

Taking Back the Future: A Short History of Singular Technologies in Brazil

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Petites singularités

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Abstract

This article discusses four unique free software-based digital infrastructures and networks that were developed in Brazilian communities as situated models of resistance. The first is Baobáxia, an eventually-connected network that can exist on the internet and at the same time disconnected from it as a local network. Its nodes are located in *quilombolas*, communities of African seized people who resisted Portuguese and European slavery and culture. The second is MetaReciclagem, a collective of Brazilian technologists promoting the upcycling of discarded computing technologies and their usage for artistic expression through *Gambiarra* (makeshift) re-appropriations. The third is a political articulation and reflection about the appropriation of digital technologies called Technoshamanism, an international artistic and activist network and set of practices. We discuss the background of the networks and characterize their practice and infrastructure. Fourth and finally, we also look at a new generation of feminist providers through the example of Rede Kefir. Our analysis highlights the importance of minoritized decentralized technological practices that convey integral organizational models opposing capitalist hegemony. We use a feminist

Roussel, Natacha, and Stolfi, Ariane (2020). Taking Back the Future: A Short History of Singular Technologies in Brazil. *Catalyst: Feminism, Theory, Technoscience*, 6(2), 1–27.

<http://www.catalystjournal.org> | ISSN: 2380-3312

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epistemology to describe the transformation they propose to the understanding of the nature and practice of technology, which considers necessary principles of “intra-action” (Barad, 2007) across heterogeneous socio technical spaces.

Introduction

The expression “take back the future” emerged from parallel conversations, documents, and communications in the context of Brazilian autonomist networks. These networks help contribute to community autonomy. The specificity of the 4 networks projects presented here resides in their situation: they are localized often in remote communities, they employ hybrid transdisciplinary methodologies, and they are committed to free software (by free software we mean software developed by and for the community, we will specify its characteristics further). We claim these are “singular technologies,” by which we mean they are both intentional and contextual (Roussel & hellekin, n.d.). These projects exist most coherently in decentralized technological infrastructures and develop along different paths. Their hybridization with a community or a place creates spaces of resistance. They converge with community organizations to create a unique terrain for identity construction, resistance, expression, and solidarity that contrasts with dominant perspectives. As the Global Information Society (2018) reports, community networks worldwide are underdocumented. Furthermore, when such autonomous projects are discussed, they are often described solely as examples of the technical achievement of bringing connectivity to remote fragile populations without taking into account community issues such as the forms of agency they contribute to developing (Echániz & López Pezéz, 2018).

The authors, while being remote for one of them, engaged personally with the projects described. Beyond the authors’ direct involvement with these projects, this paper is nourished by shared commitments in different community networks and a long-term relationships maintained through independent international online groups and mailing lists that have been active since 2008. These facts highlight the long lasting international connections that are made through and make possible autonomous initiatives. Our own technological practice also cultivates community and feminist models of organization. This paper articulates our networks and simultaneously theorizes practicing and developing a participatory methodology. We used our own infrastructure hosted in Belgium by *petites singularités*, a nonprofit active in free software production and organization, to gather the concerned people on our online platform, where we also have invited active members to contribute to the projects. The platform is

open to all upon subscription (<https://ps.zoethical.org/>), and it reveals many of our preparatory conversations. We also cross-read other digital archives as referenced along the text.

Oppressions intersect in the production and use of technology. In turn, technological illiteracy, augmented by the user's sense that they cannot even legitimately approach those tools renders community production of technology very difficult. From a feminist perspective, the technologies we discuss begin with existing community knowledges (Haraway, 1988). From this epistemological foundation, these infrastructural projects transform the practice and the production of technology to address different layers of oppression.

This approach considers necessary principles of intra-action (Barad, 2007), across the study. The concepts we use to analyze these projects begin from the participation of the project actors on the online platform as they open ways to understand phenomena emerging from their agential actions that bring together communities and technologies in particular ways.

Our analysis of these important but minoritized and marginalized free software projects in Brazil aims to understand the spaces for resistance they contributed to building. This article takes up a specific discourse of digital activism in the Brazilian context to describe how technical alternatives emerge from an anti-colonial position. We are influenced by the *Manifesto Antropófago* (O. de Andrade, 1928), a historical Brazilian decolonial text that uses an anthropophagist model for the re-appropriation of the colonial assets by the oppressed. "Anthropofagia" is the metaphorical eating of other people's ideas. The digestion process takes some things in and discharges what is not needed. Anthropofagia eats occidental culture, but doesn't keep everything that is imposed; some things are "shitted" out. We consider the anthropophagist organization of the networks presented here, in which modernist practices in computer networks and technologies are absorbed, regurgitated, and transformed for use by Afro Brazilian communities. Our study presents three projects: Baobáxia, which refers to the Afro ancestry in Brazil; MetaReciclagem, which took place in a number of "Pontos da Cultura" around the country; and Technoshamanism (TCNXMNSM), associated with the Pataxó community. These projects began in the 2000s and continue today, but, with the exception of TCNXMNSM, which is more recent, they were especially dynamic during the first decade of the century as government organizations supported free software and "*cultura livre*." Finally, we look at feminist networks that gather along with other international groups to build digital security

knowledge and resources towards autonomous technological practice. We describe these networks separately and examine how the processes they put in place address epistemological issues from the ground up. This method allows for the reconfiguration of technological infrastructure as well as institutional arrangements (Ostrom, 1990), including concepts and vocabularies, by and with the communities concerned.

