep Learning – Hyperparameter Optimization & Tuning	– Playground	– Kahoot
6	Mar 15	– Practitioners' Perspectives – Independent Consultation for Projects	– Slido Q&A	– Sharing from researchers and industry professionals
7	Mar 22	– Recurrent Neural Network (RNN)	– Natural language processing – Case study: Deep Instinct (Cybersecurity)	– Word2Vec – Kahoot
8	Mar 29	– Convolutional Neural Network (CNN)	– Google Image Recognition – Case study: SenseTime (Computer Vision)	– 3D Visualization of CNN – Kahoot
9	Apr 12	– Reinforcement Learning	– Case study: Osaro (Robotics), Ascent (Autonomous Driving)	– Kahoot
10	Apr 26	– Midterm Exam – Independent Consultation for Projects		– TBA
11	May 3	– Recent Advances & Applications of AI – Catalysts & Enablers of AI	– Recap of concepts – Case studies: Airobotics (Drones), Cornami (AI Chip)	– Kahoot
12	May 10	– Frontiers of AI – Challenges in AI Commercialization	– Recap of concepts – Case studies: Prophesee (Computer Vision), Prowler (AGI)	– Review of Neural Ordinary Differential Equations (NIPS 2018)
13	May 18	– Synthesis & Outlook		– Final presentations (details TBD)

Note: Details may change depending on class progress, development of relevant technologies, as well as information and feedback from students' surveys.

Connecting Academia with Reality


Goldman Sachs
YF CAPITAL
云 锋 基 金
sensetime
Knowledge Base

Certified Bitcoin Professional (CBP)

A Certified Bitcoin Professional is knowledgeable about the Bitcoin blockchain, Bitcoin transactions, and how the Bitcoin network operates. CBPs are able to apply Bitcoin technology to their professional area of expertise and understand privacy aspects, double-spending, and other issues that relate to the currency.

Details

Languages	English
Duration	2 years
Examination Fee	$99.99
Application Fee	$34.99
Renewal Fee	$34.99

Actions

- View all certifications
- Apply to take the CBP test
- Verify a CBP Professional
- CBP Terms and Conditions

CBPs have professional working knowledge in 33 topics which cover six (6) domains of Bitcoin knowledge.

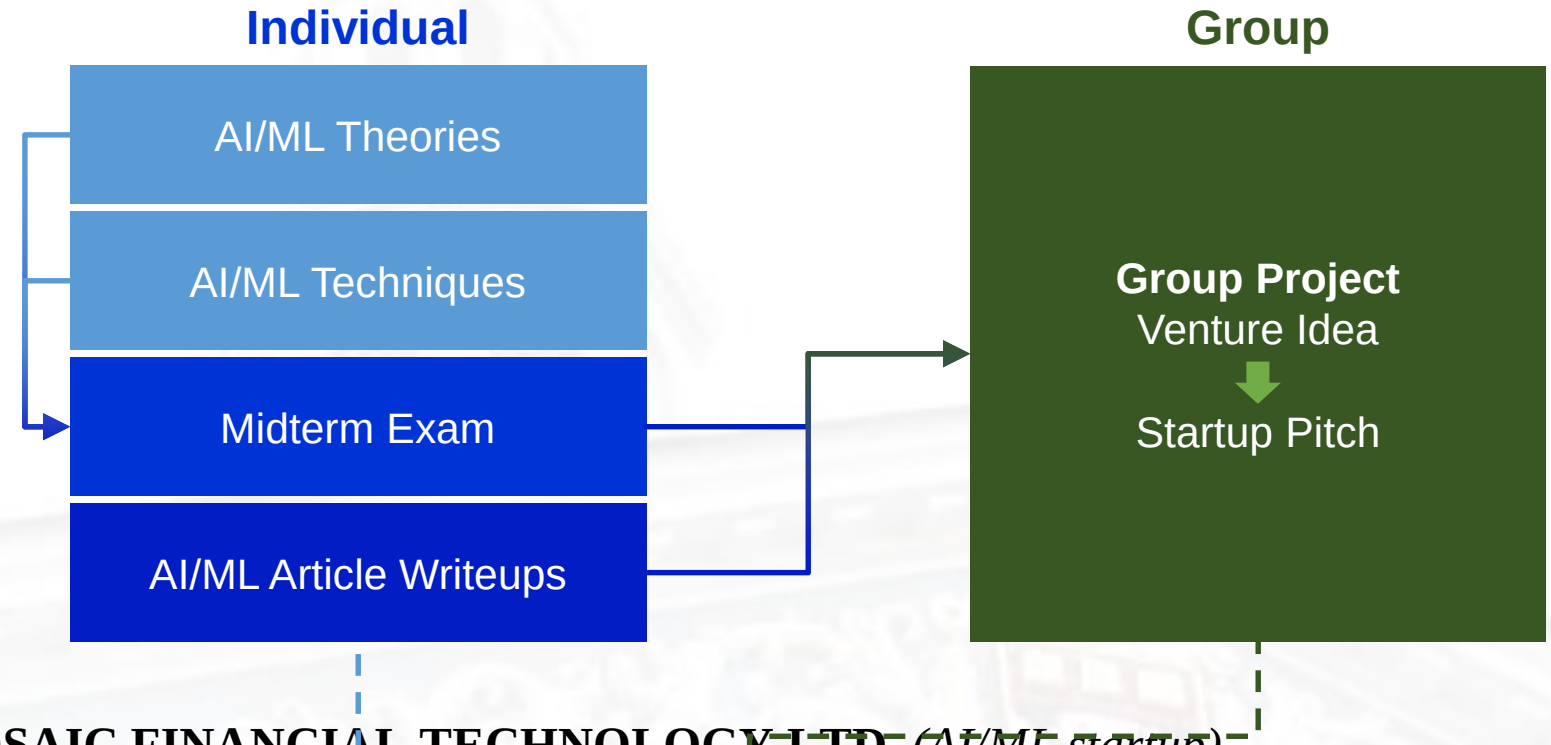
These six domains make up the Common Body of Knowledge that all Bitcoin professionals must possess to earn the CBP designation.

The following careers would benefit from certification:

- Accountants and Controllers
- Sales & Marketing professionals
- Professors, Teachers, and Educators
- Entrepreneurs
- IT Professionals
- Call Centre Representatives
- Project Managers
- Anyone who uses Bitcoin in their daily lives

Exam Information

Course Objectives



Jan 2019 – Present

MOSAIC FINANCIAL TECHNOLOGY LTD. *(AI/ML startup)* **HONG KONG, CHINA**

Co-Founder and Chief Technology Officer

- Compiled pitch deck and presented Mosaic's vision and underlying technology to potential investors and AI specialists at HKUST. Created a proof-of-concept (PoC) and demonstrated a prototype
- Devised strategy to drive adoption and compiled reports on the applications of AI/ML techniques. Elaborated on the plans for future product launches. Established Advisory Board with industry experts

Dear Professor Mathieson:

My name is Anthony Woo. I am currently a Master's student at the Faculty of Education here at HKU, and one of the Honorary Career Advisors at CEDARS. Hope all is well.

I have started a career development company at HKU leveraging the use of technology in education to help augment career development and vocational training for university students and young professionals. The company seeks to adopt the latest ICT developments, such as big data analytics and adaptive learning mechanisms, in helping job seekers build a solid foundation for their future success.

By way of background, I have over eight years of work experience in finance at J.P. Morgan and Morgan Stanley. I completed my MBA at Harvard Business School, and graduated from U.C. Berkeley *summa cum laude* with a B.S. degree in Business.

I understand that you must be very busy. But do you have 15 mins to spare so I can learn from your advice and insights on this initiative? Thank you very much.

Sincerely,
Anthony Woo, CFA CAIA FRM
LinkedIn: www.linkedin.com/in/anthonywoo

Endorsements

"[This] venture is timely, important and aligned with much of our thinking at HKU about encouraging entrepreneurship, a willingness to embrace failure and learn from it..."

Professor Peter Mathieson
President & Vice-Chancellor
University of Hong Kong

"At HKU we're delighted to be working with Anthony on such an innovative and impactful project, and we hope it will gain wide support."

Professor Ian Holliday
Vice-President & Pro-Vice-Chancellor (Teaching and Learning)
University of Hong Kong

"[This] is an ingenious initiative, which aims to help students acquire some of the essential skills for planning career development. It has the potential to have a significant impact both for individual students and for organisations providing career services."

Professor Stephen Andrews
Dean of the Faculty of Education
University of Hong Kong

Advisory Board

Prof. Peter Mathieson

President & Vice-Chancellor
University of Hong Kong

Prof. Ian Holliday

Vice-President & Pro-Vice-Chancellor
(Teaching and Learning)
University of Hong Kong

Prof. Stephen Andrews

Dean of the Faculty of Education
University of Hong Kong

HARVARD | BUSINESS | SCHOOL

NEW VENTURE COMPETITION

SPONSORS & PARTNERS | CALENDAR | UPDATES

BUSINESS TRACK | SOCIAL ENTERPRISE TRACK | WINNERS & SUCCESS STORIES | RESOURCES | FAQS

Harvard Business School → New Venture Competition

CREATING VENTURES THAT REVOLUTIONIZE

The New Venture Competition is an annual student competition sponsored by Harvard Business School's Rock Center for Entrepreneurship and Social Enterprise Initiative.

18 APR 2018
THE ENTREPRENEURIAL JOURNEY THROUGH NVC

18 APR 2018
HOUR 72+ WINS 2018 NEW VENTURE COMPETITION BUSINESS TRACK

18 APR 2018
UMBULIZER WINS 2018 NEW VENTURE COMPETITION SOCIAL ENTERPRISE TRACK

18 APR 2018
DYNAMICARE HEALTH WINS 2018 NEW VENTURE COMPETITION ALUMNI TRACK

CHOOSE YOUR TRACK

BUSINESS TRACK

Ventures with economic returns that drive substantial market value.

BUSINESS TRACK

SOCIAL ENTERPRISE TRACK

Ventures that drive social change using nonprofit, for-profit, or hybrid models.

SOCIAL ENTERPRISE TRACK

→ Not sure which track is right for you?

SIGN UP FOR UPDATES

TWEETS

HBS SOCIALENTERPRISE @HBSSEI

Thinking of starting your own venture? #HBSNVC early registration deadline is one week away! Jan 31 at 12 noon

CASH PRIZES

$300,000

ALUMNI COMPETITION

Are you pursuing a new business venture? Participate in the alumni
Competition through one of 10 regional competitions hosted by alum
around the world. The winning team from each regional competition
chance to win +$105k cash prize at the NVC Finale in April.

→ More about the Alumni Competition

TOP TWO FREQUENTLY ASKED QU

+ Who is eligible for the student competition?

+ Who are the judges? What are their backgrounds?

MORE FAQS

Cyberport Creative Micro Fund —

Hong Kong programme

HK$100,000 cash grant to realise your idea

Cyberport Creative Micro Fund (CCMF) encourage innovation and creativity by sponsoring high potential digital tech start-up projects and business ideas.

Successful applicants receive a HK$100,000 grant over six months to produce proof of concepts and prototypes.

Programme benefit

Apart from cash grant, CCMF gives you access to Cyberport's extensive resources and support for innovators and entrepreneurs, including:

Mentorship and business advice

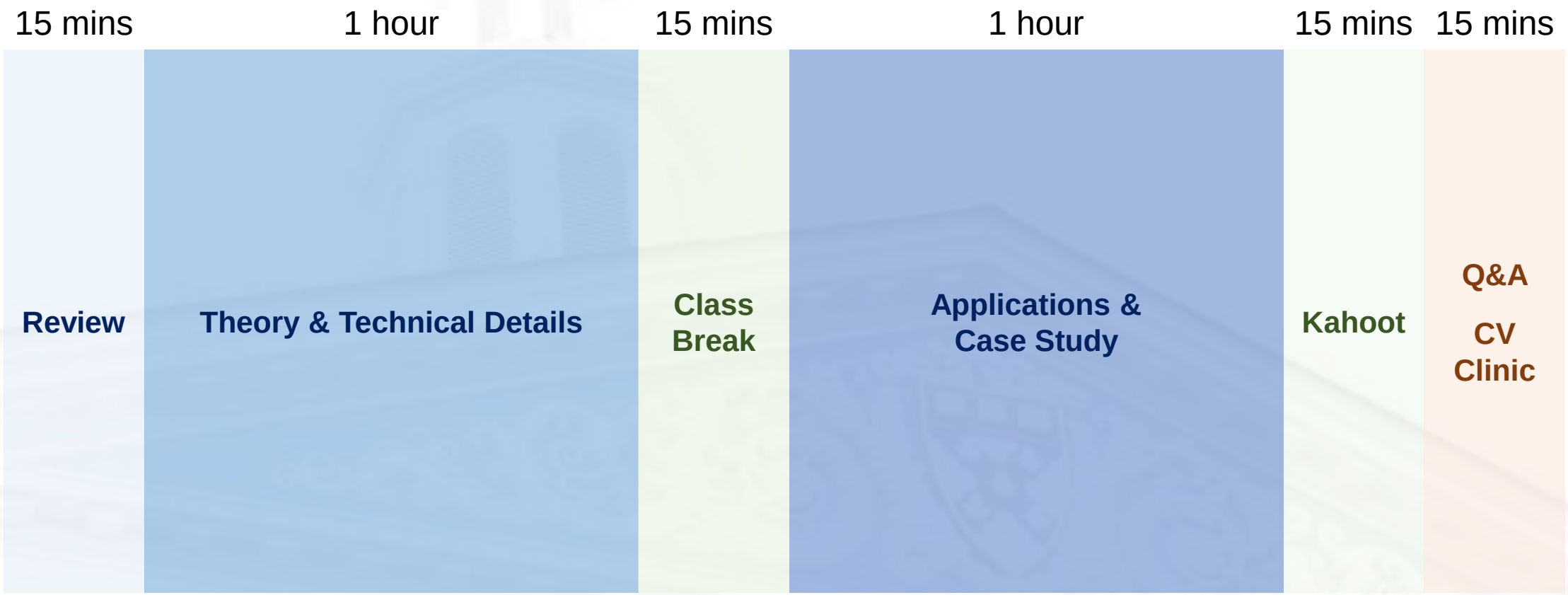
Business development and investment connections

