

Exploring Opportunities, Risks, and Resilience Among Young
Indigenous Social Media Users in the Chittagong Hill Tracts
Through Qualitative and Quantitative Lenses.

by

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A thesis submitted to the Department of Computer Science and Engineering
in partial fulfillment of the requirements for the degree of
B.Sc. in Computer Science

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Declaration

It is hereby declared that

1. The thesis submitted is my/our own original work while completing degree at Brac University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. We have acknowledged all main sources of help.

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Ethics Statement

This research was conducted with the utmost respect for the rights, dignity, and autonomy of all participants, particularly acknowledging the socio-political marginalization of Indigenous communities in the Chittagong Hill Tracts.

Prior to data collection, our research protocol was reviewed and approved by the Institutional Review Board of BRAC University. Informed consent was obtained from all participants, with clear communication, both written and verbal—regarding the purpose of the study, the use of recordings, and their right to withdraw at any time.

Interviews were conducted with cultural sensitivity, often in participants' preferred languages, and in environments they found safe. No identifying details such as names, institutions, or specific locations have been disclosed.

We are grateful to the Indigenous participants who trusted us with their narratives, and we recognize the responsibility of representing their voices with care, humility, and honesty.

Abstract

This study explores the digital experiences of Indigenous youth in the Chittagong Hill Tracts (CHT) of Bangladesh by combining qualitative inquiry with machine learning analysis. Through interviews and focus group discussions, we uncover how Indigenous social media users navigate challenges such as cultural misrepresentation, online harassment, censorship, and surveillance. Participants shared how these threats often extend beyond the digital realm into their everyday lives, and how they adopt strategies like social ciphery and selective visibility to resist and survive in online spaces.

To complement these narratives, we developed a multimodal machine learning model trained on the Fakeddit dataset to detect various forms of fake content, including manipulated, satirical, and imposter content. While the model demonstrated high accuracy in detecting manipulated content, closely aligning with the types of harmful posts reported by participants, it struggled with subtle misinformation categories, exposing key limitations of general-purpose moderation systems.

By integrating insights from Critical Race Theory and Indigenous HCI, we highlight the mismatch between algorithmic moderation and culturally situated online harm. Our findings inform the design of participatory, context-aware interventions that center Indigenous voices in the development of content moderation technologies.

Keywords: Chittagong Hill Tracts (CHT), Indigenous, Cultural Divide, Smart Bangladesh, Digitalization, Social Media, Fake Information, Mass Education

Dedication

This thesis is dedicated to the Indigenous communities of the Chittagong Hill Tracts, whose lived experiences, resilience, and cultural heritage inspired every part of this work.

This work stands as a humble attempt to represent their voices in academic discourse and to highlight the nuanced realities of navigating cultural identity and privacy in the digital age.

We hope it contributes, however modestly, toward greater visibility, understanding, and equitable technological design for marginalized communities.

Acknowledgement

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Note on Prior Publication: Portions of the qualitative findings in this thesis were previously peer-reviewed and published as a full paper at the ACM CHI Conference on Human Factors in Computing Systems (CHI2025), titled “The Good, The Bad and The Ugly: The Opportunities, Challenges and the Mitigation Strategies of the Young Indigenous Social Media Users of the Chittagong Hill Tracts in Bangladesh.” [176] We are deeply honored by this recognition and grateful for the feedback received from the global HCI research community, which helped strengthen this work.

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Chapter 1

Introduction

Technology and social media have become integral to the lives of indigenous communities worldwide in different sectors such as communication, education, health-care, banking, business, and tourism [71]. With the advancement of technology and the globalization of communication, indigenous communities also started to depend on social media as a way of communication among themselves and others [24]. This rapid change not only affected Western communities where technological advancement is faster [20] but also affected many marginalized communities around the world [18] including the Global South. In India, among the Garo indigenous farmers about “87.80 percent make use of their mobile phones for agricultural needs” [76], and the use of mobile phones and the internet has increased so much that it has directly affected their traditional way while introducing many new earning opportunities including “new services, workforce transformation, and business innovation” [145]. These studies signify the importance of analyzing the effects of technology on the Jumma people who share a long historical interaction with colonialism, politics, betrayal, and also nature [8], [9], [23], [123].

Besides, studies suggest that these communities are more vulnerable than any other group in society, which is why the chance of facing online harassment or bullying issues is higher than others [100]. Furthermore, these communities often become the victim of propaganda, fake news, and false information [160] while facing many online and offline difficulties. Despite the increasing dependency on social media platforms (such as Facebook, YouTube) for communication and other activities [72], [105] by the Jumma people, the study on the impact of social media within Bangladeshi indigenous communities is under-explored in the context of the Global South and significantly constrained [140].

Indigenous People are known for their historical and cultural diversities around the world. Despite being nearly 6% of the global population [175], they still face many significant challenges including “extreme poverty”, and denial of basic, political, and social rights [187], [189]. Even in Bangladesh, for instance, the indigenous communities such as the Jumma people, still face a lot of challenges even after so many years of independence [40]. These people are almost neglected in HCI but exploring CHT and Jumma people has been an important matter of study in various domains including anthropology [41], [78], [79], political science [2], [9], [16], social science [22], [26], environmental studies [19], [186], development studies [75], law [8], [127], and so on. Studies in these domains have described how ethnic identities and cultural differences affect the communities and their religious and cultural aspects.

Furthermore, they also explained that the people of “Chittagong Hill Tracts (CHT)” draw special attention due to their presence at a significantly geopolitical strategic location in Southeast Asia that borders India and Myanmar [144]. Besides, the internal conflict on the land between the Bengali settlers and the Jumma people of CHT has created internal displacement of the people and been a matter of concern that was partially resolved in 1997 [144] via the “CHT Accord”. Such conflict and the past history of this region not only reveal the differences between the plain land and hilly areas but also show the perspective differences among people [127]. Moreover, due to the perpetual heritage of non-recognition and nonchalance of the mainland, these communities face the denial of needs, unfair treatment, and inequalities [51] and are prone to vulnerabilities to natural calamities [28], [53], [181] and disasters. Despite all these incidents, these communities hold a special position in nature because of their ancestral knowledge of the adoption, mitigation, and survival instincts of the area [153]. The history and events create formidable challenges in understanding the role of HCI in ensuring a safe and better online environment for indigenous communities.

