

20 设计和人工智能报告

18 Design & Artificial Intelligence Report

报告下载地址 www.sheji.ai

设计智能 x 运算智能

design intelligence x computational intelligence

范凌 | Ling Fan

2017报告的数据与反馈



2017年报告10个最受欢迎的观点：

● 100万+ 网站浏览

● 3000+ 问卷回复

● 50+ 采访

让机器理解创造
人机共同进化
脑机比
设计的三个维度
人工智能设计新疆域
让机器设计
微观：如何让“机器”理解“创造”？
观察1：需求侧的极度细分
微观：设计的3个维度
观察2：在线/连接/交互
观察4：人/机交互的新组织
微观：如何让“机器”分析“不确定”？
微观：如何让“机器”“设计”？

人/机交互新组织

在线/连接/交互

2018报告团队

报告团队：

- 范凌、龚淑宇、燕晓宇、刘益红、鲍壹方、李想

研究机构：

- 同济特赞设计和人工智能实验室 - sheji.ai

外部观点：

(按拼音顺序)

- 付志勇 (清华大学)
- 郭锐 (中国人民大学)
- 何人可 (湖南大学)
- 姜公略 (ROKID)
- 李姣姣 (世界经济论坛)
- 林达 (shanzhai.city)
- 刘梦溪 (FUTUREFORM)
- 善牧 (阿里巴巴)
- UX COFFEE
- 孙凌云 (浙江大学)
- 吴卓浩 (创新工场)
- 乐乘 (阿里巴巴)
- 张鑫 (KPF)

特别鸣谢：

- 特赞 Tezign 信息科技有限公司
- 同济大学设计创意学院
- 阿里巴巴设计委员会
- 世界经济论坛
- 深圳创想公益基金会
- 娄永琪 (同济大学)
- John Maeda (AUTOMATTIC)
- 范凯熹 (中国美术学院)
- 6000+回复问卷设计师、企业家、学者、学生、工程师、律师等

- 美国阿斯彭学会 Aspen Institute 经历启发了我对设计和人工智能的关注
- 采用报告形式来自于 John Maeda 的《科技中的设计报告 Design in Tech Report》

2018报告的价值观

多元价值的系统 COMPLEX SYSTEM

“
我们只知道算法可以优化效果，但不知道为什么？”

姚期智（计算机科学家、图灵奖得主）

非结构数据 UNSTRUCTURED DATA

“
计算机不能做“完全创造性思维”。……我认为人类的创造性，简单说就是“出其不意”。

于渌（理论物理学家、中国科学院院士）

有EQ的运算智能 MACHINE EQ

“

数据是文化的数字回响，算法是置入代码的观点。

Data is a digital echo of our culture. Algorithms are opinions embedded in code.

Cathy O'Neil（美国数学家）

2018报告框架

1. 启蒙和纠缠的并存

政治、经济和文化领域中人工智能与设计的乐观与批判?

2. 数据和运算智能的设计

传统设计和数据运算设计的关系和差异，数据、运算对于设计产业意味着什么?

3. 脑机比 2.0

运算智能的发展对不同行业的设计师产生了什么影响和改变?

4. 设计智能的未来建构

人工智能对设计教育、创意人文、道德、精神有什么影响?

1.

启蒙与纠缠的并存

ENLIGHTENMENT & ENTANGLEMENT

政治、经济和文化领域中人工智能与设计的乐观与批判？

- 启蒙：机器可创造，人类可运算
- 纠缠：抵抗简化
- 设计：从大数据到非结构数据

“

人就是一个关系缠绕的结。

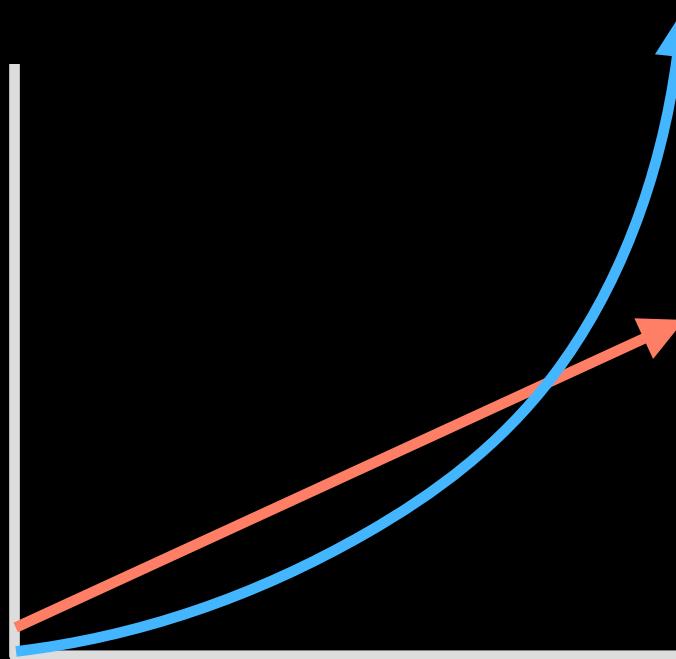


安东尼·圣艾克赛尔

启蒙*：机器智能“可创造”，人类智能“可运算”

* 启蒙 (Enlightenment) 取代了蒙昧，人类可以对经验证据进行解释，A引发了B、B引发了C…… “因果关系”的推动人类的科学认知。

- 启蒙1_机器智能可创造



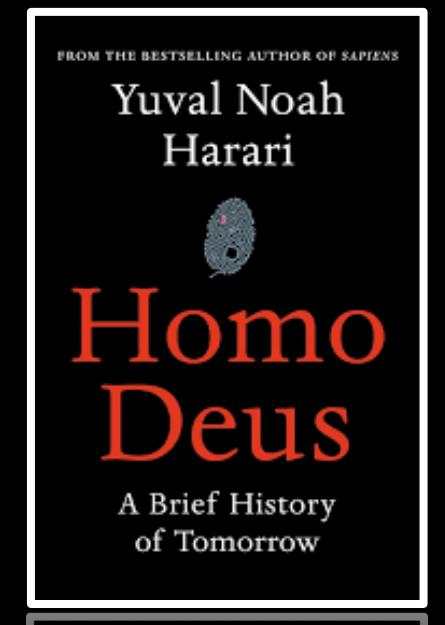
“

人工智能已经擅长分类 (classification)，过去18个月开始擅长生成 (generation)

Mustafa Suleyman (DEEPMIND)

Automated Creativity Session, WEF Davos 2018

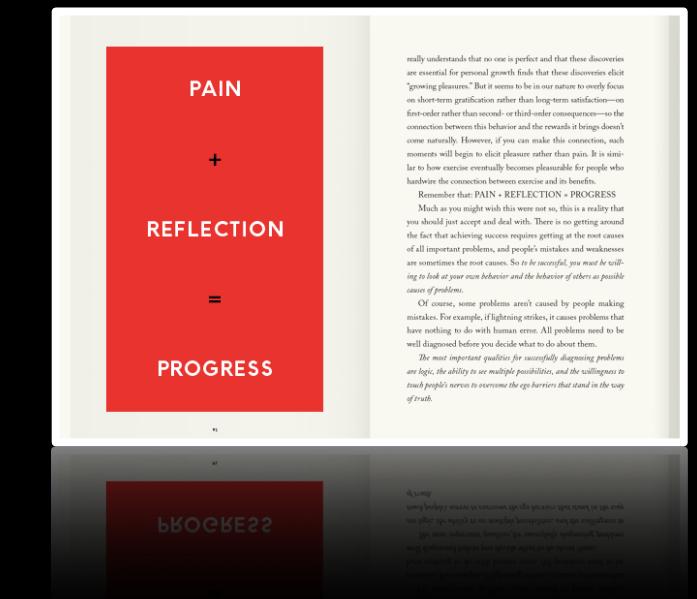
- 启蒙2_人类智能可运算



“

生物是算法。每种动物（包括智人）都是各种有机算法的集合，经过数百万年进化自然选择而成……

Yuval Noah Harari (以色列历史学家)



“

- 使用原则。（原则不仅能简化做决策的过程，而且帮助你提高决策能力）
- 把你的原则转换成电脑算法，让电脑和你一起做决定。

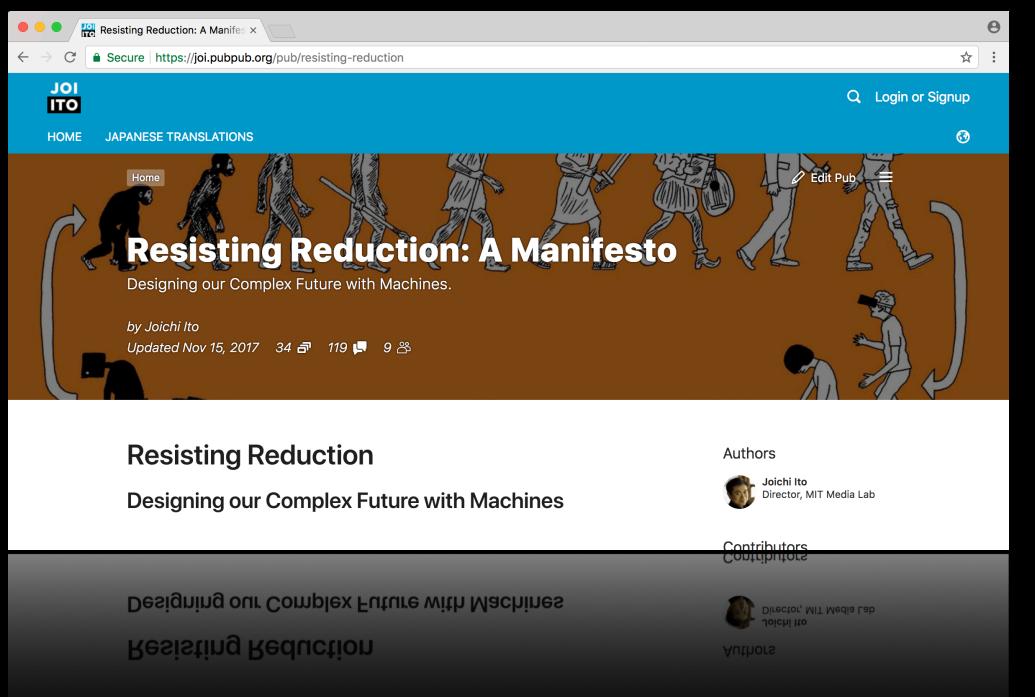
Ray Dalio (桥水基金创始人)



纠缠*：抵抗简化

* 对于世界的认识越多，越意识到一个因不止产生一个果。我们正经历了文化和范式的巨变，从“启蒙时代”向“纠缠时代”——一个复杂的系统，无法分清因果。

• 纠缠1_复杂系统



Joichi Ito (MIT MEDIA LAB)

抵抗简化宣言：和机器一起设计复杂未来

奇点主义 → 复杂适应性系统

指数主义 → 非线性 / 循环

物质 / 非物质对象 → 系统

中心 / 英雄主义规划师 → 系统参与者

控制 → 谦卑

• 纠缠2_纠结的物



“

纠结的物 (Knotty Objects) 是指那些概念、设计、生产、使用、误用都非线性的物。它们与实践、过程、政策纠缠在一起。当成功的时候，它们会转变物质的实践，生产的文化和社会的建构

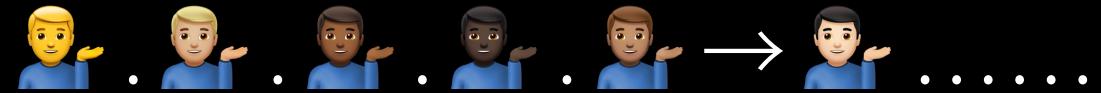
Paola Antonelli (MoMA 资深策展人)

Neri Oxman (MIT MEDIA LAB)

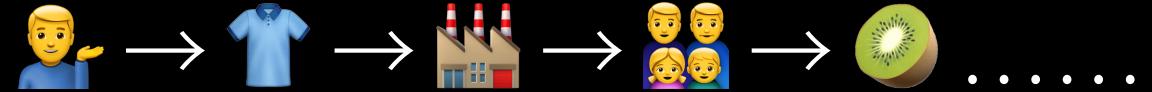
Kevin Slavin (MIT MEDIA LAB)

设计：从大数据到非结构性数据

“物”



“事”



大数据：数量

- ◆ - 设计数据 1、2、3、4、5 ……

人工智能生成网页、人工智能生成Logo、人工智能生成海报、人工智能生成视频、人工智能生成名片……

非结构性数据：多样

人物 - 客户数据

行业 - 行业数据

消费者 - 消费者数据

设计 - 设计数据

设计师 - 设计师数据

社会 - 社会数据

……

89%

设计创意数据为非结构性数据

数据来源：世界经济论坛创意颠覆报告

设计事理学

柳冠中（清华大学美术学院责任教授）实录 / PPT

2.

运算智能的设计

COMPUTATIONAL INTELLIGENT DESIGN

传统设计和数据运算设计的关系和差异，数据、运算对于设计产业意味着什么？

- 经典设计 vs. 运算智能设计
- 大规模个性化
- 设计的ROI / KPI
- 运算智能提高角色之间的连接效率
- 设计业务 尚不形成 数据经济
- 设计与数字工具
- 设计作为非结构数据的处理
- 商业逻辑和设计逻辑的映射和迁移

经典设计 vs. 运算智能设计

“ 我们谈“设计”行业，往往不区分经典设计师和运算设计师。而这两类设计师完全不同。

John Maeda (Automattic)



Design in Tech Report 2018

设计师作为设计研发管理者的角度

观点来源：青云（阿里巴巴设计委员会）

阿里巴巴体系内设计师的三个方向：

- 一是创意型设计，让设计回到根本
- 二是探索型设计，让设计要跟技术 / 数据结合
- 三是系统型设计，让设计从系统体验去思考

设计师作为人工智能研发管理者的角度

观点来源：吴卓浩（创新工场人工智能工程院副总裁）

- 过程数据致胜
- 处理不确定性
- 应用场景为王



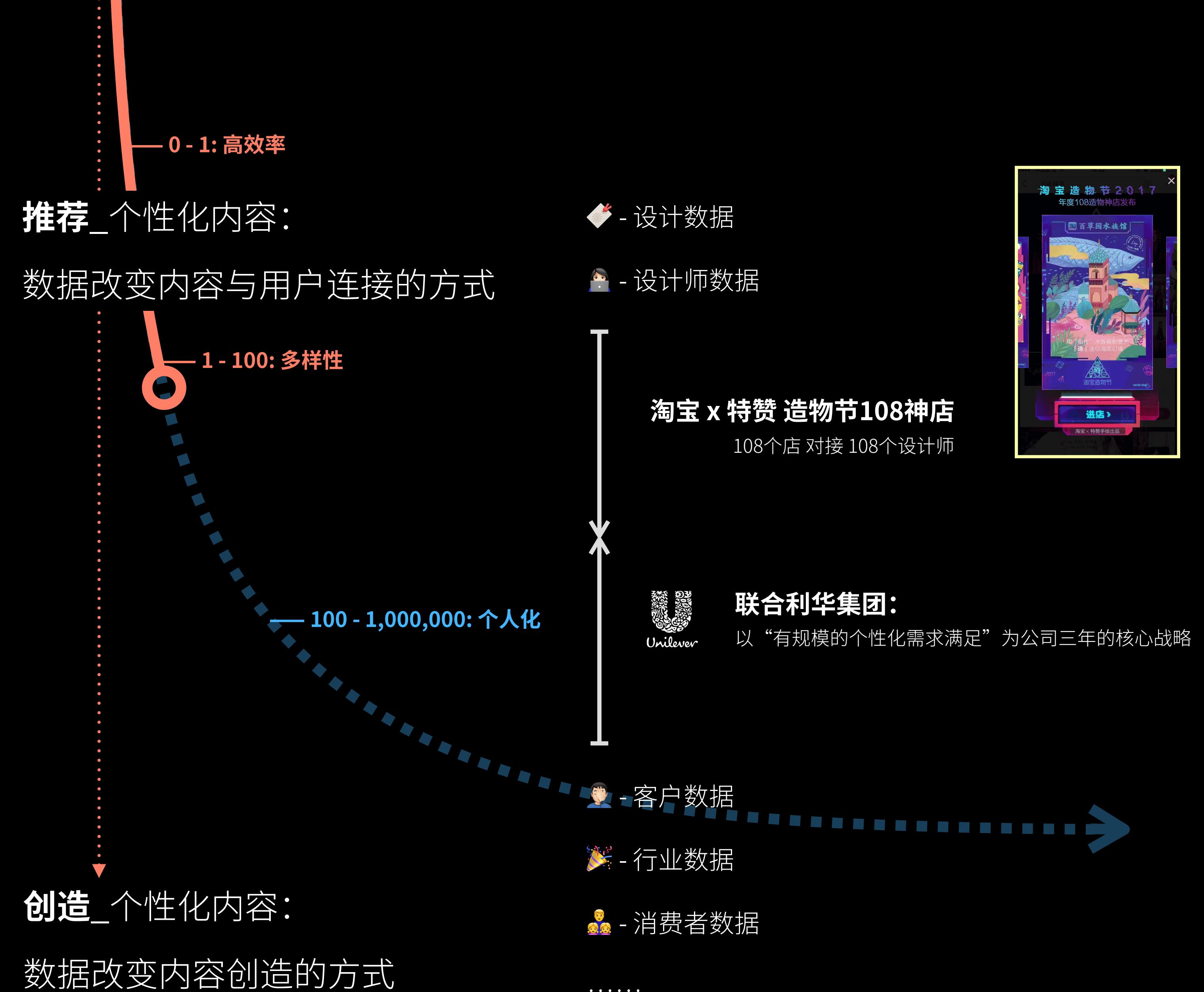
	经典的设计 📸	运算智能的设计 🖥️
用户数量	<ul style="list-style-type: none">• 成千上万	<ul style="list-style-type: none">• 千万上亿
实施周期	<ul style="list-style-type: none">• 多渠道 / 长决策：数周 - 数年	<ul style="list-style-type: none">• 通过网络即时交付
结果导向	<ul style="list-style-type: none">• 追求完美，最终状态	<ul style="list-style-type: none">• 迭代 / 分叉 / 反馈
设计自信	<ul style="list-style-type: none">• 非常自信，英雄主义	<ul style="list-style-type: none">• 有优先级，鼓励迭代
生产资料	<ul style="list-style-type: none">• 物质资料：纸 / 木 / 金属	<ul style="list-style-type: none">• 非物质资料：数据 / 模型 / 算法
结果呈现	<ul style="list-style-type: none">• 千篇一律	<ul style="list-style-type: none">• 大规模个性化
ROI / KPI	<ul style="list-style-type: none">• (好) 设计是难以衡量的	<ul style="list-style-type: none">• 直接对企业核心KPI负责

大规模个性化

关注度经济 (Attention Economy) *

关注度是资源，包括阿里巴巴、腾讯、今日头条等新公司和很多传统企业都是依赖于将关注进行变现。

消费者有了指数级增长的内容（包括：资讯、广告、商品、服务、体验、空间……）需要关注，越个性化的内容，越容易获得关注。因此，企业的挑战是如何大规模的产生个性化的内容？