A local and global business network

Assessments

Deliverables	Details	Weight	Due Date	Mode	Rationale
Presentation 10 core slides	– Startup pitch in the form of a YouTube video – Selected teams to present to a panel of judges	40%	May 3	Group	CV building and interview preparation
Midterm	– Multiple choice question format	20%	Apr 12	Individual	Knowledge base for startup venture and interview preparation
Writeup of recent AI journal articles No more than 2 pages in total	– Assessment of at least two (2) AI journal articles, including a critical analysis and potential applications	20%	Mid-Mar	Individual	Basis for startup venture
Participation	– Participation in in-class Kahoot	10%	Various	Individual	Contributing in class
Extra credit activities and assignments	– Performance in Kahoot – Helping other groups with constructive feedback and contributing insights to the class as a whole	10%	Various	Individual and group	Rewarding those who are proactive

Typical Class Flow



Speakers & Judges (Tentative)

Mr. Antoine Blondeau

Managing Partner
Alpha Intelligence Capital

Founder
Sentient Technologies

Investor
SpaceX, Dianrong, PeerIQ

Advisory Board Member
Zeroth.ai

Dr. Gregg Li

Founder & Principal
Sinoalpha Ventures

Adjunct Professor
University of Hong Kong

Former Principal Consultant
PricewaterhouseCoopers

Independent Non-Exec. Director
Cyberport

Honorary President
Invotech

Mr. Jacob Wai

Chief Data & Risk Officer
MoneySQ

Visiting Lecturer
Hong Kong Polytechnic University

Corporate Trainer & Lecturer
Hong Kong Institute of Bankers

Chairman of the Financial Technology SIG
Hong Kong Computer Society

Mr. Leo Tong

FinTech Adviser & Compliance Officer
Private Equity Funds & Family Offices

Certified M&A Dealmaker

Certified Information Systems Security Professional

Judge & Chief Assessor
Hong Kong ICT Awards

Co-Chairperson of FinTech SIG
Hong Kong Computer Society

Speakers & Judges (Tentative)

Mr. Ian Huang

Chairman
Co-operatives of Innovative Intellectuals

Former Visiting Chief Architect
Singapore National Science & Technology Board (NSTB, now called A*STAR)

Fellow
Hong Kong Computer Society

Fellow
Hong Kong Institute of Directors

Ir. Dr. Daniel Ng

Director

Engineer

Controller

Visiting Lecturer and Examiner

Forensics and Business Intelligence Machine Learning Researcher

Mr. Dominic Wu

Managing Director & Senior Risk Manager
BNY Mellon Asia

President
Asia Financial Risk Think Tank

Mr. Philip Leung

Founder
Small Talks Circles

Founder
Big Data & AI Startup

Honorary Career Advisor
Centre of Development and Resources for Students (CEDARS)

Speakers & Judges (Tentative)

Mr. Allan Lee

Director
Training and Master Family Legacy Planner of the Legacy Academy

Accredited Administrator
MBTI

Registered Corporate Coach

Mr. Winston Lam

Chairman
Invotech

Chairman
Berkeley Club of Hong Kong

Member
Entrepreneurship Committee Advisory Group
Cyberport

Mr. Jeffrey Hui

Chairperson
Hong Kong Institute of Marketing

Managing Director
InnoSights

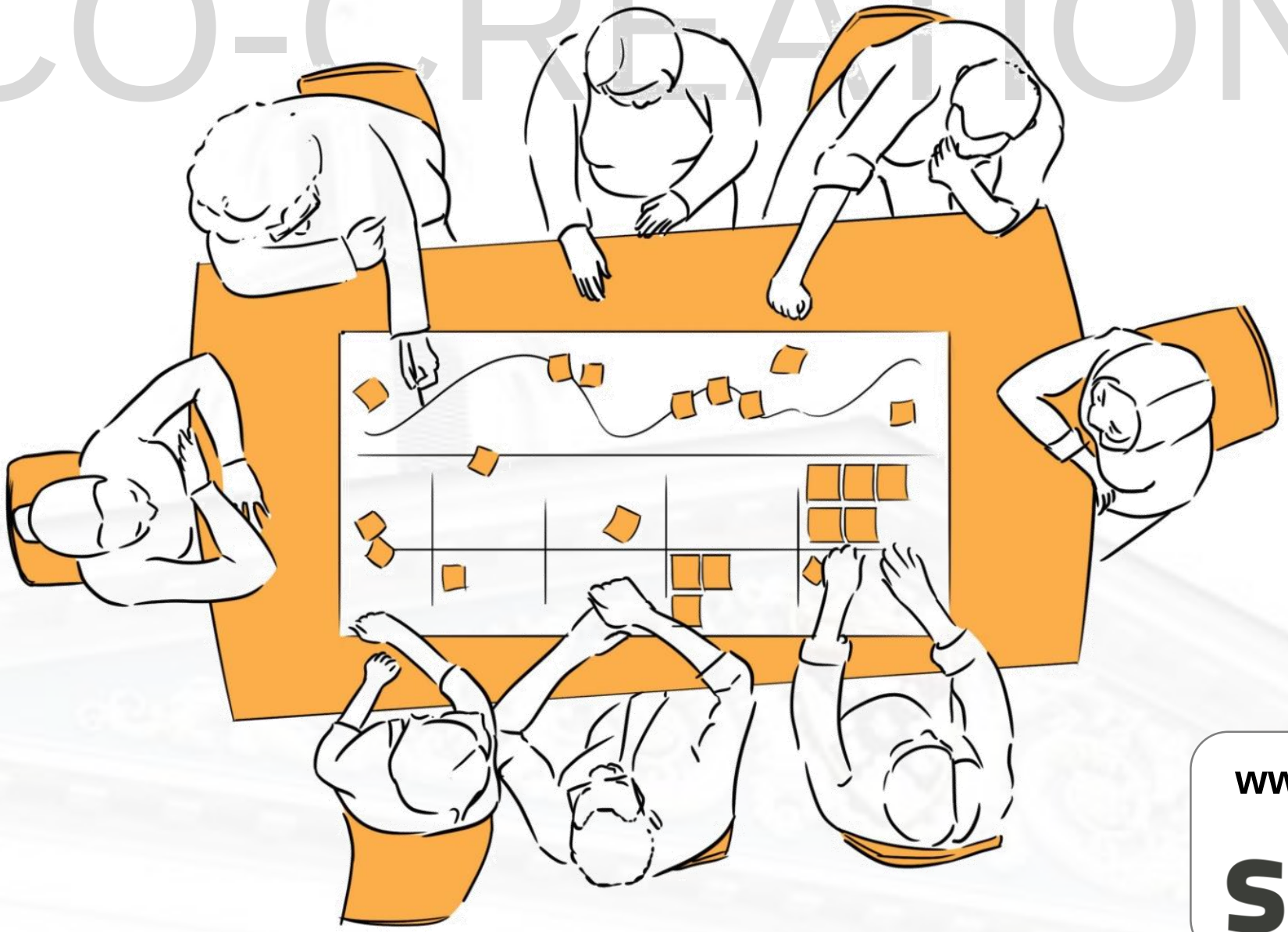
Adjunct Professor
Chinese University of Hong Kong

Mr. Justin Lao

Founder
K.U.G. Education Technology

Member
Chinese People's Political Consultative Conference Chongming District Shanghai

CO-CREATION



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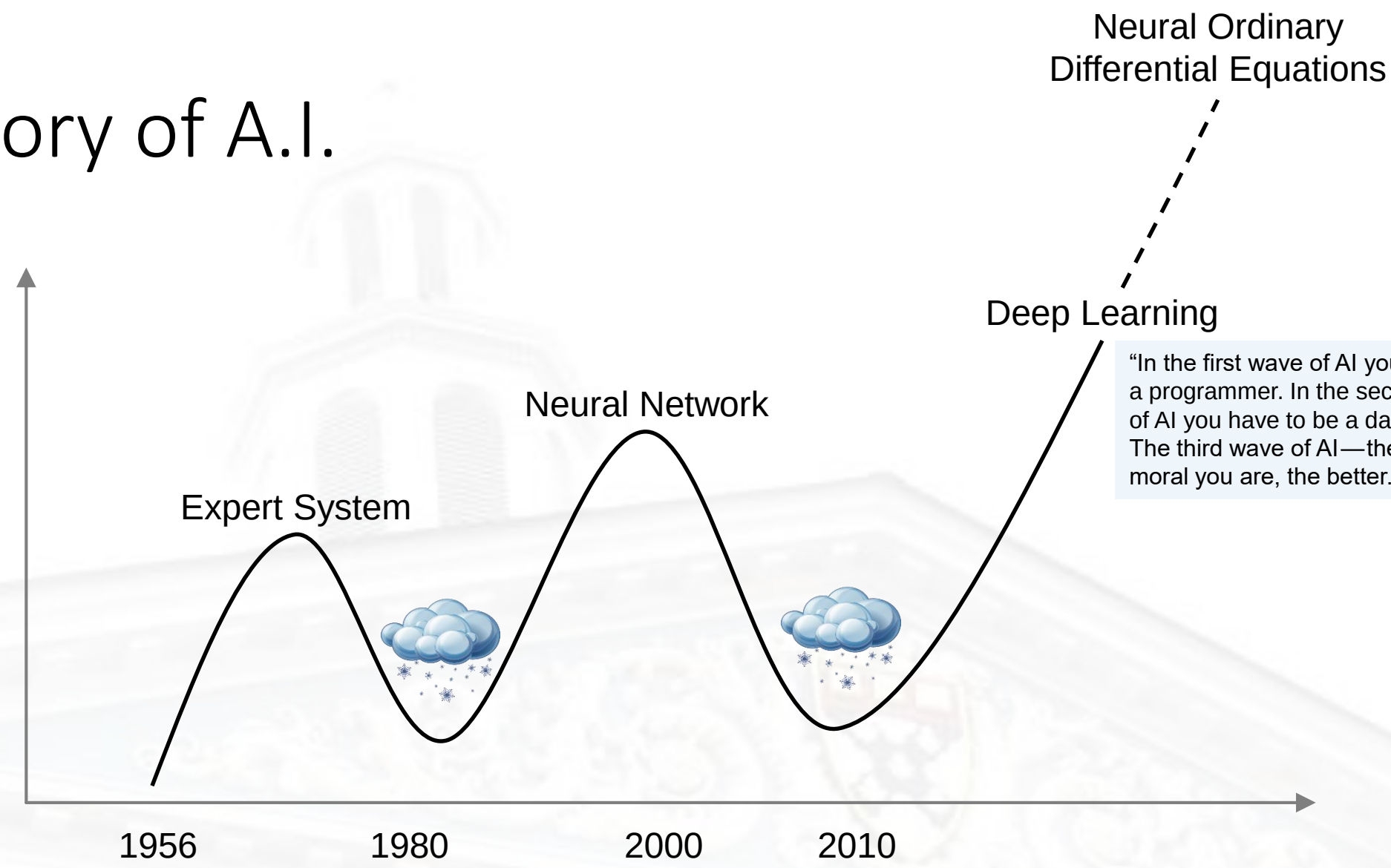
Emerging Technologies

Emerging Technologies 前沿科技	Foundational 底层科技	Cumulative and exponential 叠加和倍增	Capital Intensive 资本密集	We know "how" to do it 实施方法明确	We know the "end game" 最终目标明确	Adoption 接纳程度
Artificial Intelligence 人工智能	Yes	Yes	No	No	No	Relatively easy
Blockchain 区块链	Yes	No	No	Yes	Yes	Easy & Difficult[1]
AR/VR 虚拟现实和增强现实	No	No	Yes	Yes	Yes	Moderate
Robotics 机器人	No	No	Yes	Yes	Yes	Moderate
Internet of Things (IoT) 物联网	Yes	Yes	Yes	Depends[2]	Yes	Relatively easy
Space Tech 太空科技	No	No	Yes	Yes & No[3]	Yes	Difficult

Notes:
1. Adoption at the front end is relatively straightforward, while the back end can be challenging due to legacy issues.
2. IoT is dependent on a lot of other technologies, systems, and infrastructure (e.g. 5G, smart contracts).
3. Current technology (i.e. combustion-based) makes Mars reachable, but not beyond.

History of A.I.