In today’s fast-paced global world, social media platforms have become influential across various domains, including communication, entertainment, business, education, the economy, and agriculture. Since 2000, social media has seen rapid growth in both content and users. Indigenous communities, alongside mainstream populations, have also adopted these platforms, leading to both positive and negative impacts on their lives and cultures [77], [118], [139]. While much of the existing social computing literature focuses on Indigenous communities in the Global North (as discussed in section 2), there has been limited exploration in the Global South. To bridge this gap, we conducted a three-month study involving 26 indigenous youth from the Chittagong Hill Tracts in Bangladesh. The study aimed to understand their interactions with social media, uncover their perspectives, and examine the effects of social media on indigenous cultural practices, values, and privacy. Additionally, we explored how their engagement with social media and its content influences their daily lives, both digitally and in the real world.

1.1 Research Problem

The power of digitization should be used to the fullest to ensure the betterment of the lives of every individual. Often the people whose stories and struggles are different from the mainstream population are overlooked. Therefore, using the potential of the digital world to the fullest can help them in a great way. Hence, working for these communities is not only beneficial but also a necessity in today’s perspective. Our research makes a threefold contribution to the HCI literature. First, this study contributes to the fields of Indigenous HCI, Human-Computer Interaction for Development (HCI4D), and ICT and Development (ICTD) [27], by expanding the understanding of how one of the relatively marginalized communities in the Global South engages with technology, particularly social media. Second, we explore the vulnerabilities they encounter and how these challenges impact both their digital presence and offline lives. Finally, this study enriches HCI literature by shedding light on the effects of digitalization on community-based individuals, revealing their unique interactions in cyberspace.

1.2 Research Objective

This study aims to expand the understanding of how marginalized communities in the Global South, specifically indigenous populations, use technology and social media. It explores the digital and offline vulnerabilities they face, particularly in cultural contexts, and examines how these interactions influence their digital presence and community life. The findings contribute to Human-Computer Interaction for Development (HCI4D) literature by shedding light on the impact of digitalization on community-based communication practices in cyberspace.

1. First, we expand the Human-Computer Interaction for Development (HCI4D) understanding of how one of the relatively marginalized communities of the Global South use technology, especially their ways of using social media.
2. Second, we examine the vulnerabilities they face and how these affect both their presence in digital space and offline life and vice versa (such as uploading pictures in traditional costumes of different communities (e.g., saree ¹) as elderly people may impose restrictions, suggesting that young individuals should stay away from such activities and similar engagements also providing a clear conception of any incidents while raising awareness among people).
3. Thirdly, this study contributes to the HCI literature on the digitalization effects on community-based people and reveals their way of communication in cyberspace.
4. In conclusion, we propose a Machine Learning-based system designed to identify inconsistencies between posted photos or videos and their captions. This system will help detect and moderate misleading content that could potentially incite communal violence.

¹A saree is a traditional Indian garment, consisting of a long, draped cloth worn over a petticoat, known for its elegance and cultural significance. [98]

1.3 Workflow

Our research followed a mixed-method, iterative workflow combining qualitative inquiry with machine learning analysis to understand the digital experiences of Indigenous youth in the Chittagong Hill Tracts (CHT).

We began by reviewing the existing literature across Human-Computer Interaction (HCI), Indigenous studies, and misinformation, identifying critical gaps in how Indigenous communities in Bangladesh are represented and impacted in online spaces. Following this, we conducted interviews and focus group discussions with Indigenous participants from diverse communities. The qualitative data were analyzed thematically, surfacing recurring issues such as misrepresentation, bullying, surveillance, censorship, and the community’s resistance strategies, including social ciphering.

In parallel, we developed a multimodal machine learning model using the Fakeddit dataset to classify various forms of fake news content (e.g., manipulated, imposter, and satire). The classifier’s performance offered a quantitative lens to assess how well automated systems could detect the types of harmful content discussed in our qualitative findings.

By juxtaposing these two approaches, we uncovered mismatches between lived experiences and algorithmic recognition. We drew on Critical Race Theory, postcolonial interpretations of citizenship and otherness, and Indigenous HCI scholarship to ground our interpretation and highlight systemic issues in current moderation systems.

Finally, based on these insights, we proposed culturally grounded, participatory interventions for misinformation detection systems that better serve Indigenous users and reflect their contextual realities.

The entire research workflow is illustrated in Figure 1.1.

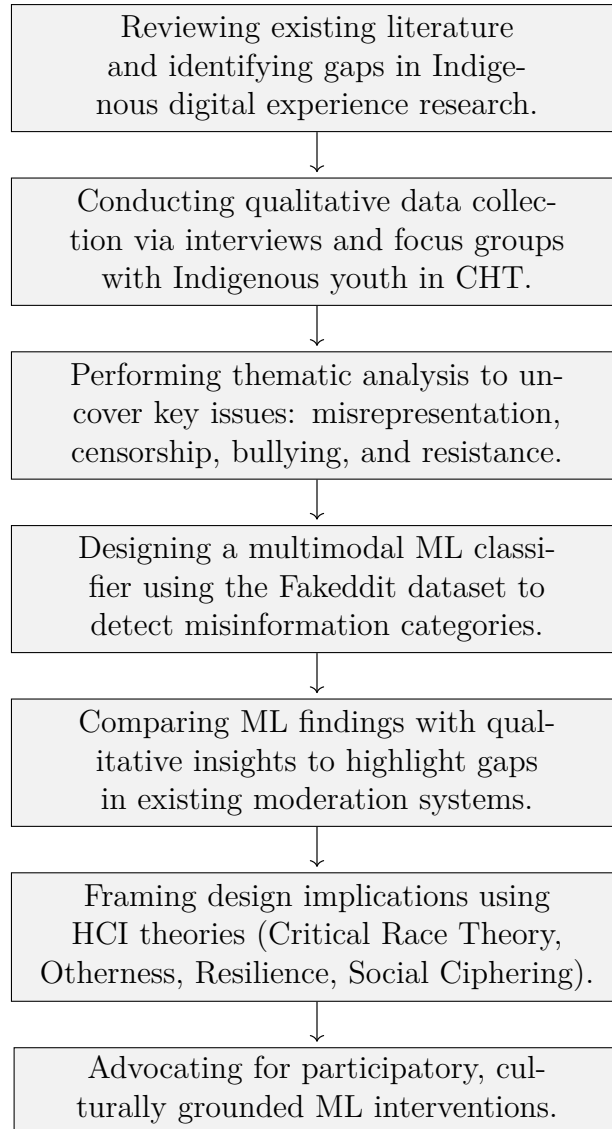


Figure 1.1: Workflow diagram of the thesis.

