

AI-Human Teaming for Decision Making

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/Administration
/Human Resource
/Legal
/Accounting
/Finance
/Marketing
/Publicity

/Production
/Research
/Business
/Development
/Engineering
/Manufacturing
/Planning

HKUST VisLab



Lab Achievements

• Awards

- 13 best paper/honorable mention awards
- Distinguished Collaborator Award 2016 from **Huawei** Noah's Ark Lab, **IBM** Faculty Award 2009
- 2014 **Higher Education Scientific and Technological Progress Award**; 2019 CCF Nature Science Award
- HKICT Awards and APICTAs; **Yelp Dataset Grand Prize**; **IEEE VAST Challenge awards**
- **AI2000 most influential scholar award**; Inductee to **IEEE VIS academy**

• Research

- **No 1** visualization group in the world based on the output in the top journal of the field (about 80 TVCGs)
- **The largest visualization group** in Asia and one of the largest in the world (30 members including 24 PhDs)
- **3 times paper co-chairs** for IEEE VIS
- Technologies adopted by **Microsoft, IBM, Huawei, Tencent, Bosch, etc.**

• Alumni

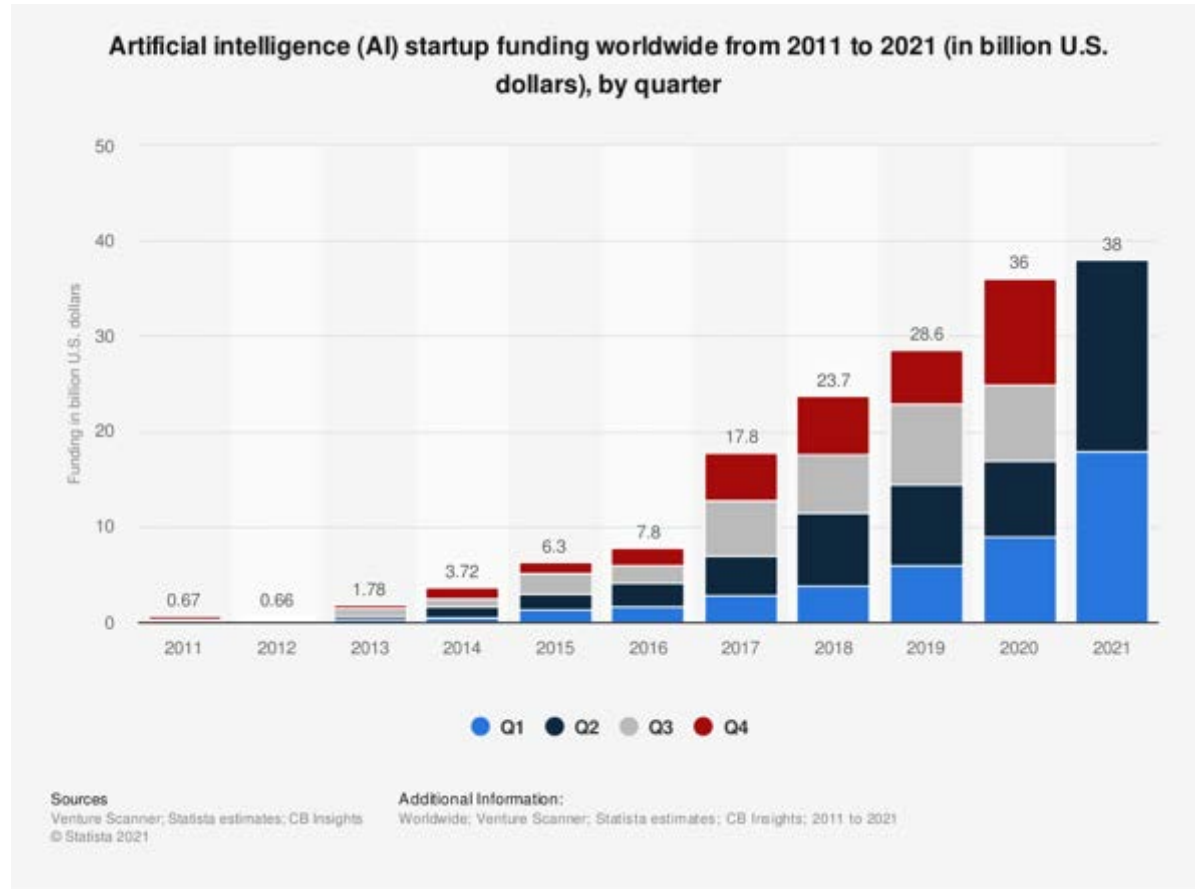
- More than 100 (30 PhDs+23 Mphils+...)
- Working in **industry**: MSRA, IBM Watson, AWS AI, Facebook AI, AirBnb, Bloomberg AI, Siemens, Google, Huawei, etc.
- Working in **academia**: Zhejiang University, Tongji University, University of Electronic Science and Technology of China , Shenzhen University, Singapore Management university
- Working in **government**: Office of the Government Chief Information Officer (OGCIO) Hong Kong