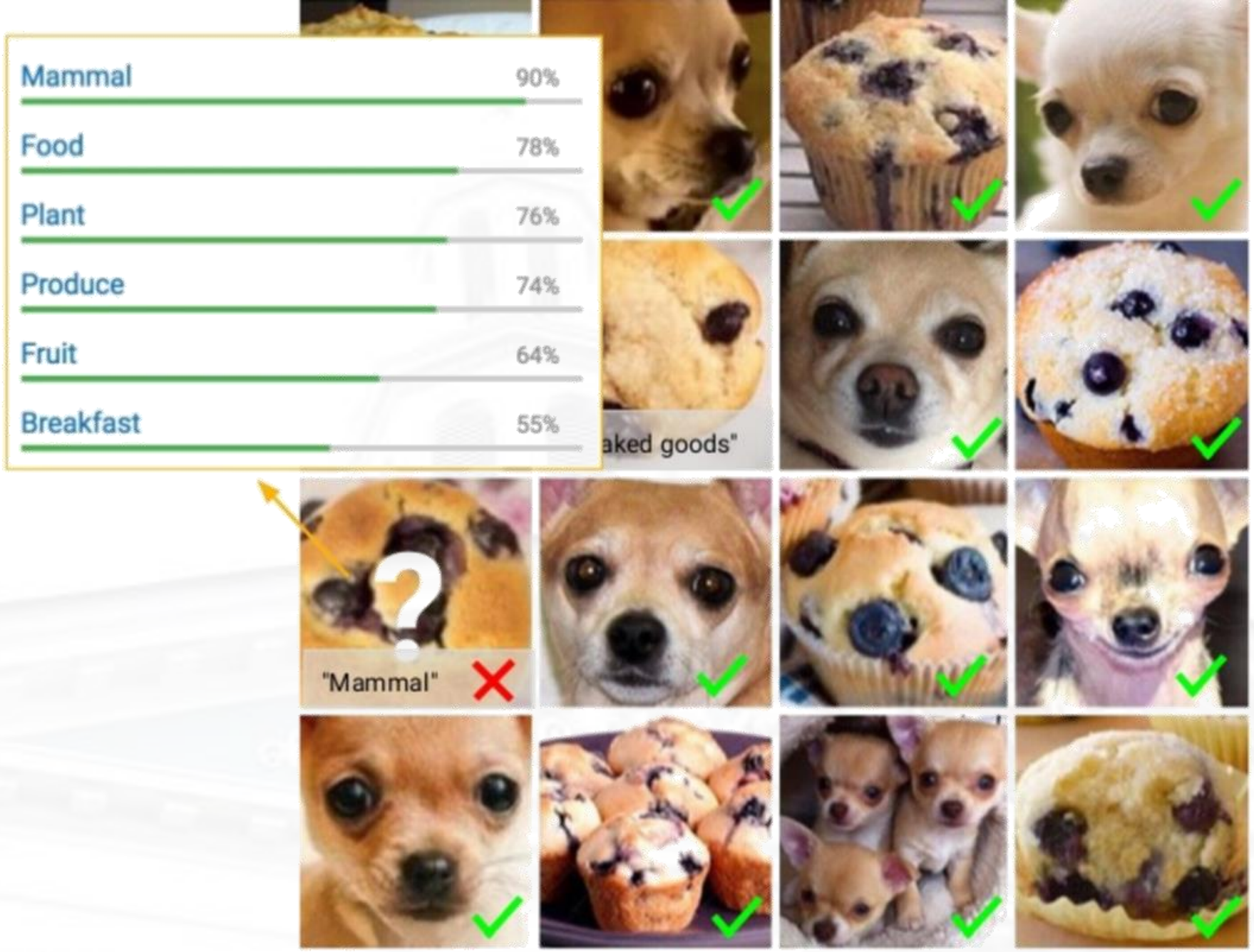
"In the first wave of AI you had to be a programmer. In the second wave of AI you have to be a data scientist. The third wave of AI—the more moral you are, the better."

Source: Dr. Lee Kai-Fu • Sinovation Ventures and 2018 Conference on Neural Information Processing Systems

Credit: https://www.pinterest.es/pin/570620215256233288/

Credit: https://www.slideshare.net/bretmc/machine-learning-with-google-machine-learning-apis-puppy-or-muffin

Credit: https://www.slideshare.net/bretmc/machine-learning-with-google-machine-learning-apis-puppy-or-muffin



Looking for:

- Dog (or breed)
- Muffin

Credit: https://www.slideshare.net/bretmc/machine-learning-with-google-machine-learning-apis-puppy-or-muffin source: boredpanda.com

A Tale of Two AI Camps

Property	Symbolic AI	Connectionist AI
Knowledge Acquisition	✓ Theoretical knowledge insertion can be made in a simple and direct manner. It is sufficient to clarify, convert, and formalize the knowledge.	× Theoretical knowledge may not useful in constructing neural networks, while examples are always required for knowledge acquisition.
Processing Mode	× Processing is sequential. Answer and consultation times are long.	✓ Neural networks consist of a set of units with information processing completed in a parallel fashion.
New Knowledge Insertion	✓ Insertion of knowledge (rules) can be made very quickly once experts have already processed them.	× Training process is often time-consuming as weights and biases are trained gradually.
Training	× Training is not a basic process. Knowledge acquisition is done by explicitation, with potential bottleneck issues.	✓ Training and generalization from examples are fundamental and integrate processes.
Results Explanation	✓ Reasoning process allows for explanability. Knowledge is coded in a language close to natural language, and therefore easily interpretable.	× Neural networks are “black” boxes, where knowledge is coded in weights and interconnections, with a lack of access to a form that is interpretable by humans.

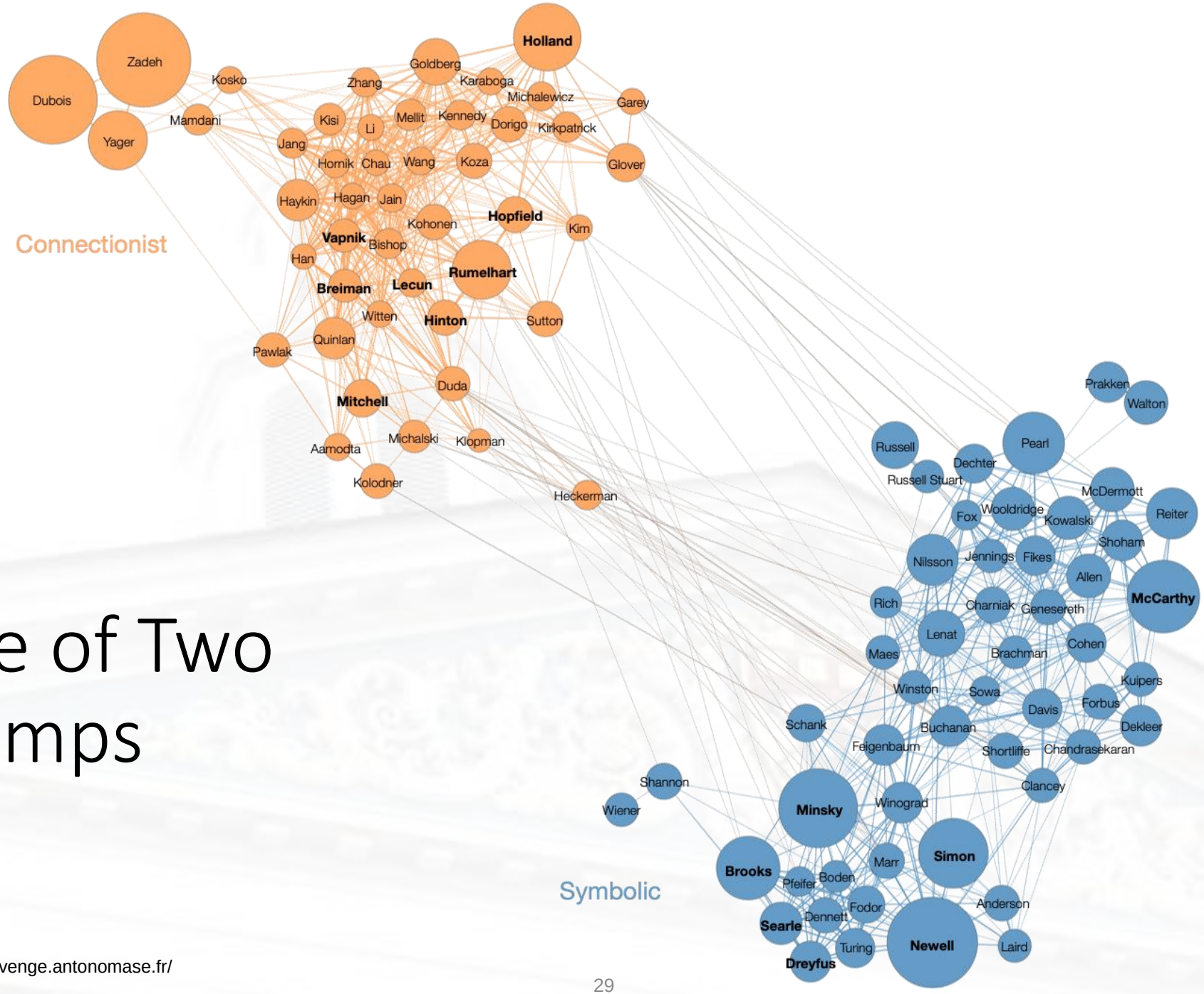
Source: Souici-Meslati, Labiba & Sellami, Mokhtar. (2004). A hybrid approach for Arabic literal amounts recognition. The Arabian Journal for Science and Engineering. 29.

A Tale of Two AI Camps

Property	Symbolic AI	Connectionist AI
Information Processing	✗ Theoretical knowledge must be complete beforehand, and the approach is not conducive to approximate or incomplete information processing.	✓ Neural networks are conducive to approximate and incomplete information processing (i.e. fuzzy logic).
Knowledge Coding	✓ Knowledge is represented by rules and data structures.	✓ Knowledge is coded in networks representing the relationships among input variables.
Development	✗ Long development cycles with domain experts are typical.	✗ Architecture and (hyper)parameters derivation and tuning can be time-consuming and difficult.
Maintenance	✗ Managing and maintaining large databases of rules are challenging. Adding new rules and updating existing ones may be difficult.	✓ Maintenance and management are often easy, and networks can be retrained based on changes in situational factors.

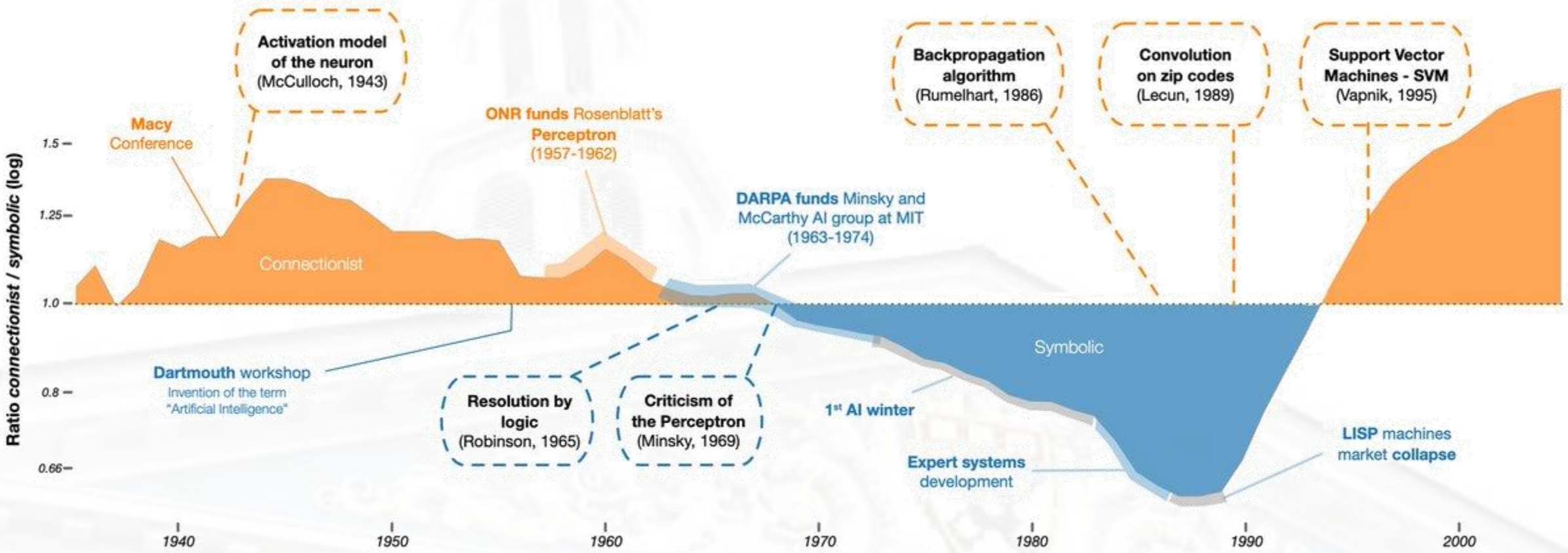
Source: Souici-Meslati, Labiba & Sellami, Mokhtar. (2004). A hybrid approach for Arabic literal amounts recognition. The Arabian Journal for Science and Engineering. 29.