Independent Networks, Free Culture and Community Organization

The free software movement has been at the core of Brazilian cultural and digital politics since the beginning of the millennium. The term *free software*, which was adopted in the early 1980s, is usually understood as "software that respects users' freedom and community," where "the users have the freedom to run, copy, distribute, study, change and improve the software" ("What Is Free Software?," n.d.). In Brazil free software was used throughout the public sector, and its advocates were encouraged by government policies. Rafael Evangelista (2014) explains, "the Brazilian free and open software movement showed great efficiency compared to other international FLOSS (Free/Libre/Open Source Software) communities: it became influential among both local and national political parties" (author's translation). The movement launched the Free Software International Forum in 2000 at the Federal University of Rio Grande do Sul during the World Social Forum. After the election of Luiz Inácio "Lula" da Silva in 2003, the free software movement in Brazil received further governmental support when Lula appointed Gilberto Gil (a key figure of the Tropicália avant-garde movement of the 1960s in Brazil) as minister of culture in 2004. Free software was used and promoted by the Brazilian federal government both as a way of accessing technological sovereignty and as distinct cultural approach, for example, in the context of the program Pontos da Cultura designed as a public initiative for remote areas to extend network access and general information to communities about digital practice.¹ Pontos da Cultura promoted greater access to cultural initiatives from groups and communities and augmented the digital infrastructures for communities to produce their own knowledge platforms (Instituto Lula, n.d.). It is however worth noting that the systemic support free software initiatives received in Brazil during this period, while crucial to their existence and inspiring many important developments, is negligible compare to the support that major companies received; US and European government policies supported corporations to establish new capital accumulation strategies for the capitalist internet economy (Fuchs, 2015).

There are few studies addressing the free software community in Brazil and its relation to the government, with the notable exceptions of Shaw (2011) and Evangelista (2014). Aaron Shaw (2011) explains that in Brazil the "FLOSS agenda emerged as a result of the actions of a network of insurgent experts." Evangelista's (2014) ethnographic analysis identifies participants (described as only masculine) as belonging to four categories: government representatives, business executives, activists, and developers. Both Shaw and Evangelista focus on technological disputes and the relation to the industry, without explaining how inequalities are addressed or acknowledging the overlapping of discriminatory systems that are experienced based on sex, gender, race, ethnicity, class, and other axes of intersectional privilege and oppression. In contrast to these overviews of free software in Brazil, feminist studies of these open technology projects highlight the dialectical relationship between access to multiple layers of technological infrastructure and the creation of gender divides. Christian Jobi Salaini and Monica de Andrade Arnt (2010) did a comparative study of gender in the adoption of free software. They note that women are the most active in the defense of women's free software projects, but they remain invisible in the previously mentioned studies. Bruna Zanolli et al. (2018) confirm this observation in a recently published report about feminist community networks in Brazil, where the founders of a community neighborhood feminist network explain, "even in the free/libre and open technologies activist field, our first impression was that this space did not belong to us, as we faced a predominance of white males and only a few women working with infrastructure and free networks." They further explain that in feminist initiatives, male tech experts tended to impose free software as a preset rather than something that could be adapted and a pathway to technological appropriation, which the feminist and community group eagerly sought (Zanolli et al., 2018). Still, they insist that technology is a central concern: "we see evidence that mere access to new technology could reinforce rather than reduce inequalities. This observation seems important to break the invisibility not only of technological infrastructure, but also of the asymmetries of power that are clear from an intersectional perspective" (Zanolli et al., 2018,). These authors, therefore, believe it is necessary to have access to infrastructure, technological understanding, and tools that they themselves create, adapt, and re-appropriate.

Our analysis will further this approach by looking at grassroots initiatives that existed in the Brazilian free software movement at the beginning of the millennium. There was a strong orientation at the time to "bridge the digital gap" and bring connectivity "everywhere." In Brazil, the size of the nation-state, the

number and heterogeneity of different communities, and the importance and isolation of their many “knowledges” made for a unique terrain on which to develop connectivity. Interconnected networks of people from technical, political, and cultural spheres support the development of free software networks in Brazil (Murillo, 2010). Two of the projects we discuss here, Baobáxia and MetaReciclagem, also contributed to the Cultura Viva program with, among others, Casa de Cultura Tainã (“way of the stars” in Tupi-Guarani), a cultural center in an impoverished neighborhood of Campinas. We will look at the organizational choices Baobaxia and MetaReciclagem made to understand the positions these two projects occupied in the larger contexts of free software networks in Brazil. We argue that these groups occupy a position of resistance, as they worked to bridge communities by working with different aesthetics and languages and governance models, and addressing intersectional issues. Finally, we find resonances in independent feminist hosting (ISP) networks associated with several community projects, such as Base Commun. We offer this analysis as a plaidoyer for well-supported grassroots initiatives that can build capacity for autonomous technologies that are built through new languages, infrastructures, and epistemologies.

Baobáxia: Rooting Technologies

Baobáxia is an autonomous digital network project rooted in concepts used by networked *quilombo*. From conversations with Baobáxia developers, referring to discussions they had at Casa de Cultura Tainã, we define quilombos as communities of African seized people who resisted Portuguese and European slavery and culture (befree, 2019). The Baobáxia network allows the communities to share their media and information independently amongst themselves, across communities, and with the outside world. Baobáxia presents itself as “a network of local servers,² a conversation wheel with the theme Baobáxia, the Route of Baobabs” (NPDD/Baobáxia, n.d.). As we will explain, the network is based on a unique software specifically developed for the needs of remotely situated quilombos. Baobáxia is supported by Rede Mocambos, named after the precarious houses that might serve as hideouts in the middle of the woods, and were often used by the quilombolas (inhabitant of quilombos) houses. While Rede Mocambos draws on the insurrectionist strength of quilombos communities, it also signifies the level of precariousness that the group is working with. The project chose the Beobab tree as its symbol because it wanted to build a network of communities linked to one another through satellite hookups and free software without going through mainstream internet portals. The trees and their fruit, the mucua, make up the parts of this network.