• Media

- **More than 30 media coverages**: NHK TV, MIT News, Guardian, SCMP, TechnAsia, IEEE Spectrum ACM Tech, 新华网, 人民网, 明报, 文汇报, 香港电台大公报, 星岛日报, 中联办, 新智元, ...



AI's funding keeps growing amid Covid-19 and economic recession

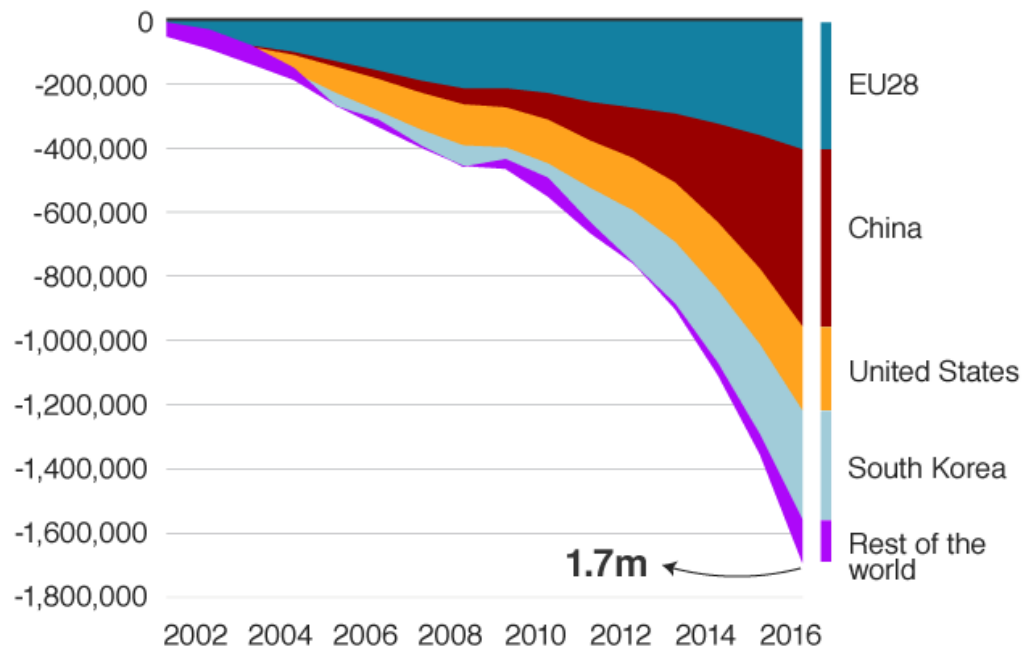


Superhuman AI is emerging ...



Where most jobs have been lost

Cumulative job losses attributed to automation since 2000



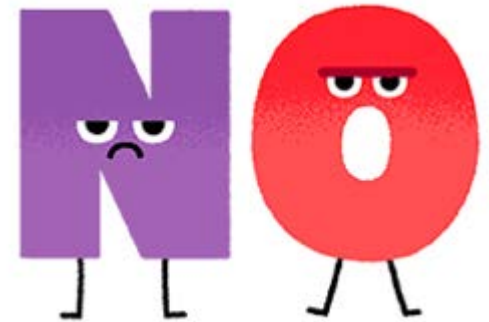
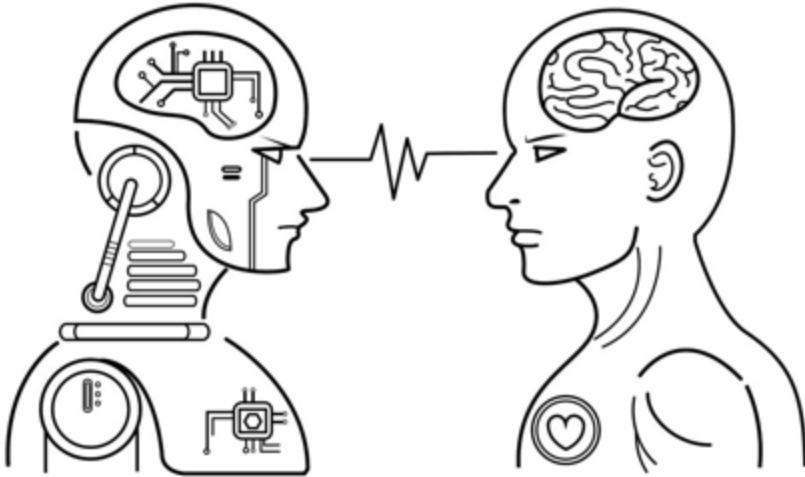
Source: Oxford Economics