A Tale of Two AI Camps



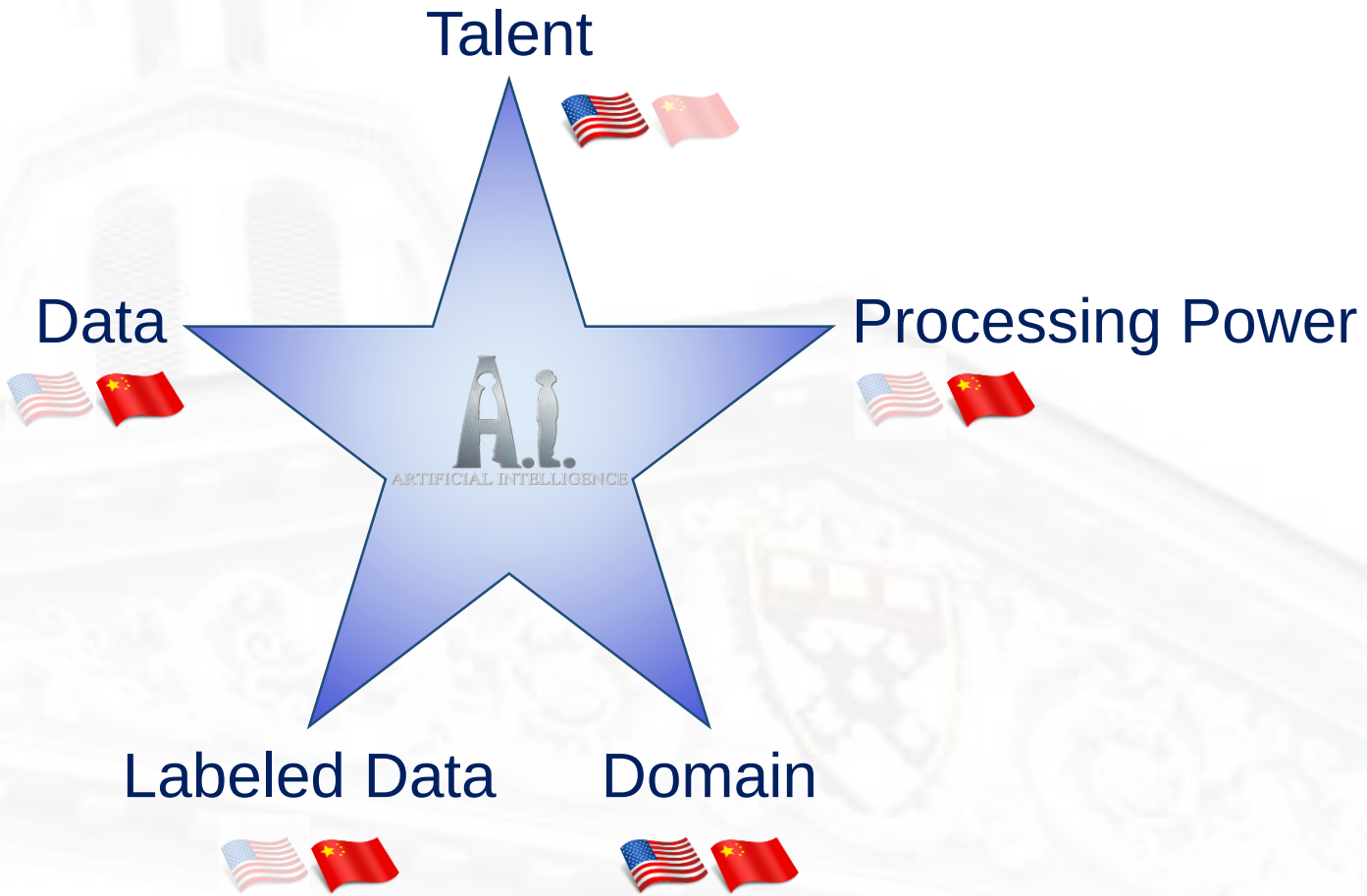
Source: https://neurovenge.antonomase.fr/

A Tug of War



Source: https://neurovenge.antonomase.fr/

The Five Elements



China seeks semiconductor security in wake of ZTE ban

Stubborn technology gap has frustrated Beijing's bid to build a world-class chip sector

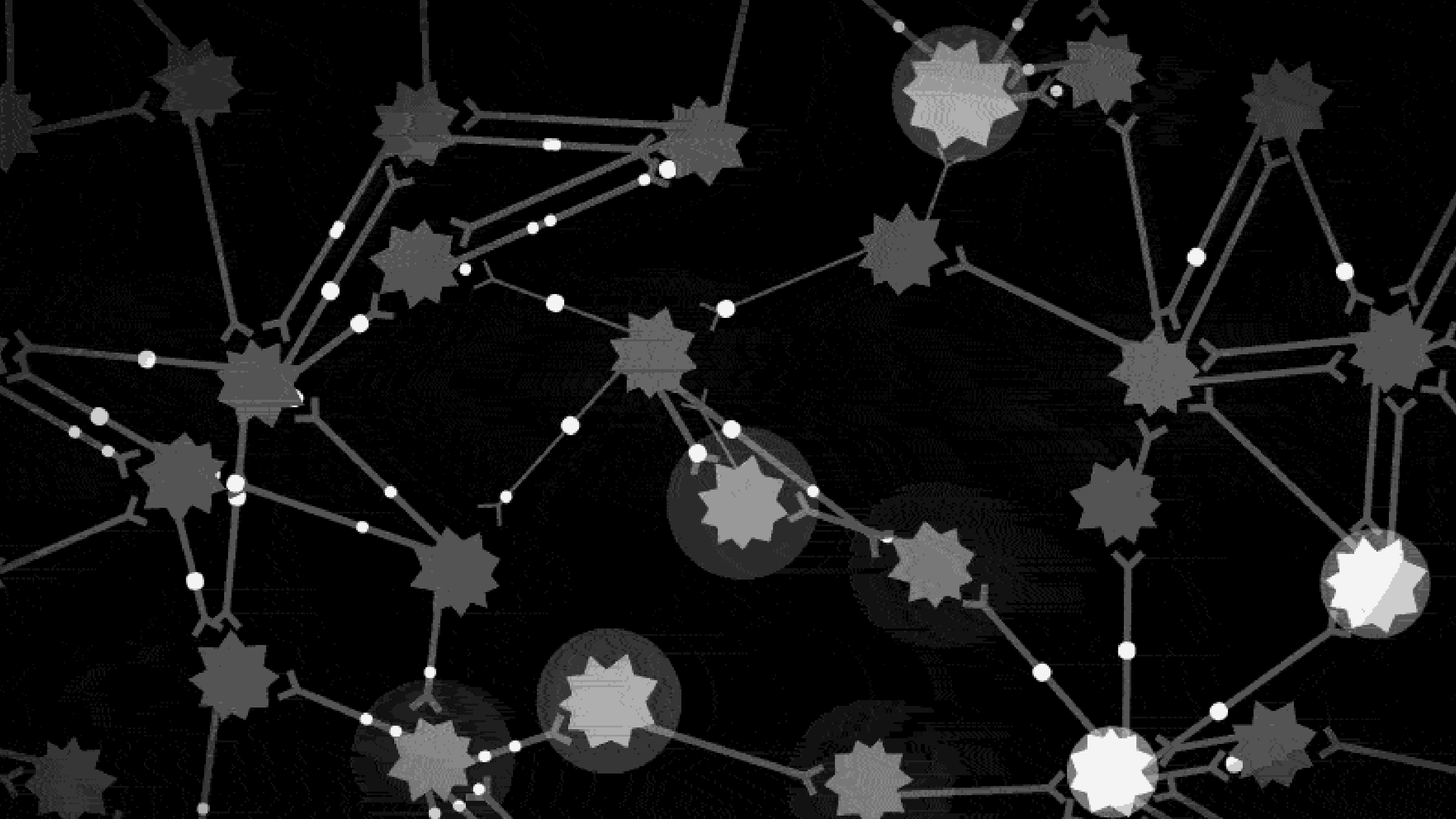
Taiwan Semiconductor Manufacturing, the world's biggest contract chipmaker, says Chinese companies will struggle to catch up to foreign rivals © FT montage / Reuters

Edward White in Hsinchu 11 HOURS AGO

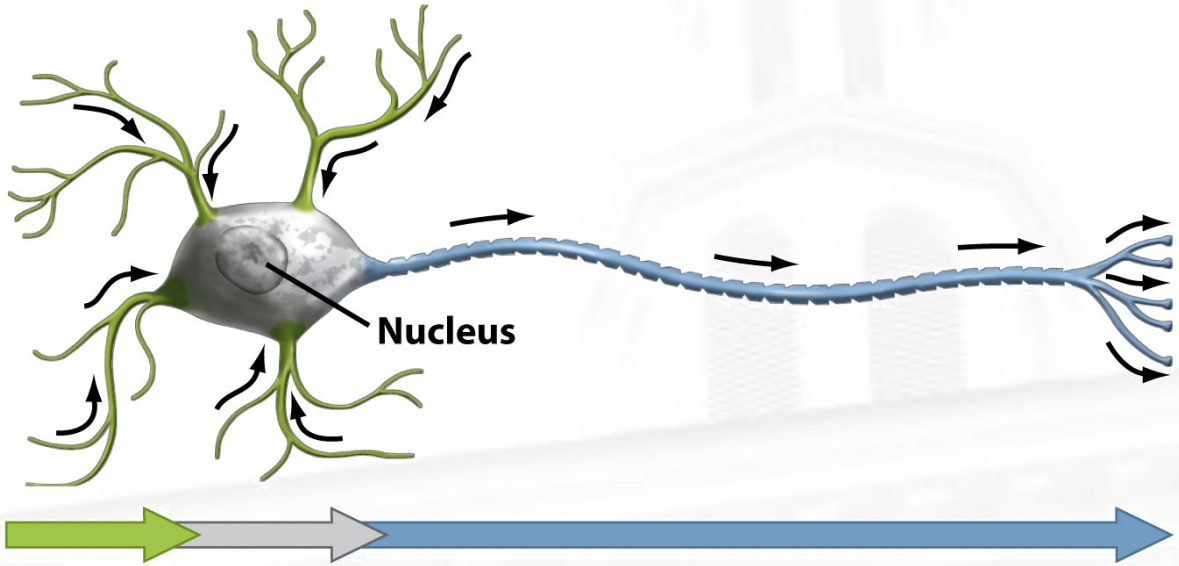
15

When the US administration shut down Chinese telecoms equipment maker ZTE in April — putting the future of a $17bn company and 75,000 jobs at risk after sanctions cut the supply of key microchips — it highlighted a vulnerability in the Chinese economy: it depends on foreign-made chips.

