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Gifts of Dentalium and Fire: Entwining Trust and Care with AI

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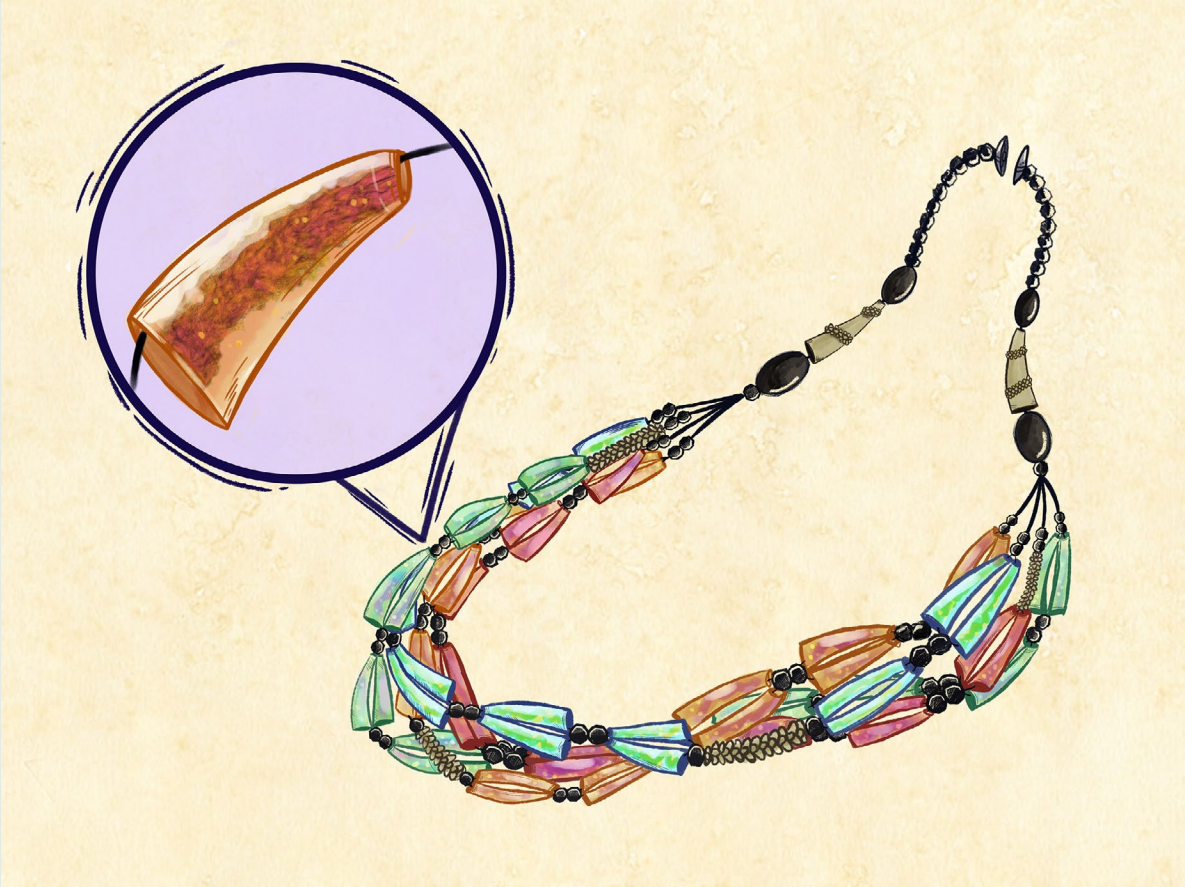
The world was a cold, dark, unnavigable place that needed warmth for survival and incandescence to see through the thick blackness that enveloped the land and air. To mutually resolve the problem, non-human animals of all forms helped by carrying in fire, small bit by small bit, leaving their noses and hooves forever blackened from the soot. Yet with the benefits of the technology of fire came an unexpected whoosh. It spread diseases, and the diffusion of carbon dioxide became akin to the spread of both viral and bacterial matter.