BBC

AI is taking human jobs ...

A zero-sum game between AI and human?

Artificial vs HUMAN
Intelligence



AI Intelligence v.s. Human Intelligence



- Processing information fast
- Repetitive
- Perform one or two tasks
- Cannot make valuable decisions or use common sense
- Generally perform poorly to unknown situations

- Processing information slow
- Creative
- Multi-tasking
- Make valuable decisions based on past experience
- Think and reason abstractly
- Have empathy



Strong AI
Weak HI

Strong HI
Weak AI

Human-AI Teaming



We need human-AI teaming when

AI is limited, biased, and intransparent

Decision-makings are multi-criteria and context-dependent

Requiring creative activities such as designing







Computational art



Data storytelling

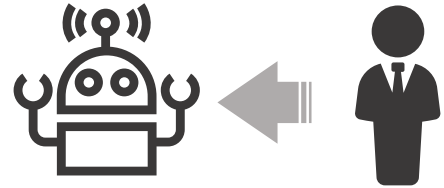
Human-AI Teaming: How?

VisLab's Work on Human-AI Teaming

Human Assist AI	Training AI	Improving AI: <i>ATMSeer</i> (ACM CHI'19), <i>ProtoSteer</i> (ACM KDD'19, IEEE VIS'19) Model Debugging: <i>DeepTracker</i> (ACM TIST'18)	
	Explaining AI	Open the blackbox: <i>iForest</i> (IEEE VAST'18), <i>EmbeddingVis</i> (IEEE VAST'18) Treat as blackbox: <i>RuleMatrix</i> (IEEE VAST'18), <i>HypoML</i> (IEEE VAST'20), <i>DECE</i> (IEEE VAST'20), <i>M2Lens</i> (IEEE VIS'21)	
	Sustaining AI	Improve the trustworthiness and fairness: <i>DiscriLens</i> (IEEE VAST'20) Deploy to domains: <i>VBridge</i> (IEEE VIS'21), <i>DFSeer</i> (ACM CHI'20)	
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	Facilitating design	AI recommends visualization: <i>KG4VIS</i> (IEEE VIS'21), <i>MultiVision</i> (IEEE VIS'21) AI improves visualization: <i>PapARVis</i> (IEEE VIS'19, ACM CHI'19)	

Human assisting AI

With human knowledge and inspirations, we could create better AI.







ATMSeer: Increasing Transparency and Controllability in Automated Machine Learning

Qianwen Wang, Yao Ming, Zihua Jin, Qiaomu Shen, Dongyu
Liu,

Micah J. Smith, Kalyan Veeramachaneni,¹⁵ Huamin Qu



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DFSeer: A Visual Analytics Approach to Facilitate Model Selection for Demand Forecasting

ACM CHI Conference on Human Factors in Computing Systems 2020

Dong Sun¹, Zezheng Feng¹, Yuanzhe Chen², Yong Wang¹, Jia Zeng², Mingxuan Yuan², Ting-Chuen Pong¹, and Huamin Qu¹

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2







VBridge: Connecting the Dots Between Features and Data to Explain Healthcare Models

Accepted to IEEE Transactions on Visualizations and Computer Graphics (TVCG) (IEEE VIS '21)

Furui Cheng¹, Dongyu Liu², Fan Du³, Yanna Lin¹, Alexandra Zytek², Haomin Li⁴,
Huamin Qu¹, and Kalyan Veeramachaneni²



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A Visual Analytics Approach to Facilitate the Proctoring of Online Exams