The country remains dependent on imports to build the phones, telecoms gear,



Information flow through neurons

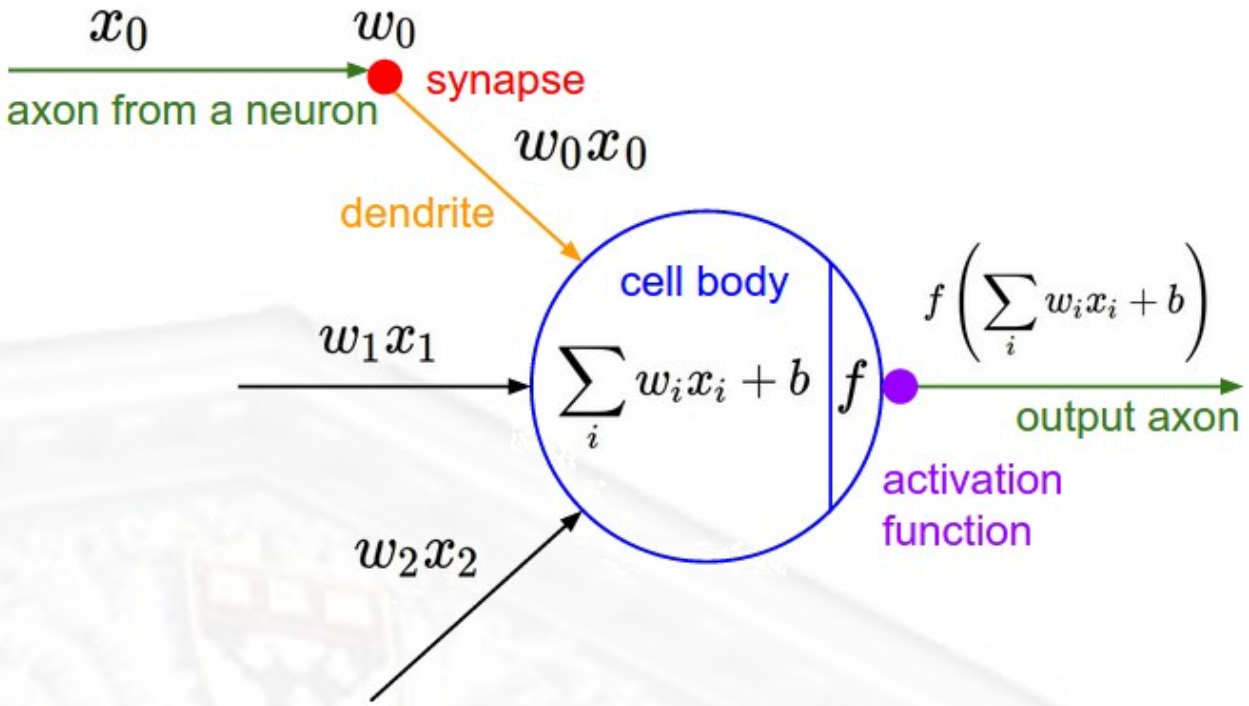


Dendrites
Collect electrical signals

Cell body
Integrates incoming signals and generates outgoing signal to axon

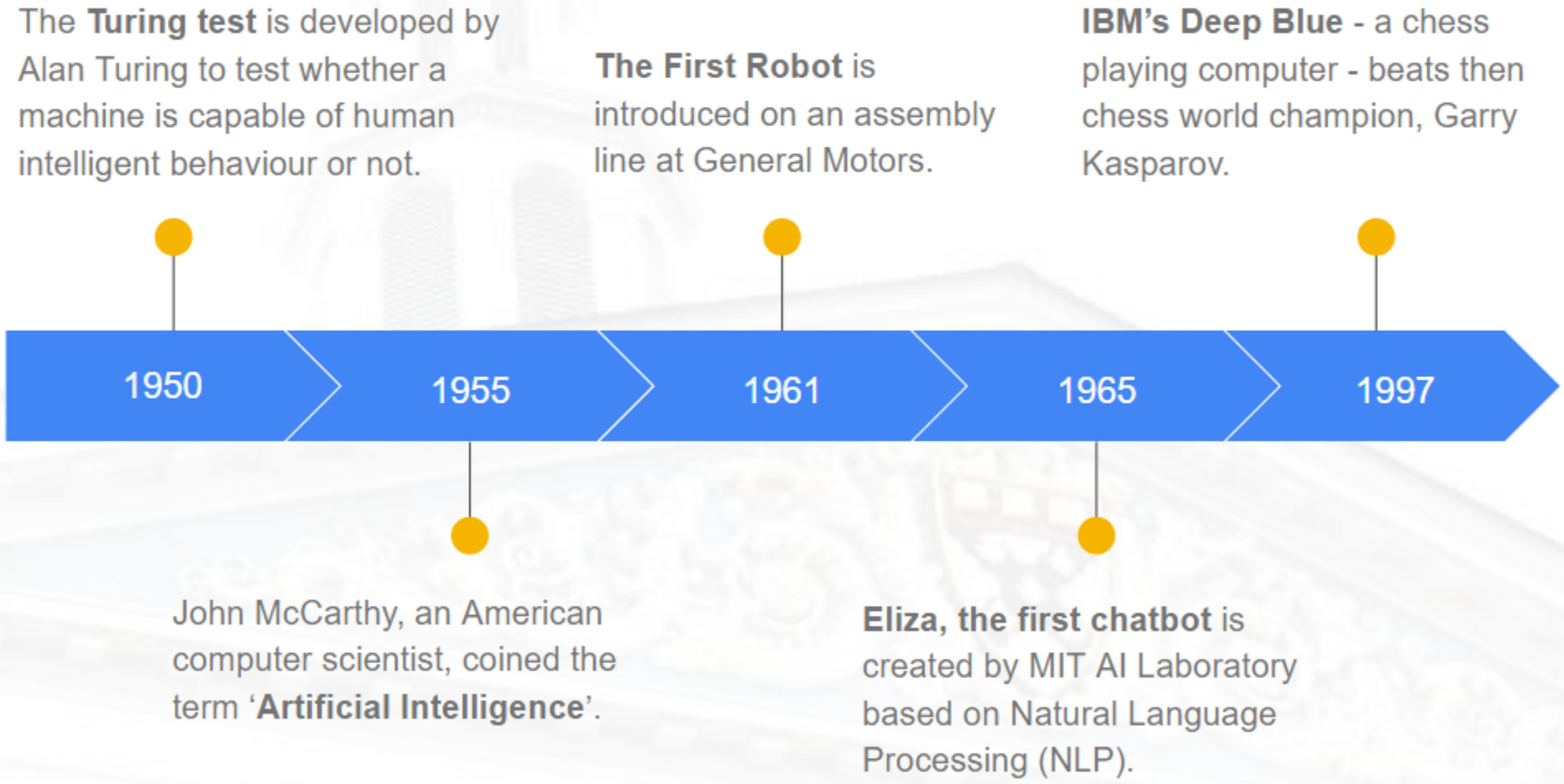
Axon
Passes electrical signals to dendrites of another cell or to an effector cell

Figure 45-2b Biological Science, 2/e
© 2005 Pearson Prentice Hall, Inc.



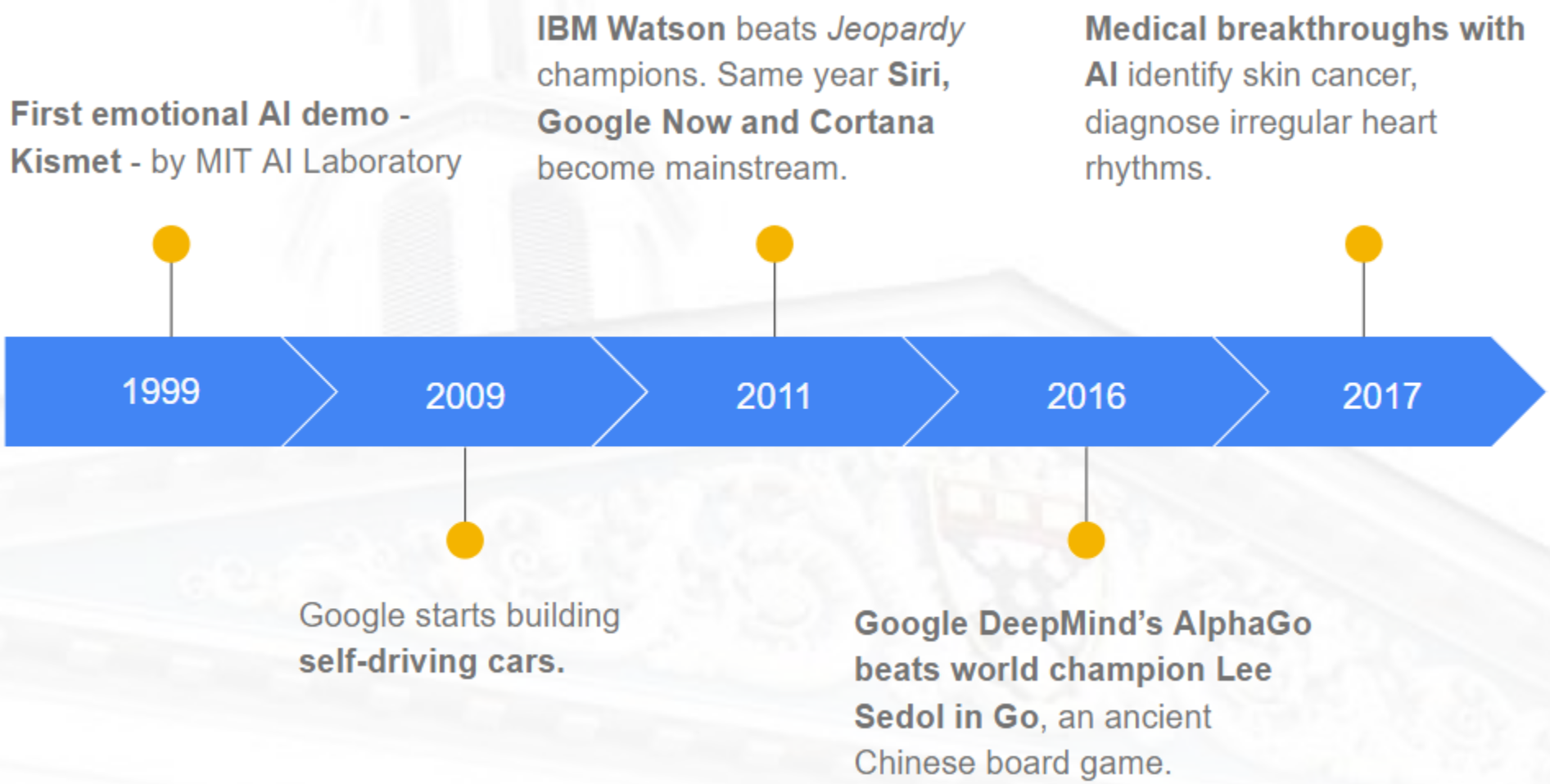
Credit (Left): https://www.psychologyinaction.org/psychology-in-action-1/2011/04/01/conventional-wisdom-upset-persistent-action-potential-firing-in-distal-axons
Credit (Right): http://cs231n.github.io/convolutional-networks/

AI Development Timeline



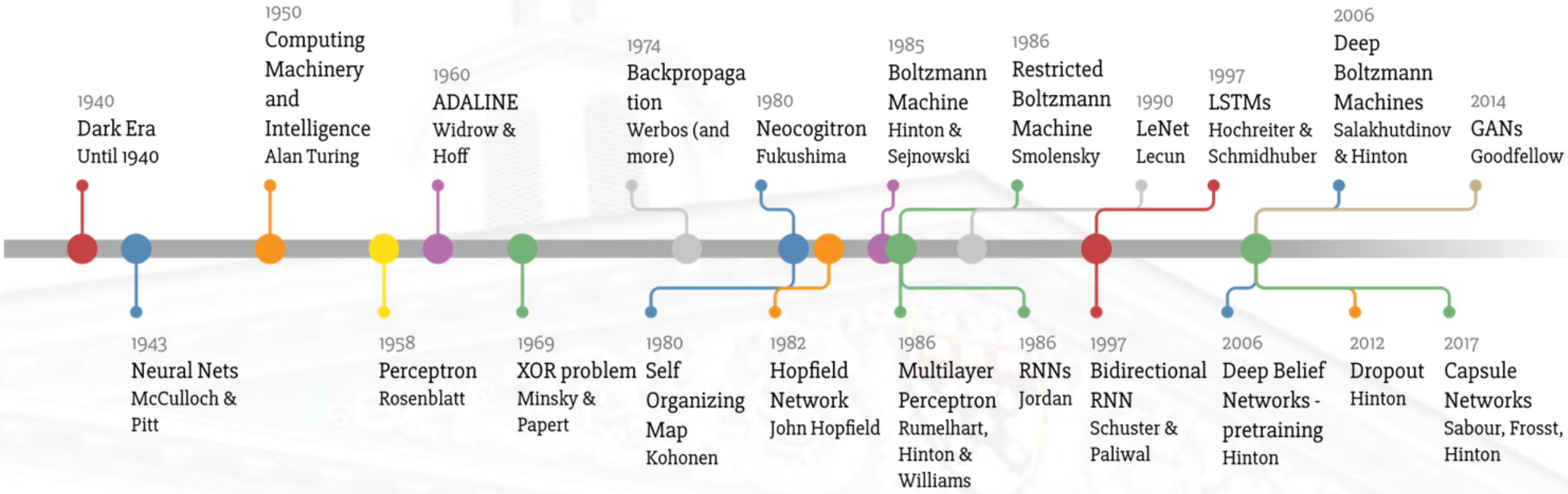
Credit: https://www.analyticsinsight.net/top-artificial-intelligence-technologies-past-present-future/

AI Development Timeline (Cont'd)



Credit: https://www.analyticsinsight.net/top-artificial-intelligence-technologies-past-present-future/

Deep Learning Timeline



Made by Favio Vázquez

Credit: https://towardsdatascience.com/a-weird-introduction-to-deep-learning-7828803693b0

https://quickdraw.withgoogle.com/

Can a neural network learn to recognize doodling?

Help teach it by adding your drawings to the world's largest doodling data set, shared publicly to help with machine learning research.

Let's Draw!

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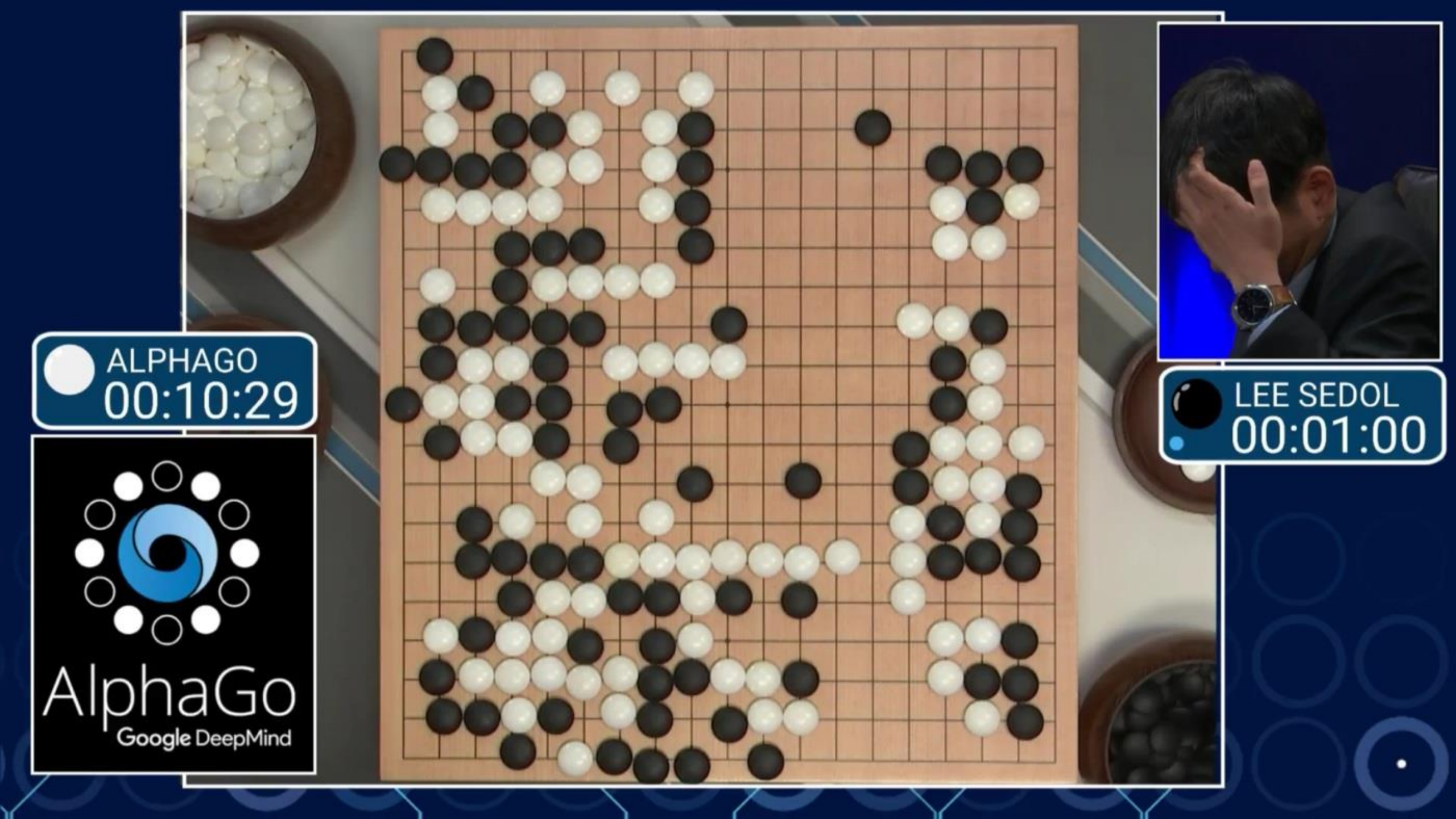
sli.do


