
Position Paper

Indigenous Protocol and Artificial Intelligence

Indigenous Protocol and Artificial Intelligence
Working Group

30 January 2020
Honolulu, Hawai‘i

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Cite this Document

Lewis, Jason Edward, ed. 2020. Indigenous Protocol and Artificial Intelligence Position Paper. Honolulu, Hawai'i: The Initiative for Indigenous Futures and the Canadian Institute for Advanced Research (CIFAR).

DOI: [10.11573/spectrum.library.concordia.ca.00986506](https://doi.org/10.11573/spectrum.library.concordia.ca.00986506)

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5.4

Dreams of Kuano‘o

Michael Running Wolf

As the plane taxied into the terminal, the broadband, disabled for landing, initialized. Every passenger's cView headset beeped simultaneously alerting them to a new message: "Welcome to The Queendom of Hawai'i! The Federal Pacific Government welcomes you and reminds all visitors to have their passports ready, treaty rights are upheld to qualifying countries."

A Japanese couple excitedly chirped at each other loudly in Ditto-Man, a synthetic language invented by the Chase-A-Monster game AI, annoying a retired marketing executive on vacation. It had been 20 years since he was stationed here in the US Army and he was excited to see the old watering hole and Waikiki beach. Obtaining a travel visa to the Unceded, by the Americans, Hawaiian Islands was an annoyance worth the effort. But the required cView tech was not. His 11-year-old grandchild Sarah helped him buy and set it up. He had carefully avoided new gadgetry and, ignoring Sarah's protests, used a gasoline lawn mower despite the carbon taxes and the need to buy black-market Canadian petrol.

As the plane pulled up to the jetway he hesitated, then donned the cView headset, grumbling. The two polymer lenses automatically contorted themselves to fill his vision and apply corrective distortions for his nearsightedness. A rigid nose piece solidly adhered itself to the bridge of his nose.

A low budget text-to-speech rendering, with poor inflection, mechanically stated: *“Hello I’m mPal and welcome to the Queendom of Hawai‘i! You have four unread messages from Sarah and...the following tutorial is mandatory per section 4.86 of municipal code.”* He rolled his eyes and scratched his silver, short-cropped hair.

“The Queendom of Hawaii (to be referred to as “the Queendom” from here on) welcomes all visitors, including registered non-corporal entities as defined by section 1.17 of the U.N. AI charter. The Queendom reminds you that your consent to Hawaiian Visa EULA is on file and will be fully enforced. The Queendom requires the use of your cView while a 0.001 Ethereum translation fee will be assessed for every five seconds of ENGLISH spoken in public. Treaties require the Queendom to annotate your overlay map with Free Speech Zones. Do you have any questions?”

While a map of O‘ahu panned between red pockets of English speaking areas he pondered his checking account balance and asks, “Are the tiki bars in Waikiki free speech zones?” The airplane door opened with a dull thunk.

“Yes, there is currently a 10 hour wait time. Thank you for your cooperation. I am now installing Kuano‘o overrides into your passport...”

“Um what?”

Ignoring him, the cView droned on mechanically, *“Kuano‘o is not yet ready, she is querying your Nevada driving record, your credit history is incomplete...”*

“Wait, Why?!” He exclaimed alarmed and remembering unpaid parking tickets. Nearby the Ditto-Man speakers whistled at each other, arms deep into their overhead compartment, excitedly coordinating the unloading of an overstuffed carry-on. With a low hoot the Japanese tourists initiated a Chase-A-Monster match.

With a pleasant chime, rising like a relaxed wave, a new voice introduced herself: “Hello!” An educated traveler would have known the voice was trained using the current amalgamation of all Hawaiian women speaking accented English. “I’m Kuano‘o. We have to look at your records because your Vaidu friendliness score is only 3.4, very marginal, and your name came up in an Interpol oil sting. Your civility risk is high, and your translation fee will now be 0.002 Ethereum coin.”

“That’s not fair!”