Haotian Li¹



Min Xu¹



Yong Wang²







Huan Wei¹

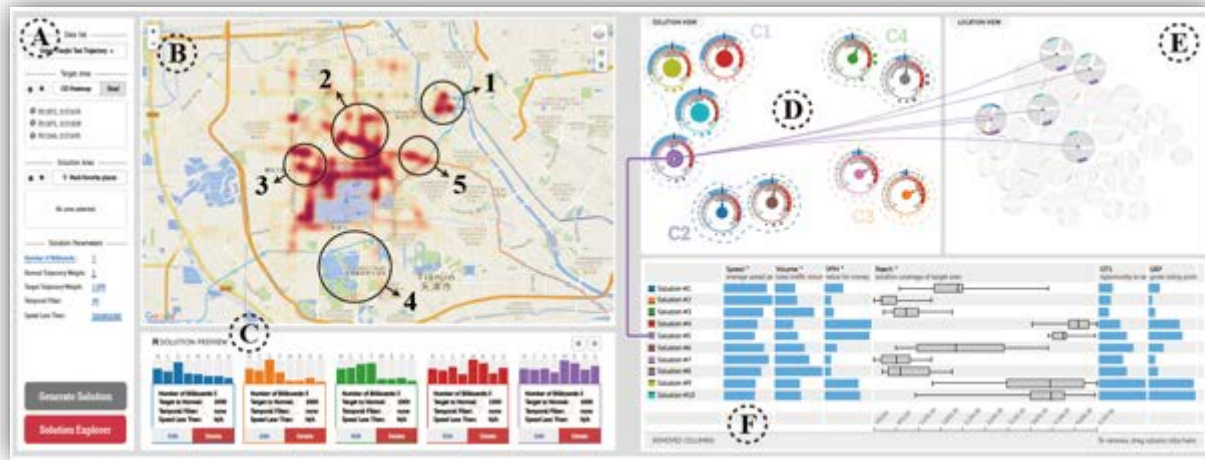


Huamin Qu¹

<https://haotian-li.com/project/online-proctoring.html>

VisLab's work on Human-AI Teaming





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SmartAdP: Visual Analytics of Large-scale Taxi Trajectories for Selecting Billboard Locations

Liu et al. IEEE TVCG 2017 (IEEE VIS'16)

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Visual Analytics for Engagement Analysis



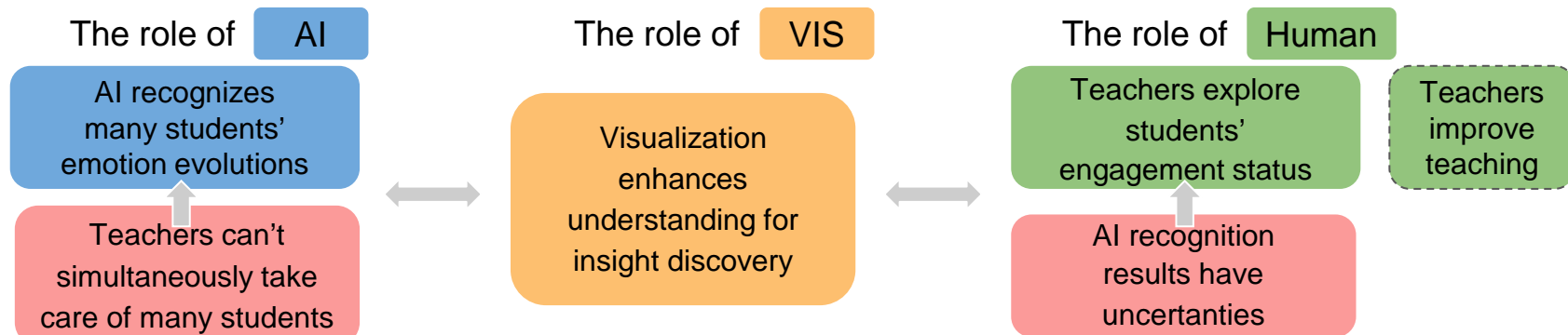
Exploring students' emotion can help both teachers and parents know about students' learning status and further help teachers improve teaching.

It is not easy for teachers to quickly capture and explore many students' emotions in the classroom.

How to carry out **efficient, informative, reliable** emotion analysis?



Visual Analytics for Engagement Analysis



Questions?

Contact:

huamin@cse.ust.hk

More info:

<http://www.huamin.org>