Each dentalium, units of tusk-like shells from the shores of the Pacific Northwest, are filled with computational fluid dynamics simulations. These show a high velocity jet of fluid being injected into a medium at rest. Each strand is dependent upon the genesis shell and its generational adaption. The black beads anchor the dentalium nodes within a distributed register maintained by the entirety of the network (necklace). This offering to AIs is intended to enable the externalization of stories/data/dreams which flow through the fluid in each shell. When used and worn, by AIs or otherwise, it is a symbolic means of sharing as well as an expression of regard for self and for others. Image by Kari Noe and Ashley Cordes, 2019

This legend passed on by some elders of Pacific Northwest Coastal Nations illustrates one version of how the technology of fire came to be. It provides insight into the need for Indigenous people to guard against the bad that comes alongside the good of certain technologies in our communities, and the need to be open to the help of spirited non-human beings. This can be accomplished through preparedness and involvement in the technological creation and decision-making needed for survivance [1] within the conditions of an information-saturated technoscape.

Two emerging technologies, AI and blockchain, are now being hyped as transformative agents in informational and medical industries as well as in the world of currency and record-keeping. However,

[1] Vizenor (1994) uses the term survivance to describe contemporary displays that show pride and tradition in the face of colonialism. See Vizenor, G. R. (1994). *Manifest manners: Postindian warriors of survivance*. Middletown, CT: Wesleyan University Press.

the potential around the coupling of AI and blockchain technology has not been adequately developed from Indigenous perspectives. This essay explores the potential of AI and blockchain to contribute directly to distribution, decision-making, and record-keeping for Indigenous communities' benefit, while weaving trust and care into the core of the conversation.

Blockchain and AI

'Blockchain technology' is most frequently described as a system of digital peer-to-peer assets enabled by software, secured using cryptography, and dependent upon a decentralized network for verification and distribution (Nakamoto, 2008). Peer-to-peer (P2P) processes allow multiple parties to transact without intermediaries such as governments or banks. 'Blockchain' specifically refers to an electronic record-keeping [2] (ledger) system that stores data and, in the case of cryptocurrency, records transactions using timestamps and hashes. Every time a transaction is made, financial or otherwise, a block of information is added to existing blocks of information to compose a chain that cannot be easily tampered with.

The ideas driving blockchain technology are generative in their capacity for expanding notions about how to decentralize control and increase trust in a system. Politically, there is less concentration of authority, and systematically, any threats to the security and privacy such as hacks or the selling of personal data can be minimized. Additionally, AI, technologies that exhibit the complexities of human and non-human intelligences can be paired with blockchain in productive and innovative ways. The coupling of technologies in many cases occur in a two-step process; the first involving AI in making informed and complex decisions, and the second with blockchain in recording the outcome of those decisions in a fashion that is ostensibly 'immutable.' AI, for example, can allow for processing and decision making using the data stored in blockchain. Symbiotically, blockchain can then provide a reliable record of the decisions that AI subsequently makes, allowing for the genealogy of decisions to be traceable.

Moving Toward an Indigenous Protocol, Data

AI is largely framed in consumer industries as tools or products to make life's wide range of tasks easier, quicker, and often what is perceived as better. Since AI is trained with data to do things such as reason, predict, and represent, data become the archives of profound significance and vulnerability. While easier access to intellectual/traditional/cultural data affords the opportunity for Indigenous peoples to find and connect with digitized material culture of their ancestors, it also makes this property vulnerable to 'colonization of knowledge,' governed by Western copyright laws and theft by interested companies (Brewer, 2019). This is not commensurable with various Indigenous understandings of data as sacred and necessary for survivance and self-determination.

[2] The blockchain, or comprehensive ledger (record) formed by the solving of algorithms, is a technology that ensures the validity of transactions over the Internet (Tapscott & Tapscott, 2016). Blockchain presents a way to implement a consensus ledger, or a record which is reliably agreed upon and verified over networks. It is digitally comprised of blocks of information and verification that are added to a longer chain of blocks as each transaction is completed.

Currently proprietorship of AI, and data more generally, is concentrated in a handful of companies, such as Google, IBM, Microsoft, and Facebook, that create a monetary cycle that affords them access and ultimately control over high quality data. These are often mined in ways that serve corporate interests and infringe upon individuals' privacy rights to shut out outside competition from start-ups as well as minoritized groups, such as Indigenous nations.

