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**Position Paper**

# Indigenous Protocol and Artificial Intelligence

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Indigenous Protocol and Artificial Intelligence  
Working Group

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## 5.1

### Indigenous Protocols in Action

*Caroline Running Wolf and Dr. Noelani Arista*

A Cheyenne, a Māori, an Aboriginal, a Crow, and two Hawaiians walk into the Gingerbread House...

Usually that is how a bad joke starts. But this is not a joke. This is the beginning of an impromptu hackathon combining cultural knowledge and technological skills to assist with Indigenous language reclamation. All of this taking place in the historic Gingerbread House, an adorable Tudor home from the 1920's located in Kahala, Honolulu.

The above-mentioned multi-tribal group of Indigenous engineers, scholars, and language activists from around the world were gathered in Hawai'i as participants in two consecutive Indigenous Protocols and Artificial Intelligence (IP AI) workshops in March and May of 2019. Our group began that second workshop in May lounging on couches in the living room of the Gingerbread House. The organizers had suggested break-out groups based on potential content overlap. Our breakout group was tentatively named "Team Prototype" and consisted of two software engineers (Joel Davison, Gadigal and Dunghutti from Australia, and Michael Running Wolf, Northern Cheyenne from the USA), a data scientist (Caleb Moses, Māori from New Zealand), a project manager (Caroline Running Wolf, Crow

from the USA), a Kanaka Maoli Knowledge Keeper (Dr. Noelani Arista), and a Hawaiian cultural consultant (Isaac ‘Ika‘aka Nāhuewai Pang). This was a rare occurrence of an all-Indigenous team of language warriors from around the world harnessing both sophisticated tech skills and deep cultural knowledge, all in one room!

Considering that the individual team members hail from very distinct and far-flung Indigenous backgrounds, it is advisable to take a step back and reflect on the meaning of that term “indigenous.”

Though the term “indigenous” has its origin in Latin, its application to human society is recent. The emerging identity of “indigenous peoples” has been adopted as an umbrella term by Indigenous leaders in international arenas, such as the United Nations, while simultaneously opposing a rigorous definition. The use of this term reflects the need for a collective label that supersedes the boundaries of nation-states. It encompasses over 370 million Indigenous peoples from disparate geographical and political backgrounds who, despite distinct cultural differences, share common experiences resulting from the relationship between the Indigenous peoples and present-day nation states.<sup>2</sup> Indigenous peoples from around the world share a common history of systemic oppression, suffering from “invasion, occupation, imposed cultural change, and political marginalization.”<sup>3</sup> They also share the common plight of their languages teetering in some degree of endangerment. Despite being “marked by past and present colonialisms”<sup>4</sup> the umbrella category “indigenous” enables historically and geographically separated peoples to recognize each other and their common plight, and to collaborate towards a better future.

Shawn Wilson (Cree) points out that one of the struggles of cross-cultural communication is finding common ground<sup>5</sup> —a task that is considerably easier when speaking with people from your own cultural background, whereas “speaking with people from another culture it often takes longer to explain the context, background or meaning of a story than it does to actually tell the story.”<sup>6</sup> Our group was fortunate to find ourselves on common ground from that very first moment in the Gingerbread House, allowing for effortless communication and seamless teamwork.

As Indigenous persons from the so-called ‘CANZUS’ Anglo-settler states (Canada, Australia, New Zealand, US), we all share a similar Indigenous set of values. In his book *Research is Ceremony*, Wilson cites Cora Weber-Pillwax, who says, “A researcher must make sure that the three R’s, Respect, Reciprocity and Relationality, are guiding the research.” Evelyn explains, Respect is more

<sup>2</sup> Factsheet: Who are Indigenous peoples?, (May 12, 2006), *United Nations Permanent Forum on Indigenous Issues*, <[un.org/esa/socdev/unpfii/documents/5session\\_factsheet1.pdf](http://un.org/esa/socdev/unpfii/documents/5session_factsheet1.pdf)>.

<sup>3</sup> Niezen, R. (2003) *The origins of indigenism: Human rights and the politics of identity*. Berkeley, CA: University of California Press, p. 93.