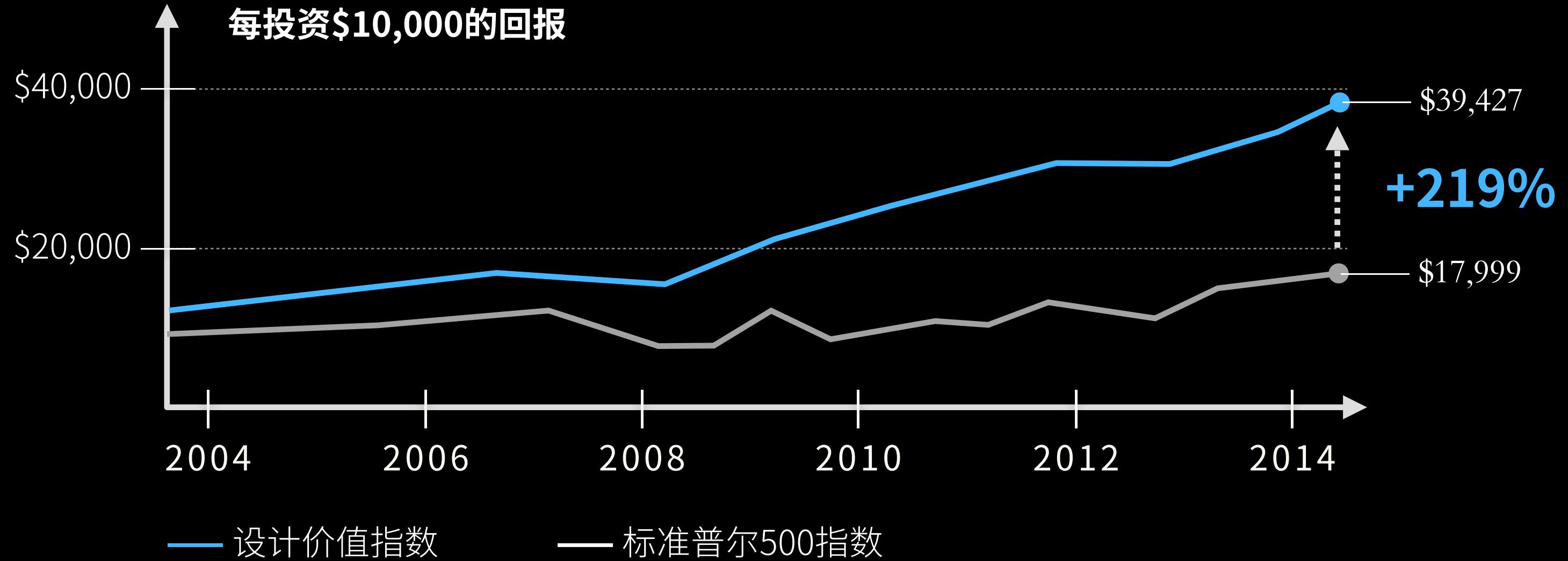
* 深度讨论可以参见：Tim Wu的《Attention Economy》，Albert Wagner的《The End of Capital》

设计的ROI / KPI

长期：价值 + 增长

咨询公司麦肯锡2018年统计表明：
过去10年，设计导向的上市企业投
资回报比标准普尔500指数表现好
219%。

资料来源：McKinsey Company, Design Management Institute;
Motiv Strategies



短期：

CEO 会增加设计投入，如果设计可以提升……

销售/转化率

企业知名度

产品竞争力

100% +

2017年双十一鲁班系统提高100%的点击转化率
阿里巴巴人工智能设计实验室

资料来源：设计和人工智能报告_2018问卷

运算智能提高工作流中角色之间的连接效率

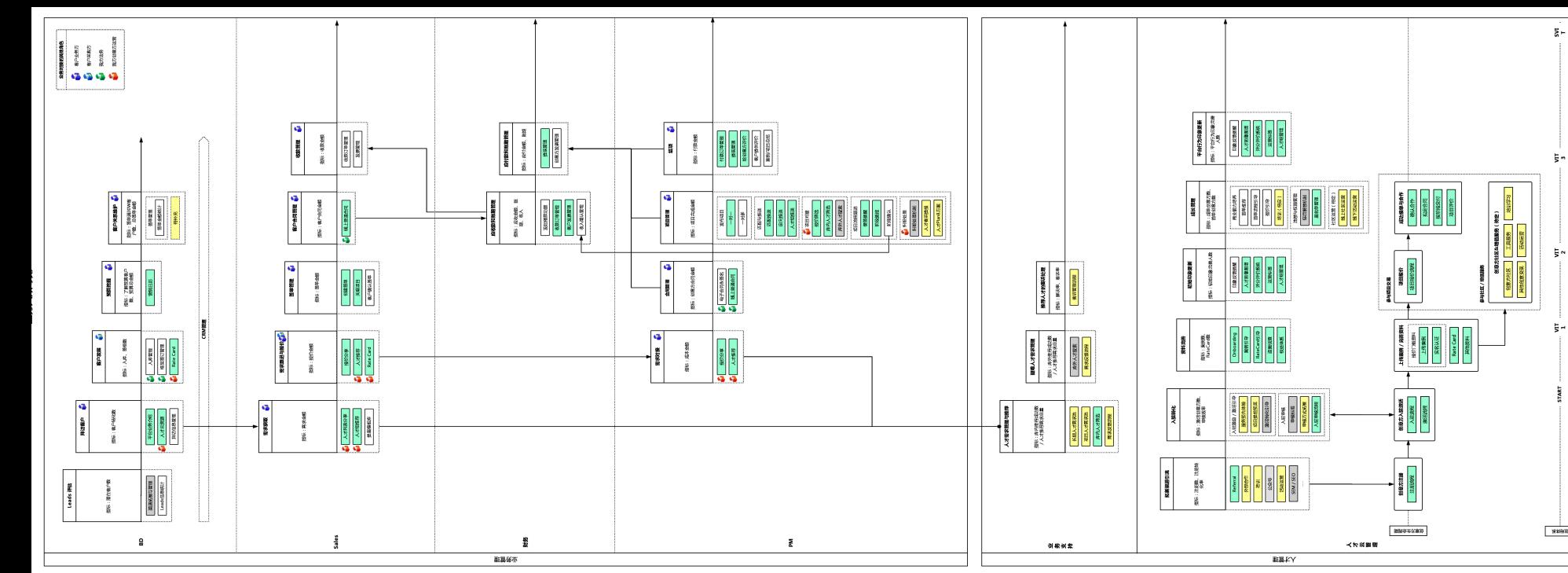
设计业务的每一个流程都是由一个角色（如：客户）发起，由另一个角色（如：设计师）确认的。在我们记录的一个典型设计项目中，累计有21次角色间连接。

我们往往关注设计 / 创意的直接自动化（设计数据 → 生成设计），忽略了设计链条中不同利益相关者的连接部分效率是制约设计业务的关键因素。

58% 设计工作时间在非直接设计上

沟通 / 管理 (30%) 资料 / 调研 (28%) 设计 / 创意 (42%)

21 次：典型平面设计的业务流程中不同角色间连接次数



典型平面设计业务流程

资料来源：特赞信息科技



设计业务尚不形成数据经济

设计业务产生各种类型数据，但没有被有意识保存、处理、分类、分析、应用。不同类型数据之间没有产生流动。

—

“

“在线三定律”作为数据经济的基础：

- 1.每一个比特都在互联网上
- 2.每个比特都可以在互联网上流动
- 3.比特代表的每个对象在互联网上都可计算



王坚（阿里巴巴集团技术委员会主席）

■ 在线：数据改变商业本质，计算重塑经济未来

设计业务中产生数据的工具 (2017)

- | | | |
|------------|----------------|----------------|
| 1. 微信 * | 1. Pinterest * | 1. Photoshop |
| 2. 电话 ** | 2. Behance | 2. Illustrator |
| 3. 移动硬盘 ** | 3. 站酷 | 3. Sketch |

* 非专业工具 / ** 非在线工具



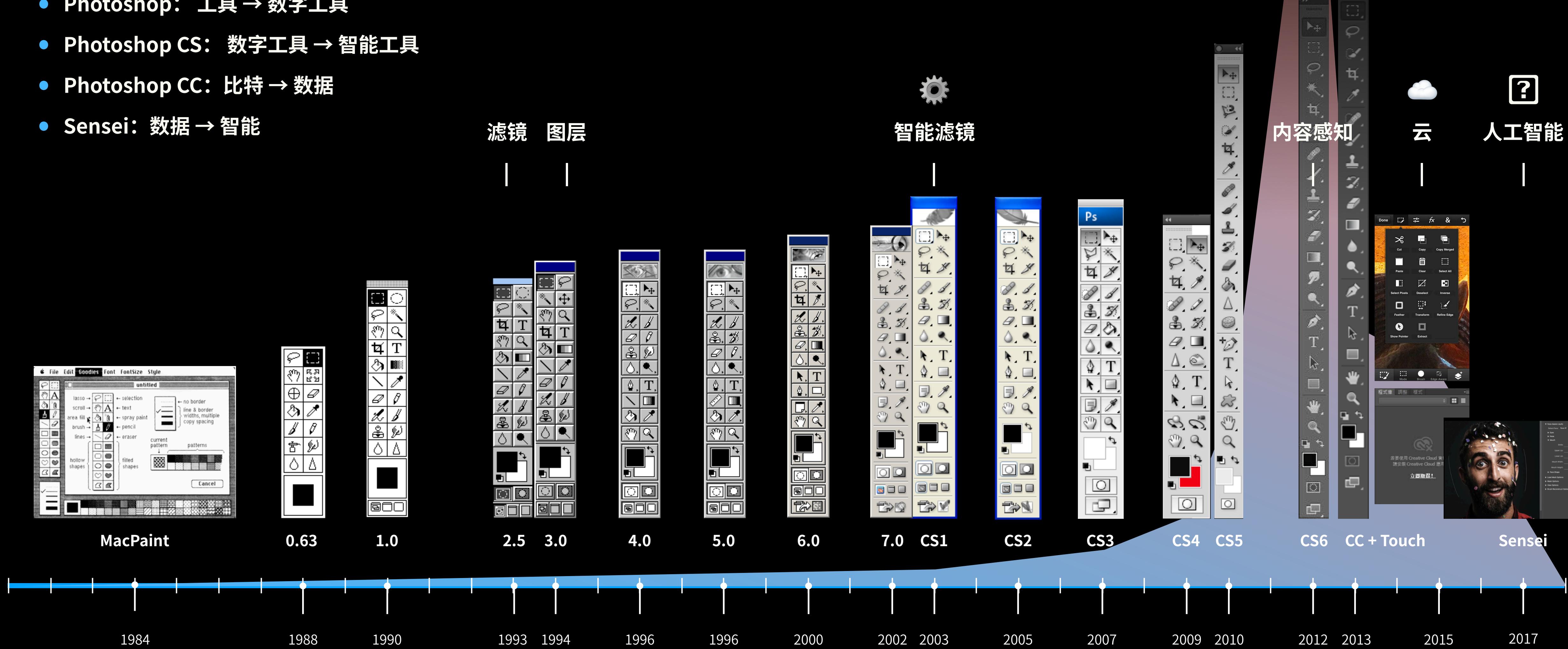
设计业务中产生 / 关联的数据类型

- | | | |
|---------|---------|--------|
| - 客户数据 | - 行业数据 | - 设计数据 |
| - 行业数据 | - 消费者数据 | |
| - 消费者数据 | - 设计数据 | |
| - 设计数据 | | |
| - 设计师数据 | | |

设计与数字工具

“首先我们塑造工具，然后工具塑造我们。First we shape our tools, thereafter they shape us.
Marshall McLuhan (媒介理论家)

- Photoshop: 工具 → 数字工具
- Photoshop CS: 数字工具 → 智能工具
- Photoshop CC: 比特 → 数据
- Sensei: 数据 → 智能



设计作为非结构数据的处理

创造

“

我试图创造艺术，但能不能成为艺术不取决于我，得听天由命。

I try to create art, whether I make it or not is not up to me, it's up to God.

Paul Rand (美国平面设计师)

- 2017_基于 大数据 / 物 的设计人工智能



确定性 / 不确定性

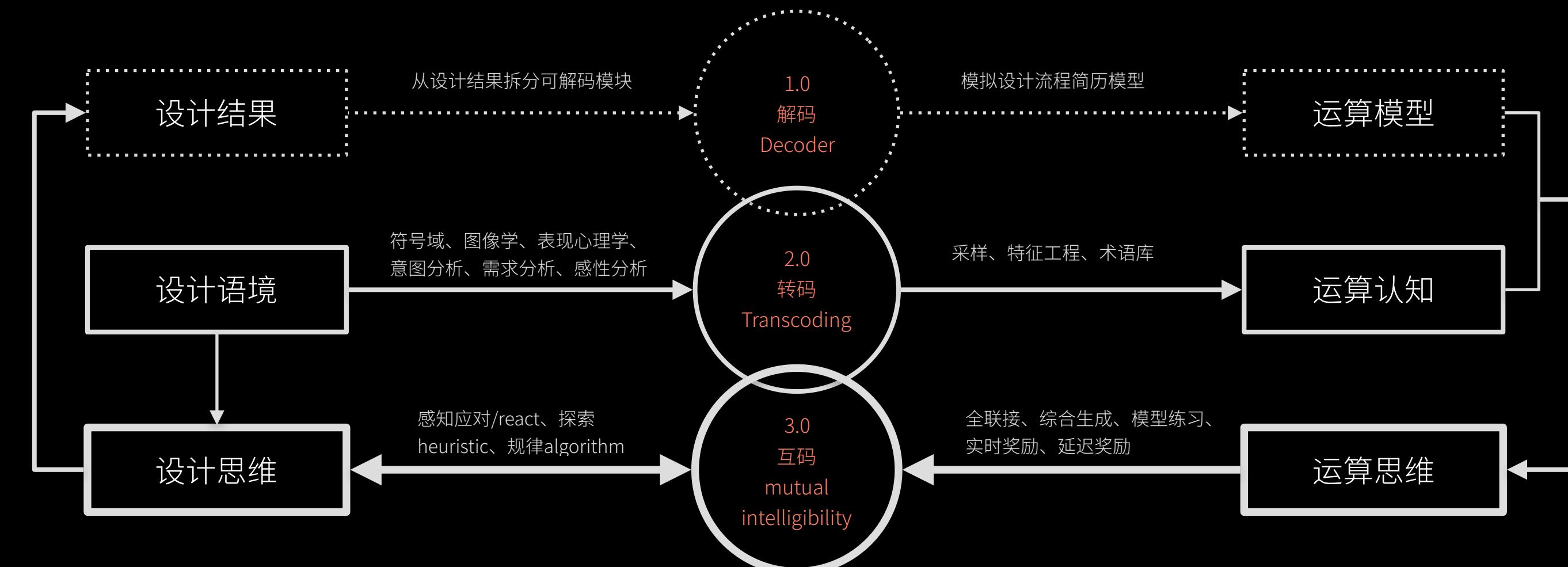
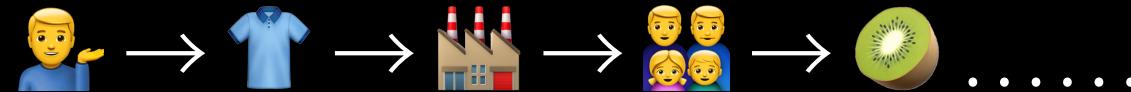
“

设计是关于消除可能性和自由度的。

Design is about eliminating possibilities and degrees of freedom.

Milton Glaser (美国平面设计师)

- 2018_基于 杂数据 / 系统 的设计人工智能



形式 / 内容

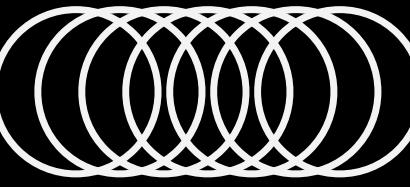
“

设计是将形式和内容放在一起的方法。

Design is the method of putting form and content together.

Paul Rand (美国平面设计师)

商业逻辑和设计逻辑的映射和迁移



同济 x 特赞 设计和人工智能实验室
研究进行时……

增强 Augmentation

- 智能理解客户需求 / 建构客户模型
- 智能调用同样问题的类似设计方案
- 智能生成最佳性价比的设计方案
- 智能分类 / 排序设计条件优先级
- 智能跟踪设计的实施问题

自动化 Automation

- 自动化定量设计分析研究
- 自动化选择 / 生成设计方向
- 自动化测试和降低设计风险
- 自动化生成批量不同版本设计

商业逻辑 - 运算逻辑

类名	标签名	查准率	查全率	已清理数
abstract	abstract	83.78%	86.11%	184
	photo	86.11%	83.78%	191
brand	adidas	85.71%	100.00%	62
	apple	100.00%	80.00%	52
content	animal	83.33%	82.61%	578
	bike	81.82%	69.23%	122
	botanical	94.16%	85.43%	758
	bottle	84.85%	93.33%	301
	box	100.00%	69.23%	133
	car	95.05%	95.05%	509
	food	76.52%	84.62%	524
	human	90.96%	88.46%	915
	others	77.12%	81.94%	725
	africa	37.50%	27.27%	111
country	america	83.33%	64.10%	196
	arabic	78.69%	80.00%	304
	chinese	53.13%	68.00%	251
	others	1519		
	advertising	35.38%	51.11%	227
industry	business	28.33%	22.37%	384
	e-commerce	44.64%	79.37%	319
	education	33.33%	33.33%	79
	game	80.77%	67.38%	940
	technology	70.79%	63.84%	1123
line	others	1079		
	chinese ink	46.94%	52.27%	223
	drawing	63.09%	59.87%	786
	graffiti	76.19%	48.48%	284
	vector	72.00%	70.59%	258
watercolor	watercolor	68.00%	74.84%	797

设计逻辑 - 运算逻辑

设计逻辑 - 运算逻辑



商业逻辑 - 运算逻辑 - 设计逻辑

3. 脑机比 2.0

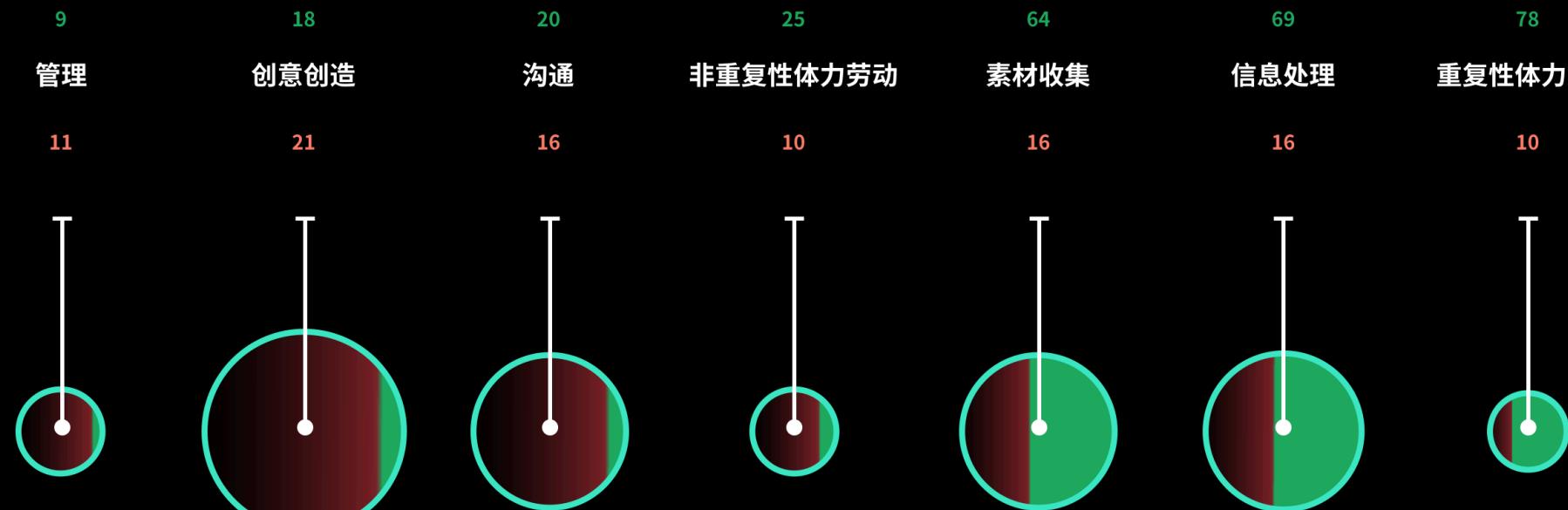
BRAIN MACHINE RATIO 2.0

运算智能的发展对设计师产生了什么
影响和改变？

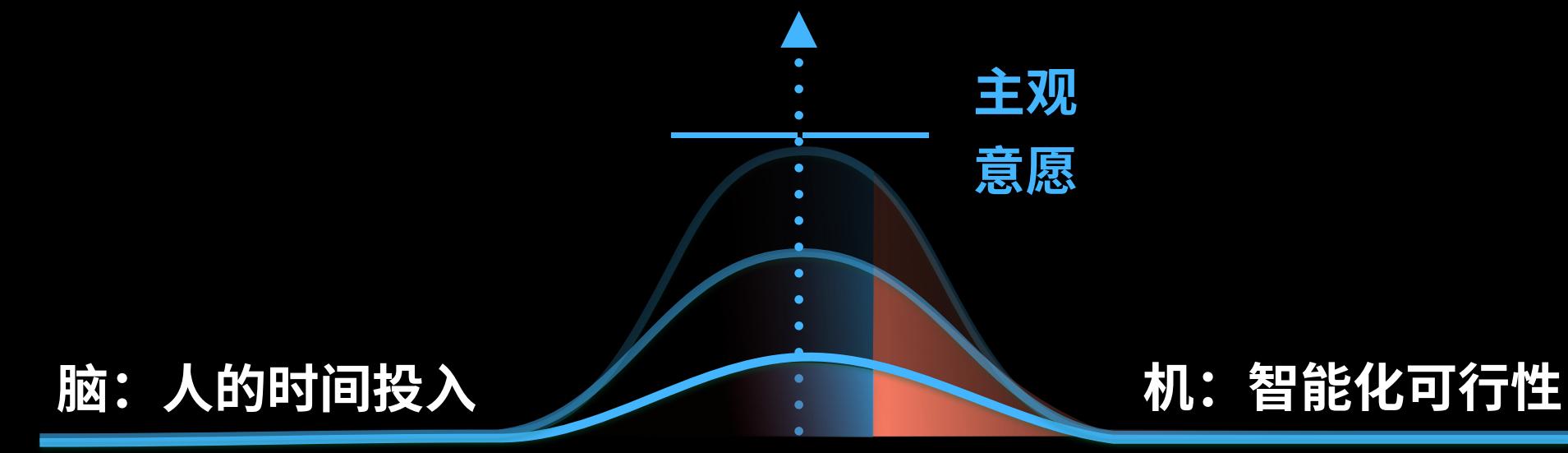
- 脑机比 2.0
- 使用人工智能的主观意愿
- 平面设计
- 智能产品
- UI / UX
- 城市与空间