Chapter 2

Related Work and Background

Bangladesh is enriched by both geographic and ethnic diversity, which creates a unique appearance. Therefore, the people of the plain and the hill tracts have distinct physical appearances, behaviors, food habits, culture, and religion. All these diversities show the enriched tapestry, contributing to the nation's unique identity [156], [162]. In this section, we present the background information and a brief history of the Jumma people. We explored colonial computing in the context of the Global South, correlating it to the Global North, while examining the privacy and security concerns of the digital presence of indigenous communities.

2.1 Chittagong Hill Tracts (CHT) and Indigenous Jumma People

Chittagong Hill Tracts (CHT) refer to the extensively hilly terrains of southeastern Bangladesh and consist of three districts - Rangamati, Khagrachari, and Bandarban. This area consists of almost 10% of Bangladesh's total land bordering India and Myanmar with an enriched history of decades [92]. Bangladesh is the home of fifty-four (54) ethnic indigenous communities with a population of 1,650,478 people, which is almost 1% of the total population [173]. The largest indigenous population is found in CHT [121], [175] spreading in eleven arguably thirteen (11/13) ethnic indigenous communities including Chakma, Marma, Tripura, Tanchangya, Murung, Lushai, Khumi, Chak, Khyang, Bawm, Pankhua. Besides, a very small number of descendants of Assamese and Gorkhas also live there [51], [142]. These people follow the hill agricultural method (shifting cultivation, slash and burn agriculture) - “**Jum**”, which is also widely practiced in South, South-East Asia [54], [61], [65], [110]. In CHT, the people practicing Jum cultivation are collectively referred to as “**Jumma**” people in CHT [61]. Their basic demographic information are represented in Table 6.1. For a long period, these indigenous people have been becoming marginalized in many aspects of their lives which necessitates studying this region's history.

Brief History: This region along with the current Chittagong district was a tributary state under the British government from 1757 to 1860. In 1860, the tributary state was split and a non-regulated state was formed with the current CHT region with a limited autonomy under British India. In 1900, the British government enacted the CHT Regulation 1 of 1900 and declared CHT as a ‘Backward Tracts’

Table 2.1: General Information About Indigenous Communities In CHT. (*TB = Tibeto-Burman Language Family, M = Men, W = Women).

Tribe	Population [173]	Language	Dress	Religion
Chakma	483,229	Chakma	Dhuty(M), ‘Pinon’ (W), ‘Hadi’(W), ‘Hobong’(M-W)	Buddhism
Marma	224,261	Marma	‘Thumbui’ (W), ‘Angi’ (W), ‘Dayah’(M)	Buddhism
Tripura	156,578	Kokborok	‘Rignai’, ‘Risa’, ‘Rikutu’ [182]	Hinduism
Tanchangya	45,972	Tanchangya	‘Keboi’(W), ‘Pinon’(W), ‘Habong’(W) [116]	Buddhism
Lushai	380	TB	‘Puan’(W) [185], ‘Korchung’ (W), ‘Korchur’(M), Puanbi(M) [115]	Christianity [68]
Khumi	3,780	TB	‘Lupao’ (Turbans), ‘Bichunika’ (W), ‘Kono’ (ear rings), ‘Sang-eie-pong’ (Head Ornaments), ‘Lakao’ (Leg Ornaments) [36]	Animism, Krama, Christianity [21]
Chak	3,077	TB	‘Kotung Pangre’ (M-Dress, Dhuti), ‘Apong’ (M-Turban), ‘Nafi’ (W-Dress, Skirt), ‘Rangkeng’ (W-Dress)[114]	Buddhism [114]
Khyang	4,826	TB	‘Ukh’ (M-Dress), ‘Bong’ (M-Turban), ‘Baiu’ (W-Dress), ‘Kel-Kah-Lu’ (Leg Ornaments), ‘Luk-Hu’ (W-Turban) [37]	Animism, Buddhism, Christianity [37]
Bawm	13,193	Bawm (TB)	‘Laikawr’(M), ‘Rentak’(M), ‘Kawrechi’(W), ‘Puan’(W) [178]	Christianity
Pankhua	1,857	TB	Pirhan [188]	Christianity
Mro	52,455	Mro	‘Wanglai’ (W-Dress), ‘Kong-ar’ (M-Ornament), ‘Ramcheng’ (W-Ornament) [38]	Animism, Krama, Buddhism, Christianity [38], [177]

and later a totally ‘Excluded Area’ in 1900 and 1935 respectively to protect the Jumma people from economic exploitation by non-indigenous people and preserve their traditional socio-cultural and political institutions based on customary laws, community ownership of land and so on. This region became a part of the then East Pakistan once the British rule ended in 1947. In 1960, the Pakistan government built the Kaptai hydroelectric dam across the Karnafuli River in the name of industrial development which broke down the economic backbone of the peoples of Chittagong Hill Tracts (CHT) as it flooded 1,036 square kilometers of land and submerged 54% (54,000 acres) of the best arable land. It caused a displacement of about 100,000 Jumma people from their ancestral hearth and homes for good [166]. After the independence of Bangladesh in 1971, the state constitution did not recognize the indigenous Jumma people in this region which caused a revolt in 1975, and the arms struggle continued for 22 years and ended with a “CHT Accord” in 1997 [144]. CHT is the home of a diverse indigenous population in Bangladesh and this region has enjoyed a self-administration until 1947. Though these communities have been a part of Bangladesh for centuries, they are still facing denial of needs, unfair treatment, and inequalities in all sectors [51]. For instance, in the 15th amendment to the Constitution of Bangladesh, minority ethnic communities were referred to as ‘tribes’ or ‘ethnic minorities,’ rather than being recognized as ‘indigenous’ or ‘Adivasi’ ¹[149], [190], [191], [195]. Furthermore, many of these tribes still can not access the basic needs and facilities [51].

¹The Adivasi are heterogeneous tribal groups across the Indian subcontinent [59].

2.2 Social Computing in Global South and North Indigenous Communities

Indigenous community members are dependent on technology. A recent body of work found that indigenous communities use Technology as a “Tool” to achieve their objectives [159]. This advanced era of technology affects the ethnic people of both parts of the world.

2.2.1 Social Computing in Global North Indigenous Communities

Social computing is an interaction of social behavior and computational systems that examines how individuals engage with one another through social media, online communities, and collaborative platforms [31]. Recently, researchers have started considering the significance of the relationship between indigenous people and technology in the HCI domain. Literature has studied the technology usage patterns of ethnic groups in Australia, and the USA representing the Global North [84], [90], [125]. These works can be grouped into 1) how the adaptation of technology benefits the indigenous community, and 2) how the design choices of the technological tools impact the indigenous community [45].