Quilombos have existed since the sixteenth century,³ but since the end of the 1980s, they have undergone a redefinition: “Through the political pressure exerted by black peasants throughout Brazil, the government established explicitly that *quilombos* should be defined by their being communities formed by black peasants in general, part of the present agrarian structure and contemporary society, not only by their relation to the past as runaway-descendants” (De La Torre, 2013, p. 10). Another important recognition has been the characterization of the collective and communal organization, including historical self-determination of the community (Leite, 2000)—that is, the ability to determine the criteria of inclusion as much as the model of governance. This self-determination was recognized under Lula's governance, which allowed these communities to better address intersectional issues rather than identifying quilombolas solely under the homogenizing term “runaways”. Today, under the current government, quilombos recognition is at risk. Baobáxia was largely, but not only, initiated by Antonio Carlos do Santos : TC, president of Casa de Cultura Tainã, precursor to the Afro-Brazilian movement and Rede Mocambos.

Baobáxia developers follow and take part in the community organization of the quilombos where the project is implemented, and make sure that the distribution of capacities and access to the network are decided by the community itself and represents their chosen balance of power. Each implementation of a *Mucua* (server node in the network named after the fruit of the baobab) is dedicated to a community and associated with a community-oriented workshop, where participants share the technology and reflect on its nature and its purpose. Baobáxia is first and foremost a tool developed along with the community it serves. While the technological challenge of setting up a distributed autonomous network, as we will describe further, is unique and mastered by only a few, the exchange with the group happens throughout the course of the implementation of a specific *mucua*, and is associated with conversations, events, and rituals that are fed back recursively into the project through video and text documentation.

Mucuas are distributed all over the country, as well as throughout other South American countries, several African countries, and some in Europe. Baobáxia is a wide network and repository of community-produced media. A map of *Mucuas* is available on the website of Rede Mocambos (Figure 1).



Figure 1. Baobáxia's Mucuas current location. Source: <http://bl.ocks.org/anonymous/raw/e872821c8d250450273c88cce1126a69/>.

Baobáxia is well documented in an online wiki, which is also used as an open organizational tool for the community—hosting reports of numerous workshop events, technical meetings, funding requests, assembly minutes, and so on. Decisions regarding the implementation of the program and its maintenance integrate traditional community organization, following their governance model. The wiki archive represents well many different aspects of the project. On the project's wiki one can read, for example, notes from the May 27 and June 3, 2013, Mocambos network meeting in Pajelança:

Some of the conversation themes were the Principles and Reflections on the Mocambos Network—the conversations were oriented around the name Mocambos and the technology of the drum; the form of organization of the Quilombo dos Palmares was in Mocambos, so were their houses called. Another symbolic element, the Baobab, was the center of the conversation round; the philosophy of the Baobab and the drum are central to the Mocambos Network: they are at the service of humanity, offer meaning to the world and strengthen a political commitment: never stop fighting.⁴ (Antonio Carlos do Santos , 2013)

"Pajelança do dia 27 de maio e 3 de Junho de 2013 IV encontro da Rede Mocambos"

In our analysis of these projects, we will further explain the ways in which the technical choices made in Baobáxia are defined by the community organization and how the transformation of an epistemology puts in front the knowledges held by communities, that are most of the time not represented in the digital environment.

Metareciclagem: *Gambiarra* and Free Software

MetaReciclagem network was most active between 2002 and 2012. It is one of the largest free software projects in Brazil, central to the governmental project of Pontos de Cultura. MetaReciclagem was also linked to the protest movement “*lixo eletrônico*,” which condemns electronic waste. MetaReciclagem has been implemented all over the country by local and federal institutions, and some instances continue their existence. MetaReciclagem was a multiple entity movement, a dynamic facilitated by the hard work of many people and activists, only some of whom are referenced here. More extensive research is needed to complete the existing archive and reconstitute the original information.⁵ In the first instance, MetaReciclagem is a technological recycling, or upcycling project, which promotes the use and reuse of computer parts. But, it is also much more than that, as the project also introduced major shifts in *what* is built out of discarded parts, and *how* creative appropriations intentionally can be put to the service of communities. As Daniel Pádua puts it in his professional profile, “MetaReciclagem is a methodology, a free knowledge project network, a universal access movement, a massive game and could be also a band. :). It’s all about sharing knowledge for autonomous/communitarian reality replication/transformation.”⁶ MetaReciclagem organized the creative upcycling and reuse of discarded computers to benefit a number of citizen groups, promoting not only free software but also creative appropriation of electronics as “gambiarra” (makeshift or repair). Many of these developments took place during the Hypertropical Programação (hypertropical programming) events, a series of workshops to develop upcycling projects and share knowledge (Fonseca, 2015)

Metareciclagem has been very forward thinking under the impulse of Daniel Pádua in discussing possible infrastructure for autonomous networks, using recycled technologies. Their reflections took place on mailing lists, conversations and are articulated and documented on developers community organization tools, wikis and github issues.⁷ MetaReciclagem installed computers in different local cultural and social centers and Pontos de Cultura, providing various community organizations, theater groups, musical studios, and kids’ groups with access to digital tools. The approach of MetaReciclagem and Hypertropical

Programação is inclusive and aims to foster access and creative appropriation in the context of existing structures supported by official programs. Free software implies, first, that the source code is accessible, often under a copyleft license (individual freedom), and, second, that the user is able or has access to someone who can understand the program (collective freedom). Free software is also seen as a liberation tool, where cultural production is also at stake. Aymeric Mansoux (2017) grounds the principles of free culture in the experience of MetaReciclagem, because it importantly encompassing technical aspects, as well as cultural and political positioning, that have been addressed in different manners by the project.