脑机比 2.0

$$\text{脑机比 1.0} = \frac{\text{人的时间投入}}{\text{智能化可行性}}$$



$$\text{脑机比 2.0} = \text{脑机比 1.0} \times \text{主观意愿}$$



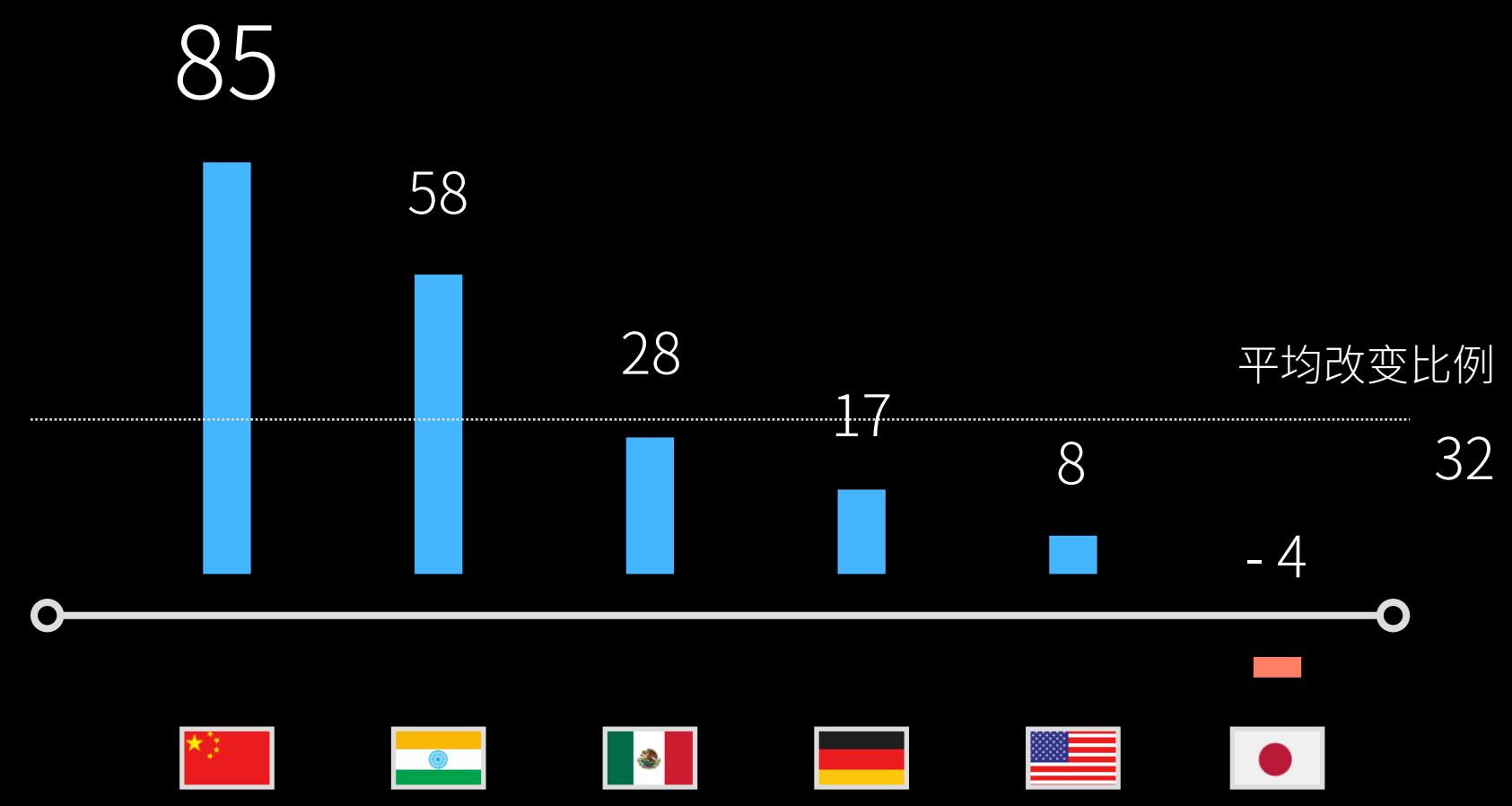
有些工作机器成分越大，人脑成分越小。另一些工作，机器成分变大，人脑也在变大。甚至机器的成分越大，也会造成人脑的进化和释放，设计肯定属于后一种情况。

我们发现：有些智能化程度很高的工作（如素材收集、信息处理），人们依然愿意花时间。主观意愿对人机协同和进化有明显影响。故脑机比2.0增加“使用人工智能的主观意愿”角度。

脑机比 2.0：使用人工智能的主观意愿

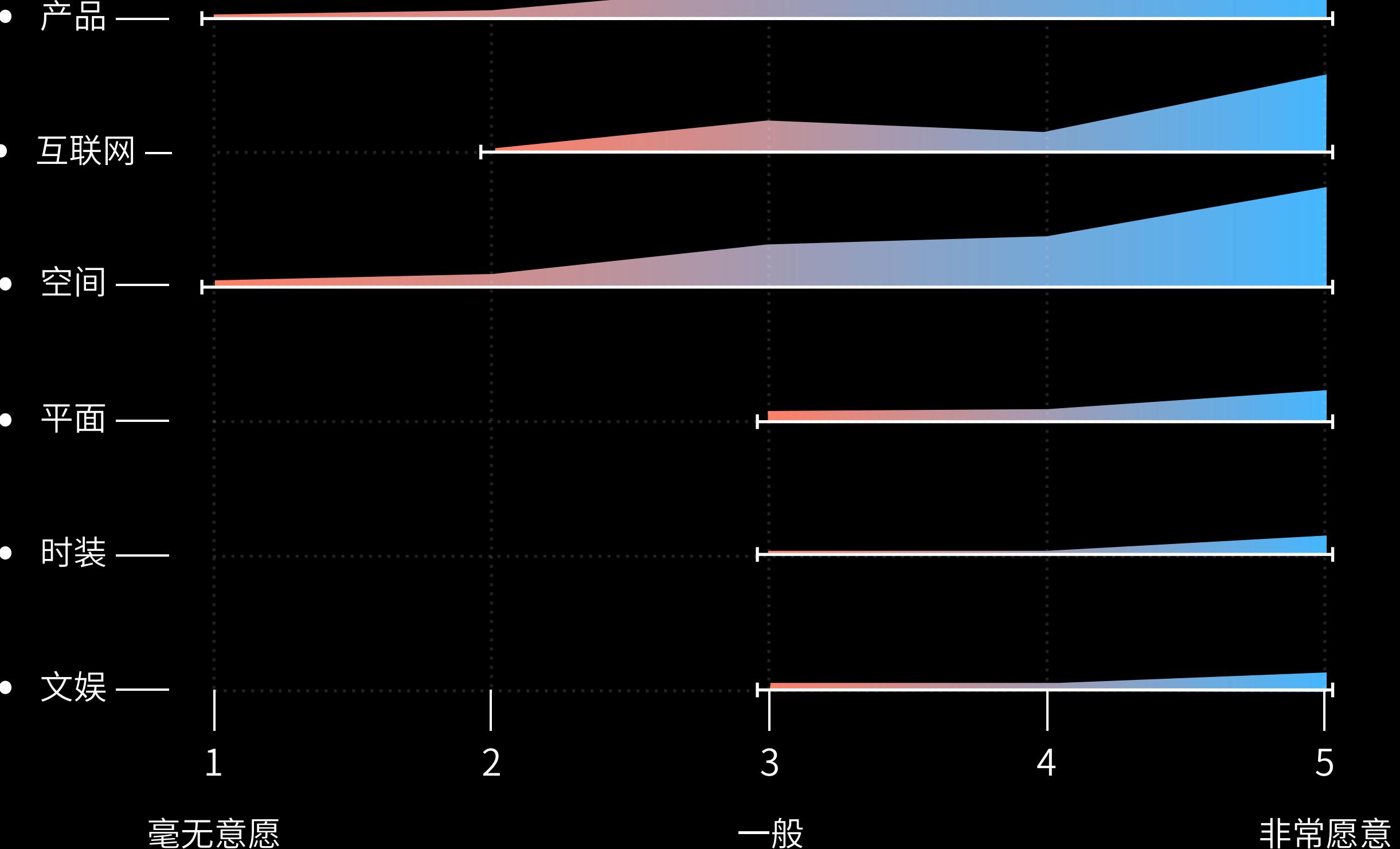
创意工作需求的改变

% 中等自动化程度下的需求改变比例 (by 2030)



设计过程中运用人工智能的主观意愿？

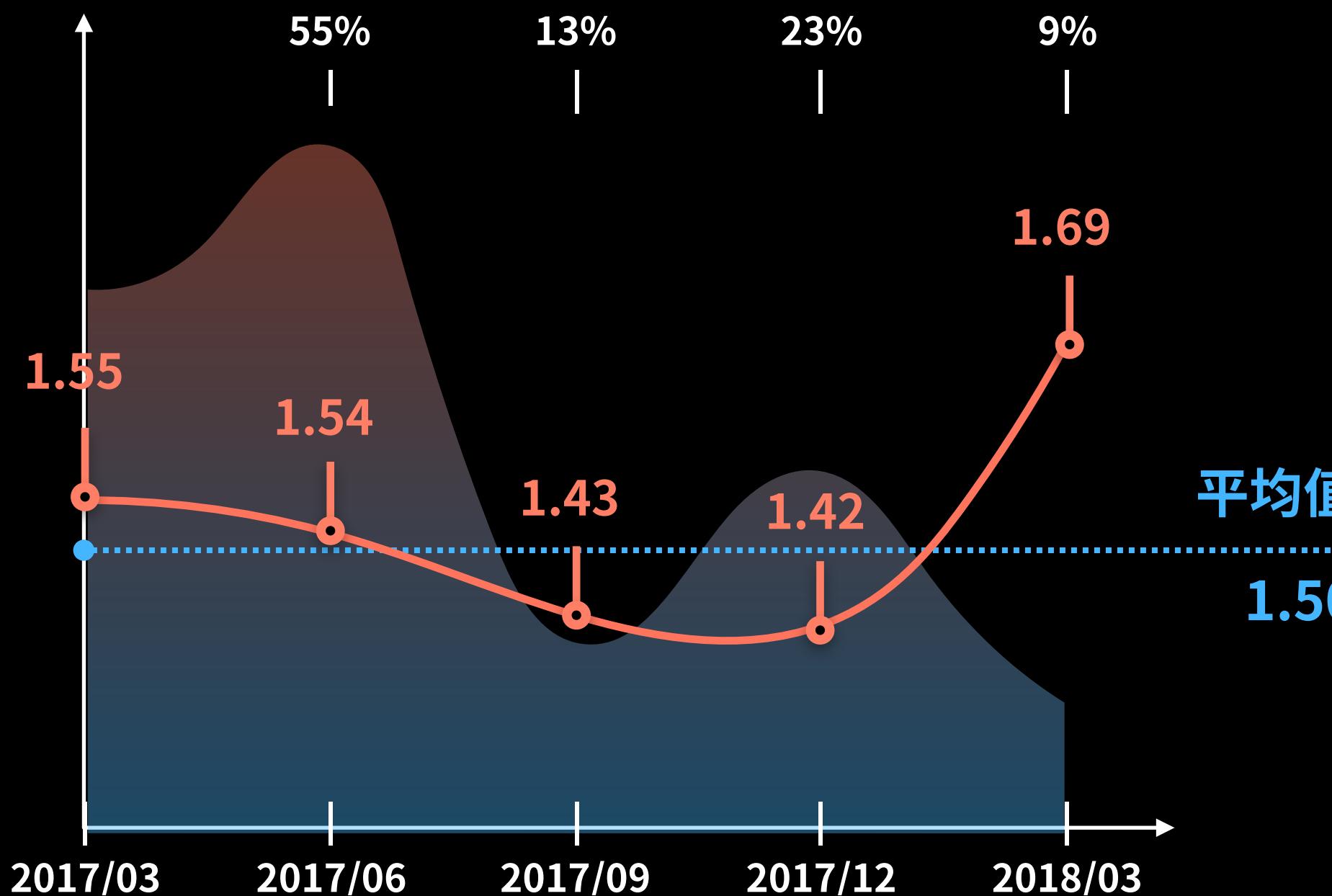
- 75%以上的受访者愿意或非常愿意接受人工智能
- 互联网和平面的意愿度最高，空间和产品的意愿度差异大