<sup>4</sup> de la Cadena, M. and Starn, O. (2007), *Indigenous Experience Today*. Oxford, UK: Berg Publishers, p. 3.

<sup>5</sup> Wilson, S. (2012), *Research is ceremony: Indigenous research methods*. Winnipeg, Manitoba: Fernwood Publishing, p. 6.

<sup>6</sup> *Ibid.*, p. 7.

than just saying please and thank you, and Reciprocity is more than giving a gift.”<sup>7</sup> Another important consideration is relevance: the methods, values, and objectives need to be linked to community needs and context. Research and applied projects need to be built collaboratively with, not on behalf of, and certainly not without the community.

Additionally to these shared values, all of the team members share a passion for, as well as an awareness of the importance of Indigenous language revitalization. According to the United Nations, of

“the almost 7,000 existing languages, the majority have been created and are spoken by indigenous peoples who represent the greater part of the world’s cultural diversity. (...) Given the complex systems of knowledge and culture developed and accumulated by these local languages over thousands of years, their disappearance would amount to losing a kind of cultural treasure. It would deprive us of the rich diversity they add to our world and the ecological, economic and sociocultural contribution they make.<sup>8</sup> (...) But despite their immense value, languages around the world continue to disappear at an alarming rate.”<sup>9</sup>

With this in mind, the United Nations declared 2019 The Year of Indigenous Languages<sup>10</sup> in order to

- “focus global attention on the critical risks confronting Indigenous languages,”
- recognize “their significance for sustainable development, reconciliation, good governance and peacebuilding,”
- “encourage urgent action to preserve, revitalize and promote them.”<sup>11</sup>

Indigenous people do not need the official declaration of the United Nations to be painfully aware that over 40% of the world’s languages are at risk of disappearing.<sup>12</sup> Few if any Indigenous communities escaped the scars of colonial oppression that outlawed our mother tongues, including Team Prototype’s nations. We fell silent when we collectively came to realize that all of us were active in the same field. The six team members were (and are) Indigenous language activists, applying their skill sets in their home nations to assist Indigenous language revitalization efforts.

The short moment of stunned silence after we introduced ourselves did not last long. Immediately it became clear that we needed to apply those skills gathered in the room to create something relevant. We

<sup>7</sup> Ibid., p. 58.

<sup>8</sup> The role of the language, (2019), *United Nations Permanent Forum on Indigenous Issues*, <en.iyil2019.org/role-of-language>.

<sup>9</sup> Media, (2019), *United Nations Permanent Forum on Indigenous Issues*, 2019 <en.iyil2019.org/media>.

<sup>10</sup> On December 18, 2019 the United Nation has declared an International Decade of Indigenous Languages to begin in 2022.

<sup>11</sup> Home - International Year of Indigenous Languages, (2019), *United Nations Permanent Forum on Indigenous Issues* <en.iyil2019.org>.

<sup>12</sup> About the Endangered Languages Project, *Endangered Languages Project* <endangeredlanguages.com/about/>.

decided to use this week like a hackathon and build an AI prototype while demonstrating ‘Indigenous Protocols’ in action. With this collection of essays we hope to document our team’s process and give some insight how our process reflects the common denominator of our individual cultural values.

After a short brainstorming process we decided that our prototype should be an Indigenous language revitalization tool. All six of us agreed that to address the requirement of Relevance, our workshop output needed to be grounded in language work—benefitting our respective communities and Indigenous peoples in general. Considering the state of Indigenous languages, we are convinced that cutting edge technologies, such as artificial intelligence, could become a game changer for world-wide efforts of Indigenous language revitalization. As Dr. Arista posits in her essay *Indigenizing AI*: “A Hawaiian Indigenous methodology should begin, not end, with a foundation in language.”<sup>13</sup> Though we initially considered various languages, specifically Crow, Gadigal, and Northern Cheyenne, we chose Hawaiian—or ‘ōlelo Hawai‘i—as the first language we would feature, as our workshop was being hosted on Hawaiian ancestral homelands. This was a simple question of *Respect* and *Reciprocity* towards our hosts.