Tecnoxamanismo (TCNXMNSM)

TCNXMNSM positions itself as resistant, dystopian, pessimistic, yet entropic as it aims to create noise in a dystopian future and take back the future. TCNXMNSM started after the previously mentioned project and builds on existing projects that aim for autonomy. Crucially, TCNXMNSM considers autonomy a pathway, a process that is never really finished, because everything is always connected. It is a space of articulation and a network (Borges, 2017). Also TCNXMNSM pushes further appropriation of occidental therapeutic practices by developing a clinic, entering the sphere of healing by challenging notions of subjectivity, thus setting up the conditions for immersive group rituals for mental health and conviviality. Although Fabiane Borges is not from the communities with whom TCNXMNSM works, as she is a psychologist, writer, and performer from São Paulo. She explains that TCNXMNSM is also relevant to the free culture practice, as it uses a collective process in the formulation of communication models aiming at subjective reconfiguration. This re-appropriation liberates subjectivities trapped in “capitalist ontologies” as it fosters “shamanic ontologies” (Borges 2017) that make accessible other modalities of being together, activated by artistic practices. In addition, TCNXMNSM produces live performances, audiovisual material, cinema, and installations. TCNXMNSM claims its international existence through performances happening during a variety of artistic events in Europe, where some of its members live. The project is not perfect, though we do not have space to discuss these aspects further here, it is important to note that its reputation as part of an international art scene unfortunately mostly benefits the white leaders of the group. Some of these representational politics are ameliorated in Brazil, where TCNXMNSM works with the Pataxó community, an Indigenous community in Bahia, and through their European network, they have been crowdfunding a health center for this Pataxó community since 2019 (Martins & Carvalho, 2017). Currently, there are seven people (São Paulo 3; Bahia 1; France

2; Spain 1), mostly women, in constant communication about this Pataxó community project in Bahia.

All four projects are intertwined in a specific moment of Brazilian history, starting in the 1990s, where support was given to free software and multidimensional cultural projects. They continue today despite the difficulties provoked by current political conditions in Brazil.

Feminist Servers

The encontrADA meetings,⁸ a feminist free technologist encounter, brought together women from the art and technology scene, in a very horizontal and participative organization, in 2012, at the Nuvem - Estação rural de arte e tecnologia (Visconde de Mauá-RJ). These meetings helped develop several feminist server organizations used to gather resources and methodologies about feminist technologies. The Redes Autônomas Feminista (autonomous feminist networks) explain, "One of the definitions of feminist technology is the application of knowledge from science to support the feminist cause, and this knowledge is developed and maintained by women who challenge the status of the normative patriarchal system, proposing new ways to politicize the debate on technology and its uses."⁹

Feminist networks exemplify principles such as

- "consent and intimacy": relating privacy issues to acknowledgement and consent;
- "situated knowledge and memory": the networks develop within a community whose memories they carry;
- "seeded connectedness": autonomous networks deploy their conditions of existence with the community and outside from the internet to which they can still connect;
- "autonomous decision making": implementation and organization decisions are taken from the ground up, involving the community in the technical process.¹⁰ (redes autonomas feministas (nd))

One example of a feminist technological network is Fuxico. It was built on feminist network principles. Fuxico (n.d.) is "an autonomous mobile device of exchange and collaboration, made to connect people present in the same physical space. Fuxico creates a wireless network outside the internet to exchange digital content such as images, videos, audios, documents, chat room and chat wheels."¹¹

As Nadège from rede Kefir, a Latin American feminist server,¹² explained during phone interviews, the workshops at encontADA focused on building new energies rather than producing criticisms. These workshops helped create an important base of resources and technological knowledge built by and for feminists. Participants were also hands-on in a hacklab, where they started their projects "from the stuff that does not work." Nadège also powerfully illustrated Redes Autônomas Feministas's website, which demonstrates the imbrication between technology and situated community.



Figure 2. Rede Autônomas Feministas website, 2020. <http://redeautonomafeminista.org/>

The Brazilian feminist server network Vedetas¹³ and rede Kefir were central to Redes Autonomas Feministas, which started at the 2017 meeting of the Association of Women's Rights in Development. These group also gathered during other international events, such as IFF (Internet Freedom Festival). By 2017 the cultural support for this kind of work in Brazil was threatened by the governmental crisis. Thus, unlike earlier ones, these most recent activities have been supported by US grants. Rede Kefir is now in the process of migrating their data, thinking through "transitioning an infrastructure," as Nadège explained during our phone interviews.

Diffraction and Resonances

Notably, all three projects claim to be networks, "*redes*," rather than software or localized community projects. As Borges (2017) explains, "I think that a fairly

representative example is the [agroforest](#), the [Baobáxia system](#) and the [web radio Aratu](#) that we implemented with the Pataxó in the Pará village. It is an exchange and simultaneously a resistance that points to the question of collaboration and autonomy, remembering that all the processes of this planet are interdependent and that autonomy is really a path, an ideal which only works pragmatically and to the extent that it's possible to practice it."¹⁴ These groups not only have a distinct model of organization, but they also foster the relation between network and cultural organization, allowing for technology to be transformed by cultural practice and become a transformative practice itself. "Technoshamanism is neither the beginning nor the end, it is a medium." TCNXMNSM is a space of articulation, a network (Martin & Carvalho, 2017).