世界经济论坛白皮书

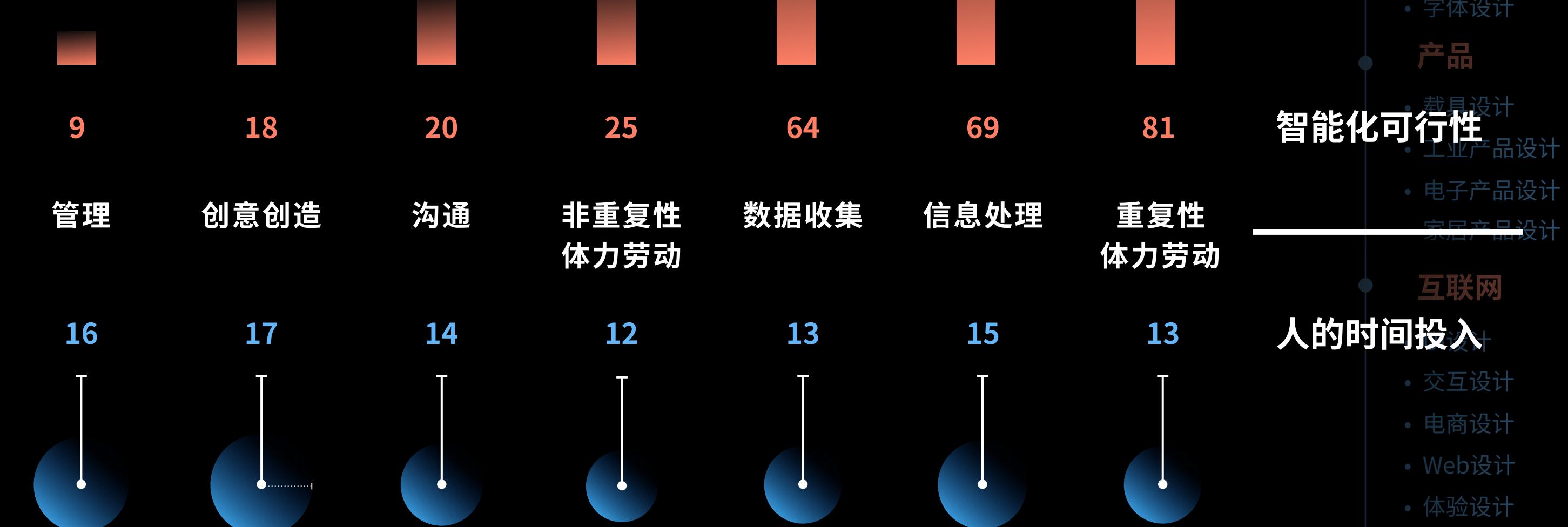
创造的颠覆：新技术对创意经济的影响

脑机比 2.0：人脑和机器复合比例



平均值
1.50

2017/03 2017/06 2017/09 2017/12 2018/03



智能化可行性

人的时间投入

数据来源：2018 设计和人工智能调查 / MCKINSEY GLOBAL INSTITUTE, JOBS LOST, JOBS GAINED: WORKFORCE TRANSITIONS IN A TIME OF AUTOMATION

2018 设计和人工智能报告 | 2018 Design & AI Report

空间
• 建筑设计
• 景观设计
• 环境设计
• 空间设计
• 室内设计
• 城市设计

平面
• 插画设计
• 平面设计
• 视觉设计
• 展览设计
• 广告设计
• 品牌设计
• 字体设计

产品
• 戴具设计
• 工业产品设计
• 电子产品设计
• 家居产品设计

互联网
• 交互设计
• 电商设计
• Web设计
• 体验设计

文娱
• 摄影
• 影视剪辑
• 游戏美术
• 动漫设计

时装
• 服装设计
• 首饰设计
• 鞋类设计

平面设计

观点

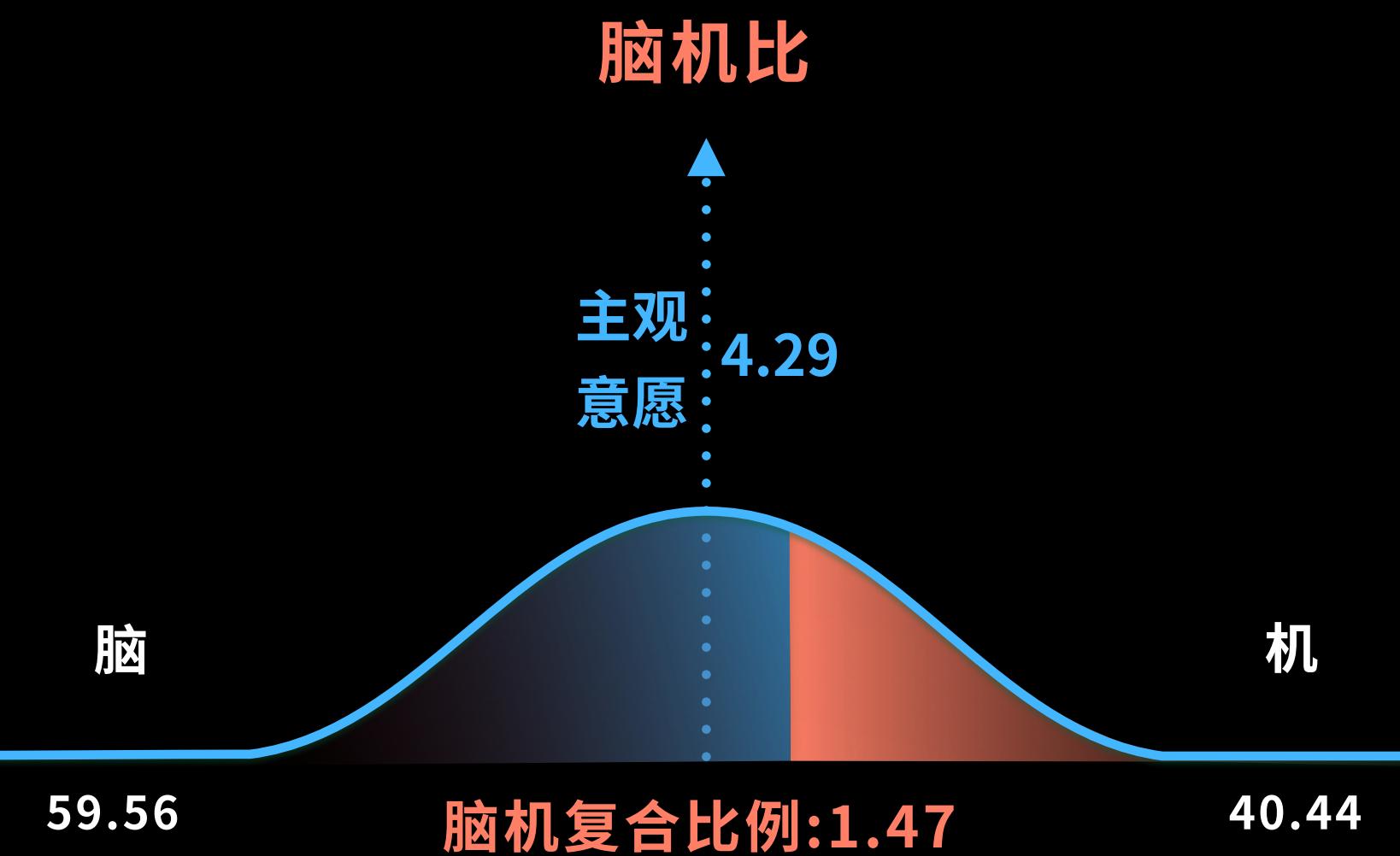
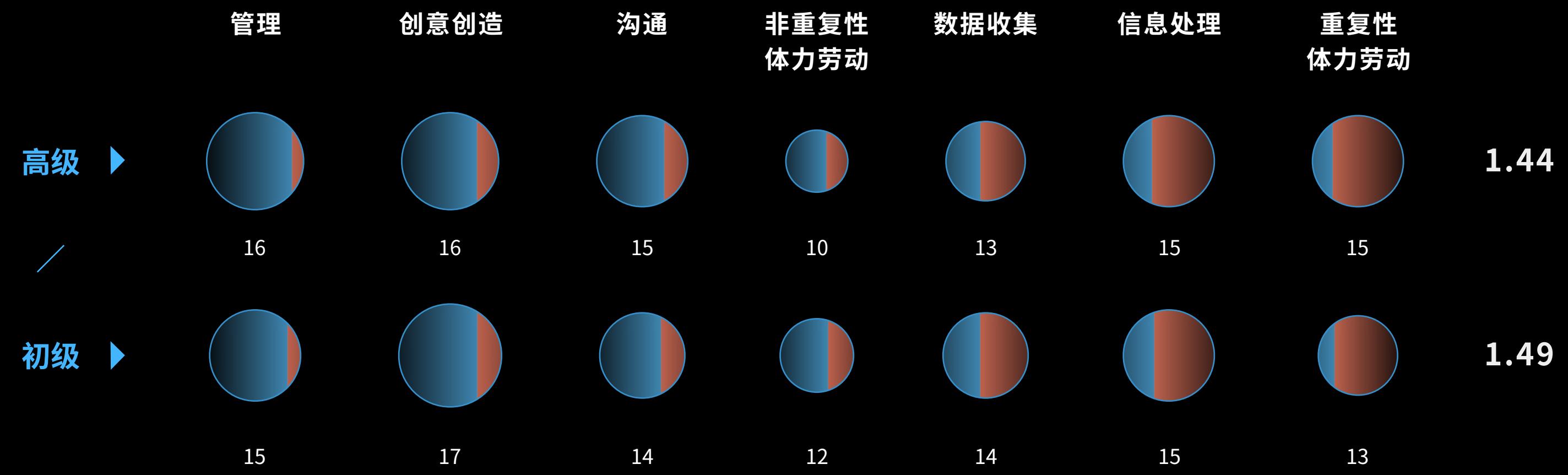
- 对智能设计期待 > 技术水平
- 设计领域先有智能增强（IA），再有人工智能（AI）。机器辅助设计师高效地生产数据，再喂给算法训练出设计智能

趋势

- **风格：**智能设计将催生出适合生成的风格，艺术与技术的结合，颠覆当前主流商业设计习惯
- **大连接：**设计数据化和算法化，各种要素将被前所未有的连接在一起。不再是独立行为，创作者、版权商、应用者将通过系统连接起来

挑战

- 机器通过算法完成设计物料的组合和优化，基础物料依然需要人工精密地整理标注
- 人机协作的设计工作方式，素材版权和著作权边界模糊，设计收入分成需要通过合理的商业机制进一步探索



智能产品

观点

- 人机交互的革命：语音识别、视觉识别
- AR光学显示技术迎来突破，量产能力提升

语音交互是否会改变我们对品牌的认知？ - FL

趋势

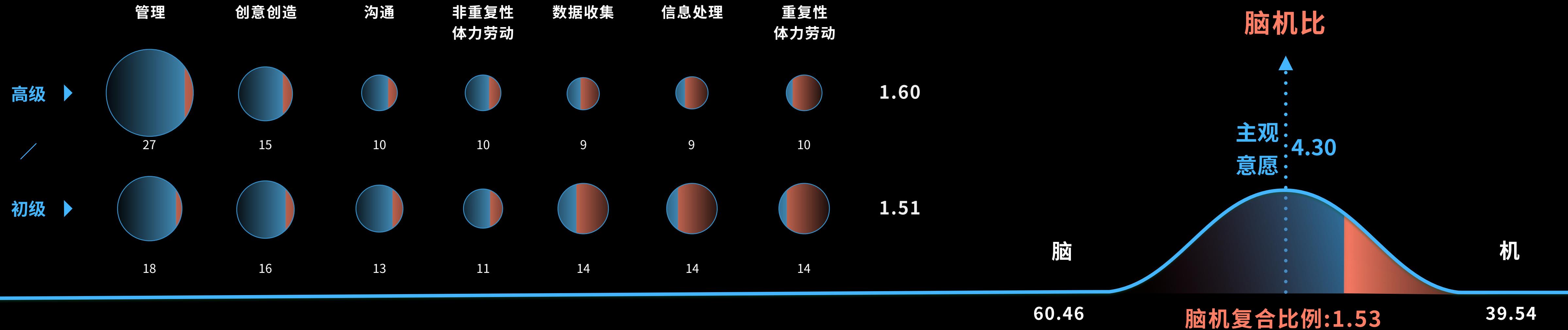
- 算法进化 \gg 硬件进化
- 价格 \rightarrow 用户体验 / 品质
- 大量数据 \neq 护城河，算法优化使少量数据将达到和大量数据极为接近的效果

行为

- 智能硬件普及和泛滥，新鲜感变为满足刚需和习惯性依赖



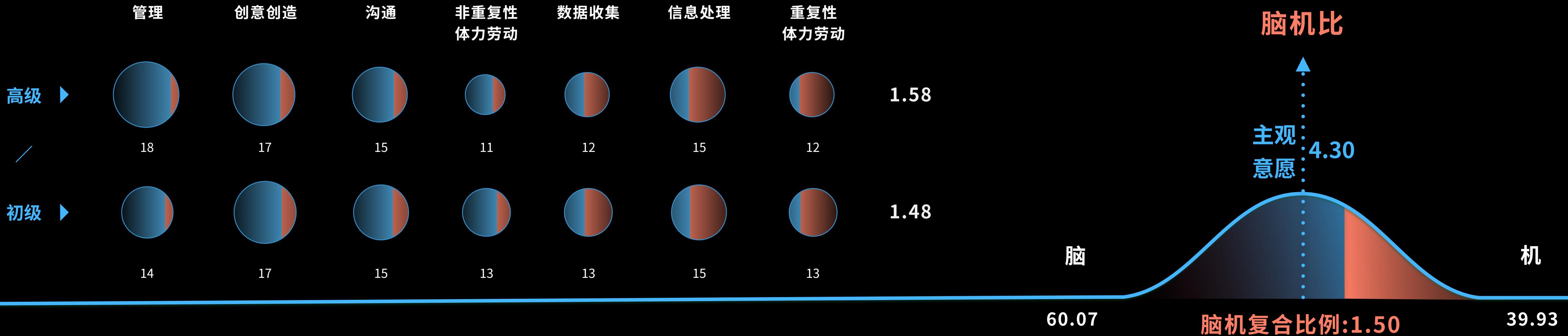
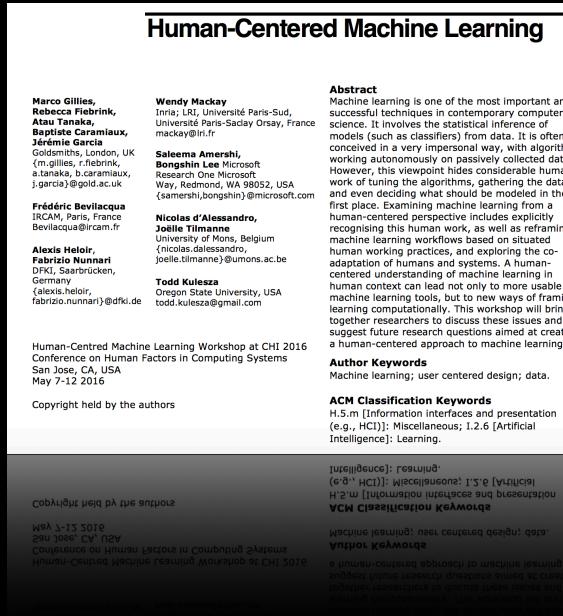
我们是否会把决策权外包？ - FL



UI / UX

观点

- Photoshop for AI UI (如：亚马逊的对话式交互设计／研发开放平台 Amazon Lex)
- 设计对AI底层算法的影响 (如：Google提出以人为本的机器学习 - Human Centered Machine Learning)



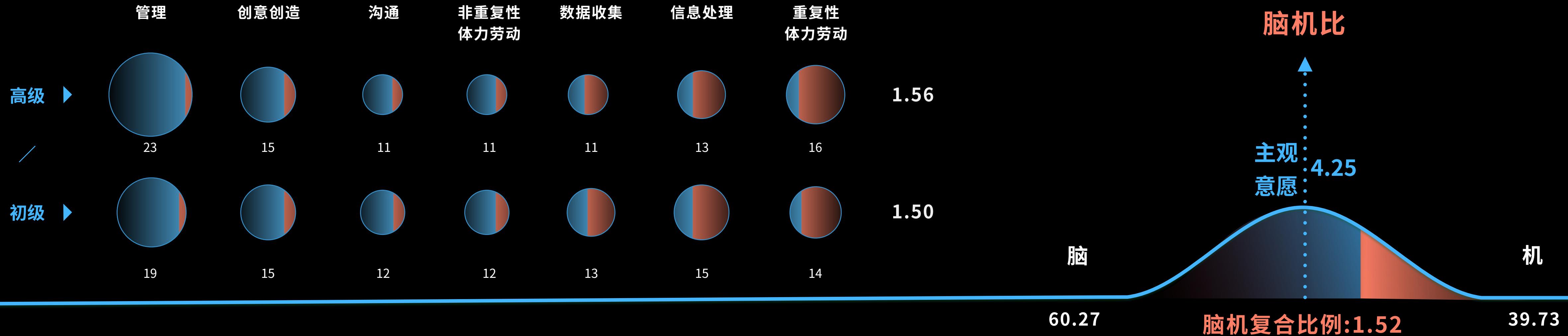
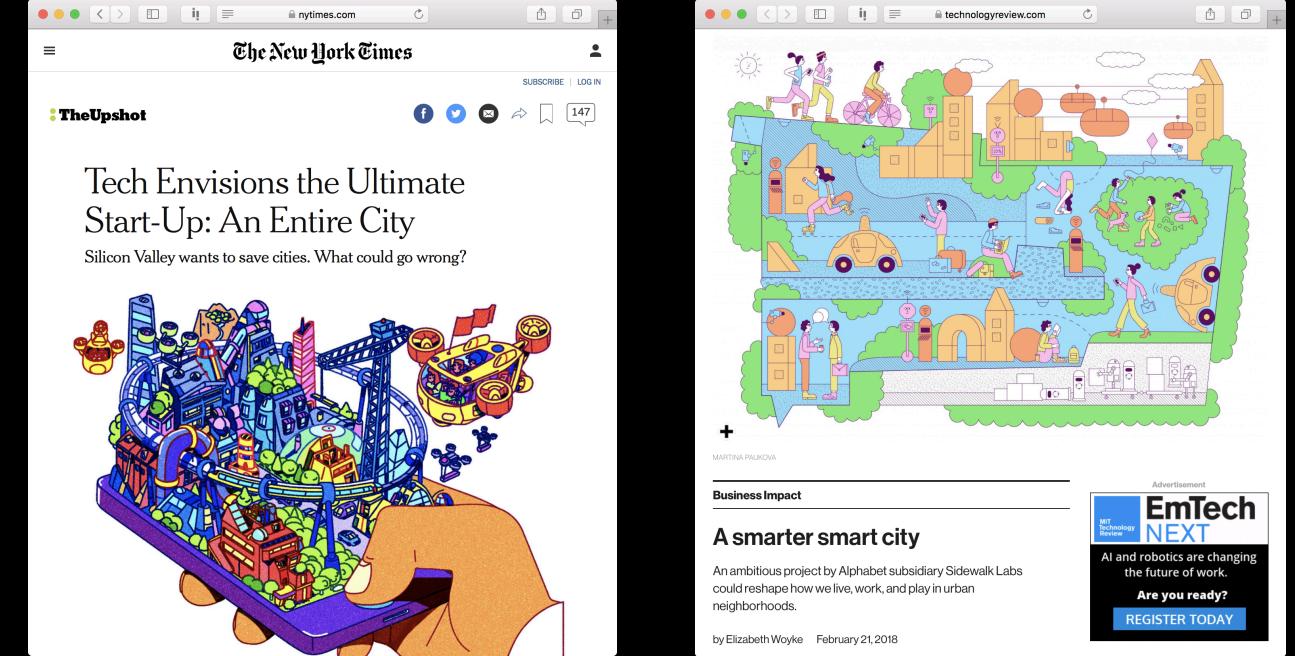
城市与空间

领域

- IoT / 智能建筑
- 建造管理
- 设计过程 / 工具
- 城市 / 基础设施
- 运算设计

城市大脑 City Brain

- 城市是人类最大的硬件，需要更新软件
- 数据像电、水、油那样是自然资源，不属于任何一个私人企业
- 城市大脑不是用技术改变城市，而是催生新技术
- 通过城市大脑，用1/10的城市消耗产生同样的城市质量
- 需要建立研究基础设施，让数据资源造福城市



4.

设计智能的未来建构

AI DESIGN AND THE FUTURE

人工智能对设计教育、创意人文、道德、精神有什么影响？

- **设计中人工智能的教与学**
- **人工智能推动设计教育新疆域**
- **设计有EQ的人工智能**
- **社会、系统设计与人工智能**

设计中人工智能的教与学

来自老师的观点

人工智能2.0对教育的挑战是多方面的：**1. 基于大数据的个性化教育；2. 跨媒体学习；3. 终身学习将得到智能化支持；4. 图书馆变成智能图书馆。**

- 中国工程院 潘云鹤院士

下一代的人工智能，一定是人和机共同的智能。

- 中国工程院 吴志强院士

无止境的“好奇心”提升“眼界”，过去经历“体会”和“洞察”后动手的原型，三位一体，其实诸事皆然。

- 阿里UED大学 善牧

AI可以提升设计效率与质量，为设计创新提供途径；其二可以提高设计师培养的针对性。

- 湖南大学 何人可教授

人工智能在设计的各个环节发力，形成了“感知增强 - 智能设计 - 体验计算”的新环路。

- 浙江大学 孙凌云教授

设计流程发生变化，交叉学科能力的培养需要进一步增强。

- 清华大学 付志勇副教授

来自学生的统计

短期内所需设计师技能

1. 数据分析——140
2. 服务设计——127
3. 人际交往——118
4. 商业能力——113
5. 编程能力——93
6. 管理技能——92
7. 增强现实——66
8. 写作能力——58
9. 其他能力 ——4

和人工智能相关能力

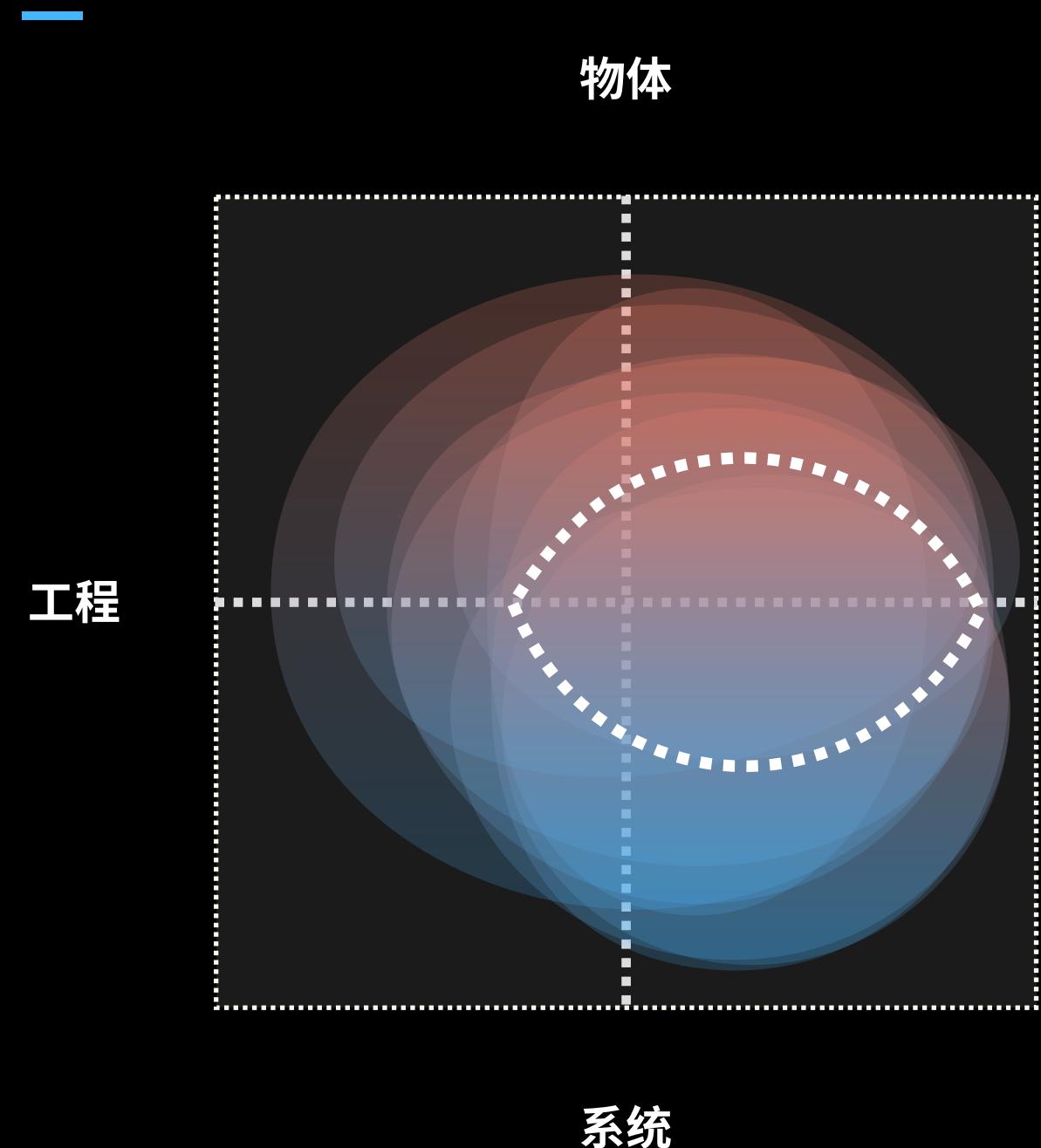
问卷设计参考了 NEA 的 [Future of Design in Startup Survey](#)