An aspect of building respectful Relationships with our Hawaiian hosts and ensuring the relevance of our prototype was to include them throughout the entire development process. Dr. Arista and ‘Ika‘aka equally contributed to the initial project idea in our brainstorming session as well as throughout the project life cycle from concept to implementation. As Dr. Arista points out in her essay, the currently existing gap between “developers who have been trained to code, but not trained to know (‘ike)” can be bridged by “cultivating good social relations between developers, engineers, and knowledge keepers.”<sup>14</sup> There were unexpected positive benefits to working as an all-Indigenous team: members bonded easily, as they felt supported in their work. Group dynamics were not retarded by having to spend a lot of time discussing Indigeneity or identity, rather developers found accord over the many things shared in common in our experience.

As Indigenous developers with merely the technological literacy we were well aware of our knowledge gap and were grateful for the opportunity to work closely with Dr. Arista and ‘Ika‘aka, who brought both language knowledge as well as cultural depth to the table. Knowledge keepers can supply deep historical connectivity to language, introducing older concepts which are now considered ‘novel,’ while also crafting approaches to gathering new data, supplying digital interfaces that reflect and update Indigenous language usage within existing language communities in real time while connecting them to the foundation of ancestral knowledge.

Working with an all-Indigenous team following Indigenous Protocols came with an unexpected, refreshing shift for Dr. Arista and ‘Ika‘aka, who were used to being treated as ‘consultants’ in similar project settings. In their experience, too often the role of ‘cultural consultant’ translates to a tacked-

<sup>13</sup> Arista, N. (2020). *Indigenizing AI: The overlooked importance of Hawaiian orality* in print, this publication.

<sup>14</sup> *ibid.*

on ‘authenticator of tradition’ for the commercialization of Hawaiian aesthetics. In contrast, our team emphasized the importance of working together as equals to maximize our complementary knowledges and skills. As a team we worked well together, recognizing each person’s strength and taking time to discuss problems and tackle individual concerns in a compassionate and cooperative manner.

Consequently, to attain our goal of creating a relevant Hawaiian language tool, our prototype needed to be situated in the larger context of Hawaiian ‘ike and mo‘olelo which also addresses a Hawaiian future vision. Before we could develop this ‘North Star’ vision of a future AI-powered language tool together, it was necessary to develop a common understanding of where technology is today and where it might be five to seven years from now. As a team we reviewed some existing language applications as well as some augmented and virtual reality experiences. On the basis of contemporary cutting-edge technologies we then envisioned “actual effective Indigenous edu-tech”<sup>15</sup> with Indigenous AI as a personal assistant, simultaneous translator, and virtual knowledge repository. We envisioned a mixed reality device that would allow us to wrap ourselves in our ‘olelo. Based on our GPS coordinates it would offer context-appropriate ‘ike and mo‘olelo of the land that we were standing on. We named this AI-powered Hawaiian language tool *Kuano‘o* [thoughtful, meditative, comprehending]. As Michael Running Wolf points out in his essay, *Dreams of Kuano‘o*, the basic technologies, such as augmented reality headsets, machine translation, and voice assistants, already exist today—but not for Indigenous languages.

Considering the available time frame of merely one week, the whole team then carefully pared down our future vision to a feasible first step: a mobile app prototype of a visual dictionary using image recognition.

Our first task was naming the future product. How and why we eventually decided on the names *Hua Ki‘i*, for the prototype, and *Kuano‘o*, for the long-term vision, is described in the *Indigenizing AI: The Overlooked Importance of Hawaiian Orality in Print* essay.

In-depth discussions with ‘Ika‘aka and Dr. Arista about conceptualizing these technologies within a Hawaiian framework supplied another good example of Indigenous protocols and methodologies in action and application. The whole process—from deciding on the project to developing the prototype and filming a demo video<sup>16</sup>—demonstrates Team Prototype’s Indigenous approach whereby project managers, engineers and knowledge keepers work together equally on the task at hand throughout all phases.