Several studies have found technological adoption benefits both the modern indigenous youth in improved psychological traits (increased confidence) [32]–[34], and the people with limited education because of the visualization and interactive support of the technological tools [32], [43]. Moreover, technological tools adoption within the indigenous community in communication [67], financial services [42], [67], religious activities [117], agriculture [30], [82], start-up business [130] Information Technology (IT) [119] are reported to be a boon in their daily life activities. The presence in digital space and using technology has helped the indigenous people of the Navajo community by “conducting prayers by phone or FaceTime”, “multipoint videoconferencing”, “Home-based Telemonitoring” and with other facilities [117] during COVID-19.

Moreover, prior work [137] reports the importance of understanding the feelings, thoughts, and proposals about indigenous knowledge (IK) before designing or proposing any technological solutions. A study on Canadian indigenous Youths has examined the mental challenges faced by online bullying while having the indispensability of culture-based mental health programs to make it more effective because most of the time these programs are based on the majority of the population [83]. While another literature [164] developed a framework on the Kanaka Maoli (Native Hawaiian) community and suggested maintaining the equability of designs, including preserving their indigenous knowledge. Consequently, they also pointed out that the framework may vary from community to community. Furthermore, after interviewing the Kenyan diasporan women of Australia, a study suggested new approaches to preserving and sharing their indigenous knowledge (IK) even after displacement [55]. Prior work [137] emphasizes the importance of the Global South indigenous study to create more user-friendly technological frameworks and designs that could potentially augment alternate research directions and theories to the existing literature. Extensive research has examined the impact of technology on indigenous communities in the Global North. However, there is a growing need to explore

indigenous communities in the Global South, where studies remain limited.

2.2.2 Social Computing in Global South Indigenous Communities

Existing literature mostly studied the impact of technology on the Indigenous communities of the Global North [126] whereas the large population (82% of the global population) of the Global South is still understudied [171]. Limited explorations have been made in India [99], Sri Lanka [120], [147], Sudan [3], Nepal [52], and Bangladesh [135], [140]. Rajeevan et al. [99] explored the implications of sustainable technology for agricultural growth in India. By conducting focused group discussions and gathering quantitative data researchers found that “Dambana Radio” serves as the leading media of the “Vedda community” which is formed by the elders in Sri Lanka [147]. Prior studies [3], [120] also investigate the human rights of the indigenous communities of India, Sudan, and Sri Lanka. While another study [52] explored the use of social media among indigenous as a means of self-empowerment, connectivity, and, sharing awareness among the indigenous community members. An additional piece of literature [135] proposed an Information and Communication Technology (ICT)-based model aiming to improve different aspects of indigenous people’s lives including academia, commerce, judicial affairs, and tourism. In line with this, scholars [140] explored the technological adoption of the indigenous communities of Bangladesh during COVID-19, and how the adoption has helped to sell traditional products all over Bangladesh. This also reported the negative impact of online fraud and fake information which is also supported by another study [103]. Fake information has increased drastically and affects the lives of marginalized individuals by taking a toll on deaths, assaults, and violence. Within the limited exploration of the Global South Indigenous communities, the effects of misinformation, privacy concerns, and protection mechanisms in the social platforms have been less considered.

2.3 Social Media Adoption and Cyberbullying Concerns Among Indigenous Communities

The presence of indigenous people online is growing every day [140], along with the associated risks and concerns. This has made them more vulnerable, increasing the chances of being affected by others, either knowingly or unknowingly [67], [89], [106], [132].

2.3.1 Adoption of Social Media by the Indigenous Communities and the Concerns

Social media has a broader impact on the different spectrums of society [12], for instance, engaging people in the movements has become easier because of the internet [10], [14], [15]. Literature [77], [84], [125] studied the influence of social media on various indigenous communities such as strengthening marginalized communities by allowing collaborative action [80], communication [67]. Social media allows the sharing of political ideas among marginalized social groups and gives them a

sense of belongingness and political reinforcement [49], [60], [63]. Note that, some community members can access the internet through cellular networks [44], and WiFi [46] while others need to rely on local businesses, libraries, and media centers [44]. As the presence of social media and its influence is ever-increasing, concerns have arisen regarding the ethical usage of social media [137]. The struggle of the indigenous communities could have shaped their perceptions of social media and its influence from both an online platform and a real-life environment.

2.3.2 Effects of Cyberbullying on Indigenous People in Digital and Physical Spaces

Increased social media platforms with their diversified content to express individuals' ideas and opinions, the surge of online harassment and hatred is paramount. The existing regulatory scheme of the social media platforms struggles to prevent the spreading of online harassment and hatred [129], [155]. Often such abusive behavior spills from the digital space to the physical real-life environment [69], [70], [74], [107]. Many focused groups including women, refugees, including indigenous population are at risk of being the victims [56], [81], [112], [129], [133], [155]. Scholars [77] shed light on the fact that social media is being used to exploit the rural indigenous girls in Western Canada, describing the necessity of raising awareness through social media and proper education. Existing literature also [84] discussed that cyberbullying victims can not return to their regular lives easily because of the huge emotional damage that they face. In the case of the indigenous population, the feeling of depression due to cyberbullying is interestingly different [83] and the mental suffering is more severe than the dominant majority population [11], [17], [25]. Moreover, another literature [172] found that cyberbullying experiences differ from one to another which begs that different hate and harassment issues need distinct strategies [129] to circumvent the problem. In a recent work, researchers found that chatbots can be a good medium to help the youths to understand about cyberbullying [161].

These studies reveal that the existence, depth, and impact of cyberbullying on indigenous populations in the Global South remain underexplored. To our knowledge, only a few studies have examined how indigenous individuals in the Global South perceive social media's influence on their culture and values. Our research seeks to address this gap through a qualitative study focused on the younger generation of the indigenous Jumma people in the Chittagong Hill Tracts, Bangladesh.

2.4 Machine Learning to Detect Content and Caption Consistency

The technological advancement and collaboration of natural language processing (NLP) and computer vision have created multiple dimensions to work on, including disaster management, ensuring public safety, and content moderation which includes both image and text data [95], [101], [108]. These studies focused on the integrating part which mainly focuses on object detection, sentiment analysis, and image caption generation.