These singular technologies put in question existing approaches to computing project, even free software ones. While situating themselves within the free and open software movement, these projects understand their approach to free software as not only as produced under a specific copyleft license but literally as liberated culture (Mansoux, 2017), aiming toward liberation from within actual capitalist society.

These projects develop in a culture of resistance manifesting itself through language, cultural appropriation, spiritual quest, and a necessity for independent infrastructure. Baobáxia engages Quilombolas; MetaReciclagem works with remote rural cultural centers; TCNXMNSM uses shamanic knowledges; and Kefir employs a feminist methodology to co-construct the technology. They all redistribute the responsibility to different actors. As we acknowledge their history, we also intra-act, recognizing the specificity of actions coming from spaces where oppressions intersect. We observe how they successfully put in practice taking back the future by "rooting technology"—a double entendre where "rooting" first implies growing roots, with reference to locality, as well as the hacker jargon for gaining privileged access (superuser, or *root*) to a system. Re-appropriation of technological production meets the acknowledgement of ancient history. Across all three projects we identify at two specific aspects. First, we emphasize semantic appropriation through *a dedicated language*. Baobáxia, TCNXMNSM, and MetaReciclagem each have developed a language they deem more appropriate because it better fits their conception of communication. This can be understood as an important process of absorption allowing for different models of expression in the digital space. Second, we examine how they build coherence and intra-act in the technology itself—the essential meaning of taking back the future. Associating technology to community and ancestral knowledges

results in the development of specific decentralized infrastructures, developed with dedicated free software.

Language as a Process of Absorption

Singular technologies such as those presented here share modalities that differ from conventional organizational structures and coding languages. N. Katherine Hayles (2010) proposes, "Language alone is no longer the distinctive characteristic of technologically developed societies; rather it is language plus code" (Hayles 2005 p.16). She calls this combination "regimes of computation." Language analysis and critique, Hayles suggests, need to situate technology in the different ways that technology materializes. Feminists address the necessity of formulating contextual analyses for technologies by explaining that some parts of society have been excluded from discourses about computing technologies by simply underusing or devaluing their vocabulary and denying the epistemic authority of these communities. As a response, singular technologies in Brazil have developed unique networks, reorganized their functions, and through a differentiated formulation of key concepts, renamed elements of their networks. While this practice towards technology is frequent in creative practices, it is rarely the case that less privileged groups have the possibility of imprinting their semantics in technological construction, as most often technological concepts are imposed by dominant cultures without consultation.

As Hayles explores the impact of code on everyday life, she argues that language and code have grown more entangled, and the lines that once separated humans from machines, analog from digital, and old technologies from new ones have become blurred; this is concomitant to different forms of colonization of everyday life led by major telecommunication companies. Singular technologies engage in activating different starting points using their own sets of references. Language is a specific part of those many aspects, as well as other forms of cultural significance such as time and place, or localization. Challenging the hegemony of technical expertise, projects such as Baobáxia and MetaReciclagem operate through situated modes. They work towards opening the technological construction; decisional and semantic elements come from principles that are shared among those who relate to them. They also significantly rename concepts and tools, transforming the relation to technology in a community-centered process. As part of this effort, Fabi Borges (2017) offers the practice of "ancestrofuturismo," which, she explains, consists of bridging the timeline from ancestral knowledges and technologies of communication, such as shamanism, to actual technological practice. She looks for entropic interferences and noise that

recombine themselves to bring "shamanic ontology" to technological production rather than what she calls a "capitalist ontology" (Borges, 2017). She explains, "it[TCNXSMN] is entropic because it inhabits this paradoxical set of forces and maintains an improbable noise—its perpetual noisecracy, its state of disorganization and insecurity is continuous and is constantly recombining itself" (Borges, 2016,). She brings this recombination of language to the larger scope of concepts and ontologies, affirming a resistance across time and places, in a hybrid process that inhabits many spaces.

While American corporations are taking over the digital economy via digital colonialism (Kwet, 2019), the projects we have described are actively decolonizing language, a process that runs in parallel to the decolonization of technology, and is characterized by the use of free software and a decentralized infrastructure. Keeping the infrastructure in local hands, these projects prevent corporations from building infrastructure that doesn't meet community needs (Kwet, 2019). Both processes are complementary, constitutive, and intrinsic to the projects. Such a thorough endeavor cannot be justified by the sole necessity to respond to a lack of infrastructure or a specific situation of some isolated communities. On the contrary, the projects presented here are born from an attempt to remodel technology, encompassing needs and knowledges of communities and to develop hybrid infrastructures whose institutional arrangements differ from existing organizations of centralized networks. Baobáxia's developers have taken great care in renaming all the elements of the technical infrastructure composing a digital network. This renaming is essential to the structure of the project, and is based on a language that refers to the organization of quilombos. Those words, *baobab*, *mucua*, *tambor* (a type of drum), and so on, function as building blocks in the service of their resistance carried over centuries. The three networks took an opposite approach from those taken by the usual top-down technology for development or access projects. They developed dedicated tools and governance systems that respond to the exchanges with communities. Baobáxia associates directly with local processes of governance by including issues related to the governance of the network in the community assemblies, as documented in the reports available on the Baobáxia wiki. Similarly, Metareciclagem argues for the re-appropriation of technology, as documented in a YouTube video that describes creative and educational processes as a primary motivation and motor for *gambiarra* (collingsp2004, 2007; Regine, 2011). *Gambiarra* means "makeshift," solving problems creatively in alternative ways at low cost and with spontaneity, or giving unusual functions to everyday objects. To MetaReciclagem, *gambiarra* implies repairing and enhancing machines collectively with invention and