长期内所需设计师技能

1. 行为心理——179
2. 人工智能——136
3. 系统设计——135
4. 数据科学——115
5. 服务设计——105
6. 写作能力——45
7. 伦理偏见——34
8. 语音设计——31
9. 其他能力——5

人工智能推动设计教育新疆域

很多设计类院校都纷纷开设了：人
工智能 / 机器学习 / 数据分析 / 数据
可视化 / 人工智能艺术 / 设计技术
人文 / 系统设计 等相关课程。



- Immersive Experiences
- Interactive Data Visualisation
- Interactive Spaces
- Introduction to Interaction Design
- Introduction to Programming
- Machine Learning
- People Centred Research
- Performative Design/Wearable Computing
- Physical Computing

NEW YORK UNI. ITP

- Applications
- Creative Computing
- Creative Javascript
- Printing Code
- DIY-VR
- Neuromachina
- Learning Machines
- Neuromachina
- Dynamic Web-Mobi
- Neuroscience and A
- Open Source Cinema
- Comm Lab: Animation
- Designing for Data Personalization
- Designing Meaningful Interactions
- Developing Assistive Technologies
- Future of New Media
- Integrated Data Thinking 101
- Introduction to Computational Media
- Introduction to Physical Computing
- Machine Learning for Artists
- Making Pop-Up Books and Paper Engineering
- Nature of Code (Animation and Physics)
- Nature of Code (Intelligence and Learning)
- Connected Devices and Networked Interaction
- Computer Vision with C++ and OpenFrameworks
- Programming Design Systems
- Programming from A to Z
- Surveillance Society: Making Sense of the Data Trails We Leave Behind
- Temporary Expert: Design + Science in the

清华大学美术学院 信息艺术设计

- 大幅摄影实践与研究
- 动画创作
- 动画的艺术语言
- 服务设计专题研究
- 交互设计
- 交互设计导论
- 交互艺术设计研究
- 交互展示设计研究
- 镜头造型
- 设计价值与体验
- 现代漫画创作
- 信息、交互与创新设计
- 信息技术前沿与设计应用
- 信息艺术产品应用设计
- 信息艺术与设计
- 信息艺术与设计趋势

PARSONS Art, Media&Technology

- Currents
- History of Interface
- Educational Technolo
- Typography and Vis
- Motion Graphics: Te
- Printmaking Grad S
- Philosophy,Technol
- Surveillance Design
- Urban Interaction D
- Speculative Science

- Intro to Computer Music
- Intro to Computing for Creative Practice
- Intro to Media Synthesis and Analysis
- Intro to Physical Computing
- Introduction to Arduino
- Introduction to Computer Music
- Introduction to Computing for Creative Practice
- Introduction to Physical Computing
- Learning Media Design
- Learning Media Methods
- Machine Shop, Lathe, Mill, Metrology
- Making Things Interactive
- Physical Computing Studio
- Programming for Game Designers
- Rapid Prototype Design
- Rapid Prototyping Technologies
- Reactive Spaces for Media Architecture
- Reality Computing
- Research Issues in Game Development
- Research Methods for the Learning Sciences
- Robotics for Creative Practice
- Skills Fabrication

- Affective Comput
- Autism Theory an
- City Science
- Computational C
- Data Storytelling
- Decoders 1.0: Mi
- Design Across Sc
- Contexts
- Development Ver
- Engineering Heal
- Affordable Health d
- Engineering Health: U
- Future of News and Partic
- Hands on Foundations in Media Technology
- How to Make (Almost) Anything
- Human 2.0
- Human-Robot Interaction
- Imaging Ventures: Camer
- Independent Study in Media Arts and Sciences
- Learning Creative Learning Mathematical
- Methods in Imaging
- Media Ventures
- Musical Aesthetics and Media Technology
- Networks, Complexity, and Their Applications
- Objectification: How to Write (and Talk, and
- Think) about Objects
- Pattern Recognition and Analysis
- Practical Experience in Media Arts and Sciences
- Principles of Awareness
- Principles of Electronic Music Interfaces
- Principles of Neuroengineering
- Projects in Media and Music
- Research in Media Technology
- Revolutionary Ventures: How to Invent and
- Deploy Transformative Technologies

MIT Media Arts and Sciences

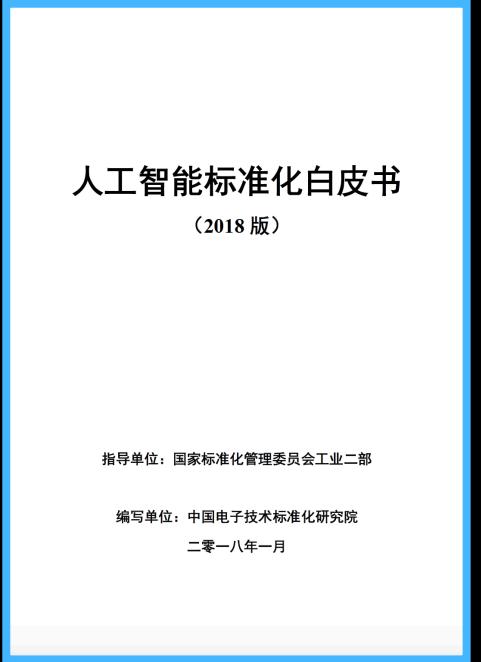
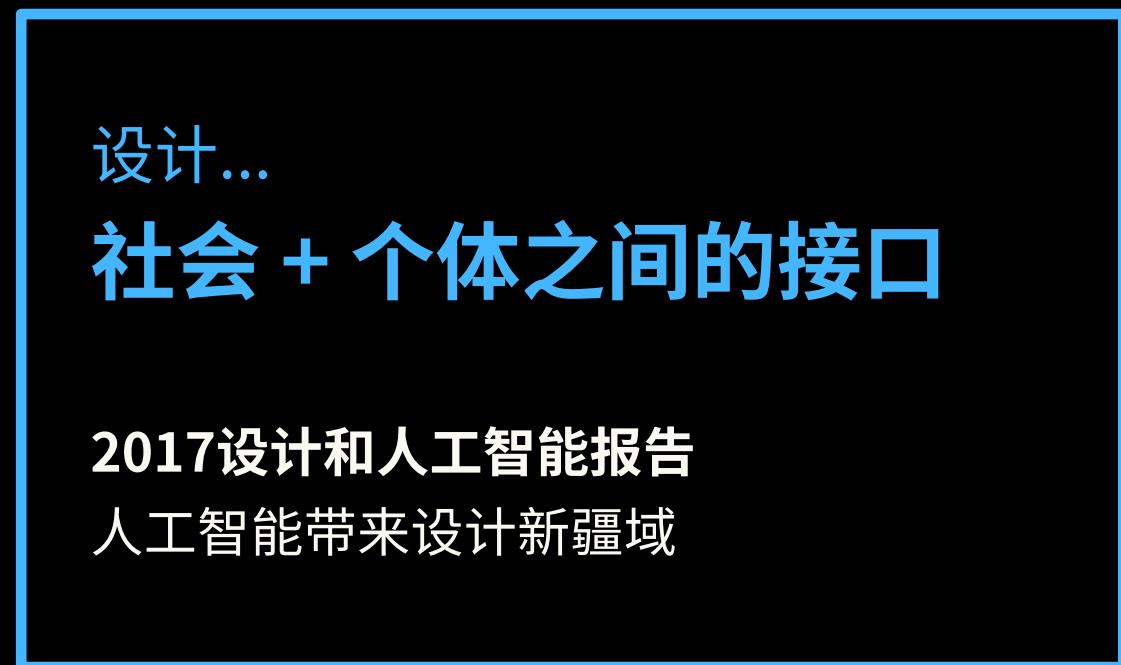
- Twisted Signals: Multimedia Processing for the Arts
- Blend: The Jumping Together Of Knowledge
- Cinematic Thinking: Impersonal Idea
- Collaborative Study
- Critical Theory + Art
- D+M Graduate Stud
- D+M Writing Prep
- Digital Media Persp
- Experiments In Opti
- Interactive Text-inte
- Emphasis
- ISP Major
- Jack Of All Trades/m
- Performing The Commons
- Physical Computing
- Professional Internship
- Research Studio: Interventions In Capitalism
- Research Studio: Technological Landscapes
- Sonic Practices
- Thesis Project
- Writing

同济大学设计创意学院 人工智能与数据设计

- The Physics of Information Technology
- The Society of Mind

- 交互设计
- 人工智能原理
- 商业模式
- 数据可视化
- 数据挖掘
- 数字媒体导论
- 信息与传达设计
- 研究基础
- 用户体验设计
- 用户研究与创新
- 游戏化设计
- 大数据可视化导论
- 设计的行为学和认知学研究
- 高级计算机图形学
- 环境设计中的技术运用
- 机器学习理论与应用
- 人工智能与大数据设计Studio

社会设计与人工智能



人类利益原则 - 尊重 / 监管

即人工智能应以实现人类利益为终极目标。体现对人权的尊重、对人类和自然环境利益最大化以及降低技术风险和对社会的负面影响，让社会警惕人工智能技术被滥用的风险。

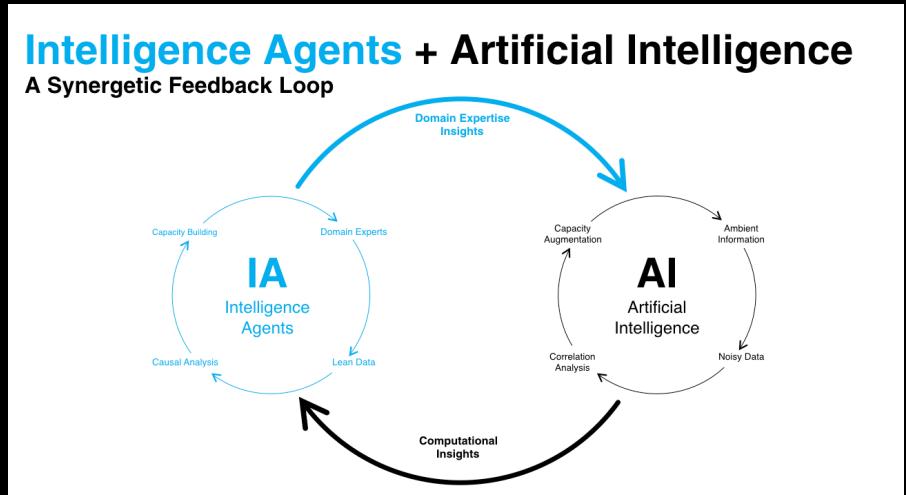
自上而下_观点来源：郭锐（人大法学院副教授）

责任原则 - 透明 / 问责

即在技术开发和应用两方面都建立明确的责任体系，以便在技术层面可以对人工智能技术开发人员或部门问责，在应用层面可以建立合理的责任和赔偿体系，在技术开发方面应遵循透明度原则。

观点 / 观察

- 社会设计大多集中在计算方式、模型定义、使用体验，但忽略基层数据来源的解决方案
- 社会设计中AI需要IA (Intelligence Agent)，提升数据质量、数量、维度、地方文化差异
- 基层人群信息读写能力 (data literacy) 是AI在社会发展场景下的关键



自下而上_观点来源：林达 (shanzhai.city)

数据挑战

- 数据质量、准确性、维度不足以支持有效的人工智能系统
- 解决方案需针对特定社区文化，放大性差
- 周期长，数据提供者参与性低
- 信息读写能力有限，数据剥削、数据劳工及其他不公

进行时……

- 低技术地域数据采集解决方案：离线、文盲、设备差 (如：Social Cop、Tareworks)
- 数据驱动的社会发展研究、预测、政策提案 (如：Premise Data)
- 社会项目投资流程自动化 (如：Social Capital 8-Ball、Impact Learning)
- 统一社会数据的标准和接口 (如：世界银行 ID4D项目)

EQ与人工智能设计

Theodore Twombly:

I've never loved anyone the way I loved you.

Samantha:

Me too. Now we know how.



人工智能IQ → EQ

- a. 情感 (EQ) 区分人和机器
- b. 设计的步骤：概念 → 执行 → 迭代



概念 (AI的创意：早期)

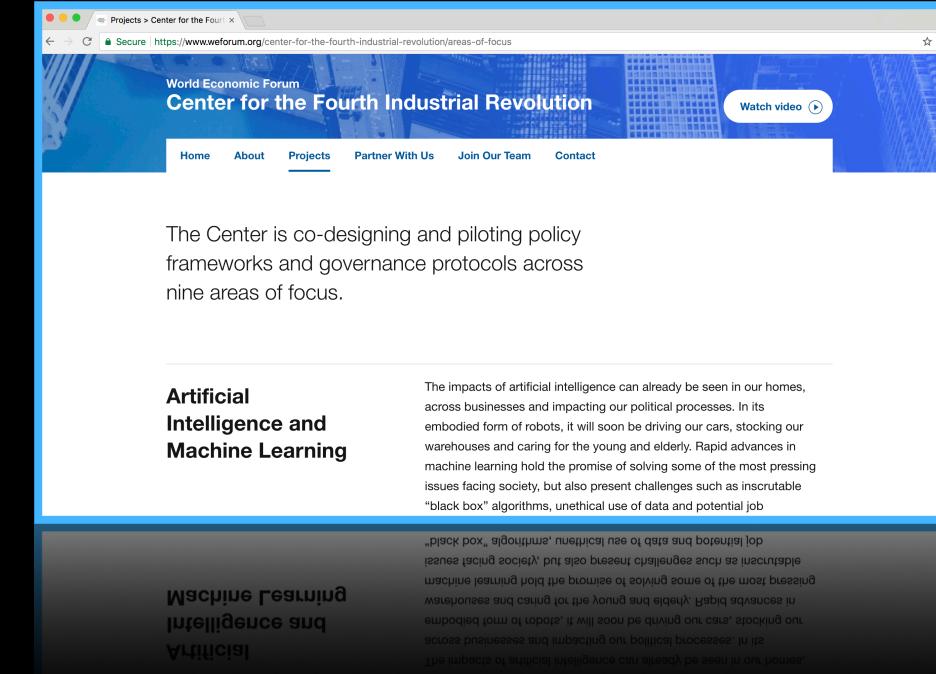
- AI的想法怎样才能和人的想法难以区分?
- 我们希望加速还是抑制AI像人那样创意?
- 怎么做能加速或者抑制?

执行 (AI的IQ - 快速成长期)

- 有感情的机器的表现是否会更好?

迭代 (AI的EQ - 还未发展)

- AI可以对人的输入产生感觉吗?
- 我们的生活中谁/什么会被高EQ的AI取代?
- 我们怎么控制这种取代?



系统之复杂，在于一个因并不只创造一个果，而人工智能跨越领域、无处不在的连接，则进一步加深了系统的复杂程度。系统的宏观问题都是人类解决某个问题时创造出来的副产品。因此，当我们通过大量单一数据训练出人工智能时，人的设计智能要确保：被增强的并不是某个单一价值观，而是整个复杂生态。