Recent studies tried to explore harmful and illegal content on social media. For example, scholars [131] detected the weapons in social media profiles with the help of Fast-Convolutional Neural Networks (F-CNNs) based on YOLO-V5 and textual fingerprinting. The combination of text and image has shown better performance, indicating that regularized adaptive models and data augmentation techniques are effective in managing unstructured social media data. Correspondingly, another study [101] used YOLO to detect pornography in videos, integrating object detection and Convolutional Neural Networks (CNNs) to identify nude content. Concentrating on CNNs-specific areas and improving classification accuracy using Support Vector Machines (SVM) and Random Forests, this study tried to make the online safer while addressing the ethical challenges that arise while dealing with sensitive data.

During COVID-19, the domain of public safety gained new momentum and at that time, YOLO-based models were used to detect social distance violations [102], [138]. These models have worked in various challenging environments including shadowy and crowded areas. Another literature [138] explored that in monitoring social distancing using CCTV, ShuffleNetV2 is more accurate than Darknet53 which demonstrates the vast usage of the object detection model in the public health sector.

In today’s world, fake news and propaganda are spreading faster than lightening speed, that is why detecting these has become a crucial part of research and academics. Existing literature [109] introduced a named entity-based model (DIDAN) which makes a comparison between articles and their corresponding images to detect fake information. The model trained on mismatched image dataset and captions, and it detects the inconsistencies among information while providing a robust approach to detect the fake news. Furthermore, various models (i.g. CLIP and VinVL) [136] were introduced with large datasets and advanced object detection techniques to find out the inconsistencies between text and images reducing semantic gaps also enhancing fake news detection.

Another body of literature [108] explored the disaster images on social media using sentiment analysis. They proposed a framework to analyze the human sentiments and activities. This proposal offers a more refined understanding of emotions such as sorrow and anger, activities such as sitting and running. This approach enhances crisis response efforts based on visual data.

Deep learning architectures are being used in a vast way to research image caption generation which connects the visual content with natural language description. Existing literature [58], [62], [111] applied same kind of framework which uses CNN for visual features extraction and RNNs or attention methods for generating contextually relevant captions. The advancement of attention mechanisms has enhanced the ability of these models which helps to focus on specific regions of the image, improving the relevance of the caption. For instance, scholars [88] demonstrated that combining regional object detection with RNN-based attribute prediction results in more detailed and descriptive captions. Consequently, transformer-based models (i.g. CaPtion TransformerR (CPTR) and ClipCap) [111] have enhanced the generation process by capturing hierarchical language structures and better aligning visual and textual representations.

Furthermore, another study [122] worked on crowd analysis in social media for crowd size estimation using the images shared on social media during city events. They created datasets with annotated crowd sizes and made a comparison between regular approaches and CNN-based approaches. This study explored that object recognition performed best when images were taken from a parallel perception. Their result highlights that image characteristics can have a very positive impact on crowd size estimation, which could be used for managing large public events.

To conclude, these studies show the vast usage of the integration of visual and text data in multi-model systems that advances the traditional approaches. Though the use of advanced neural networks, attention mechanisms, and large datasets are being used to enhance the usability of human lives, there is still a gap as these studies did not consider the relatively marginalized communities and their situations. Our study wants to fill this gap by making a tool which can be helpful for the people apart from the mainstream population.

Chapter 3

Methodology

3.1 Qualitative Data

In our study, we explored the social media usage of the young Indigenous community members of the CHT, focusing on individuals who have received an institutional education and are active on social media. We conducted our study over a seven-month period between May 2024 and November 2024. A total of 30 participants (18 males and 12 females), aged between 20 and 35 years, were recruited for the study. Depending on their availability and comfort, we conducted four group discussions (with 18 participants in total) and 12 individual interviews. The participants came from various professions, including university students (22), professionals (5), school teachers (2), and activists (1). The details of the participants are provided in Table 6.3.

Table 3.1: Demographic information of Indigenous participants.

Community	Participant	Male	Female
Chakma	12	8	4
Marma	5	2	3
Tripura	2	1	1
Tanchangya	4	1	3
Mro	4	4	0
Chak	1	1	0
Khumi	1	1	0
Bawm	1	0	1
Total	30	18	12

Participant Recruitment and Interview Procedure

We initiated the recruitment through our contributor, Dr. Avijoy Chakma, who belongs to one of the eight Indigenous communities that we studied. The first four participants were his acquaintances and from there we proceeded through snowball sampling. We also recruited participants randomly by advertising our study on various social media groups. To ensure participants' comfort and create a familiar environment [113], we conducted four group discussions: two in-person and two online. The participants were distributed as follows: Group 1 had 9 members,

Group 2 had 2 members, Group 3 had 5 members and Group 4 had 2 members. More details about the group discussions are provided in 6.2 in Appendix.

In addition to the group discussion sessions, twelve additional participants agreed to take part in individual interviews. We continued the interviews until we reached data saturation. Although our original plan was to conduct everything face-to-face, political unrest in Bangladesh from July 8 to August 20 [154], [163] necessitated a shift to remote methods. Consequently, the first two group discussions, involving 11 participants, were held in person, while the rest group discussions and all individual interviews were conducted via Google Meet. Consent was obtained for both offline and online interviews. For offline interviews, participants provided consent using printed forms; for online interviews, consent was given via Google Forms. In both cases, we verbally explained the consent form and received verbal consent as well. The interviews were conducted in Bangla, with participants' written and verbal consent obtained prior to recording. We ensured that the purpose of the recording and how the recordings would be used were clearly communicated to the participants. In response to some participants' concerns about privacy, we assured them that all recordings would be permanently deleted after the anonymous transcription process would be completed.

Data Analysis

For data analysis, two of our authors who are native Bangla speakers, translated and transcribed the audio recordings manually without using any automated software. Content analysis began immediately after the first discussion, providing a better context-based understanding that informed subsequent data collection [73]. We used thematic analysis [4] and inductive coding (open coding) method [50]. Three members of the group coded each piece of data and labeled them individually with different themes. Then the labels added by different members were compared. When the labels matched, they were accepted. When the labels did not match, the whole team discussed that piece of data and an agreement was achieved through the discussion. Example codes include "privacy," "hate posts," "memes and trolls," "freedom of speech," "sensational journalism," "censorship," etc. We did not use predetermined themes to maintain openness to emerging themes. The whole team worked together to group the related themes and find the final set of broader themes that can illustrate our findings the best.