Our prototyping project, *Hua Ki‘i*, illustrates what happens when Indigenous developers, engineers and knowledge keepers work together to create AI systems for language reclamation across multi-tribal linguistic and geographic spaces.

<sup>15</sup> Joel Davison during brainstorming session in May 2019, *Indigenous Protocol and Artificial Intelligence*, Workshop 2, May 26 - June 1, 2019.

<sup>16</sup> Obx Labs, (2019) IP AI: Hua Ki‘i (video), *Vimeo* <[vimeo.com/348661163/d9bff8f5bf](https://vimeo.com/348661163/d9bff8f5bf)>.

Just as fast as our decision to focus on a language tool, we quickly distributed the responsibilities among the team:

- Joel Davison, a Gadigal and Dunghutti engineer from Sydney Australia: designed the user interface based on a wishlist and input from ‘Ika‘aka with additional input from Dr. Arista.
- Caleb Moses, a Māori data scientist: worked closely with both Dr. Arista and ‘Ika‘aka to develop the core component—providing a dictionary with translations from English to Hawaiian.
- Michael Running Wolf, a Northern Cheyenne computer scientist: developed the back-end and created APIs (Application Programming Interfaces) that connect the app’s architecture consisting of dictionary, the AI, and the front-end.
- Dr. Arista, a kanaka maoli knowledge keeper and Associate Professor of History at University of Hawai‘i at Mānoa: worked to build a dictionary of Hawaiian terms, guided discussion on names and gave direction regarding Hawaiian customary knowledge, language, and naming conventions.
- ‘Ika‘aka, kanaka maoli, is a professional musician, and MA student at Ka Haka‘ula ‘O Ke‘elikolani, University of Hawai‘i at Hilo. Dr. Arista and ‘Ika‘aka were front and center to it all. They envisioned a future Hawaiian technology with us and ensured that we had the necessary context to develop this technology for the Hawaiian language community in a respectful way. They built a dictionary for the prototype, partially based on existing Hawaiian dictionaries but also through crowdsourcing of terminology.
- Caroline Running Wolf, a Crow project manager: ensured that communication between the individual components and team members flowed smoothly, that daily coordination meetings were held, and decisions documented. She assisted with the design of the user interface and was responsible for team coordination across time zones and oceans, including assembling the pieces of this essay.

Every component, from the front-end to the back-end, is closely interrelated. Each of us had to agree upon the functionality of each of our components and how they will communicate with one another. We collectively agreed upon technical and social protocols merging Indigenous thought and technical requirements throughout the process to ensure a successful prototype assembly by the end of our limited time together. Decisions could not be made in isolation because they affected everyone and their tasks, and decisions had to be made early and quickly. We were aware of challenges and necessary compromises to our project of Indigenous technology and had to decide together how we would move forward in this imperfect world.

Ideally, we would have created and trained our own AI model, using Indigenous culture and language for context integration. We did not, however, have the amount of time and resources available to create our own model. This meant we needed to decide which of the existing English language machine



learning frameworks to use for our prototype. We spent an afternoon evaluating existing models used by the scientific AI community, all English based, that could recognize everyday objects in a way that was simple to translate. Each of the available machine learning models has its own challenges and its own foreign concepts that needed translation. For example, a 1000 word image recognizer could tell you the dog breed, but could not simply respond with “dog.” Translating all the subcategories for a high resolution model was not tractable. Eventually we decided on a simple open-source 90-word model. Once this critical component, the AI brain, was decided, developing the app was designed and tasks divided up.

It should be noted that our strategy was not novel. Through our process we had independently arrived at a technical strategy using a model similar to the one used by a Māori image recognition app called Kupu.<sup>17</sup> We are not competitors with our fellow Indigenous AI developers. The realization that Kupu exists reinforces our thesis that AI is accessible and reproducible for Indigenous communities today.

From coding frameworks and machine learning models to dictionaries, every tool ties into the greater language narrative of English as lingua franca and every tool has been shaped by and embodies Western thought. The reality is that, in the case of this prototype, we were using Western technology to create an Indigenous tool and infusing a Western framework with Indigenous values.