ALPHAGO
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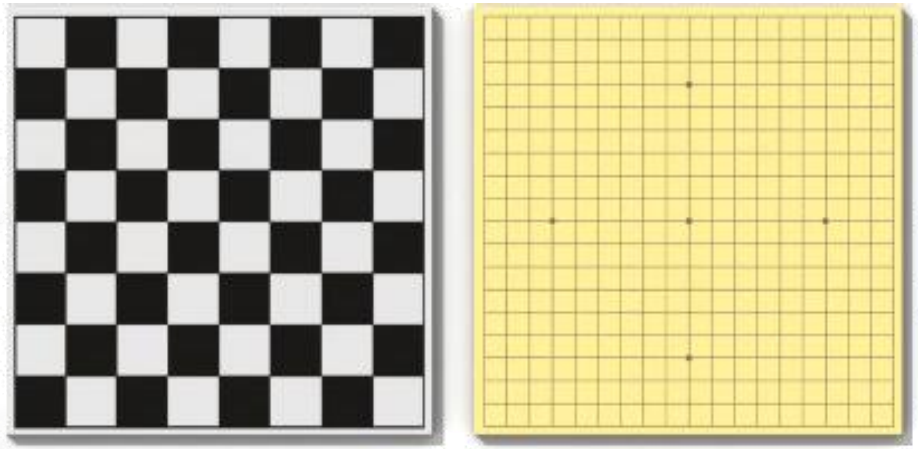
AlphaGo
Google DeepMind
LEE SEDOL
00:01:00



GRID SIZE	
8 x 8	19 x 19

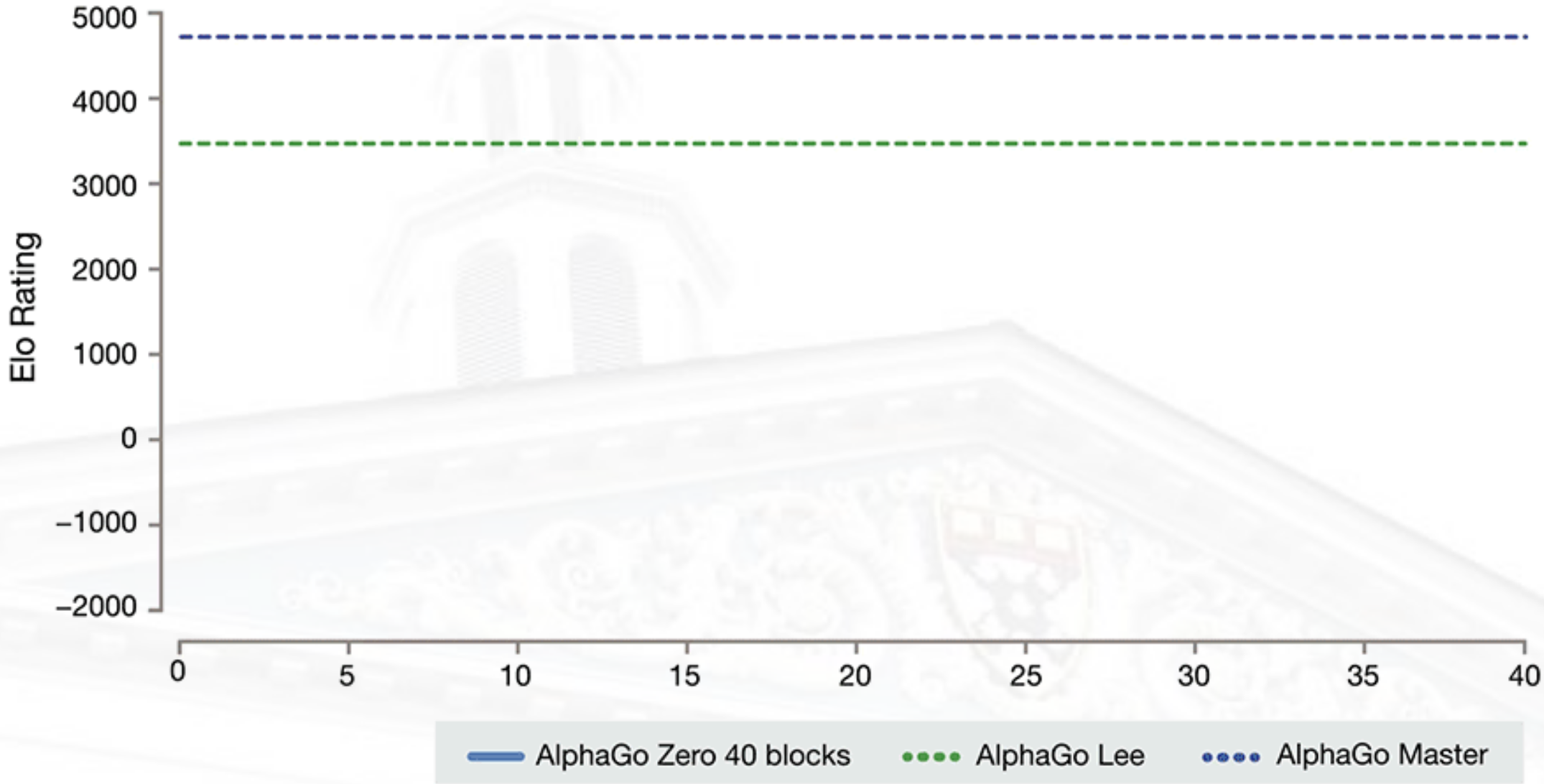
AVERAGE NUMBER OF MOVE CHOICES PER TURN	
35	200–300

LENGTH OF TYPICAL GAME	
60 moves	200 moves

NUMBER OF POSSIBLE GAME POSITIONS	
10^{44}	10^{170}

EXPLOSION OF CHOICES
(starting from average game position)

35	Move 1	200
1225	Move 2	40 000
42 875	Move 3	8 000 000
1 500 625	Move 4	1 600 000 000


Elo Rating
5000
4000
3000
2000
1000
0
−1000
−2000
0
5
10
15
20
25
30
35
40
AlphaGo Zero 40 blocks
AlphaGo Lee
AlphaGo Master

A.I. Landscape: China vs. U.S.

	China	United States
Institutional Norm	Large volume of data via proprietary systems, yet to focus on building innovation capacity. China tends to be averse to adopting the standard metrics structures used by most multinationals. Chinese A.I. initiatives are good at developing facial recognition as well as tools for surveillance and tracking.	A.I. ecosystem with unified standards and cross-platform sharing. More conducive to developing international standards for what is acceptable for law enforcement use of big data and A.I., and how they will be held accountable for abuse. Developing A.I. tools for surveillance and tracking remains a sensitive topic in U.S.
Regulatory Environment	Tends to set regulations *after* product commercialization. Pursues a strategy of "military-civil fusion" in A.I., as China devises a range of policy mechanisms to incentivize industry cooperation. A looser approach to digital regulations means that companies have more freedom to experiment.	Tends to set regulations *before* product goes to market. The White House has so far been characterized as "missing-in-action" in terms of policymaking for A.I.
Industry Structure	592 A.I. companies (23% of global). Came second in the total number of A.I. enterprises in the world in 2017, and contributed 48% of the world's total A.I. startup funding. A.I. Potential Index = 17.	Ranked first with 1,078 A.I. firms (42% of global). Provided 38% of the funding for A.I. startups globally in 2017. A.I. Potential Index = 33.

A.I. Landscape: China vs. U.S. (Cont'd)

	China	United States
Institutional Norm		
	• China has a **large volume of data** via proprietary systems. • China has yet to focus on building its innovation capacity. But the nation has been supporting different research and workforce development, and reportedly aiming for international collaboration and expansion. • In China, "outside companies do not plug in," but become part of the business as one of hundreds of players in an ecosystem. • China tends to be **averse to adopting the standard metrics structures used by most multinationals**; local suppliers, distributors or customers become partners to help them achieve success in an uncertain business environment. • With regarding to developing software and hardware in A.I., China looks at it from a marathon perspective. • Chinese A.I. initiatives are good at developing **facial recognition as well as tools for surveillance and tracking**.	• The U.S. is in process of creating a **data-friendly ecosystem with unified standards and cross-platform sharing**. • The U.S is producing **more influential A.I. research**, with a **more robust ecosystem** nurturing more competitive A.I. startups. • Companies in U.S. tend create platforms which external parties either plug into or put to use directly. • The U.S. believes it is essential to develop **international standards** for what is acceptable for law enforcement use of big data and A.I., and how they will be held accountable for abuse. • The U.S. is driving A.I. innovation across the spectrum in both software and hardware, with more early adopters and innovators. • In U.S., companies in A.I. tend to be **averse to developing tools for surveillance and tracking**.

A.I. Landscape: China vs. U.S. (Cont'd)

	China	United States
Regulatory Environment		
	• China can be the leader in introducing new regulations for the A.I. industry in the world, suggested by Jeffrey Ding, Macrostrategy Researcher at Future of Humanity Institute in Oxford University. • The Chinese government **sets regulations <u>after</u> product commercialization in the market**. • China pursues a strategy of "**military-civil fusion**" in A.I., as it wields a range of policy mechanisms to incentivize industry cooperation. • The Chinese government is willing to give private entrepreneurs the opportunity to test ideas, e.g. creating policy frameworks, providing subsidies and setting preferential policies to help them. • A **looser approach** to digital regulations means that **companies can experiment more freely**.	• The White House has so far been characterized as "**missing-in-action**". • **Regulations are often devised <u>before</u> the product goes to the market**. • U.S. companies with the best A.I. technology are often considerably **less willing to invest in national security applications**. • In 2017, the U.S. government drafted the first policy to move the U.S. public sector beyond acknowledging the significance of A.I., and toward fully embracing A.I. technologies. • More emphasis placed on **digital regulations**, e.g. tighter cryptocurrency regulations.

A.I. Landscape: China vs. U.S. (Cont'd)

	China	United States
Industry Structure		
	• With **592 A.I. companies** (23%), China came second in the total number of A.I. enterprises among the world in 2017. • Chinese A.I. companies received RMB 63.5 billion (USD 10.1 billion) in funding as of June 2017, and collectively ranked No. 2 in the world in terms of capital raised. Most funds were raised from domestic sources. • China overtook the U.S. in terms of A.I. startup funding, with the former contributing **48% of the world's total A.I. startup funding in 2017**. But in terms of individual deals, China only accounted for 9% of the total. • **Chinese production of semiconductors is only 4% of the total global market share**. • Most Chinese companies tend to only hire Chinese people, focus on the China market, and may lack an international vision. • The "AI Potential Index" of China is 17, almost half of that of U.S., according to an analysis at the University of Oxford.	• The U.S. ranked first with **1,078 A.I. firms**, representing 42% of the total worldwide. • About 50% of global A.I. investments went to U.S. startups, reaching RMB 97.8 billion (USD 15.5 billion) as of June 2017, and leading the world in terms of funding. • In 2017, the U.S. provided 38% of the funding for A.I. startups globally, and **led in both the total number of A.I. startups and total overall funding**. • **50% of semiconductors in the world is produced by the U.S.** • Silicon Valley companies are dominated by a diversified culture. • The "AI Potential Index" of U.S. is 33.

A.I. Implementation Matrix

	Process A	Process B	Process C	Process D	Process E
Function & Nature	Strategic direction exploration	Sales lead management	Quality control	Risk management	Customer service (non-chatbot)
Data Availability					
AI Function & Role	Classification and Sentiment analysis	Facial recognition	Fault identification	Fraud detection and forecasting	Text to image processing
AI Data Type	Unstructured	Structured and clean	Structured and clean	Structured but sparse	Unstructured
AI Model	• Support Vector Machines (SVM) • Clustering • Recurrent Neural Networks (RNN)	• Convolutional Neural Networks (CNN)	• Support Vector Machines (SVM) • Clustering	• K-Nearest Neighbors (kNN) • Recurrent Neural Networks (RNN)	• Generative Adversarial Network (GAN)
AI Readiness					
Schedule	TBD	Q3 2019	Q1 2019	TBD	Q1 2020

ConvnetJS demo: toy 2d classification with 2-layer neural network

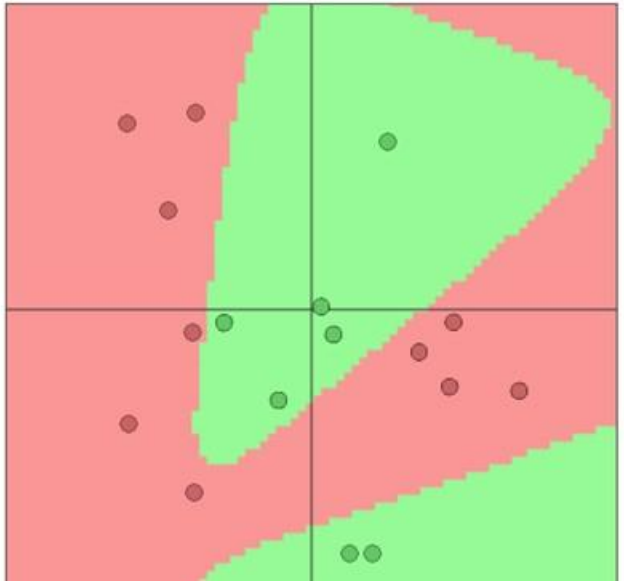
The simulation below shows a toy binary problem with a few data points of class 0 (red) and 1 (green). The network is set up as:

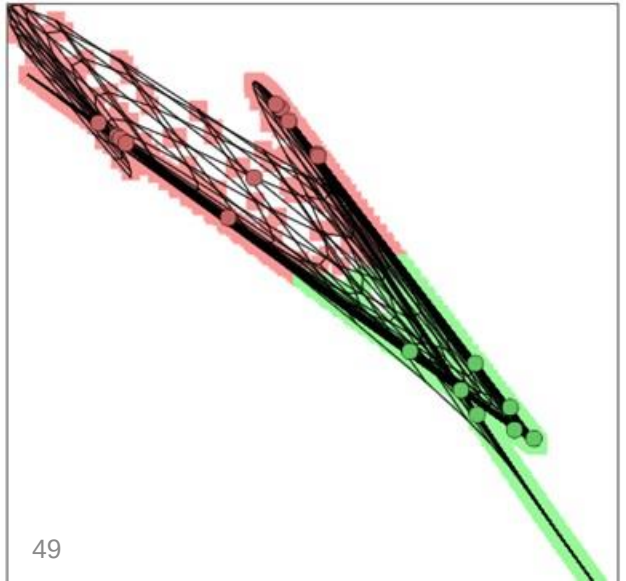
```
layer_defs = [];
layer_defs.push({type:'input', out_sx:1, out_sy:1, out_depth:2});
layer_defs.push({type:'fc', num_neurons:6, activation: 'tanh'});
layer_defs.push({type:'fc', num_neurons:2, activation: 'tanh'});
layer_defs.push({type:'softmax', num_classes:2});

net = new convnetjs.Net();
net.makeLayers(layer_defs);

trainer = new convnetjs.SGDTrainer(net, {learning_rate:0.01, momentum:0.1, batch_size:10, l2_decay:0.001});
```

change network

Feel free to change this, the text area above gets eval()'d when you hit the button and the network gets reloaded. Every 10th of a second, all points are fed to the network multiple times through the trainer class to train the network. The resulting predictions of the network are then "painted" under the data points to show you the generalization.