creativity. These singular technologies are organized along institutional lines that bring together collective and community organizations and public funding. They are, to different degrees, formulated in collaboration with the people who use them, and are paired with dedicated coaching in different locations. Unlike Baobáxia, MetaReciclagem, is directly implemented in publicly funded Pontos da Cultura following their organization and governance. The choice of the term *gambiarra* is an attempt to valorize an otherwise dismissed culture and give a sense of accessibility to technology by adding intimate and personal value. Most importantly, this process is integrated into a social and community organization as an upcycling project that valorizes makeshift technologies. Also translated as kludge or hack, and understood as the possibility to intervene in a technology, *gambiarra* similarly reclaims the technological processes in the Brazilian cultural environment. The term *gambiarra* is used widely, including in professions such as programming, electronics, cinema, theater, plastic arts, architecture, and design. Countering the often pejorative use of the term, Metareciclagem appropriates it in an attempt to address the oppressions that strain the relation to the computer and bring forward possibilities for less technologically proficient people across the social spectrum, through their implementation in both urban and remote social centers, to engage with technologies for their communities' ends. While MetaReciclagem did not directly address race and class intersections, they did bring access to technology through existing hyper-local initiatives across the country where people face those intersecting oppressions. *Gambiarra* creates a space of familiarity with the object, when the precious technical object becomes something made out of recycled parts, nicely decorated, losing its features of dominance and making space for creative use, and what Felipe Fonseca (2016) calls "Hypertropical Programação." In those projects, the decolonization of language functions as a performative utterance—a speech act (Austin, 1962). They embed a different relation to technology countering the fact that important specific concepts pertaining to the domain of communication are not represented, therefore rendered difficult to use.

Significant areas of social experience are obscured from our collective understanding of what technology can be, such as ancestral Indigenous conceptions of communication, social organization, and consciousness. In addition, resonances with the epistemological and ontological positions of feminist scientists such as Karen Barad can be readily established: while these projects value the relational understanding of communication presented in Indigenous communities, TCNXMNSM is particularly clear in stating as a ground fact that shamanism is a communication technology. Borges argues that

Indigenous knowledges have been ripped out: "there has been a violent destruction of ancestral knowledge and technologies to leave space for science following monotheist principles" (Borges quoted in Martin & Carvalho, 2017). Reaffirming *ancestrofuturismo* formulates what Barad calls a diffracting relationship (Barad, 2007), to resignify histories of technology on other terrains, allowing for an intra-action that modulates *ancestrofuturistic* relations based on ancestral knowledges and contemporary technologies. *Ancestrofuturismo* breaks the sense of continuity, (re)configures the relation to space and time, and develops other modalities. It asks us to think with and through dis-continuity (Barad, 2007). This approach diffracts—as a means of tracking the effects of resistance as it appears through interferences—across the spectrum of time and space, and therefore allows for the reconfiguration of the scenes, from a large set of perspectives, read and thread through one another. As Borges (2017) puts it, "Faced with this, techno + shamanism is an articulation which tries to consider historical trauma, these lost yet not annihilated leftovers, and to recover (and reinvent) points of connection between technology and wasted ontologies." TCNXSMN is concerned by cultural processes based on a form of re-appropriation very true to *anthropofagia*. TCNXSMN also activates different resistance models, producing diffracting and decentralized intra-actions, as it revises current concepts and organizes technologies that can better serve resistances and reconfigure their capacity through the use of ancestral language and communication practices in dedicated decentralized networks.

These projects expose the immense possibilities of underused technologies, transform usages of standard tools, and can perhaps connect technological developments with ritualized events. These transformations are based on decentralized technological infrastructures, which means that all software is hosted on a different server (each of them situated physically in a proxy or remote relation to the community or person(s) using the service). Each hosting place, person, or community organizes and determines the condition of usage of specific software, sometimes formulating clear criteria and governance. Decentralization, as we will explain it, is very coherent with both free software and community organization, setting infrastructure for a political organization. All projects conceive decentralization as a premise, inclusive of a dedicated decisional process. As we have seen, they have made distinctive choices, forming new concepts in the light of ancestral and community organization, adapting existing technical possibilities inclusive of the ones discarded by internet monopolies. In what follows, we analyze the technical choices and their entanglement with historical modalities of resistance, community organization, and models of

decision making. We conclude with an examination of how singular technologies open the way for technological processes that counter populist strategies.

Decentralizing Technology for Collective Organization

Decentralized computing can be simply defined as the allocation of resources, both hardware and software, to various locations. From a technical point of view, decentralization is considered the solution to problems caused by the accumulation of power in centralized monopolies, since it allows communities to moderate the implementation of software locally, distributing the decisional capacity and the risks of failure and authoritarian control. However, its implementation is not straightforward, as many issues arise, including access to the network and availability of technical knowledge. We will address how the possibility of autonomy that resides in the technology is made more concrete when activated by community who cultivated for centuries practices and networks of resistance among quilombolas (residents of quilombos). We suggest that these technologies can help organize a decolonial network that is true to a community's culture and can co-create the internet (Echániz & López Pezé, 2018).