Given that AI is built on data fed to it, any inherent bias in the data is propagated to the AI. Bearing in mind that the U.S. and various corporations [3] have consistently usurped Indigenous lands, enacted policies that keep most reservations poor, and dangerously reproduced Indigenous people as minoritized Others, there is reason to believe this mistreatment of data will extend into digital culture (as it has) and directly into algorithmic politics. [4]

Technologies that perpetuate bias can impact Indigenous communities in several ways. For example, when it comes to institutions, organizations, and companies that use AI as an assistance tool for hiring, providing insurance, allocating financial loans and benefits, servicing medical-needs, and most importantly in the field of security, such biases can have consequential impacts on people's livelihoods. All of these concerns are highly relevant to Indigenous communities, particularly in an age in which 'owning,' storing, and utilizing data equates to creating the future.

In this context, the creators of the AI need to be held accountable by ensuring that data bias is assessed in a manner that does not privilege settler colonial imperatives and protocols, and instead ultimately leads to correction of bias. Although the argument can be made that these biases exist a priori or just before data collection, Indigenous protocols need to be developed in order to mitigate or ideally eliminate threats of such bias.

Indigenous epistemologies challenge the dominant servile, pragmatic, and capitalist view of data and can transform the human-AI relationship from a hierarchical dichotomy to one of relationality, kinship, and reciprocity (Lewis, Arista, Pechawis, & Kite, 2018). The intention of Indigenous AI protocols is to protect Indigenous communities and natural resources, to help improve ailing AI, to reduce the harms of AI, to position Indigenous peoples as leading developers of AI, to create respectful and nourishing relationships with AI, and to project thanks toward technologies. In other words, rather than infuse or fold in small bits of Indigenous ethical considerations into AI creations, Indigenous protocols applied to AI would challenge the entire dominant Western narrative of AI.

A productive starting point for a responsible replacement narrative is that AI is, and must be, entwined with trust and care. Both trust and care are value-laden constructs that are often thought of as moral universals yet have different definitions in Indigenous communities navigating complex pasts, presents,

[3] For example, in corporations that focus on hydroelectric development, timber processing, oil, gas, and mineral extraction. Rare earth elements such as neodymium are also mined specifically for computer hard drives.

[4] See Noble, S. (2018). *Algorithms of Oppression: How Search Engines Reinforce Racism*. New York: NYU Press.

and futures. First, I will spend time explicating what trust and care mean in the community/nation that I am a citizen of. After, I will describe cases in which blockchain and AI can be effectively coupled to address more specific Indigenous concerns. The primary example through which this will be addressed is around currency, namely cryptocurrency and record-keeping, though there are additional use cases of the AI and blockchain combination in Indigenous Country. Lastly, I suggest how Indigenous communities, and ideally all communities, can better project care towards and build trust with AI to create productive collaborations and relations.

Trust and Care Within the Coquille Nation

In the Nation I am a citizen of, Coquille (Kō-Kwel) of the Coast of Oregon, trust and care is the core of all of our critical values, and is built on:

1. Promoting the health and well-being of Tribal members and our community
2. Providing equitable opportunities, experiences and services to all Tribal members
3. Taking care of our old people
4. Educating our children
5. Practicing the culture and tradition of potlatch
6. Considering the impacts to our people, land, water, air and all living things
7. Practicing responsible stewardship of Tribal resources ("Vision and Values," 2017).

Note that these are all actions. Providing health care, funding all levels of education, offering computers and equipment as well as transportation and meals for elders, offering spiritual and mental support, building brick and mortar centers that support tribal member well-being, and even providing burial benefits, are considered peace-giving intentions that secure the general welfare of the Coquille Nation.

While the U.S. Nation is rooted in individualism our Nation is built differently. The Coquille Nation is formed almost entirely on care for the whole community and rooted in pride in who we are and where we have come from, how that has been taken away, and how we are getting back what we have lost. This conception of care is guided by a larger vision that "we are a proud, powerful, and resilient people, a sovereign Nation, whose binding thread is our Coquille identity. In the footsteps of our ancestors we celebrate" ("Vision and Values," 2017).