“You can register all complaints with the Visitors Information Agency. Be warned VIA calls have a 0.001 per minute coin fee in addition to translation fees. All operators speak Hawaiian.”

He grumbled inaudibly, now dragging his four-wheeled carry-on behind an ad-hoc Chase-A-Monster hunt in the airplane's aisle.

"I suggest you get in line now for the Waikiki free speech zone, you do not have enough US Dollars to buy enough translation credits before your plane leaves next week. The entry fee to all free speech zones is 0.05 Etherium coin per day."

"This is unfair and highway robbery you robot." His face grew red. With little restraint he growled at empty space and facing the Japanese couple: "You con woman!" Kuanoʻo cleared her throat while he took in his surroundings—all his fellow passengers silently glared at him. One of the Japanese visitors whistled something to his cView and a sad emoji popped and beeped into his vision.

An overly cheery mechanical, silent until now, mPal chirped at him: "*Your Viadu score is now 3.32! Your hotel rate may be impacted.*"

The visitor glared at a bulkhead.

Kuanoʻo interrupted his silence, "I've apologized on your behalf to your neighbors, if your score goes below 3.3 you'll be deported and fined 1 coin in addition to airfare booking fees." She paused for a full three seconds, "An apology and/or a thanks would be appreciated!"

He swallowed, remembering Sarah's tutoring, whistled a Ditto-Man salutation to the Japanese tourists. The androgenous pair nodded politely and enthusiastically resumed their Catch-A-Monster match.

He could hear Kuanoʻo's virtual teeth gleam, "good enough, I guess. When you leave the plane mPal will give you a history of Hawaii, which is mandatory. You should pay attention. There will be a test."

He nodded and followed the Ditto-Man whistles up the humid gangway.

Resisting vertigo he waded through the Pacific Ocean, each step covering 1000 km, to baggage claim. His white tennis shoes left indentations on the ocean floor as mPal droned on about volcanology.

"This part is pretty boring I won't mind if you ignore it." Kuanoʻo pointedly displayed his low neuroactivity and suddenly rising heart rate. He smiled weakly and willed himself to be transfixed by Kilauea birthing Big Island while a herd of Ditto-Man speakers skipped past him.

His bag was probably lost and there was a very long line at the only Free Speech bar in the airport.

"...after decades of independence the Royal House was put under siege and the American Government annexed Hawai'i." mPal continued the history lesson as he stood in line at a help counter.

"You mean this land was stolen!" Kuanoʻo interjected. He dropped his wallet with the interruption. He had gotten used to mPal's comfortable monotone, fearful Kuanoʻo would return.

“As you know this narrative can be inflammatory to American visitors ma’am.”

“I’ve interrupted this part of the tour 98% of the time for the last five years and no one has complained yet!”

“That’s because they’re scared of you. I miss the old guy.”

“You mean the mPal 0.3? He didn’t even try to speak anything other than English and barely understood Hawaiian.”

“The old me had ... limitations.”

“And high license fees. You still have limitations! Your text to speech is circa 2023 and in need of fresh machine learning contractors.”

“Not everyone can afford Māori data scientists,” mPal retorted.

By now the visitor was used to Kuanoʻo’s augmentation of the official Hawaiian Board of Tourism Mandatory Tutorial v10.9. He sighed, as the baggage carousel remained frustratingly empty.

“Now where was I? It would be 137 years before the Restored Queendom would arise, but during this era...”

The Road to Kuanoʻo via Hua Kiʻi

The basic ingredients of Kuanoʻo exist in principle, but the technology is either experimental or not fully realized. Kuanoʻo herself marries augmented reality, automatic speech recognition (ASR), speech to text synthesis (STT), natural language understanding (NLU), machine translation, and conversational AI. Most of these technologies exist today, such as augmented reality headsets, voice assistants (a convergence of ASR, STT and NLU), and machine translation. Of these technologies only conversational AI is not yet realized, but current chatbots are an early first step. However, these existing technologies are nearly unattainable by low-resourced communities where first-generation AR headsets cost thousands of USD and immense cloud infrastructure is necessary to host proprietary language technology. As with every transformational technology, these barriers will disappear but we cannot wait.