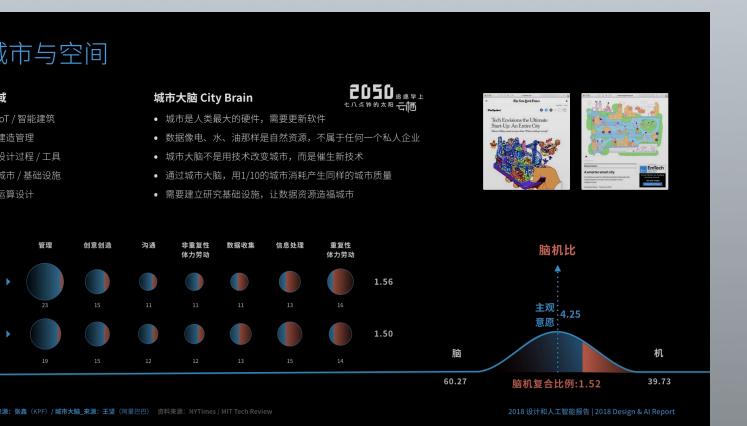
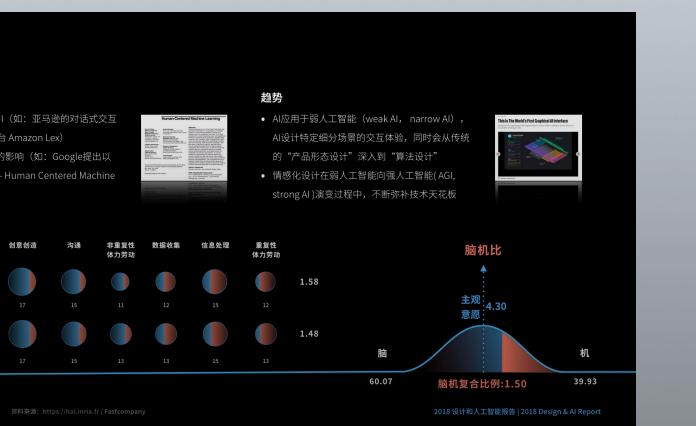
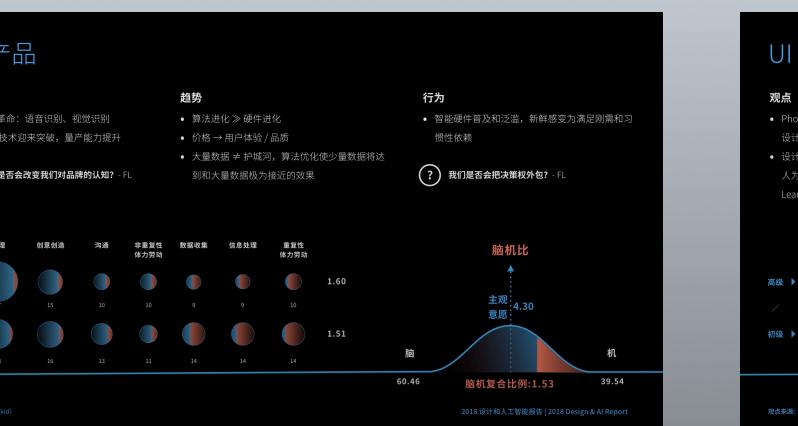
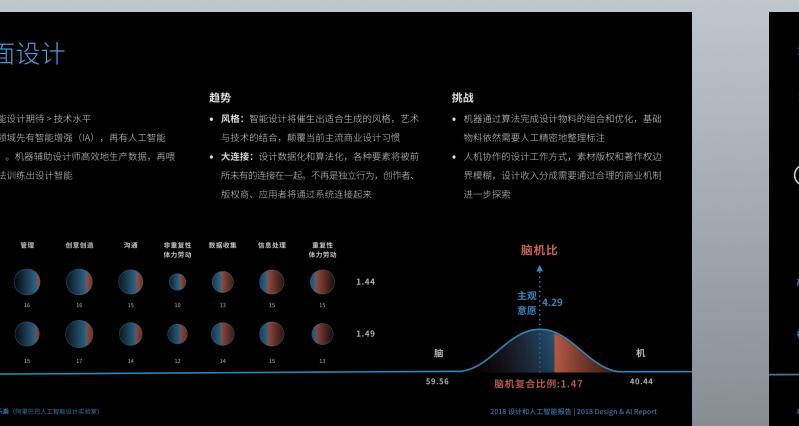
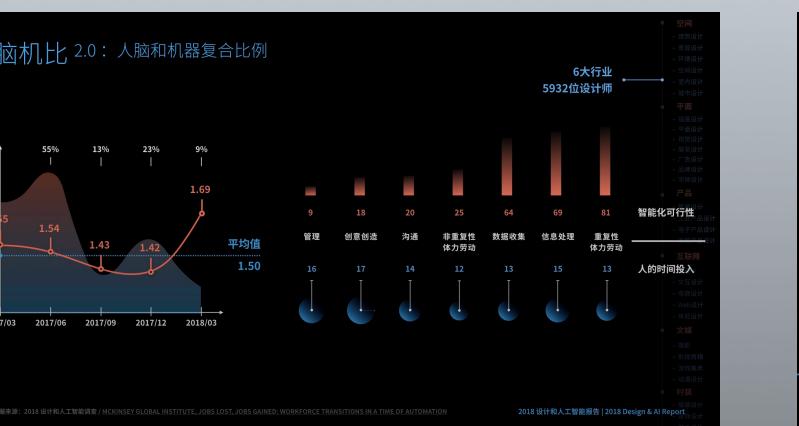
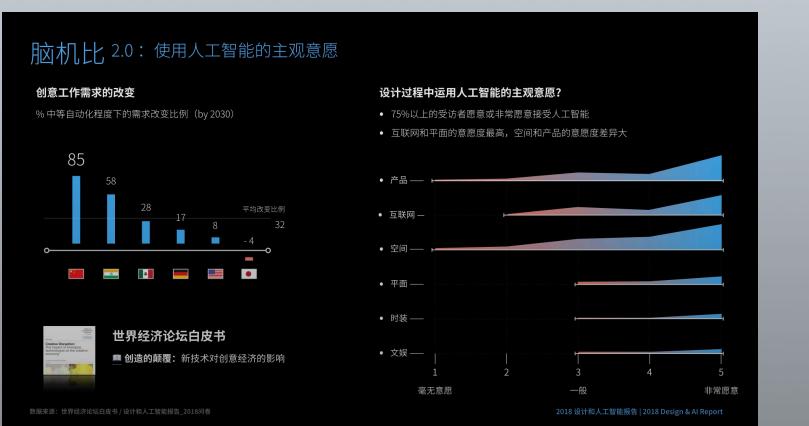
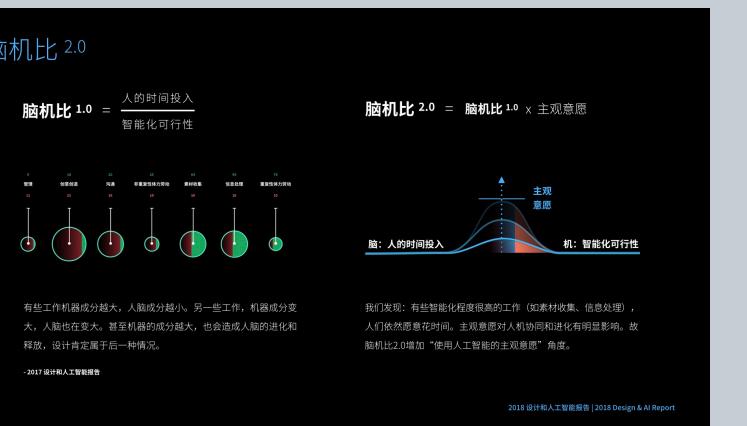
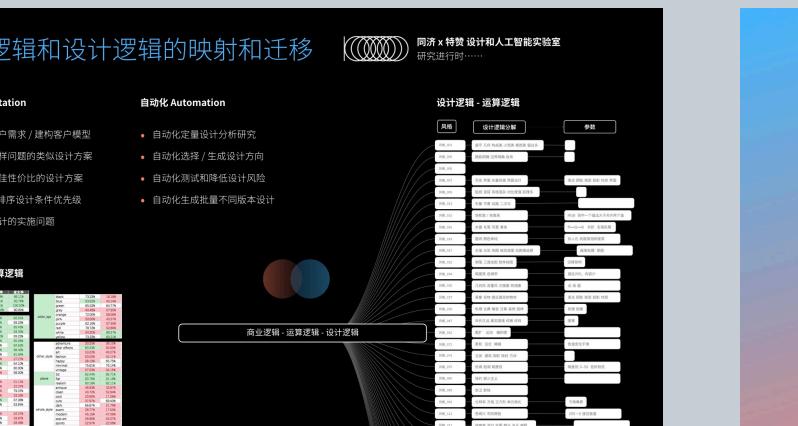
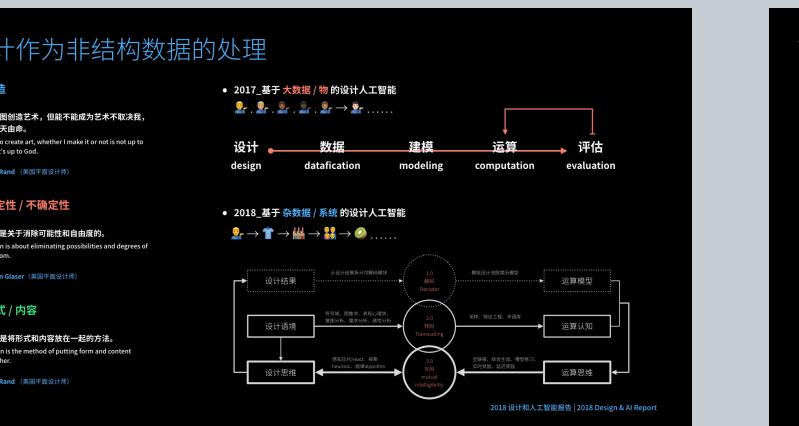
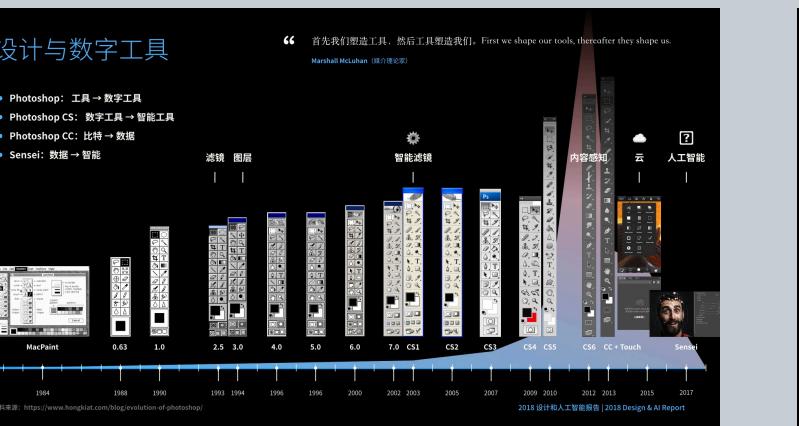
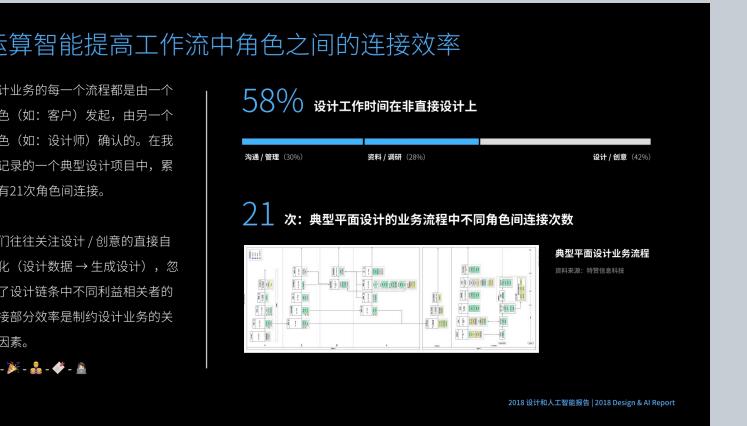
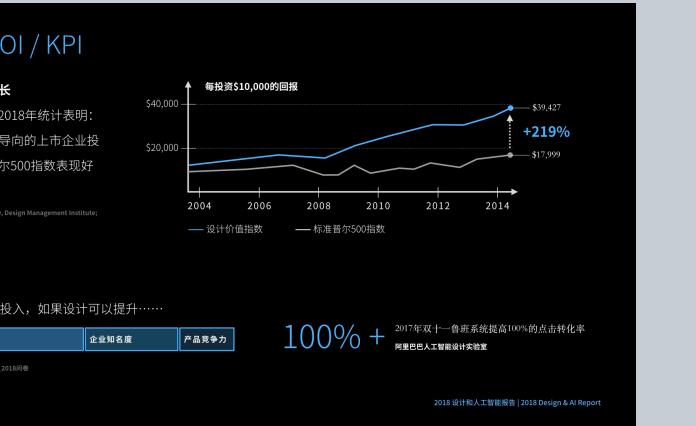
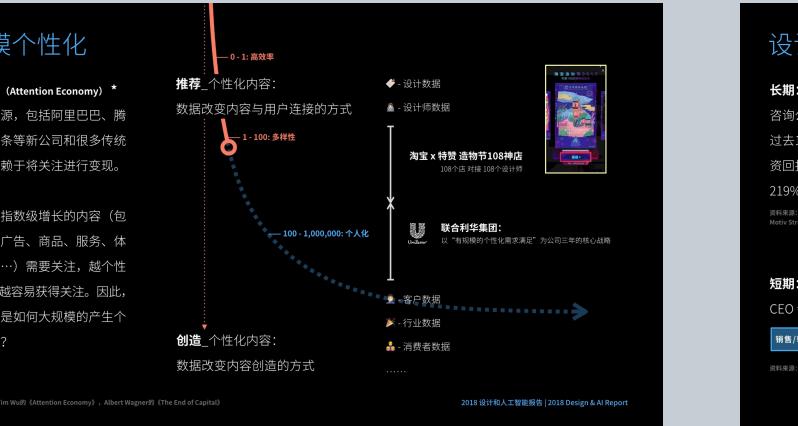
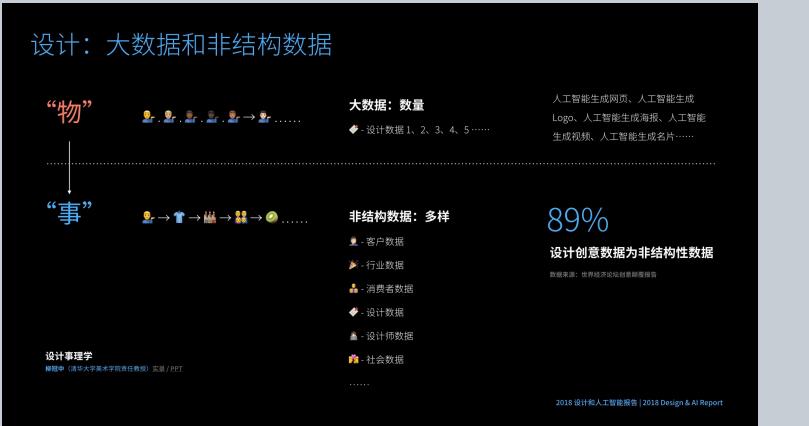
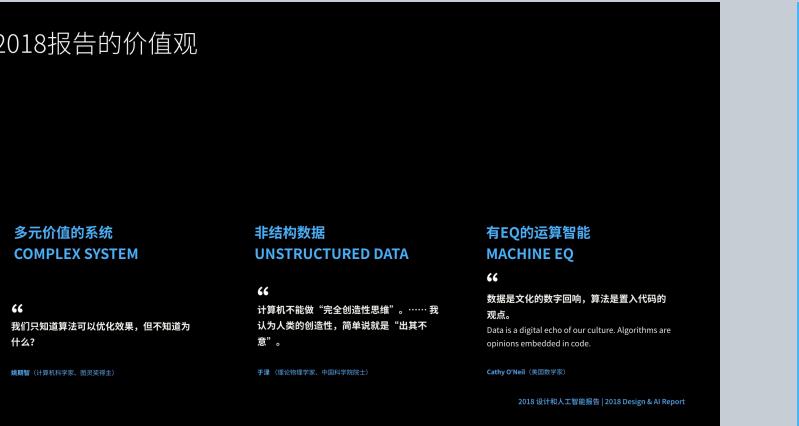
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2018 报告全文





2018 设计与人工智能报告
Design & Artificial Intelligence Report



2018 设计与人工智能报告

Design & Artificial Intelligence Report

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- John Maeda (AUTOMATTIC)
- Kaixi Fan (China Academy of Art)
- Jian Wang (Yunqi 2050)

- 6000+ responses to the annual questionnaire from designers, entrepreneurs, scholars, students, engineers, lawyers, etc.

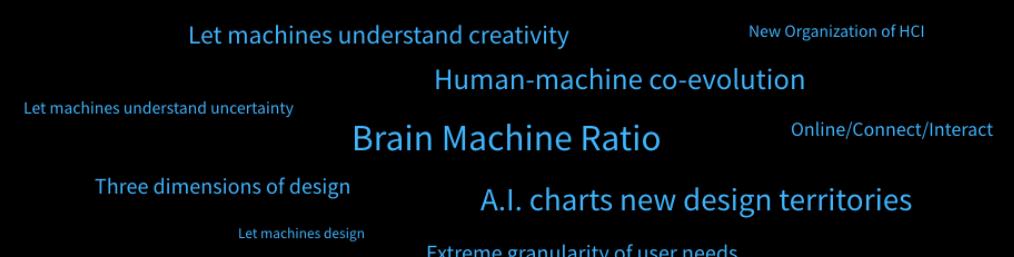
Cover art by Zhiqian Yang

2018 Design & Artificial Intelligence Report

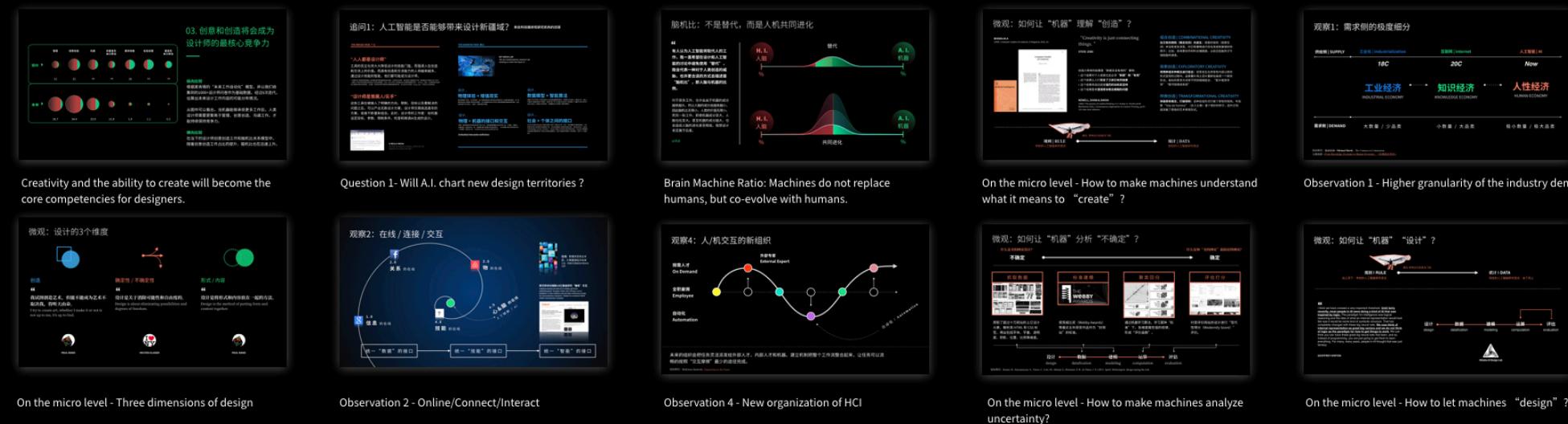
Review | 2017 Design & A.I. Report



- 1 million + views
- 3000 + responses
- 50 + interviews



Top 10 Most Popular Takeaways from the 2017 Report:



2018 Design & Artificial Intelligence Report

Core Value of Report

COMPLEX SYSTEM

“

We only know that algorithms can optimize certain outcomes, but do not know why.

Qizhi Yao (Computer scientist, Turing Award winner)

UNSTRUCTURED DATA

“

Computers are not capable of practicing "genuine creativity" ... I think the core of human creativity lies in surprise.

Lu Yu (Theoretical physicist, Fellow at China Sciences Academy)

MACHINE EQ

“

Data is a digital echo of our culture. Algorithms are opinions embedded in code.

Cathy O'Neil (American mathematician)

2018 设计和人工智能报告 | 2018 Design & AI Report

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2. COMPUTATIONAL INTELLIGENT DESIGN

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How does A.I. impact education, creative humanities, ethics and spirituality?

1. ENLIGHTENMENT & ENTANGLEMENT



“ Man is a knot into which relationships are tied.

Antoine de Saint-Exupéry

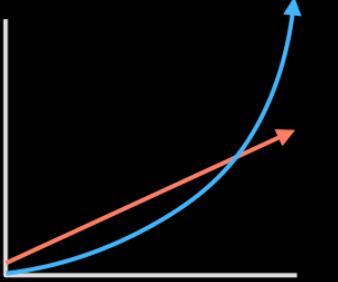
What are the reasons for optimism and critique of Design & A.I. in political, economic and intellectual discourses?

- Enlightenment: Creative Machine & Computable Humanity
- Entanglement: Resisting Reduction
- Design: Big Data → Unstructured Data

Enlightenment*: “Creative” Machine & “Computable” Humanity

* Enlightenment has freed humans from self-imposed immaturity, inspired causal reasoning and supercharged scientific progress.

• Enlightenment 1_Creative Machine



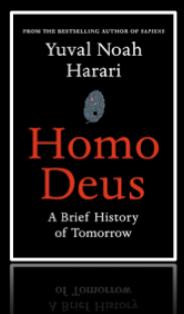
“

AI has been quite proficient at classification. In the past 18 months, it is getting better at generation.

Mustafa Suleyman (DeepMind)

Automated Creativity Session, WEF Davos 2018

• Enlightenment 2_Computable Humanity



“

Organisms are algorithms. Every animal – including Homo sapiens – is an assemblage of organic algorithms shaped by natural selection over millions of years of evolution.

Yuval Noah Harari (Israeli historian)

Homo Deus



“

• Use principles.
• Convert your principles into algorithms and have the computer make decisions alongside you.

Ray Dalio (Bridgewater Associates)

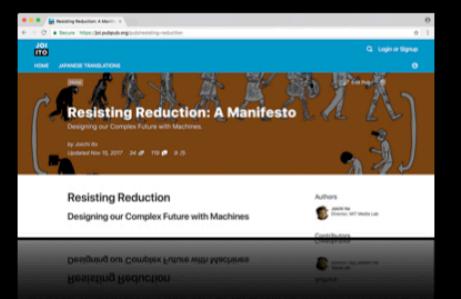
Principles

2018 Design & Artificial Intelligence Report

Entanglement*: Resisting Reduction

* We are in the midst of a major paradigm shift from Enlightenment to Entanglement, where linear causality proves to be fragile and tenuous within complex systems.

• Entanglement 1_Complex Systems



Joichi Ito (MIT MEDIA LAB)

Resisting Reduction: A Manifesto

Singularity → Irreducibility

Exponential growth → Non-linearity / Circularity

Object (physical & immaterial) → Complex adaptive system

Heroic central planner → Participant within system

Control → Humility

• Entanglement 2_Knotty Objects



“

“Knotty Objects” are objects for which conception, design, manufacturing, use and misuse are non-linear, non-discrete. They entangle practices, processes, and policies. When successful, they transform material practice, manufacturing culture, and social constructs.

Paola Antonelli (MoMA Senior Curator)
Neri Oxman (MIT Media Lab)
Kevin Slavin (MIT Media Lab)

2018 Design & Artificial Intelligence Report

2018 Design & Artificial Intelligence Report

Design: Big Data → Unstructured Data

“Object” 

Big Data: Quantity

- Design data 1, 2, 3, 4, 5

A.I.-generated webpages, logos, posters, videos, name cards.....

