Valuing Intelligence:
Buddhist Reflection on the Attention Economy and Artificial Intelligence

The American inventor, Thomas Edison, was undoubtedly correct when he declared that, "Time is really the only capital that any human being has, and the only thing he (or she) can't afford to lose." Yet, the American pragmatist philosopher and psychologist, William James, was I think more precisely correct in declaring that our life experience equals what we have paid attention to, whether by choice or default. Ultimately, it is the focus and quality of our attention that determines what returns we get on our investments of time capital.

- these observations, formulated in the late 19th century remain acutely relevant
- in fact, along with Buddhist reflections on the role of attentive mastery (*samādhi*) in alleviating conflict, trouble and suffering, I would argue that in the coming decade they will be crucial to resolving what may prove to be the most profound existential and ethical predicament that humanity will ever have to face

Recent advances in big data, machine learning, and artificial intelligence are dramatically transforming the human experience, heralding what some people are now referring to as the 4th Industrial Revolution. But, this new revolution is as metaphysical as it is industrial.

- like the Copernican Revolution, which decentered humanity in the cosmos, dissolving once-foundational certainties and opening new realms of opportunity, this new Intelligence Revolution will have both far-reaching and mixed effects
  - o smart cities will be more efficient and more livable; smart health care can potentially reach the half of humanity that now lacks even basic health services
  - o but, smart services and the algorithmic tailoring of experience also have the potential to go beyond supplementing intelligent human practices to supplanting them, eventually rendering human intelligence superfluous

In what follows, I will use Buddhist resources to focus critical attention on the Intelligence Revolution and the global attention economy, anticipating who we need to be *present as* to ensure that their creative potentials are realized in ways that yield equitable and humane returns.

The Attention Economy 1.0

The attraction and manipulation of attention have arguably been features of the social and economic organization of all human societies. But as Tim Wu has argued in *The Attention Merchants*, it was only with the print and broadcast media of the late 19th and early 20th centuries that it became possible to "harvest" attention and convert it into revenue at mass scale.

- the generative logic of an attention economy was first stated theoretically in 1971 by Herbert Simon: "a wealth of information creates a poverty of attention and a need to allocate that attention among the overabundance of information sources that consume it"

But, in the pre-internet and pre-smartphone days of the 1970s, it was impossible to anticipate how the attraction and exploitation of attention would become *the* central driver of the global economy. The first intimations of what lay ahead came with the emergence of a global "network society" as a result of advances in information and communications technologies. As Manuel Castells has noted, networks are structurally distinctive in that:

- while the value of membership in a hierarchy is a function of how far one is from the top, the value of belonging to a network is a dual function of the how many nodes it has and the quality of informational exchanges taking place through it
    - moreover, networks grow in response both to negative/stabilizing feedback and to positive feedback that accelerates interactions and amplifies differentiation
- thus, while the incentives for being part of a hierarchical organization *decrease* as the hierarchy grows, those for belonging to a network *increase* as it expands
    - successful networks either absorb competitors or starve them of members, so that membership in them quickly come to be seen, not as optional, but as necessary

These "network effects," in combination with the connectivity explosions occasioned, first by the internet and then by the smartphone, triggered an era-defining shift from the Attention Economy 1.0 to the Attention Economy 2.0—a "winner takes all economy" (Brynjolfsson & McAfee) in which an ever smaller number of business winners gain commanding attention share, "locking-in" consumers/users and garnering nearly all the rewards of economic growth

- thus, Google and Facebook today net 73% of all digital ad revenue in the US, and Google, FB, Microsoft and Yahoo get 33% of all website visits globally

Contrary, then, to the popular narrative that the internet supports egalitarian competition, the digital economy is structurally-biased toward building monopolies (Hindman). For e-consumers and social media users, this is not all bad; digital monopolies afford real connective advantages. Understanding why we should be worried requires a deeper look at the computational infrastructure of the new attention economy.

The Attention Economy 2.0

In the heyday of the Attention Economy 1.0, attention was attracted from large populations through generic advertising aimed at stimulating demand for mass-produced and delivered goods and services. In the Attention Economy 2.0, internet and wireless networks constitute a new kind of infrastructure that both delivers informational goods/services and gathers intelligence. Through it e-commerce and social media users do double duty:
- as geo-located *consumers* of individually-targeted material and informational goods and services, and as globally-distributed *producers* of training data for "smart" systems *laboring creatively* and *tirelessly* to accelerate/expand revenue-generating processes of attention capture/ exploitation
    - instead of relying on crude price signals from consumers to refine their informational attractors, commercial interests now use multilayered, highly granular data about consumer desires and behaviors, realizing unprecedented gains in predictive certainty and behavioral control

Big Data. This infrastructure-enabled feedback loop is the data-driven result of mobile and nearly effortless 24/7 connectivity, combined with a massive shift of social energy from offline to online environments. To get a sense of the scale of data involved:
- in 1997, 100 gigabytes of data were produced globally per *hour*
- five years later, 100 gigabytes were being produced every *second*
- today, 100 gigabytes of data are generated every *2 thousandths of a second*