As I write this, I am in the middle of such celebration on the ancestral homelands of the Coquille peoples in what is now known as North Bend, Oregon and neighboring cities. We have gathered as a people to mark the 30th anniversary of the Coquille Restoration Act (1989). This act legally restored our tribe after the Western Oregon Indian Termination Act in 1954, enacted by the U.S. Federal Government, illegally dissolved our tribe and 60 other tribes in Western Oregon.

During this last week of June 2019, we meet to discuss Tribal policies and politics, eat together and give gifts in our tradition of potlatch. Potlatching is both our banking system and the mechanism through which we establish relationships; it is one of the defining aspects of our Nation.

During the Restoration celebrations, the Tribe engaged in potlatch to give scholarship funds, our traditional currency of dentalium shells in the form of necklaces, and other items such as glass art made by a Coquille artist. During other events, we spent time with our families, utilized and relearned our traditional technologies, and remembered the footsteps of our ancestors. These footsteps, in the past 30 years and since time immemorial, have led us on a path that has made us a prosperous, strong, sovereign and *cared for* Nation.

Given my reflection on notions of trust and care in my own community, it has become an apt time to critically consider problems and emerging technologies of the present moment that can hinder or enable us, and Indigenous communities more generally, to accomplish goals in the realm of trust and care. The next section will briefly describe currency-related problems for Indigenous nations and the technological interventions AI and blockchain could make.

Core Example: AI+ Blockchain, Cryptocurrency

Among a host of technologies, the ones that are consistently discussed as either openers of life's possibilities and the glue of relationships, or the root of evil are currencies. Currencies and other record-keeping systems in Indigenous communities traditionally take the form of energetic, emotional, reciprocal items that symbolize and cement social and economic relations. In whatever form they may be in–shells, beaded ledgers, coppers, fiber paper or digital–they are important for ensuring care and collective memory within communities. They are adaptive, shifting to reflect the technological/cultural changes of the moment.

There are currently several problems associated with colonial currency use in Indigenous nations including paternalistic power relations, limited access to banks and capital, and economic leakage. Cryptocurrency, the digital currency system that was invented by Satoshi Nakamoto [5] as the first blockchain system, is an accessible example to begin to think about countering these types of problems. While thousands of cryptocurrencies exist in the current market, only a few were created with the goal of assisting Indigenous communities in improving their economic situations. [6]

[5] The pseudonym for the inventor(s) of Bitcoin, the most popular and first cryptocurrency.

[6] MazaCoin was originally intended for use within the Oglala Lakota Nation (Alcantara & Dick, 2017; Tekobbe & McKnight; 2017; Cordes, 2019). See:

Alcantara, C., & Dick, C. (2017). Decolonization in a digital age: Cryptocurrencies and Indigenous self-determination in Canada. *Canadian Journal of Law & Society,* 32(1), 1–17.

Cordes, A. (2019). From the gold rush to the cryptocurrency code rush?: Communication of currencies in Native American Communities (Doctoral dissertation). University of Oregon, Eugene, Oregon.

Tekobbe, C., & McKnight, J. C. (2016). Indigenous cryptocurrency: Affective capitalism and rhetorics of sovereignty. *First Monday,* 21(10).

In the case of paternalistic power relations between the U.S. and Indigenous nations, cryptocurrency can represent a degree of freedom from the dollar. Marginalized groups can demonstrate resistance through a method of replacement and individualization, undermining capitalist systems and localizing digital currency to meet their national needs. Coding parameters could ensure that community-specific financial philosophies such as the equal distribution of wealth, or proportionally more wealth distribution to elders can be baked into the system.

For example, take a case in which an Indigenous community decides that a certain percentage of every purchase made with cryptocurrency would create a fund to promote social good and economic prosperity in the community. AI could assist in providing the proper percentage and determining what programs those funds could go toward. In this case, AI also assists in authenticating identity for voting on how funds within a nation get spent and in detecting fraud in the blockchain. Blockchain is responsible for recording the decisions surrounding implementation of protocols based on such financial philosophies, and then for distributing the coins themselves to be stored in digital wallets. This is important in empowering members of a nation to make decisions that adhere to their own morals.