Ethical Consideration and Positionality

Our research protocol was reviewed and approved by the research ethics board of BRAC University. Throughout the interviews and discussions, we were extremely careful engaging in respectful conversations with our participants, acknowledging that they belong to a highly marginalized community with their own culture and norms. Before beginning the interviews, we engaged in extensive discussions with our author, a member of the Indigenous community of CHT, and conducted an ethnographic background study. We also clearly communicated our neutral stance on political and religious issues to avoid any potential miscommunication. Moreover, we avoided political issues as much as possible, as our study was mainly focused on culture, norms, unawareness, and online harassment. Participants were informed of their right to withdraw their data after the interview, skip questions, or leave

the interview at any time. During reporting, we omitted sensitive information that could harm the community and removed all identifiers (e.g., location, institution) to ensure participants’ safety. According to the local customs in Bangladesh, the participants were offered light snacks and tea [94]. We note that financial compensation is mainly offered for recruiting professional participants to describe their work experience [124], [170].

Our questionnaire was crafted by the authors, drawing from insights in existing literature [140], background studies, and the authors’ substantial HCI expertise. The whole interview questionnaire is shared in section 6.1. One author, who is a member of the Indigenous community and was born and raised in the CHT, supervised the interviews. The other authors contributed extensive experience working with Indigenous and marginalized communities. In solidarity with the rights of Indigenous peoples, we recognize and support their fundamental human rights and their efforts to preserve their cultural identity. Moreover, we envision a Bangladesh where ethnic harmony prevails, allowing both Indigenous and Bengali communities to live together peacefully.

3.2 Quantitative Data

3.2.1 Dataset

In our study, we have used Fakeddit [97] dataset for training and testing our models. Fakeddit is a state of the art multimodal dataset, which contains over 1 million image and their captions from Reddit posts. The dataset contains three classification options, two-way, three-way and six-way. For this study, we have used the 6-way classification to detect fake news. In this dataset, each instance has a label, which indicates the nature of the instance, whether it is a fake news or not. We discuss the labels briefly,

- TRUE (0): This category refers to those posts and news that are true and contain actual information. Here, in this case, the captions are relevant to the posts and the information present are true.
- SATIRE (1): Humorous posts like memes are a candidate of this category. News or information twisted in a satirical way is included here.
- FALSE CONNECTION (2): The instances of this category contain posts where the image and the captions are not relevant.
- IMPOSTER CONTENT (3): In this dataset, all the posts that are generated by Bots on Reddit are included in this category.
- MANIPULATED CONTENT (4): Posts where the original information has been manipulated. Like edited video, picture.
- MISLEADING CONTENT (5): Posts and captions that are misleading for the public.

The distribution of the classes is illustrated in Figure 3.1. The Fakeddit dataset is divided in three portions, train segment, test segment and validation segment. Also,

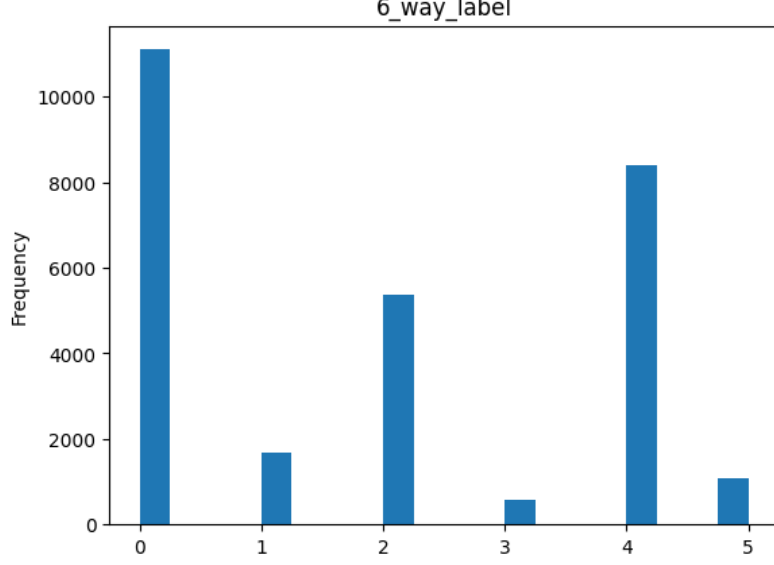


Figure 3.1: Distribution of Classes in 6 Way

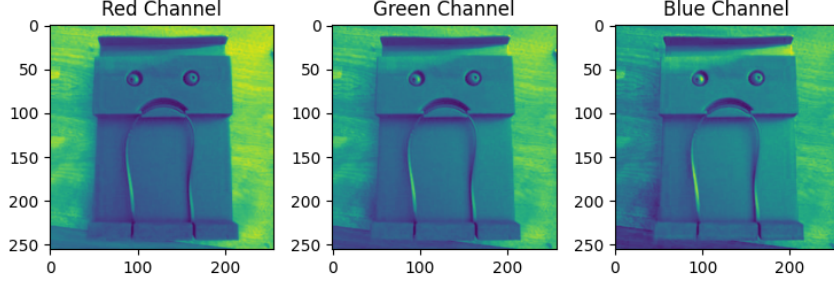


Figure 3.2: Image in RGB Channel

the dataset contains two parts, one is unimodal dataset and another is multimodal dataset. The unimodal dataset only contains the captions of the posts where the multimodal dataset contains captions along with images. For our study, we have used the multimodal dataset to train our models.

3.2.2 Dataset Preprocessing

Image Preprocessing

For training, we preprocess the images of the dataset in multiple steps. Firstly, we checked for corrupted images. Images that are empty file or not fully downloaded were counted as corrupted image in our study. When we found a corrupted image file, we dropped the corresponding instance from the dataset. After checking the image files, we plotted the images and found out that the images are not same sized, thus, in the second step we resized all the image files using ``torchvision.transforms.Resize'``. We resized the images into (256, 256, 3) ensuring uniform image size across the dataset. After that, each image in dataset were converted into RGB to maintain color channel consistency. A sample of these steps is shown in Figure 3.2.

In our dataset, image normalization ensures that all input images have a consistent

scale, improving the stability and efficiency of training. Since our CNN model processes images of different brightness levels and contrasts, normalization standardizes pixel values using ImageNet’s mean and standard deviation [39]:

$$\mu = [0.485, 0.456, 0.406], \quad \sigma = [0.229, 0.224, 0.225]$$

This prevents certain features from dominating others, accelerates convergence, and aligns our data with pre-trained models, enhancing feature extraction and overall performance. The normalization is implemented using the Equation 3.1

$$x_{\text{normalized}} = \frac{x - \mu}{\sigma} \quad (3.1)$$

where:

- x is the original pixel value,
- μ is the mean of the dataset,
- σ is the standard deviation of the dataset.

Text Preprocessing

To preprocess the text data, we use a pre-trained BERT tokenizer [87] to convert the Reddit post titles into numerical representations. Each title is tokenized and embedded using the BERT model from the Hugging Face `transformers` library. The model outputs a fixed-length 768-dimensional embedding for each title, ensuring consistency across inputs. This transformation enables efficient processing in neural network models while preserving contextual meaning. The uniform embeddings allow our classifier to leverage deep semantic representations for improved classification performance.