On the right we visualize the transformed representation of all grid points in the original space and the data, for a given layer and only for 2 neurons at a time. The number in the bracket shows the total number of neurons at that level of representation. If the number is more than 2, you will only see the two visualized but you can cycle through all of them with the cycle button.






Friends
Parents
Grades
Knowledge

Interact

Encourage

Reward

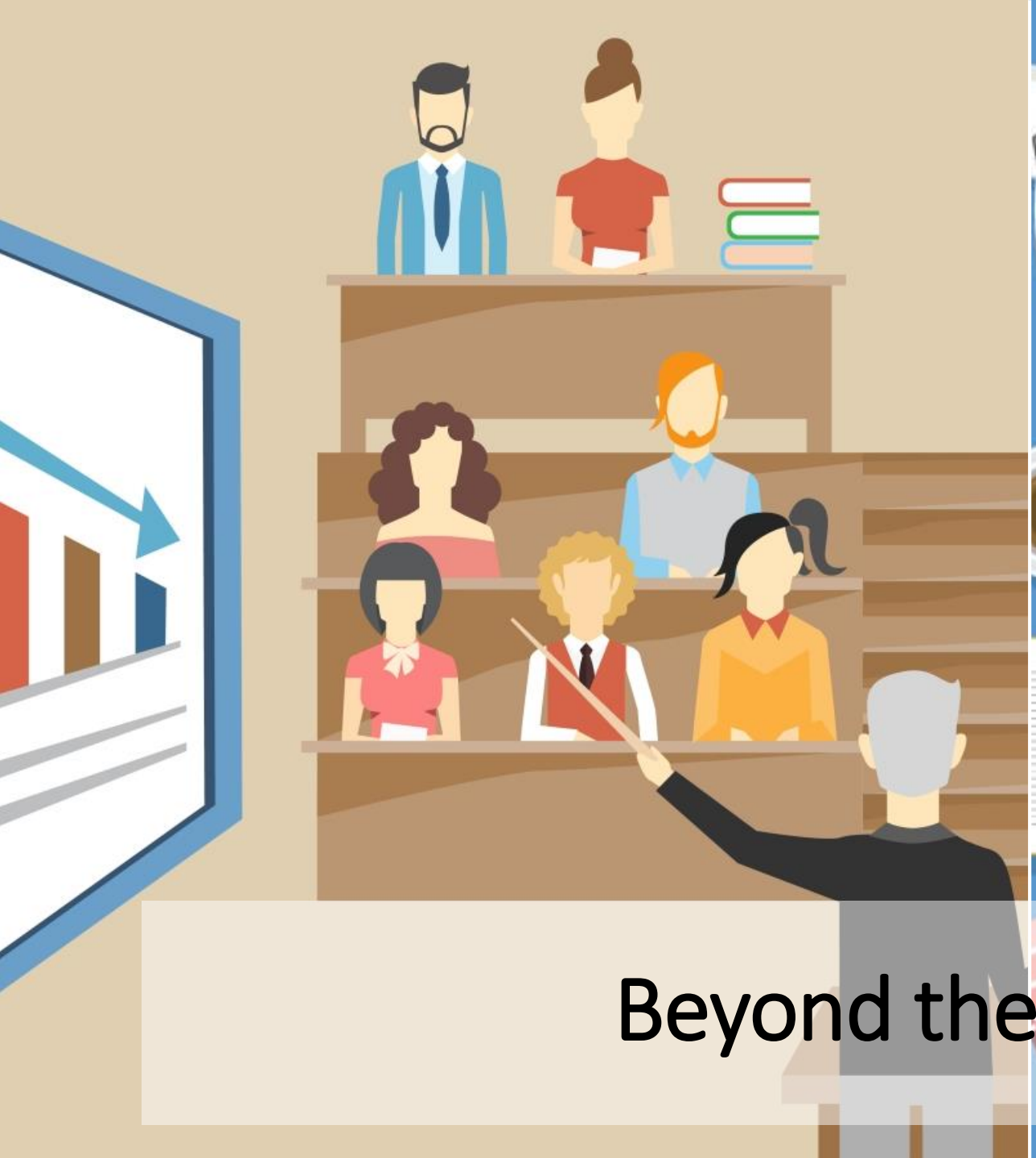
Kahoot!

https://kahoot.it/

Please wait for the Game Pin
Use your full name for attendance

www.slido.com
#UST
sli.do

Source: https://debrief2learn.org/



Beyond the Classroom

Speaker
Renmin University of China

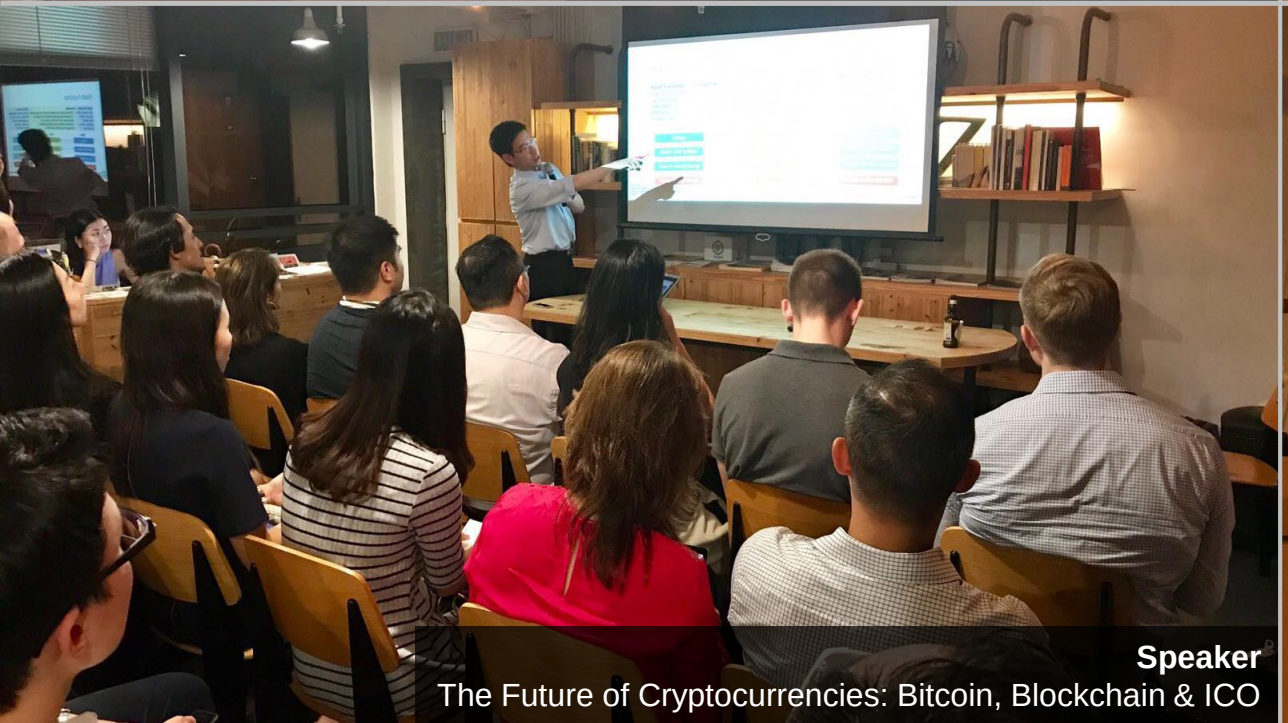
Speaker on A.I.
2016 Hong Kong CFO Rising Summit

Panellist
Hong Kong University of Science and Technology

Delegate
Xi'an Jiaotong-Liverpool University
International Innovation Hub

Speaker on Blockchain and A.I.
Shanghai University of Finance and Economics

Speaker & Panellist
2017 Process Automation & Robotics Summit Asia



Speaker
The Future of Cryptocurrencies: Bitcoin, Blockchain & ICO

Guest Speaker on A.I.
Chinese University of Hong Kong

Robotic Process Automation
机器人与工序自动化
Full-stack AI-enabled Robotic Process Automation (RPA) solution suite for business-critical tasks spanning multiple applications and data silos

Quantum Computing
量子计算
Solution provider and platform developer for quantum and classical computing for predictive analytics, forecasting, and optimization

Computer Vision
计算机视觉
Developer of deep learning technology-based computer vision solutions aimed at a broad range of consumer and enterprise applications

Knowledge Graph
知识图表
Dynamically evolving knowledge graphs that provides inference strength across concepts, events and themes derived from a wide variety of information services

Real-Time Robotics Automation
实时机器人自动化
Deep reinforcement learning-based AI software platform that enables enhanced perception, reaction and control in real-time robotics environments

AI Chips
人工智能芯片
Deep reinforcement learning-based AI software platform that enables enhanced perception, reaction and control in real-time robotics environments

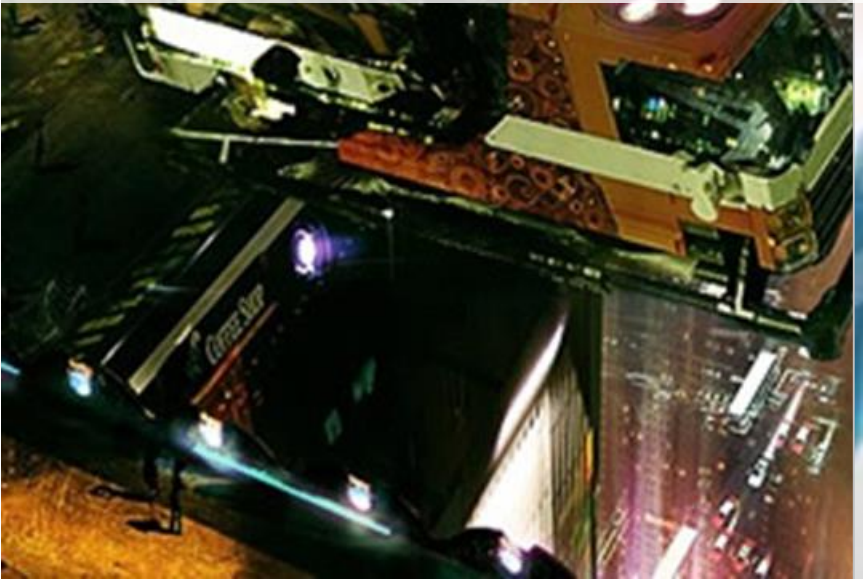
Cybersecurity
网络安全
Advanced deep learning technology-based cybersecurity products and solutions for threat detection and prevention

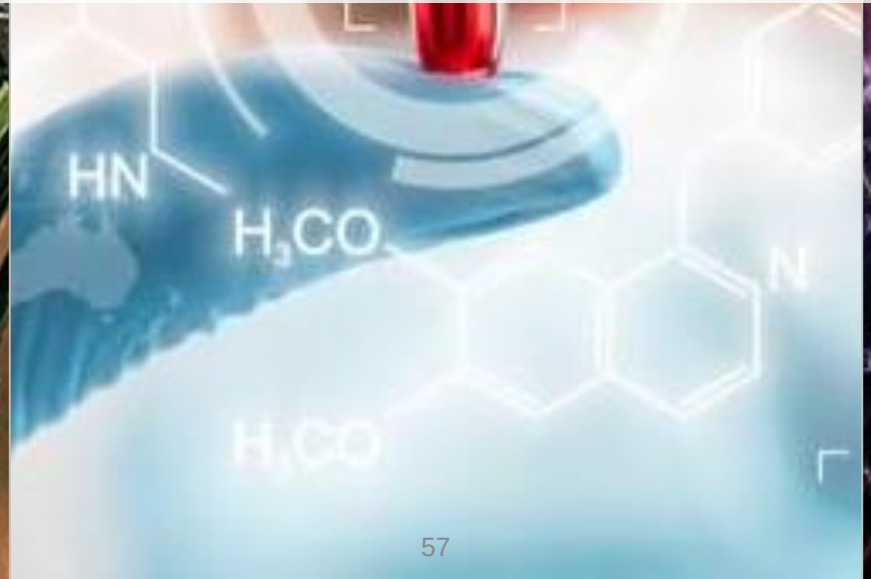
Music Augmentation
音乐强化
Developer of a music augmentation technology that transforms linear music to dynamically personalized music for consumers, ad-agencies, music labels, and producers

Predictive Maintenance
Hypothetical Scenario Generator
Symbolic Reasoning
Reinforcement Learning

Drug Discovery
Generative Adversarial Networks

General Purpose Decision Engine
Probabilistic Modeling
Reinforcement Learning
Multi-Agent Systems





Alpha Intelligence Capital

Key Responsibilities

- Keen interest and experience in venture capital transactions and financial analysis
- Familiar with transaction legal documents and investment structure
- Understanding of the commercialization of technologies from an investor perspective
- Conduct due diligence for potential investments in the AI space
- Assist in the preparation of deal-related materials (e.g. data collection, industry research, comparable company and valuation analysis)

Position Requirements

- Undergraduate or postgraduate students, preferably majoring in Finance, Investments, Legal Studies, and/or Business Analytics
- Experience in using Bloomberg, S&P Capital IQ, Pitchbook, and Wind preferred
- Exposure and understanding of the high-tech industry (especially AI/ML) a plus
- Strong sense of responsibility and attention to details

Availability: Spring and Summer 2019
Number of Openings: 1-2
Renumeration: Market competitive
Office: Central • Hong Kong

Anthony Woo
CFA CAIA FRM
Associate Director
Alpha Intelligence Capital
aw@aicapital.ai

CFA Exam Adds Fintech to 2019 Curriculum

Come 2019, the wealth managers and financial analysts aspiring to add the Chartered Financial Analyst designation to their credentials have one more subject to deal with. The CFA Institute has decided to **add fintech to its 2019 exam curriculum**. The new curriculum contains a section called fintech and adds study material on hot industry topics such as **robo-advisors, big data, artificial intelligence and data analysis**. The new questions will appear in the CFA exam that will be administered in 2019.