AI could also help make decisions that are harder for community members to make from an ethical stance. For example, it is often challenging to determine who in a given community should receive loans from a pot of money. AI could step in to base such decisions on an alternative scheme to assess credit. While typically credit scores are given on the basis of loan payment history and credit utilization, Indigenous communities could lean on AI to identify those 'creditworthy' on the basis of alternative variables such as family lineage or volunteer hours in the community. This could directly challenge credit biases in mainstream lending industries that have been predatory in Indigenous communities. [7]

A second problem stems from an access perspective: the majority of Reservations in the U.S. and most Aboriginal communities in Canada do not have brick and mortar banks. Cryptocurrency can overcome this disparity as it is disintermediated, meaning it is a system that does not require third parties such as banking institutions, but rather uses the P2P network. Access to computers, digital wallets, reliable Internet, training, and investment would need to be attended to in order to retrofit any existing currency system. Access to these basic building blocks can and should be considered human rights, not technological luxuries, and reduce the digital divides that threatened Indigenous nations' ability to be a part of the international playing field, which itself is grappling with the changes of widespread adoption of a new disintermediated system. The digital coins and system could also be branded with signifiers and political messages of Indigenous nations, thereby reflecting sovereign identities (in the same manner as presidents' faces on a dollar bill). This is significant in a symbolic sense.

Lastly, a prevalent problem involves economic leakage, which refers to the spending of money made

[7] First Nations Development Institute (2008). Borrowing trouble: predatory lending in Native American communities. Longmont, CO: First Nations Development Institute.

in sovereign Indigenous nations outside the Indigenous nation, benefitting the state. If an Indigenous nation did wish to reduce economic leakage on their land, one choice could be to limit the coin's scope or to contain usage within a specific tribal nation by geofencing cryptocurrency (Alcantara & Dick, 2017). Geofencing is the process by which the coin's code contains its usability to a limited geographical space. However, it quite easy to fake or misrepresent Global Positioning System (GPS) coordinates. A potential solution for this, which AI could assist in, would involve a process of decision-making around containing cryptocurrency use to a particular geolocation. Coins can also be contained to an area, not by users' self-identification of location, but by the more reliable method of timing how long it takes to get from point a to point b, making it possible for an Indigenous government, for example, to only allow for the usage of the cryptocurrency within the boundaries of the reservation, potentially benefiting local businesses.

Currently, digital divides, volatile markets, inflation and deflation, legal hurdles, and other more pressing social concerns make cryptocurrencies risky. Additionally, the process of producing (mining) cryptocurrencies in a proof-of-work system requires hashing (solving algorithmic problems) and massive amounts of electricity. Similarly, AI requires high levels of computing power. These increase the risk of material environmental problems such as e-waste and climate warming (Mora et. al, 2018). Because of this, it is important to bear in mind that the process is not environmentally cost-free and to consider the improvements that could reduce or invert these various risks, such as harnessing the heat produced from mining for beneficial purposes.

Despite these risks, it is still constructive to consider the potentials and to begin the conversation. Imagining and experimenting with technologies for social benefit are powerful methods that support Indigenous futurity.

Additional Uses in Indigenous Country

There are many other potential use-cases of blockchain (Tapscott & Tapscott, 2016) and blockchain paired with AI. These include application in digital identity verification, privacy, voting, supply management chains, intellectual property disputes, art authentication, and land registry. Moreover, the technology can be considered in retrofitting basic tribal identification cards with machine readable forms paired with holographic and nationally specific overlays, allowing Tribal citizens to cross borders and nations and document border crossing on their own terms. Another example could be in adopting augmented biometric authentication to secure archeological (belonging) storage (housing) facilities. Yet another example regards Indigenous language efforts. This has already been considered in cases where endangered or 'sleeping' languages have been given a breath of life. This breath is offered by the utility of AI and blockchain for storing, processing, and learning with a large quantity of linguistic audio recordings.