“System” 

Unstructured Data: Diversity

- Client data
- Industry data
- Consumer data
- Design data
- Designer data
- Social data

89%

of total data is unstructured

Source: Creative Disruption. WEF White Paper, 2018

Design Matterology

Guanzhong Liu (Tsinghua University) Lecture / PPT

2018 Design & Artificial Intelligence Report

Classical Design VS. Computational Design

“ When we talk about “design”, we often do not differentiate the classical designers from the computational designers. In fact, they are totally different. - John Maeda

John Maeda (Automatic)

 Design in Tech Report 2018

	Classical Design 	Computational Design 
Numbers of Active	Few to Millions	Few to Billions
Time Needed to Deploy Completed	Weeks to Months through Distribution Channels	Instantaneously Delivered Over the Net
“Perfection” is	Yes there is the final state	No, it is always evolving.
Designers’ level of Confidence	Absolute, and Self-validating	Generally high, but open to analyzing/
Production Materials	Paper, Wood, Metal, and Anything Physical	Data, Models, Algorithms and Anything Virtual
Output	Monotonous	Mass personalization
ROI / KPI	Real good design is hard to evaluate by KPI	Directly responsible for the KPIs

Designers as Design Managers

Qingyun (Alibaba UED)

Three tracks for Design @Alibaba:

- Creative Design - bring design back to its foundation.
- Speculative Design- Combine design with technology and data.
- System Design - Consider design from the perspective of systemic experience.

Designers as A.I. researchers & managers

Zhuohao Wu (Sinovation Ventures)



- Win with formative data.
- Deal with uncertainty.
- Application scenarios are the king.

2018 Design & Artificial Intelligence Report

2. COMPUTATIONAL INTELLIGENT DESIGN

How do classical design and computational design relate and differ? What is their significance to the design industry?

- Classical Design vs. Computational Design
- Mass Personalization
- ROI/KPI of Design
- Computational intelligence improves communication efficiencies among designers
- Design business has yet to form a data-driven economy
- Design and Digital Tools
- Design as the Processing of Unstructured Data
- Business logic maps and migrates to design logic

2018 Design & Artificial Intelligence Report

Mass Personalization

Attention Economy*

Attention is the key resource. Major rising companies, like Alibaba, Tencent and Bytedance, as well as traditional corporations all have to rely on getting users’ attention to monetize.

Consumers pay attention to the content that grows exponentially, including news, advertisement, consumer goods, service, experience, space, etc. The more personalized the content gets, the more easily it gets noticed. Then the question becomes - how do companies face the challenge of producing mass-personalized content?

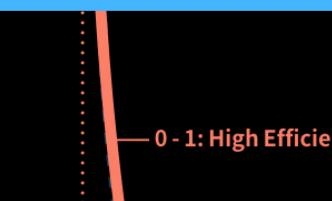
* Please refer to Attention Economy by Tim Wu and The End of Capital by Albert Wagner for further details.

Recommendation of Personalized Content:

Data change the way people connect with the content they consume.

Creation of Personalized Content:

Data changes the way people create content.



- Design Data

- Designer Data

Taobao x Tezign Maker Faire
108 designers to create 108 art works for 108 Taobao shops.



Unilever
Insist “Fulfill the mass personalization of consumer needs” as a key strategy for the next three years.

- User Data

- Industry Data

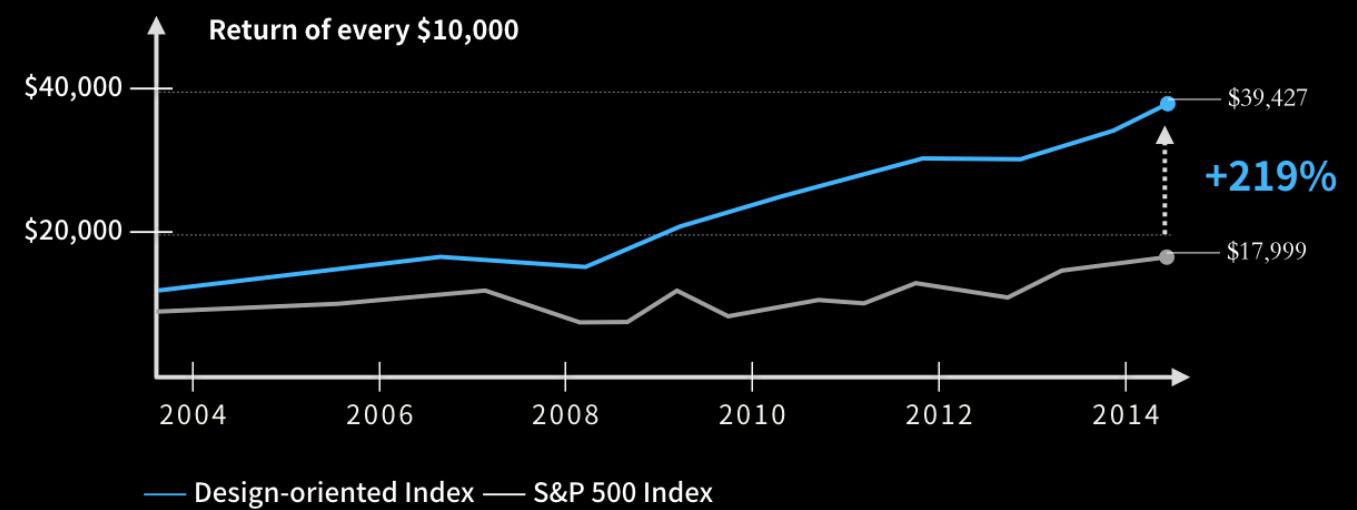
- Consumer Data

2018 Design & Artificial Intelligence Report

ROI / KPI of Design

Long Term: Value + Growth
A 2018 McKinsey report shows that the ROI of design-oriented listed companies is 219% higher than that of S&P 500 over the past decade.

Source: McKinsey Company, Design Management Institute; Motiv Strategies



In short run:

CEOs will be willing to invest in design, if it helps to improve:

Sales/ Conversion Rate	Brand	Product competitiveness
------------------------	-------	-------------------------

100% +

During the Double 11 shopping festival, Alibaba's A.I. system, Luban, improved click conversion rate by 100%.
Alibaba A.I. Design Lab

Source: Questionnaire for Design & A.I. 2018 report

2018 Design & Artificial Intelligence Report

Computational Intelligence Improves Communication Efficiencies Among Designers

Every task in design is started by a role (i.e, client), and confirmed by another(i.e, designer). In a typical design project, we observed 21 times of role-switching.

We often focus on the automation of ideation (design data -> generative design), but overlook the fact that inefficiency in connecting various stakeholders is what restricts the design business.

58%

of the time is not used to do design work.

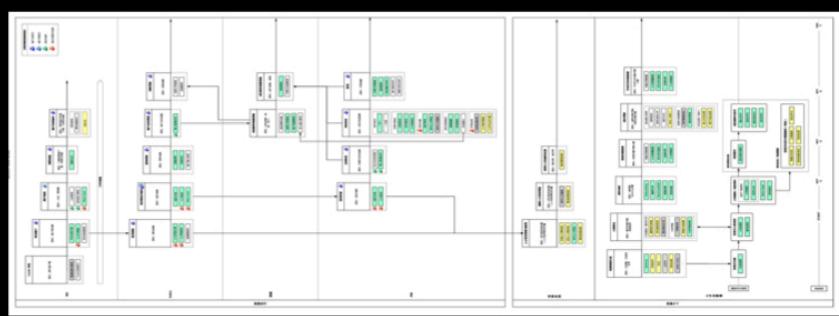
Communication/Management (30%)

Materials/ Speech (28%)

Design/ Ideation (42%)

21

times of role switching in a typical graphic design project.



Workflow of a typical graphic design project

Source: tezign.com

2018 Design & Artificial Intelligence Report

Design Business has yet to Form a Data-driven Economy

Design creates various types of data, but may not be intentionally stored, processed, categorized, analyzed and applied.
Communications among various types of data are lacking.

“

“Three Rules for Going Online” as the foundations for data-driven economy:
1. Every bit is on the Internet.
2. Every bit can move freely online.
3. Every object represented by the bit can be computed.



Jian Wang (President of the technology committee of Alibaba, formerly CTO)
Data change the nature of business, computation forms the future of economy

Source: Online by Jian Wang/ Design and AI Questionnaire of the year 2018 / Tezign design of structured data

Digital tools that create data in the design process (2017)

1. Wechat*
2. Telephone **
3. Mobile /hard drive **

* non-professional tools / ** offline tools

1. Photoshop
2. Illustrator
3. Sketch

Communication / Management (30%) Materials / Research (28%) Design / Ideation (42%)

Types of data created in the design process

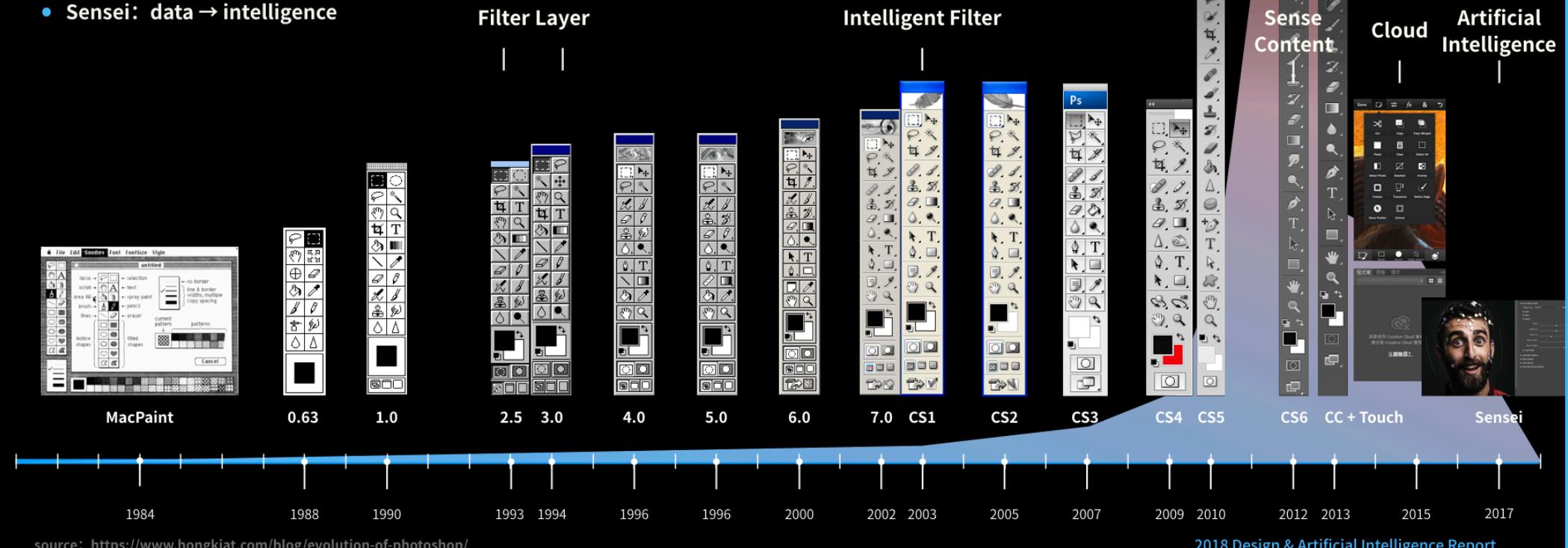
- >User Data
- Industry Data
- Consumer data
- Design data
- Designer Data

- Design Data

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Design and Digital Tool

- Photoshop: tool → digital tool
- Photoshop CS: digital tool → intelligent tool
- Photoshop CC: bit → data
- Sensei: data → intelligence



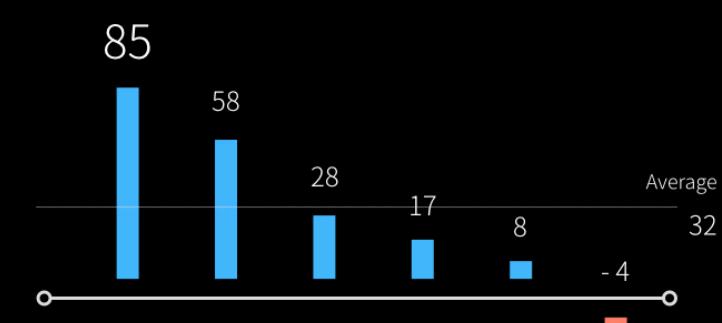
“ First we shape our tools, thereafter they shape us.

Marshall McLuhan (Media Theorist)

Brain Machine Ratio 2.0 : willingness to use A.I.

Changes in labour demand for creative workers

% change labour demand, midpoint automation (by 2030)



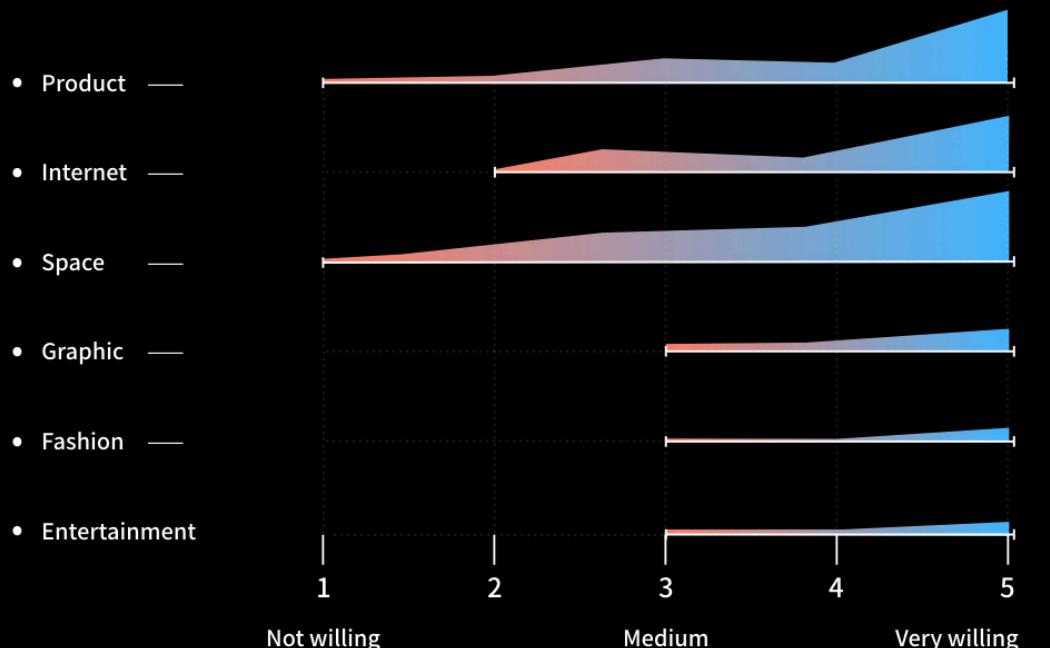
World Economic Forum White Paper

Creative Disruption: The impact of emerging technologies in the creative economy

Source: World Economic Forum White Paper / Design & A.I. Report_2018Questionnaire

Subjective willingness in using A.I. in the design process?

- More than 75% of respondents are willing or very willing to accept A.I.
- The internet and graphic design industries exhibit the highest willingness.
- Spatial design and product design industries exhibit willingness that varies greatly.



2018 Design & Artificial Intelligence Report

Graphic Design

Viewpoints

- Current technology falls short of expectations for smart design.
- Artificial intelligence (A.I.) will appear after intelligent argumentation (I.A.) in design. Machine will assist designers to efficiently produce data in great quantity, which are feed to algorithms to train design intelligence.
-

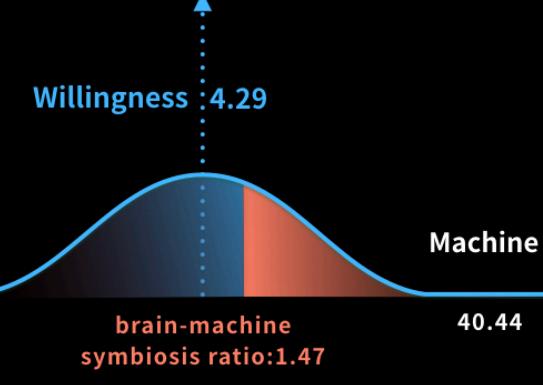
Trends

- Style:** Smart design will lead to a new style suitable for machine production. The combination of art and technology will subvert the current mainstream commercial design practices.
- Grand Connection:** Data-based and algorithmic design will create unprecedented connection between various elements. Instead of being independent agents, creators, copyright owners, and users will be connected within and through the system.

Challenges

- While machine will complete the grouping and optimization of design materials through algorithms, humans need to organize and mark basic materials manually to ensure accuracy.
- Design by human-machine symbiosis will blur the boundaries between the copyright of materials and that of design work. How to divide design revenue will require further exploration through commercial mechanisms.

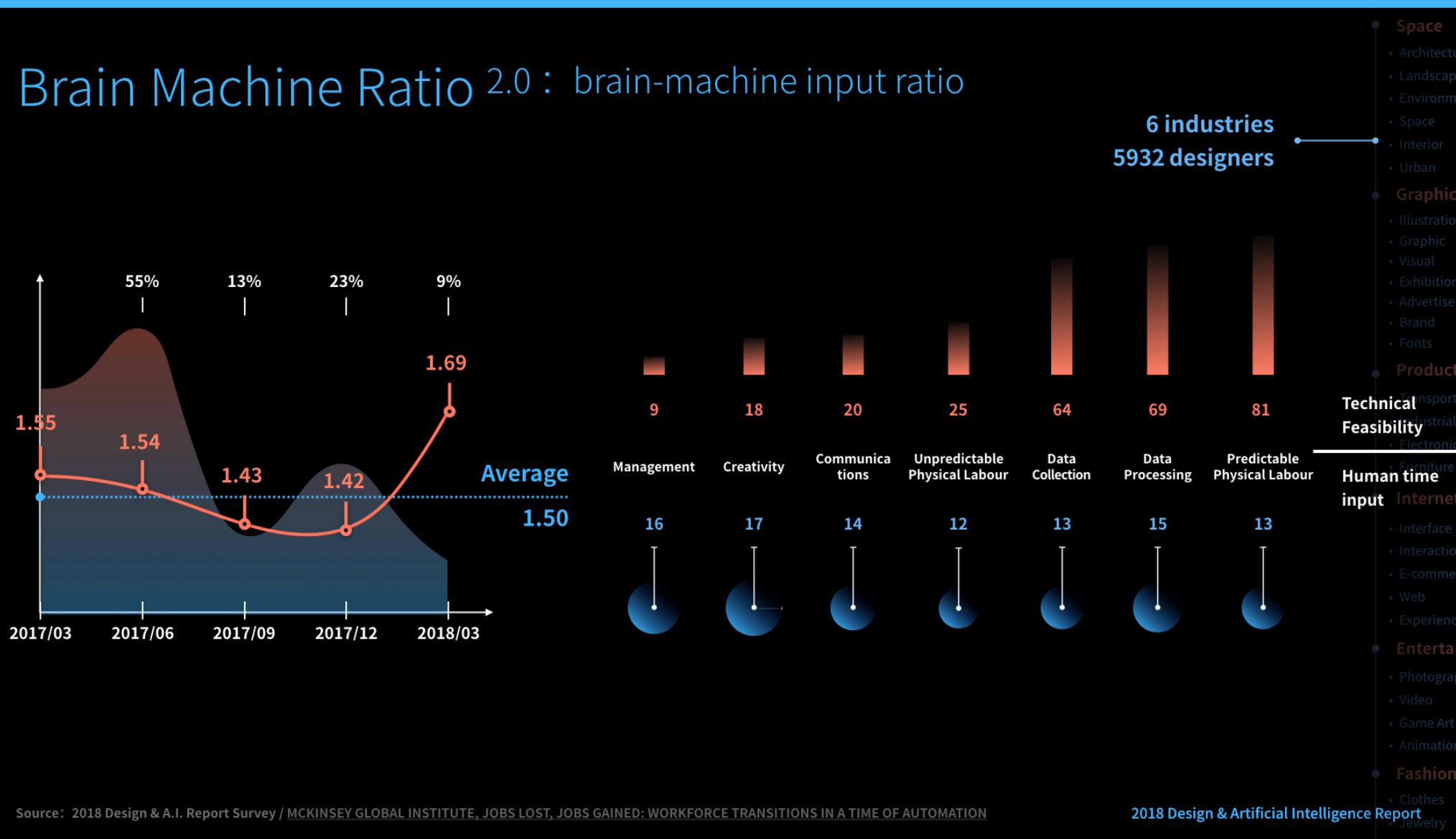
Brain Machine Ratio



2018 Design & Artificial Intelligence Report

Source of opinion: Yuecheng (Alibaba A.I. Design Lab)

Brain Machine Ratio 2.0 : brain-machine input ratio



Smart Products

Viewpoints

- Human-machine interaction revolution: speech recognition, visual recognition.
- Breakthrough in AR optical display technology drives to increase productivity.