For the training, we split the training set in three portions, we use 80% of the set for training, 10% for testing and the rest for validation. This is achieved using `sklearn.model_selection.train_test_split`, ensuring balanced label distribution in each subset.

By combining both image and text preprocessing, we create a structured dataset suitable for multimodal classification tasks.

3.2.3 Model Description

To effectively classify fake news using both textual and visual information, we employ two deep learning architectures: `MultimodalClassifier` and `BERTResNetClassifier`. These models independently process images and text before merging their features for classification.

MultimodalClassifier (CNN + BERT)

The `MultimodalClassifier` has two main components: a `Convolutional Neural Network` (CNN) for handling images and BERT for processing text. The CNN works by extracting visual features through `three convolutional layers`, each followed

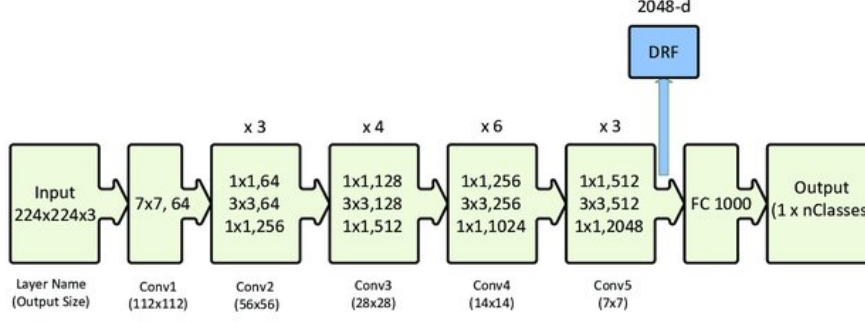


Figure 3.3: The Architecture of ResNet-50 Model

by ReLU activation and max-pooling, which helps to reduce the spatial dimensions while preserving important features [86]. The resulting feature maps are then flattened and passed through a *fully connected layer* for classification.

On the text side, a **pre-trained BERT-base-uncased model** [64] from Hugging Face is used to process the input text. BERT consists of 12 **transformer layers**, 768 **hidden units per layer**, and 12 **self-attention heads**, enabling it to capture **contextual relationships** between words in a **bidirectional manner**. The input text is first tokenized using the **BERT tokenizer**, which converts it into token IDs before passing it through BERT’s transformer layers. The model extracts a **768-dimensional embedding vector** from the [CLS] token’s final hidden state, representing the overall meaning of the text.

To integrate textual and visual features, the **BERT embedding** undergoes a **linear transformation** to align it with the image feature space. The model then applies **max pooling** to combine the feature vectors from both modalities. The final fused representation is passed to the classification layer, which applies **CrossEntropyLoss** for the final prediction. This architecture enables the model to leverage **both textual and visual cues**, improving the effectiveness of multimodal fake news classification.

BERTResNetClassifier (ResNet-50 + BERT)

The BERTResNetClassifier substitutes the CNN with a ResNet-50 backbone to enhance image feature extraction. ResNet-50, which is pre-trained on ImageNet, captures hierarchical features from images that are subsequently processed through a fully connected layer. ResNet 50 is a convolutional neural network (CNN) architecture that features 50 layers. This model includes 1 MaxPool layer, 48 Convolution layers, and 1 Average Pool layer. ResNet 50 carries out around 3.8×10^9 floating-point operations [64]. The architecture of ResNet50 is depicted in Figure 3.3. The text processing pipeline remains unchanged from the MultimodalClassifier, employing BERT embeddings along with a linear transformation layer.

The fusion mechanism adopts a similar strategy, taking the element-wise maximum of the text and image feature vectors. This approach ensures that the model effectively captures the most significant features from both modalities prior to classification.

Training and Optimization

Both models utilize CrossEntropyLoss for training, applying class weighting to tackle any class imbalances in the dataset. The optimization process is managed by Adam, along with a learning rate scheduler (ReduceLROnPlateau) that dynamically adjusts the learning rate according to the validation loss. Additionally, early stopping is employed to cease training when the validation loss ceases to improve, which helps in preventing overfitting.

By integrating both textual and visual features, these models improve the accuracy of multimodal fake news classification, effectively capturing the complementary information found in both images and text.

Chapter 4

Findings

4.1 Qualitative Findings

In this section, we first present an overview of how social media is leveraged by the young Indigenous community members in Bangladesh, particularly in protecting and promoting their culture, heritage, history, and identity. We also provide a situated understanding of their social media behavior in the context of cultural diversity, conservatism, and appropriation. Next, we highlight the online threats and challenges encountered by these participants, with a detailed description of how these issues are translated into the physical world. Finally, we summarize the mitigation strategies adopted by them.

Participants from the group interviews are denoted using the format G#, P#, Gender. For example, “G1, P1, Female” represents the first participant from group one who identifies as female. For individual interviews, we use the format I#, Gender. For instance, “I1, Male” represents the first individual participant who identifies as male. Table 4.1 provides the definitions of the key terms used throughout the Findings section.

4.1.1 Cultural Protection

We found that culture plays the most important role in shaping the social media behavior of our participants. The Indigenous young people of CHT extensively use social media and the Internet to preserve their culture and protect their ethnic identity. In doing so, they have to consider both internal and external circumstances. In this section, we provide a nuanced portrayal of these issues.

Preservation of identity, heritage, and history

From our interviews, we found that the Indigenous members of the CHT strive to preserve their culture through various means. Our participants shared that they leverage modern technology such as social media to promote their cultural symbols and elements. For example, one participant mentioned that they use social media to showcase cultural tools, introducing their heritage to a broader audience:

“When I post about traditional elements like Hallung or Mejang, my friends often ask me about them. They respond positively and show great curiosity about our traditions. Without social media, it would not

Table 4.1: Definition of key terms.