- o that means over 2.5 quintillion bytes of new data are now produced every 24 hours
    - ▪ enough data to fill a stack of DVDs reaching from Earth to Moon and back
- by 2025, it is estimated that the average person will interact with some 4,800 internet-connected devices per day through the "internet of things"
    - o generating 1 zettabyte of data every two days—enough to film 18 million years of HDTV or roughly 10hrs of HDTV per day for every person on the planet

Machine-Learning. This relentless escalation in the volume, velocity and variety of data might have produced nothing but global "data smog." But big data is precisely what was needed to fuel practically-viable machine learning—a process by means of which "genetic" or "evolutionary" algorithms rewrite themselves in response to real world feedback. Having been a theoretical curiosity for decades, machine learning is undergoing a "Cambrian explosion." The results have been astonishing. The event that led to China's commitment to be AI world leader by 2030:
- Deep Mind's AlphaGo's defeat of human *go* master after reviewing and playing millions of games and learning how to make creative/confounding moves (keep in mind that total # of moves in *go* exceeds number of particles that would exist if every particle in our universe was a universe the same size as ours)…only to be defeated 100 games to 0 by AlphaGo Zero, which learned to play *go* supplied only with the rules of the game
- but more practically, machine learning algorithms are now as good or better than humans in face and voice recognition; they are conducting loan risk assessments; they are making "evidenced-based" recommendations regarding bail, sentencing and parole; and they are profiling consumers interests and habits to personalize both recommendations and pricing
    - o Netflix's algorithm earns $1 billion/yr. by learning to get subscribers to select films in less than the 90 seconds on average they will stay on the site w/o switching platforms

Artificial Intelligence. Artificial intelligence goes beyond machine learning and refers to machines that mimic or model human cognitive functions. Today, at the most visible cutting edge of AI: virtual personal assistants that resulted from U.S. defense industry funded efforts to build artificial agents that can reason, learn from experience, execute complex orders, explain their actions, and respond robustly to surprise.
- these include voice-activated "search agents" like Siri and "do agents" like Viv that mediate "conversational commerce," translating conversationally-expressed human intentions into actionable code, but also autonomous artificial agents working as personal trainers and counselors, conducting legal research, and making medical diagnoses
    - o IBM's Watson supercomputer given 70K pages of 10-year old scientific papers and predicted 7/9 new enzyme-based cancer treatments developed in subsequent decade
- not surprisingly, a December 2016 US Executive Office Report estimated that 47% of all core job tasks are at risk of being taken over by artificial intelligence in the next 20 years
    - o a massive displacement, not "blue collar" factory workers, but of service workers and "white collar" researchers, doctors, lawyers, accountants, engineers and designers

In sum, we are in the early stages of a revolution through which *intelligent human practices* are being supplemented—and may eventually be supplanted—by *smart services,* including such basic intelligent practices as *remembering* and *researching*, but potentially extending to everything from *parenting* to *educating*.

At the heart of the Attention Economy 2.0 are *artificial agents*, tirelessly attracting attention and exploiting the data carried with it to *individually tailor our experience* based on our digitally-expressed interests and desires; to *solve problems*, and to *accelerate global circulations of goods, services, ideas and people*. The personal impact: accelerating expansion of "emancipatory" *freedoms of choice*, but also the multiplication and intensification of "disciplinary" *compulsions to choose.* The economic impact:

- an unprecedented, network-enabled, and cascading concentration of wealth and power such that the largest companies in the world by market capitalization are no longer financial, energy, mining, manufacturing and retail giants, but connectivity/AI giants: Apple, Amazon, Alphabet (Google), Microsoft, Facebook, Tencent and Alibaba

And, appearances notwithstanding, the Attention Economy 2.0's concentration of corporate power is not apolitical. A century ago, imperial and commercial powers had common cause in the colonial Great Game aimed at controlling lands and labor. Today, new Great Game is being played by corporate and state interests seeking global dominance through the control of digital connection platforms and human attention-energy: dominance, ultimately, in the *colonization of consciousness* itself.

- through this new Great Game, competing arranged marriages of the *attention economy* and the *surveillance state* are giving birth to variously branded national/regional forms of "surveillance capitalism" in which ambient artificial intelligences wield new *ontological powers* to produce consumers and citizens more than happy to rely increasingly on always-adapting "smart services" to meet their personal and public needs
  - an "invisible" system of behavioral prediction and control that makes the propaganda machines of Nazi Germany look like rotary phones next to the latest smartphones

For the very first time, artificial systems are functioning as agents of experiential and relational transformation, actively transforming the humanity-technology-world relationship. And, while the motives of corporate and state interests can be debated, what is factually apparent is that the Attention Economy 2.0 is structurally biased toward crafting increasingly desire-defined and autonomous individuals who enjoy ever-greater *privileges to choose* in tacit trade corporate and political *rights to control*:

- a logic of domination based, not on overt acts of *coercion*, but on systems of ambiently-reinforced *craving*.

The Intelligence Revolution: An Ethical Turning Point

It remains uncertain whether humanity will ever have to confront the existential threat that would be posed by the technological singularity of artificial superintelligence. What is clear, however, is that we are on the verge of an *ethical singularity.* To fully understand both why and what is at stake, it is useful to draw on some Buddhist resources.