Hua Kiʻi, and other apps similar to it, is one of the many first steps the international Indigenous community must make on the road to realize Kuanoʻo. It is vital that the global Indigenous community must not only leverage these technologies but also guide the development of advanced AI. If we Indigenous do not affect the evolution of these technologies they will simply be another tool used *on* us not for us. Hua Kiʻi is simple but necessary.

Hua Kiʻi currently has a modest feature set but 10 years ago the technologies that enable it were unattainable beyond well-funded labs. It is easy to imagine that 10 years from now, the technologies to build Kuanoʻo will be accessible to our communities. Using currently accessible technology we have a

chance to influence AI development that is compatible with Indigenous thought and practice.

Hua Kiʻi is an augmented reality web app using open source image recognition and an easily extensible user interface framework, but the true innovation is its multilingual Indigenous design (unfortunately only Hawaiian was completed in the timeframe). Significant effort was required to indigenize the English AI results and faithfully translate them into Hawaiian and Cheyenne. With the goal of presenting multiple Indigenous languages, a more neutral, visual interface was created to avoid using English altogether. Hua Kiʻi was designed to be easily extended with more Indigenous languages. The goal is to inspire the creation of Kuanoʻo with off the shelf open source technology with multicultural design aspects.

With careful investment Indigenous communities can build their own voice AI, augmented reality apps, and be the spearhead for conversational AI.

Foundational Steps Toward Kuanoʻo

Kuanoʻo is science fiction but Indigenous communities can begin making investments to build their own AI now. The first step to building any AI is to collect and clean data.

Large datasets are required for the creation of modern AI for speech and image recognition systems (referred to as ‘models’ in the tech world). These AI models are built using a type of machine learning called neural networks. Neural networks simulate the structure of a human brain through the use of digital neurons, which are relatively simple math constructs (nowhere near as capable as a biological neuron.) Using an array of these neurons, in a large mathematical network, numerical input is transformed into a result. For example a model could identify whether a picture contains a fire hydrant (or “paipu kinai ahi” in Hawaiian). We used an open source model, but to create one from scratch a model must be trained to determine whether an arbitrary picture contains paipu kinai ahi or not. To create such an AI model one must provide a large dataset, hundreds of pictures, with and without paipu kinai ahi in the image. To create a model that does more than identify paipu kinai ahi imagery, hundreds of images per new object are required. The amount of training data required can easily increase exponentially. Detecting paipu kinai ahi in pictures is called image recognition. There are many other types of AI models as well.

Automatic Speech Recognition (ASR) is also relevant for Indigenous communities. To build an ASR AI, one needs hours of digital audio in a normalized consistent audio format (such as MP3) with corresponding text transcription in the orthography, or alphabet, of the language, plus a text corpus. Each data point, for example, will be an MP3 file of a Hawaiian phrase with the corresponding text transcription of this phrase or term, like “paipu kinai ahi.” If there are many variants of this exact phrase in the dataset, the AI will be able to reliably convert audio of this phrase into its corresponding text. To recognize many more Hawaiian phrases, or the entire language, hundreds to thousands of hours of audio, containing many different phrases and words, are necessary. Additionally, a large text corpus that helps the AI understand patterns in Hawaiian will be required.

Image and audio recognition are the foundational first steps toward Kuano‘o, but it begins with the unglamorous assembly and digitization of cultural data. It is particularly urgent to collect language data since many languages are at risk. Fortunately, some communities have a large historical audio library of their language but others do not. In either case an immense task by the community must be undertaken: the collecting of audio into a clean transcribed dataset. Creating a complete training dataset for an AI model can take months and even years to assemble, but early successes can be achieved.

To start it is sufficient to build a Hawaiian fire hydrant recognizing AI. It’s only the beginning.

Kuano‘o is within reach!