While decentralization has been a major digital trend, it is only recently discussed as a possibility for the structural reorganization of decision-making processes. Decentralized infrastructure must also imply a distributed system of decision making, accountability, responsibility. In other words, this debate is not only technical but also cultural and political. A diversity of identities and models of governance can happen, and the modalities of a decentralized network organization are also characterized by technical features. A decentralized network needs a determined protocol to organize the communication between nodes, and clear modalities by which exchange is made possible. Practically, the organization can happen along two major different types of protocols, peer-to-peer or federated. These make for two different network architectures. A peer-to-peer system partitions tasks or workloads between peers and all nodes are equivalent, whereas in a federated system, some nodes act as relays to other nodes acting as clients.

TCNXMNSM, MetaReciclagem, and Baobáxia have experienced decentralization technologies in different modalities, using decentralized servers, mesh networks, intermittently connected networks (Tozzi, 2011), and both peer-to-peer and federated protocols. Most importantly, they have developed unique technologies such as the previously mentioned eventually-connected network: Baobáxia. The software developed for Baobáxia is social-media-based on Git, a widely used

software that requires developers to work together to deal with version control in large, distributed software development projects. However, the usage that Baobáxia makes of Git as a basis for a social media software is unique and adapted to the context of the quilombos, where access to network and electricity might be scarce. Using Git as a basis permits users upload media locally to Mucuas without needing internet connectivity; so when connection is re-established, they can share with the rest of the Baobáxia rede. This responds to the needs of remotely situated quilombos in rural parts of Brazil.

The Baobáxia methodology promotes a congruence between accurate physicality of the encounter and accurate construction of the digital archive and distributed social network. This translates into the project being discussed during encounters/*palejança* (rituals) that follow the models of governance and organization of the communities themselves. From the Baobáxia archives stored on the wiki, we see that technical workshops were organized alongside workshops on other topics; the reports describe the ritual as much as the technical processes, and all participants are called by their name used and function within the community. The reports also describe specific ritual practices and important discussions about quilombolas identity and their relation to technical processes. For example, one report reads,

In the sacred presence of the Baobab, which represents our African roots, TC draws attention to the importance of spirituality and passes the word to Mother Beth of Oxum, of Olinda, to pass on the *axé*, the spiritual strength, the communication. She sang a song for Ossanha, accompanied by the drums. She remembered the importance of strength through the leaves, because we are around the Baobab. He also did a song for Oxum and Yemanjá.¹⁵

While the workshops transmit important technical knowledge about how to implement, use, and maintain a *Mucua*, Baobáxia engages quilombolas in a reflection about their relations to communication and technology, in collaboration with local social centers, such as Casa Tainã, also part of Rede Mocambos. Their model relates to the history of quilombos, where preserving culture, organizing life, and hiding from the oppressor has been practiced for centuries. Indeed, the relation to visibility and invisibility is crucial to the history of quilombos, and this concern is reflected in the network infrastructure of Baobáxia, which not only enables connectivity issues to be dealt with locally, but also provides an autonomous platform where information of value to the community

can be shared and kept away from mainstream exposure, following a centuries-old resistance strategy.

Those rituals also focus on important political issues such as sustainability, where community sustainability and larger ecological issues are entangled and technology is envisioned in relation to both. In addition, care is taken to publish full reports online, which demonstrates that careful attention is given to building and deploying a technology that converges with all community reflections, attuned not only to existing models of community organization but also to political claims. All reports are archived on the organization's wiki, whether they are about governance issues or reflect on the space of the encounter. For example, one report reads, "During the conversations and openings of the days, the relationship between ancestry and technology was deepened in the perception of the appropriation of technology as one of the tools for the diffusion of quilombola and community contributions."¹⁶

Transformative practices and affirmative resistance happens in contexts where an active choice to prevent decentralization is exercised—as the Baobáxia sits at the fringes of mainstream technological model, free cycling its hardware components with an approach to gambiarra for creating autonomous technology, organizing dedicated decision-making processes through workshops in each of the different nodes of the network, defining its own governance, and proposing unique community produced media. Complete autonomy does not exist while, in technology and media practices, affordances are modeled after occidental approaches to computing, but important projects like Baobáxia profoundly redefine the basis of technical construction. This project exists in the process of active resistance of the quilombos, the millennial culture of Indigenous people, and other marginalized people who are resignified in developing singular technologies.

Conclusion

What does *taking back the future* mean in the context of Brazilian minoritized networks at the margins? This essay began with the intuition that a specific situation in Brazil at the beginning of the millennium and the appropriation of technologies by communities of resistance offered a different vantage point on computing in/of/and from the South. We observed cases that allowed for the development of singular technologies that emerge from the appropriation of technologies by communities of resistance. These examples engage both language and technology in processes of reconstruction, in keeping with existing

creative or historical community organization. The three networks we chose to present—MetaReciclagem, TCNXMNSM, and Baobáxia—understand technology as potentially liberating, and organize their networks in correspondence with the modalities of their research and their communities. Technology is understood in a broader scope, and the initiatives they undertake enable different forms of practices to emerge.

Each project presented here deploys its own understanding of technology, envisioning different types of functionalities, scopes of application, and social relations, associating the notion of freedom fundamental to free software with an insistence on building technologies of liberation. We have described different approaches, from deploying constitutive language to singular networking technologies, that comply with resistance models and community conditions, such as the lack of an effective network connection. Furthermore, these three projects take a holistic approach, thinking about historical relations to communication, epistemology, and technology in relation to the emergence of information and communications technology. These networks have been conceived and practiced as foundations of resistances and their models of organization. This diffracting allows us to examine histories and situations, which is the first necessary step to embrace the full scope of the technology situation from within a history of domination.