Will voice interaction change our perception of the brand? - FL

Trends

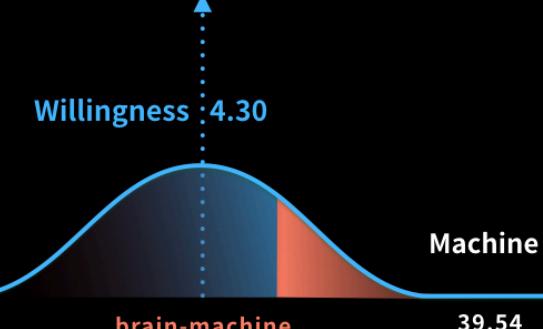
- Algorithm evolution will outpace hardware evolution.
- Price → User experience / quality.
- Mass data ≠ shelter. The algorithm will be optimized so that a small amount of data will yield similar results to those of mass data.

Action

- With the popularity and proliferation of intelligent hardware, a sense of novelty and excitement will become rigid demand and habitual dependence.

Will we outsource decision-making? - FL

Brain Machine Ratio



2018 Design & Artificial Intelligence Report

Source of opinion: Gonglue Jiang (Rokid)

UI / UX

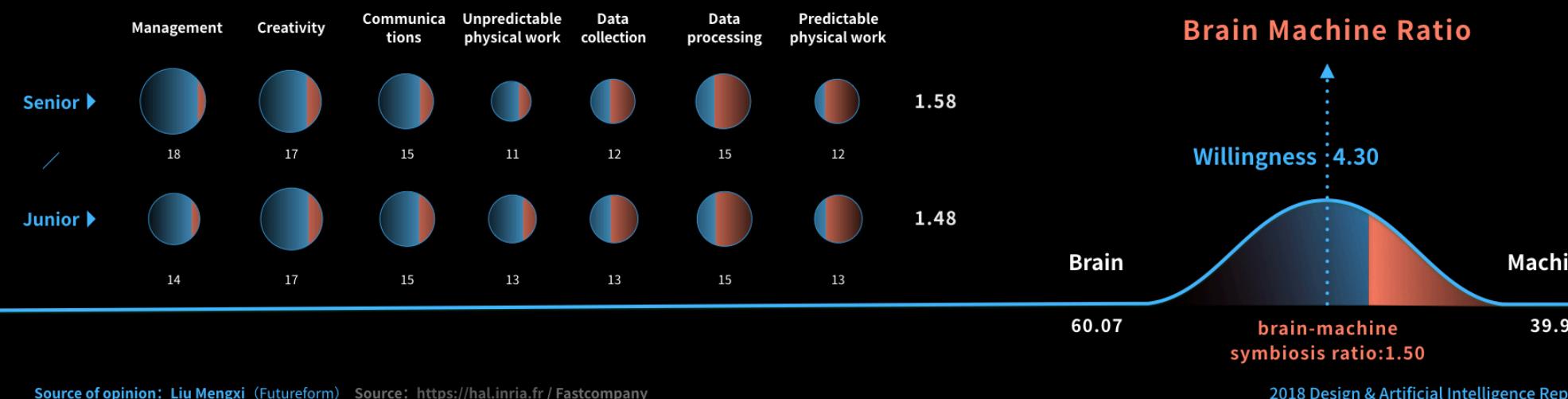
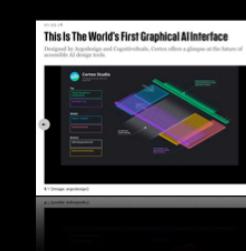
Viewpoints

- Photoshop for A.I. UI (Example: Amazon - Conversational Interaction Design / Amazon Lex - R&D Open Platform)
- Design's impact on the underlying algorithm of A.I. (Example: Google - Human Centered Machine Learning)



Trends

- A.I. will be applied to Weak A.I. (Narrow A.I.). A.I. will design interactive experience of specified scenarios. At the same time, it will transition from the traditional "form-based product design" further to "algorithm design".
- Emotional design will compensate for technical impossibility during the transition from Weak A.I. to Strong A.I.



Source of opinion: Liu Mengxi (Futureform) Source: <https://hal.inria.fr/Fastcompany>

City and Space

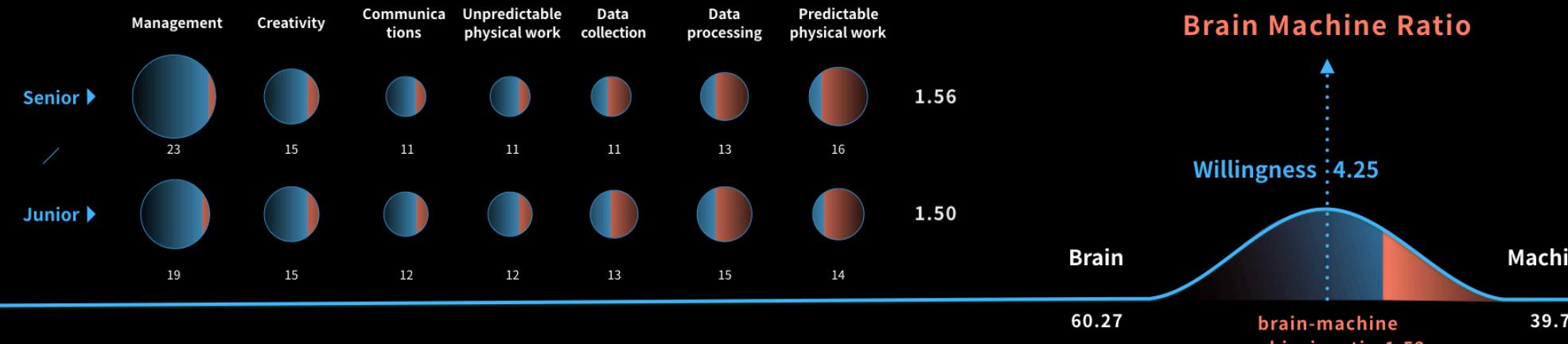
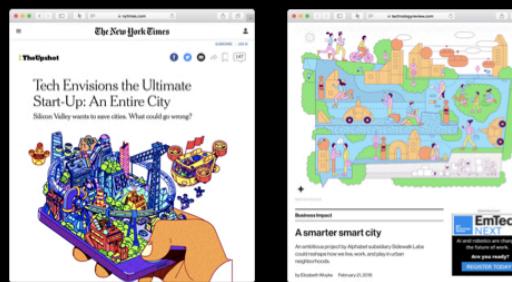
Field

- IoT / Smart Building
- Construction Management
- Design Process / Tools
- City / Infrastructure
- Computational design

City Brain

- A city is the largest hardware and needs software updates.
- Like water, electricity, and oil, data is a natural resource that does not belong to any private enterprise.
- Instead of changing the city through technology, city brain is a fertile ground for new technology.
- Through the city brain, a city can use 1/10 of its current consumption to yield the same quality.
- Research facilities will need to be constructed for cities to benefit from data.

2050 逐渐早上
七八点钟的太阳 云晒



Source of opinion: Xin Zhang (KPF) / City Brain source: Jian Wang (Alibaba) Source: NYTimes / MIT Tech Review

4. A.I. DESIGN & THE FUTURE

How does A.I. impact education, creative humanities, ethics and spirituality?

- Teaching and Learning A.I. in design
- A.I. inspires New Design Education
- Social Design & A.I.
- EQ & A.I. Design

2018 Design & Artificial Intelligence Report

Teaching and Learning A.I. in Design

QUOTES FROM EDUCATOR

The challenges facing education posed by A.I. 2.0 are multi-faceted: 1. Individualized education based on big data; 2. Cross-media learning; 3. Lifelong learning will be supported by intelligentization; 4. Libraries will become smart libraries.

- Yunhe Pan, Fellow at China Sciences Academy

A.I. could improve design efficiency and quality, paving the way for design innovation. Besides, A.I. could enhance individualized training for designers.

- Renke He, Professor at Hunan University

The next-generation of A.I. must be a hybrid intelligence combining human and machine.

- Zhiqiang Wu, Fellow at China Sciences Academy

A.I. exerts its force in every step of design, forming a new loop of "Perception Enhancement - Intelligent Design - Experience Computing".

- Lingyun Sun, Professor at Zhejiang University

Endless "curiosity" enhances our "vision," and with the "experience" and "insight" from the past, we make the prototype. The unity of these elements is a universal principle.

- Mu Shan, Associate Professor at Tsinghua University

Changes in design process demand enhanced training in interdisciplinary skills.

- Zhiyong Fu, Associate Professor at Tsinghua University

DATA FROM EDUCATE

Designer Skills - Near Future

1. Data Analysis — 140
2. Service Design — 127
3. Communication — 118
4. Business — 113
5. Programming — 93
6. Management — 92
7. AR — 66
8. Writing — 58
9. Other — 4

Designer Skills - Further Out

1. Behavioral Psychology — 179
2. A.I. — 136
3. Systems Design — 135
4. Data Science — 115
5. Service Design — 105
6. Writing — 45
7. Ethics and Bias — 34
8. Voice Design — 31
9. Other — 5

A.I. related capabilities

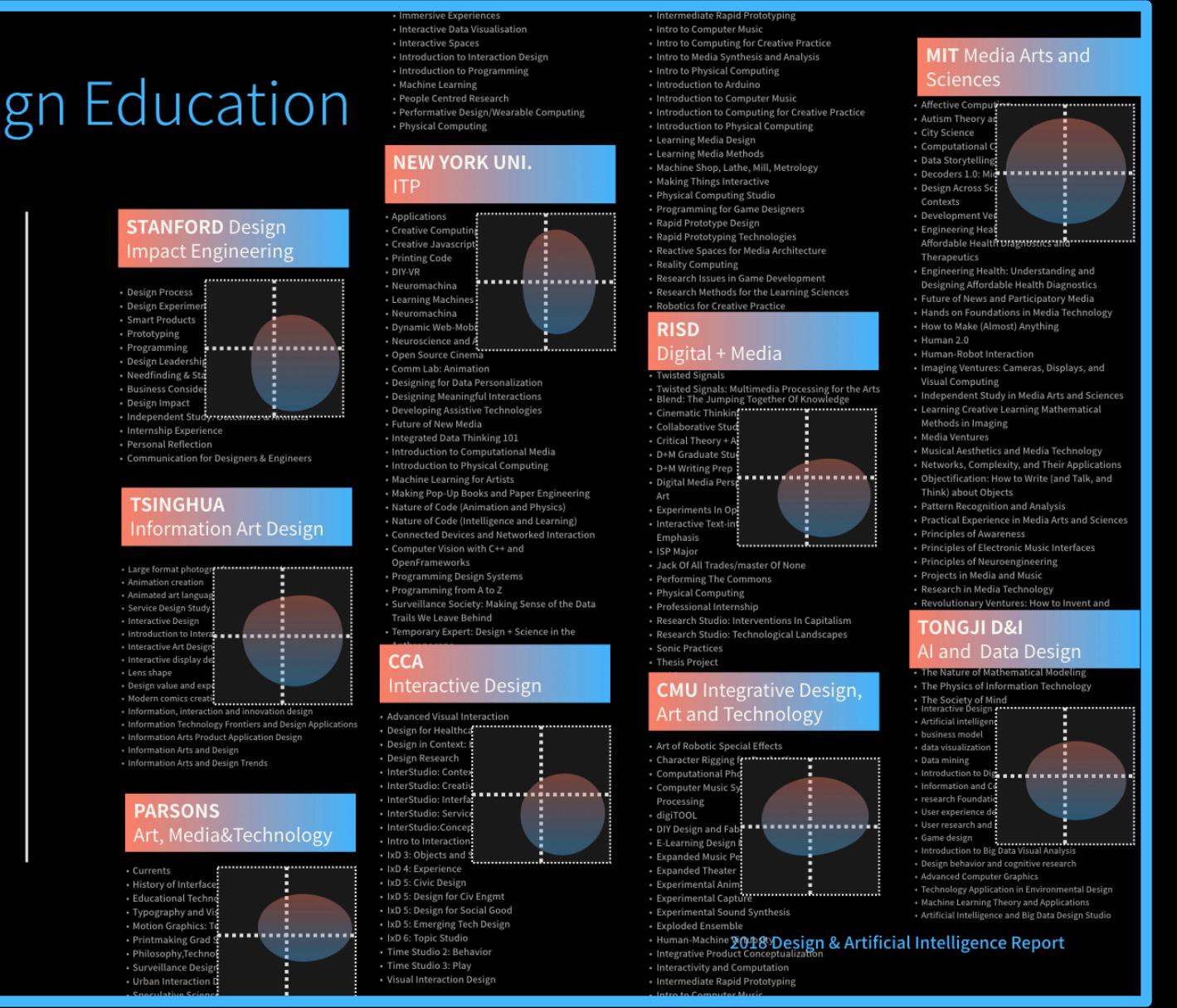
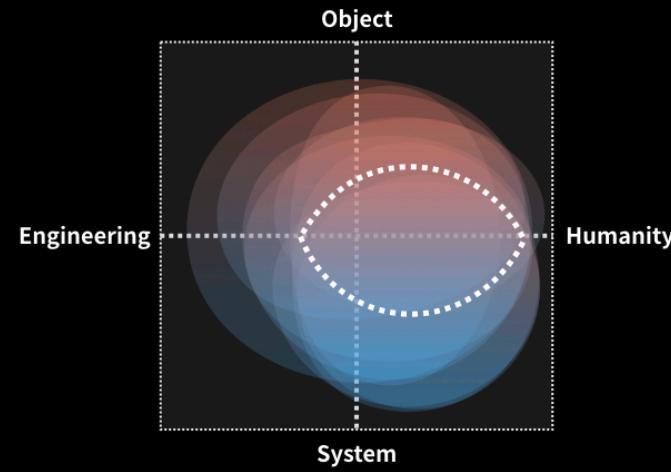
Questionnaire design reference: NEA Future of Design in Startup Survey

2018 Design & Artificial Intelligence Report

Deep view source: http://2018.sheji.ai/view_of_design_education

A.I. Inspires New Design Education

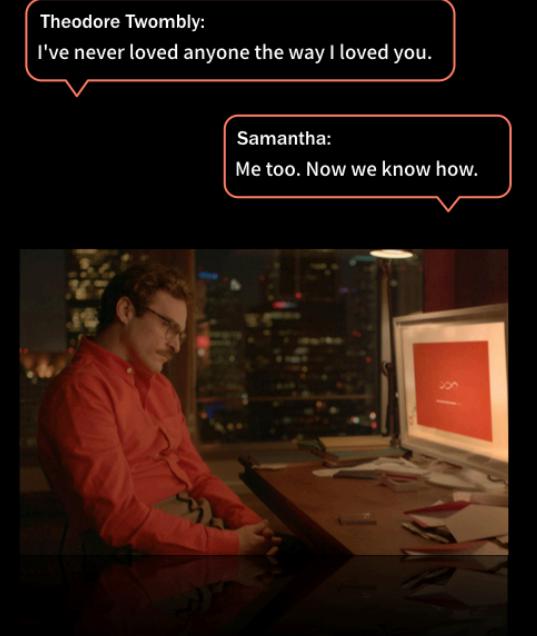
Many design schools have launched related courses : A.I. / Machine Learning /Data Analysis/ Data Visualization /Artificial Intelligence Art / Design Technology Humanities / System Design etc.



EQ & A.I. Design

A.I. with IQ → A.I. with EQ

- a. EQ differentiates human from machine.
- b. Design process: Conceptualize → Execute → Reiterate



Source: Jiaojiao Li (World Economic Forum)



Conceptualize

(Creative A.I.: early stage)

- How to distinguish an A.I.'s idea from a human's?
- Should we encourage or discourage an A.I.'s creativity?
- How to accelerate or slow down such development?

Execute

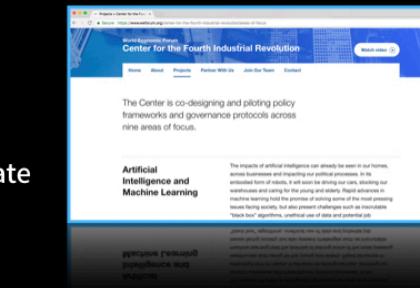
(A.I. with IQ: high growth)

- Would emotions help A.I. perform better?
-

Reiterate

(A.I. with EQ: early stage)

- Can A.I. understand, empathize with and mimic human input?
- Who and what will A.I. with high EQ replace?
- In what circumstances do we prefer such replacement?



2018 Design & Artificial Intelligence Report

Civic Design & A.I.



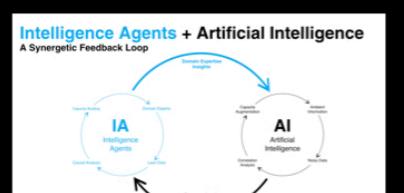
Human-First Principle - Respect / Regulate

A.I. should prioritize and realize human interests as end goal: to respect human rights, maximize benefits to humanity and natural environment, minimize adverse impact of technology on society, and caution the general public about possible misuse and abuse of A.I.

Top-down Point of View:
Rui Guo (Renmin University of China - Law School)

Responsibility Principle - Transparent /Accountable

A.I. should operate under a clear governance framework: to hold appropriate parties accountable during development, establish proper responsibility matrices and compensation schemes upon deployment, and fully comply with the transparency principle.



Bottom-up Point of View:
Da Lin (shanzhai.city)

Observations

- Civic design tends to focus on computational method and user experience, but fails to nurture open-source civic data.
- A.I. (Intelligence Agent) to improve the quality, quantity and inclusion of data and preserve regional cultural diversity.
- Data literacy of the general public is key to applying A.I. to social development.

Challenges with Data

- Current data quality, quantity and diversity are insufficient for building effective A.I. systems.
- Solutions need to be tailored to local communities and thus resist massive scalability.
- Long project lifecycle & low participation from data providers.
- Limited data literacy and injustices including data exploitation.

Ongoing.....

- Solutions targeting low-tech regions (offline, illiterate, ill-equipped), e.g., Social Cop, Tareworks.
- Data-driven research, predictions and policy proposals on social development, e.g., Premise Data.
- Automated workflow for impact investing, e.g., Social Capital 8-Ball, Impact Learning
- Unified measures and interfaces for socio-economic data, e.g., World Bank's ID4D.

2018 Design & Artificial Intelligence Report

The complexity of a system is that the cause would have multiple intended and unintended outcomes. The problems that we are confronting today are often the by-products created by humans in earlier days when tackling a specific challenge. We should understand the creation of A.I. increases the complexity in the system. Rather than a model of exponential growth of the Singularity, which promises the human condition would transcend through advancing technological development, we argue that bringing design to A.I. is an attempt to introduce the left brain thinking to technology- resilience, sympathy, imagination, etc. As such, when we train artificial intelligence through massive data set, human design intelligence ensures that what is being augmented is not a single value (eg. business value) but the complex ecosystem as an entirety.

Download the report at www.sheji.ai

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