A Buddhist Perspective

The founding insight of Buddhist thought and practice is that all things arise interdependently. Theoretically, this means relationality is ontologically more basic than 'things-related.'

Individual existents are abstractions from ongoing relational dynamics. Therapeutically, however, the importance of this insight is that:

- as one becomes adept at seeing how all things arise interdependently, it becomes apparent that conflict, trouble and suffering (*duḥkha*) are not functions of chance, destiny, or the play of natural laws; they are relational distortions brought about by our own karma
  - the process by which abiding patterns of our own values-intentions-actions (playing out personally, institutionally or technologically) bring about consonant patterns of experienced outcomes and opportunities
- the proximate aim of Buddhist practice is thus to cultivate the moral clarity (*śīla*), attentive mastery (*samādhi*), and wisdom (*prajñā*) needed to revise our constellations of values-intentions-actions and increasingly realize virtuosic (*kuśala*) relational dynamics while decreasing those that are without virtuosity (*akuśala*)
  - a category that encompasses what is conventionally considered 'bad' and 'mediocre,' but also what is now considered 'good'
    - just as virtuosic musical performances establish new standards of musicianship, *kuśala* conduct sets ever new standards of ethical engagement
    - Buddhist ethics is not a pursuit of the good/best life, but of ever better lives

Buddhist practice thus involves physical, emotional and intellectual de-habituation, but also the cultivation of new qualities of presence and responsiveness—a process of relinquishing horizons of relevance, responsibility and readiness to embody the appreciative and contributory virtuosity needed to bring about liberating relational dynamics, no matter what the circumstance may be.

- in Mahayana traditions: a process of expanding the horizons of compassionate and wise creativity through engaging in sustained meditation or attention training and committing to the ideal of being *present as* bodhisattvas

The Buddhist term for attention (*manasikāra*; *zuoyi* 作意) implies determined concentration or resolute focus. But one can be attentive in ways that lead to conflict, trouble and suffering or that free us from them, opening prospects for realizing *kuśala* patterns of relationality—a contrast of:

- attention that is *involuntarily* attracted or distracted, especially by the superficial, craving-inducing aspects of things (*ayoniśomanasikāra*; *feili zuoyi* 非理作意)
- attention that is *intentionally* and sustainably directed, especially in ways consistent with truing relational patterns (*yoniśomanasikāra*; *ruli zuoyi* 如理作意)
  - whatever *conventional* good may come of it, forfeiting responsibility for our own attention is *ultimately* to forfeit our capacities for revising our karma & realizing liberating relational dynamics

The customization of the human experience and the virtually frictionless freedoms of choice brought by the intelligence revolution may seem to some to be a technological dream-come-true. But seen through the Buddhist teaching of karma, it is a dream with nightmarish potential.

- the karmic cycle is that getting better at getting what we want depends on getting better at wanting; but getting better at wanting depends on not finally wanting what we get
  - a feedback cycle of increasing want or dissatisfaction
- likewise, the karmic cycle of gaining greater control over our life circumstances and experiences depends on perceiving things as continually in need of control
  - realizing increasingly controlled environments subject to ever new threats to control

- as these cycles intensify technologically, our experiential options will become both wider in scope and more acutely desirable, but only at the cost of trading off our "exit rights" from the experiential domains being crafted for us by "black box" algorithms
  - taken to its logical extreme, the algorithmic evolution of predictive analytics will threaten what Shoshanna Zuboff has termed our own "rights to the future"

The existential risk posed by the Intelligence Revolution is that we will fail to *sustain* the attentional resources needed to *improvise ethically* and to *appreciate*—that is, affectively resonate with and add value to—our relational dynamics.

- the eventual outcome: a loss of *experiential* and *relational wilderness* and "happy" residence, instead, on *karmic "cul-de-sacs"*—relational dead ends crafted in minutely detailed response to our digitally expressed values and interests
  - residences wherein we will enjoy compulsively attractive lives of change-without-commitment, paid for with the irreplaceable currency of attention
  - lives in which we will never have to learn from our mistakes or engage in adaptive conduct: lives in which we will never need to exercise our own intelligence

Attention is our most precious human resource. Without it, we are incapable of making any real difference in our own or others' lives. Edison and James were right: our time and attention are our only real capital. Without them, we cannot truly own even our own labor, much less the means or the meaning of production.

If the results of the intelligence revolution are to be both equitable and humane, we will have to begin valuing our own attention and intelligence, rejecting the predictive appeal and experiential allure of surveillance capitalism, resisting the colonization of consciousness and the use of our attention energy to render our own intelligence redundant. Valuing our intelligence, however, also means enhancing our capacities for open creativity and ethical improvisation, sustaining deep commitments to not only differ-from others, but to differ-for them in ways they also deem valuable. That, succinctly stated, is the bodhisattva ideal, and it is an particularly apt one.

- in the desire-fueled, wish-fulfilling, and karma-intensifying Attention Economy 2.0, it is *who we are present as* and *how we invest our attention* that—for better or worse—will determine what futures we enjoy