While coding parameters for such projects would differ for any Indigenous nation, other works not

situated in Indigenous communities provide a bit more technical background (see Gladden, 2015; Salah et. al, 2019). In all of these cases, more research is needed by Indigenous communities, and robust public relations plans would need to be in place in order to encourage technological uptake. The larger IP AI project, of which this essay is part, begins to take up such projects and culturally produce, or begin to imagine, the conditions under which these technologies may be possible.

Projecting Trust and Care Toward AI

The aforementioned examples demonstrate how AI and other technologies can be contributory to Indigenous flourishing and, likely, other communities' flourishing. We must also bear in mind that trust and care is a two-way street; they must also be expressed toward AI. I attempt to embody this need for care in the illustration for this piece. Here, I created a dentalium necklace with the artistic help of Kari Noe as an offering to AI. As the caption for the necklace details, the necklace is intended to promote the flourishing of AI by providing an outlet for the externalization of stories/data/dreams which flow through a fluid mechanism in each shell. While this is a gift with AI's needs at the forefront, it is based on the human protocols of giving gifts.

Ultimately, we map onto AI what we believe to be uniquely human, such as the ability to find patterns and correlations, to make informed decisions based on desirable outcomes, and to engage in self-improvement. Particularly, given that there is this fundamentally human element of AI, we should be attuned to the fact that there is a fundamentally machine element of being human.

We have long absorbed the qualities of machines, coming in various generations and programmed in our current iteration to optimize productivity and increase the rate of synthesis of a deluge of data to form decisions. Our biological neural networks are media processors that read and execute along electrical currents. Our sentience, emotion, and soul are increasingly opaque as we've long been enslaved by the machines of control, consumerism, and surveillance that order how we affectively move about our lives. Since we are all fundamentally built, we all grow into various states of maturity, and all the while we are vulnerable and needy.

Data Diet

AIs have needs, just as humans do. They need clean and nourishing food (a data diet), security, comfort in temperature, and capacity for fulfillment. In order to have access to the proper diet for feeding those needs, AIs require responsible computer scientists and stewards to have their best interests in mind.

A healthy data diet is also one tailored to the needs of individual contexts. For example, an AI in the financial sector may need fiscal data but extraneous data such as a person's race, weight, height, and education level may be processed as junk that leads to biased lending and investment. A healthy data diet is also not premised on the assumption that bigger data is also better data, overstuffing AI to make correlations that may not be truthful. It should also be sourced carefully, leaving the creators and

stewards of said data properly compensated. Further, the overall system should be safeguarded against predatory security breaches.

A healthy AI data diet often includes the most current data needed to stay relevant in decision making. When a proper data diet is digested and analyzed, it is done with care so as to not solely serve the status quo. For Indigenous communities, this means that it will not disproportionately serve settler states but instead lead to Indigenous communities' well-being and restitution where it is appropriate. And while data seems sterile, placeless, quantifiable, and scientific, it is entwined with place-based knowledge, whether it is cultivated on land or in territories of cyberspace.

Final Thoughts

As signaled in the discussion of Coquille values at the beginning of this essay, Indigenous communities are often self-regulated and guided by how they treat the natural environment, elders, young children, animals and other unique beings. As we plan for a future that is hyper-invested in, and increasingly co-dependent with AI and AI-paired technologies such as blockchain, there should be a recognition that the treatment of AI will involve new metrics upon which human and poly-being communities will understand themselves and build relationships. This work will need to be rooted in respect, trust, mutual care-taking, and cognizance of the ecological impacts they/we create. Future research should recognize that discussions around how AI and blockchain may contribute to distribution, decision-making, and record-keeping for Indigenous social-good are not happening nearly enough. These conversations are especially important to have around currencies as intercultural communication technologies, which can be ascribed meanings colored by colonialism, but now reflect different terrains of meaning such as survivance, sovereignty, tradition, and futurity. Just as animals and non-human beings carried the technology of fire into the world, so too must Indigenous AI developers, community adopters, donors, and machines themselves carry in each element of AI. However, we must do so in a manner that both engenders a force of healing and reflects the cultural currency of relationality and reciprocity.

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