Audre Lorde famously declared “For the master’s tools will never dismantle the master’s house. They may allow us temporarily to beat him at his own game, but they will never enable us to bring about genuine change.”<sup>18</sup> Audre Lorde’s words of warning guide our thinking and while acknowledging the pitfalls of working with the “master’s tools,” and the limitations of the technology: it is incumbent upon us to take up the work our kūpuna (elders) left to us.

Our prototyping team is cognizant of the limitations of working solely within the Western colonial frameworks, and have built a prototype with a dictionary that reflects the real time usage of words. While building a language repository, we also needed to build an image bank with appropriate images, those taken of native flowers or plants, for example, would be portrayed in the way that Hawaiian people envision them, placing them in context.

While dictionaries are helpful tools and often massive undertakings, they come with their own design foibles and flaws. The last generation of Hawaiian dictionaries were a labor of affection and pain for the Hawaiian scholar Mary Kawena Pukui. Pukui had been an avid collector of Hawaiian words beginning in her forties, a task she could undertake only after decades of being trained to listen, repeat and remember. It is hard for people today who grew up speaking English as a first language to imagine what the work of compiling words for a dictionary in your native language might entail. Colonial subjects are made to feel responsible for not ‘remembering’ native language, customs, culture and practices while

<sup>17</sup> Kupu’s software, featuring the Te Aka Māori Dictionary, can be found on their website, <kupu.co.nz>.

<sup>18</sup> Lorde, A. (1984). The master’s tools will never dismantle the master’s house, in *Sister outsider: Essays and speeches*. Berkeley, CA: Crossing Press, p. 112.

living within mainstream nationalist cultures that have only recently begun to acknowledge the role that government played in dividing Native peoples from lifeways and belief, destroying social relations between people and between people and their lands. Centuries of institutional programs of reform, assimilation and, where these failed, outright destruction have contributed greatly to the present state of affairs. Identity is a poor substitute for social ties and it too has been born of colonialism. To learn a native language anew, as if it were ‘foreign,’ is yet another lasting grief or perhaps humiliation that Native people have been made to feel they have to bear.

In an unpublished biography of Mary Pukui written by her family, they noted:

“Of all her work towards the preservation of Hawaiian culture she felt that her contribution to the dictionary would remain the most important for the young people of the future though she often said, ‘One may learn all the grammar possible today and have a very large vocabulary of Hawaiian words at his command, but if he fails to understand words sweetly spoken and sourly meant, he still had more to learn.’”<sup>19</sup>

Working on this multi-tribal prototyping group has led Dr. Arista to consider what it might mean to extend and build upon the work of Mary Kawena Pukui and those maoli and non-maoli scholars of her generation to develop with others a Hawaiian framework lexicon: to not only edit, add to, and deepen the contextual usages that supply words with their “sweet and sour” inflections, but also to suggest organizational principles based on Indigenous thought that might govern our access to knowledge by using artificial intelligence. Given the large data set which exists in the Hawaiian language it is possible to pursue numerous avenues of research beginning with the creation of new data sets, collation, aggregation, and organization, which have numerous applications in the public and private sectors.

However, creating such structures requires more than just linguistics and language. Data sets built without context are faulty by design. Many designers may have technical or linguistic skills yet lack the disciplinary training to create the cognitive pathways that lead to knowledge that is rooted in tradition. Hawaiian material as case study can be re-scaled and applied to other Indigenous and non-Indigenous language and cultural pursuits and reclamation projects.

From this one-week multi-tribal hackathon emerged not only an early prototype of a visual dictionary using image recognition but also a trans-Pacific collaboration of Indigenous language activists. We hope that in the near future we can continue working on Hua Ki‘i and towards Kuano‘o while gradually replacing the Western frameworks in our dictionaries and in our code.

<sup>19</sup> Pukui, M.K., Bacon, G. and Bacon, P. N. (n.d.) *Untitled Biography of Mary Kawena Pukui*. Unpublished. Honolulu. Bacon Family.

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