The projects explored here are functional examples of resistance communication strategies, which allow for a diversity of expressions and social media. They include all aspects of community models of governance in the technological organization, providing examples of decentralized software developed and implemented to serve minoritized populations, under their specific conditions.

Despite the importance and relevance of these projects, they are hardly reported or studied. Yet, they achieve autonomous modes of organization. It is crucial to recognize the existence of their decentralized networks that compose free technologies at the service of human creativity and historical resistance in various political locations.

Acknowledgements

The authors are grateful for the amazing encounters, love and friendships between activists, across networks, beyond borders. Thank you Sareeta for your support, Luis for your patience.

Notes

¹ As of 2014 the program 'Cultura Viva' was still supporting around 300 *Pontos da Cultura* around the country. Gilberto Gil famously proclaimed, "I am a hacker. A minister hacker," (Cantor, 2008) to signify his contribution as a government member to grassroots technology, which then triggered some critiques by those who defended a theoretical liberal model of independence from the government.

² "Valorizar las iniciativas culturales de grupos y comunidades, ampliando el acceso a los medios de producción" (Instituto Lula, n.d.).

³ *Server* is a technical term to designate the device (or program) that provides functionalities for programs to function on another computer.

⁴ Quilombo dos Palmares, located in the captaincy of Pernambuco, hosted over ten thousand people. It was ruled as a kingdom according to Angolan tradition. It existed from 1605 until its suppression in 1694, after fifteen years of war led by King Zumbi.

⁵ Alguns dos temas das rodas de conversa foram os Princípios e Reflexões sobre a Rede Mocambos - neste momento as falas foram orientadas em torno do nome Mocambos e da tecnologia do tambor; a forma de organização do Quilombo dos Palmares era em Mocambos, assim chamavam suas moradias. Outro elemento simbólico, o Baobá, esteve no meio da roda; a filosofia do Baobá e do tambor são centrais na Rede Mocambos: estão a serviço da humanidade, oferecem sentido ao mundo e fortalecem um compromisso político: nunca mais deixar de lutar.

Introduction to the Pajelança Quilombólica Digital, Territorios Digitais Livres - source: retrieved, 2019/02/27 from

<https://wiki.mocambos.net/index.php/NPDD/Baobaxia>. MetaReciclagem wiki hosts a lot of information; see <https://MetaReciclagem.github.io/>. As we were writing the last revisions to this article, the site came back online after a major crash, but it was not available when we originally researched this article.

⁶ <https://br.linkedin.com/in/dpadua>

⁷ <https://mutgamb.github.io/metalivro/historia/primordios.html>

⁸ <http://nuvem.tk/?encontrADa>

⁹ Uma das definições de tecnologia feminista é a aplicação de conhecimentos da ciência para apoiar a causa feminista, sendo que esses conhecimentos são desenvolvidos e mantidos por mulheres que desafiam o status do sistema patriarcal normativo, propondo novas formas de politizar o debate sobre tecnologia e seus usos. (Redes Autônomas Feminista, n.d.)

¹⁰ "Consentimento e intimidade: É uma rede que tem como objetivo potencializar a comunidade, respeitando a privacidade, consentimento e intimidade de cada integrante. Gerenciamento autônomo e colectivo: É uma rede que pretende co-criar seus protocolos e gerenciamento de autonomia. Memórias e narrativas: É uma rede que respeita e resgata a memória de suas comunidades e de suas mulheres. Sementes interconectadas: É uma rede que não depende só dos seus pontos de conexão, mas que também planta sementes para garantir que suas histórias sejam continuadas e retro-alimentadas." unclaimed probably collective authorship from <http://redeautonomafeminista.org/> (last seen online 03/15/2019)

¹¹ É um dispositivo móvel autônomo de troca e colaboração, feita para conectar pessoas presentes em um mesmo espaço físico. A Fuxico cria uma rede sem fio fora da internet para troca de conteúdos digitais como imagens, vídeos, áudios, documentos, sala de bate-papo e Rodas de conversa. Totalmente anônima! unclaimed probably collective authorship from <http://redeautonomafeminista.org/fuxico/> (last seen online 03/15/2019)

¹² See <https://kefir.red/>.

¹³ See <https://vedetas.org>.

¹⁴ Technoshamanism and Wasted Ontologies Interview with Fabiane M. Borges published on May 21, 2017 By Bia Martins and Reynaldo Carvalho <http://www.em-rede.com/site/entrevista/fabiane-m-borges-tecnoshamanismo-como-meio-de-recuperar-e-reinventar-pontos-de-conex%C3%A3o> Translated by Carsten Agger

¹⁵ Na presença sagrada do Baobá, que representa as nossas raízes africanas, TC chama a atenção para a importância da espiritualidade e passa a palavra à Mãe Beth de Oxum, de Olinda, para passar o axé, a força espiritual, a comunicação. Ela cantou um canto para Ossanha, acompanhada pelos tambores. Lembrou da importância da força pelas folhas, pois estamos ao redor do Baobá. Fez ainda um

canto para Oxum e para Yemanjá. Introduction to the Pajelança Quilombólica Digital, Territorios Digitais Livres - source: retrieved, 2019/02/27 from <https://wiki.mocambos.net/index.php/NPDD/Baobaxia>

¹⁶ “Durante as rodas de conversas e aberturas dos dias, a relação ancestralidade e tecnologia foi aprofundada na percepção da apropriação da tecnologia como uma das ferramentas para a difusão das contribuições quilombolas e comunitárias.” (Introduction to the Pajelança Quilombólica Digital, Territorios Digitais Livres - source: retrieved, 2019/02/27 from <https://wiki.mocambos.net/index.php/NPDD/Baobaxia>)

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