1. **Financial Analysis Technology**: This includes how the financial analysis landscape is changing with things such as big data analysis, artificial intelligence, machine learning, and algorithmic trading.
2. **Portfolio Management Technology**: This includes robo-advisors, technology in enterprises such as asset management companies
3. **Capital Formation**: This includes peer-to-peer lending, shadow banking, and crowd funding.
4. **Market Infrastructure**: This includes innovations such as cryptocurrencies, blockchain technology, high-frequency trading, and regulatory-related technology

Source: https://financetrain.com/cfa-exam-adds-fintech-big-data-data-analysis-2019-curriculum/

Anthony Woo, CFA CAIA FRM

Associate Director at Alpha Intelligence Capital

888
Who's viewed your profile

7,567
Connections
Manage your network

Access exclusive tools & insights
Free Upgrade to Premium

Share an article, photo, video or idea

Write an article | Images | Video | Post

Sort by: Top

Germain Chastel
Developing the First Open Knowledge Access Platform
16h

The market for solar homes has skyrocketed - and these green tech disruptors are winning the race to reduce our carbon footprint:

The Market For Solar Homes Has Skyrocketed, and These Green Tech Disruptors Are Winning the Race to Reduce our Carbon Footprint
Germain Chastel on LinkedIn

By Germain Chastel and Sascha Eder NewtonX recently conducted an extensive panel on the pos...

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+ Follow

Add to your feed

Investment Banking + Follow

Hussain Ali
HR Manager at Canadian Medical... + Follow

Ovilia. Mendonca.
Vice President-Flight Services⭐Corporate... + Follow

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Promoted

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Finance and Banking MSc with King's. An Industry Leading Online Experience
Learn more

Trade Binary Options
No Credit Card or Phone Required. Get Your 100% Free Demo Account. 24/7
Learn more

Messaging

Resources for a Career in Finance

1. FinanceAsia (http://www.financeasia.com/)
2. Dealogic (http://www.dealogic.com/)
3. McKinsey Insights (http://www.mckinsey.com/insights)
4. 清科集团：投资界 (http://www.pedaily.cn/)
5. Wind Financial Terminal

HireVue Iris™ Deep Learning Analytics Engine

15,000
PREDICTIVE ATTRIBUTES

100,000X
MORE DATA THAN A RESUME

W

Aug 2011 – May 2013 **MORGAN STANLEY ASIA** **HONG KONG, CHINA**

Associate, Investment Banking Division – Hong Kong Corporate Finance Coverage Team

- Shangri-La Asia inaugural issuance of US$600MM under US$3Bn Medium Term Note Program
- Multiple senior unsecured bond offerings for Hong Kong corporates, such as Kerry Properties (US$600MM), Hang Lung Properties (US$500MM), Nan Fung (US$300MM), and PCCW (US$500MM)

Summer 2010 **Summer Associate, Investment Banking Division – Technology, Media & Telecommunications Group**

- US$272MM IPO of Dangdang Inc., China's largest B2C e-commerce company (equivalent of Amazon)

2006 – 2008 **J.P. MORGAN CHASE & CO.**

Investment Strategy Analyst, J.P. Morgan Private Wealth Management **NEW YORK, NY**

- Sole analyst directly supporting the global Chief Investment Officer (CIO) and Chief Economist of PWM

2006 – 2008 **Financial Analyst, J.P. Morgan Private Bank** **SAN FRANCISCO, CA**

Summer 2007 **Financial Analyst, J.P. Morgan Private Bank, EMEA Equity Derivatives Group** **LONDON, UK**

E

Education

2015 – 20 **UNIVERSITY OF HONG KONG** **HONG KONG, CHINA**

Master of Science in Information Technology in Education (Specialist Strand: e-Leadership), *Distinction*.

2009 – 20 **HARVARD BUSINESS SCHOOL** **BOSTON, MA**

MBA. Co-producer, Asian Cultural Show. Advisor, Harvard Innovation Lab (iLab)

2002 – 20 **UNIVERSITY OF CALIFORNIA, BERKELEY – HAAS SCHOOL OF BUSINESS** **BERKELEY, CA**

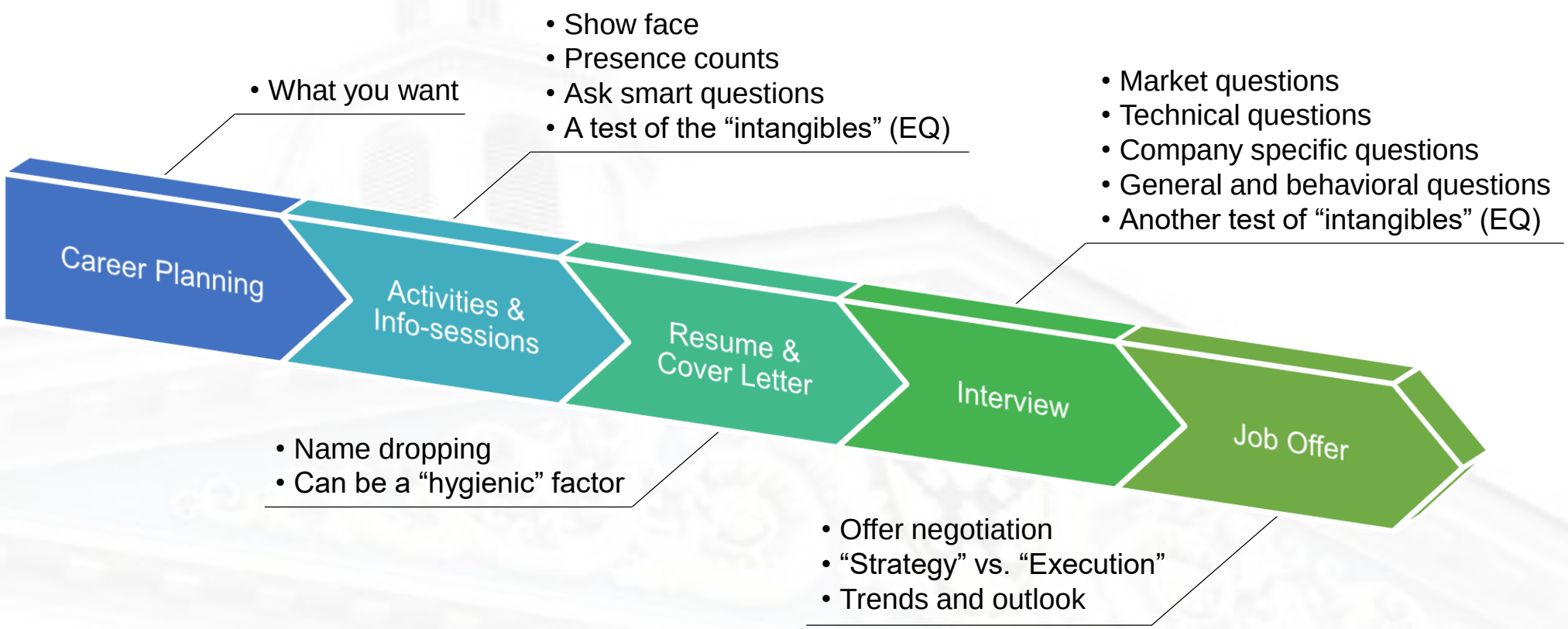
Bachelor of Science in Business Administration, *summa cum laude* (cu lative GPA: 3.9, top 3% of class). Dean's Honor List (02-06). President, California Investment Associat as-sponsored investment fund)

T

Technology-related Certifications

Certificate on Machine Learning for D ata & Text Processing at MIT Computer Science and Artificial Intelligence Laboratory (CSAIL). Ce e on Deep Learning and Machine Learning with TensorFlow. Certified Bitcoin Professional (CBP). Conducted research into Probabilistic Topic Modeling using R

Career Roadmap & CV Clinic



Biography

Anthony Woo
CFA CAIA FRM

Anthony is currently a researcher focusing on fintech and frontier technologies such as artificial intelligence, and blockchain. He has co-authored HBS cases such as Ant Financial and Dianrong, and is conducting research into machine learning (e.g. neural networks and deep learning). Anthony is the Chief Strategy Officer of Bauhinia Creek Ventures, and Venture Mentor of the Hangzhou Municipal Government. As an advisor of the Harvard Innovation Lab (iLab), Anthony is part of multiple startups in Greater China.

Anthony used to be an investment banker at Morgan Stanley. Prior to that, he spent several years at J.P. Morgan in portfolio management, equity derivatives, and investment strategy in San Francisco, London, and New York. In New York, Anthony reported directly to the global Chief Investment Officer (CIO) and Chief Economist of J.P. Morgan Private Wealth Management managing over US$ 249 billion of client assets.

Anthony completed his MBA at Harvard Business School. He graduated from the University of California, Berkeley (Haas School of Business) *summa cum laude* with a B.S. degree in Business Administration. As an elected member of the Board of the Faculty of Education at the University of Hong Kong (HKU), Anthony has completed an M.S. degree in Information Technology in Education (Distinction) and is conducting research into topics in education and innovation using artificial intelligence.

Anthony has been appointed by the HKSI Institute as an instructor. He is also a GCDF certified by the U.S. Center For Credentialing & Education and the Chinese University of Hong Kong. Anthony currently holds the designations of Chartered Financial Analyst (CFA), Chartered Alternative Investment Analyst (CAIA), Financial Risk Manager (FRM) and Certified Bitcoin Professional (CBP).

Anthony has completed a certificate in Machine Learning for Big Data & Text Processing at MIT, and a workshop on Adaptive Testing at the Psychometrics Centre of the University of Cambridge. He has also passed exams in probability and financial mathematics of the Society of Actuaries. Anthony is an FAA licensed Private Pilot and a PADI Advanced Scuba Diver, and has completed Wine & Spirit Education Trust (WSET) Level 2 with merit.

Source: Bauhinia Creek Ventures

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CFA CAIA FRM

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Source: Bauhinia Creek Ventures

Poor contrast and illegible

Text overflow

Too many words and full sentences not helpful

Poor image selection

Lack of emphasis

Misalignment

Unexplained jargon

Inconsistent font size

Inadequate referencing

Missing page number

Biography

Anthony Woo
CFA CAIA FRM

Four sections (e.g. SWOT) depending on context

Sufficient contrast in the same color tone for legibility

Image blend in with the rest of the slide

Avoid complete sentences, use bullet points instead

Appropriate text wrapping

Consistent font and font size

Proper alignment

Highlight important points

Incorporate page number for the ease of navigation

Incorporate (short) links for quick referencing

Sources:
Bauhinia Creek Ventures (www.bcventures.co) and LinkedIn (www.awoo.me)

Biography

Anthony Woo
CFA CAIA FRM

Fintech

- Researcher focusing on **fintech** and **frontier technologies**, e.g. A.I., blockchain
- Advisor of the **Harvard Innovation Lab** (iLab)
- Instructor of A.I. and blockchain at Hong Kong Securities & Investment Institute
- Chief Strategy Officer of Bauhinia Creek Ventures

Finance

- Investment banker at **Morgan Stanley** serving Shangri-La, China Resources, PCCW etc.
- Analyst at **J.P. Morgan** in portfolio management, equity derivatives, and investment strategy in San Francisco, London, and New York (**over US$249 billion** of assets under management)

Education

- MBA at **Harvard Business School**
- B.S. Business Administration at **U.C. Berkeley** (*summa cum laude*)
- M.S. of Information Technology in Education (Distinction) at the University of Hong Kong
- Global Career Development Facilitator (GCDF)

Certifications

- **Chartered Financial Analyst** (CFA); Chartered Alternative Investment Analyst (CAIA); Financial Risk Manager (FRM); Certified Bitcoin Professional (CBP); **Certificate in Machine Learning** for Big Data & Text Processing at MIT
- FAA licensed Private Pilot and PADI Advanced Scuba Diver

Sources:
Bauhinia Creek Ventures (www.bcventures.co) and LinkedIn (www.awoo.me)