Terms	Definition
Upojati	This is a Bengali word that translates to sub-nation. This term is used to refer to non-Bengali population in Bangladesh. The Indigenous people of CHT do not embrace this term with their identity. Instead, they prefer to be referred to as ‘Adivasi’. ‘Adivasi’ is also a Bengali word that translates to the term ‘indigenous’ in English [167].
Hallung	A large basket-shaped artifact used to carry agro-products on the back with a circular strap attached to the basket bottom [146].
Mejang	A stockpot-shaped artifact used as a dining table at wedding receptions [180].
Pinon	A traditional Chakma attire for women, serving as the lower garment, wrapped around the waist [13].
Hadi	The upper garment of traditional Chakma women’s attire, complementing the Pinon to complete the outfit [13].
Water Festival	The Marma/Mogh Indigenous community celebrates the ‘Rilong Poweh’ water festival during the Sangrai (marks the New Year in the ‘Mraima’ calendar) in Bangladesh [179].
Saree	A traditional Bengali female outfit, consisting of a long, draped cloth worn over an underskirt, known for its elegance and cultural significance [98].
Punjabi	A traditional Bengali attire, worn by both men and women. For men, it typically includes a long shirt called a kurta paired with loose-fitting trousers, such as pyjama or salwar [143].
Ching Chong	A derogatory ethnic slur historically used to mock or insult individuals of East Asian descent. It caricatures the sound of East Asian languages, perpetuating stereotypes and reinforcing xenophobic attitudes. Its usage is widely recognized as offensive and racist [47].

have been possible for us to share our traditions so effectively with our Bengali friends, which is a genuinely positive impact.”[I4, Male]

In addition to social media, the Indigenous youth of CHT also use platforms like YouTube to preserve their cultural heritage. These platforms allow them to upload videos and songs, ensuring that cultural practices are documented and accessible for future generations:

“Platforms like YouTube, in particular, have played a vital role in preserving our cultural songs and language. Uploading these songs to YouTube serves as an effective method of preservation, which is a positive development.”[I2, Male]

Another participant further elaborated that the traditional songs and poems of her culture and community – which were on the verge of extinction once – have now been preserved through technology. This preservation takes place through digitally recording and storing the cultural artifacts:

“This is the era of globalization and every culture is somehow affected by technology. In our case, for example, there are Chakma songs and poems that were once on the verge of extinction. But thanks to technology, they are now recorded and can be passed down from generation to generation.” [G1, P8, Female]

During our study, we also found that young Indigenous people use social media to promote their cultural events online, helping to spread their cultural history to people outside of their community.

“Nowadays, the Masus (the individuals responsible for organizing programs) from the Rakhine community use social media to promote their events. As a result, many people are learning about the Rakhin traditions, which helps to advertise their culture. Additionally, they collaborate with popular social media vloggers to promote those events, which further boosts the popularity of those events.” [I7, Male]

In addition to preserving their cultural heritage, social media also helps in raising awareness among the mainstream Bengali population regarding Indigenous movements and historical incidents. For example, during the Quota Reform Movement¹ In Bangladesh, the history and quotes of Kalpana Chakma² were highlighted to draw attention to the oppression in CHT. As a result, Kalpana Chakma’s words and history gained widespread recognition, helping to bring a relatively unknown aspect of Indigenous history to the new generation. In this case, they have used social media to show the similarity of struggle between them and the Bengali people. In the words of a participant:

“You see, people are also becoming more aware of our history because of social media. A few days ago, only a few people knew about Kalpana Chakma, but today, many more are familiar with her work and history. Additionally, on August 9 of this year, during the ‘International Indigenous Day,’ many posts were shared about us – the discrimination we face. The timing was good because the Quota Reform Movement had just become successful so people were really vocal about any form of oppression or discrimination. This is really a great thing. It’s a positive aspect of social media that people are learning about our historical figures.” [G3, P4, Female]

¹On August 5, 2024, the Quota Reform Movement in Bangladesh, which had evolved into an anti-government uprising, culminated in the successful overthrow of the former government of Bangladesh. [157].

²Kalpana Chakma was an Indigenous rights activist from the Chittagong Hill Tracts in Bangladesh, who was abducted from her home and possibly murdered in 1996, allegedly by security forces personnel. She has been missing ever since. Her disappearance became a symbol of the struggle for justice and human rights for the Indigenous people in the region [5].

Another participant categorically mentioned an incident regarding Kalpana Chakma that highlights the importance of social media in empowering the voice of the Indigenous population:

“After August 5, when the Quota Reform Movement became successful, students launched their ‘Reform Bangladesh’ mission. As part of this movement, they began creating art and graffiti on old walls to beautify them and preserve the memories of the protest. In the Chittagong Hill Tracts (CHT), many Indigenous students made graffiti of Kalpana Chakma, which was allegedly destroyed by law enforcement agencies. This incident went viral on social media, leading to widespread support from Indigenous people across Bangladesh, who then created more graffiti of Kalpana Chakma. I remember seeing a post that said, ‘If one Kalpana Chakma dies, a thousand Kalpana Chakmas will be born.’ This shows how, through social media, we can now collectively protest against oppression.” [G3 , P4, Female]

She also referred us to the Facebook post relevant to her quote, which is depicted in Figure 4.1.

During our interviews, we found that the Indigenous young people of CHT try to preserve their language through social media as well. While CHT is one of the top tourist spots in Bangladesh and the places here are mostly named in their native language, they understand that the distinct pronunciation of the Indigenous words often makes it challenging for the Bengali tourists to learn the original names of the places. Over time, these Indigenous names have been modified, pushing them to the verge of extinction. However, there is now a renewed effort to preserve these unique names, with social media playing a key role. Our participants shared that they actively post on Facebook using the traditional Indigenous names as they believe that these names are closely tied to their identity:

“We have our own names for places, which come from our language. However, these names and pronunciations are difficult for Bangla-speaking people or tourists. Over time, they have modified the names. For instance, the place now known as ‘*Keokradong*’ is called ‘*Kyaka krah tang*’ by us. ‘*Nahphah khung*’ has become ‘*Nafakhum*’, ‘*Nai Morong Oing*’ is now ‘*Debotakhum*’, and ‘*Kra U Makyak Tang*’ is referred to as ‘*Dim Pahar*’ (Egg Hill). However, we – the Indigenous people – hold these old names dearly because they are deeply connected to our identity. To preserve them, we raise awareness through Facebook, using the original names ourselves. We try to resist these changes by leveraging social media.” [I7, Male] ³

We found another important act of activism through Facebook. Despite the state’s effort to label them as “Minor Ethnic Groups,” [48], [149], [195] all of our participants steadfastly hold on to the term ‘Adivasi,’ which represents their identity, both online and offline. During our study, all the participants agreed that they wanted to be addressed as ‘Adivasi’ rather than ‘Upojati’ (Tribe). In summary, social media is extensively used as a tool by the Indigenous young population to protect and promote their culture, history, and identity.

³Supplementary sources for the places mentioned here are provided in section 6.2.



Figure 4.1: The original and the vandalized graffiti (Collage) [165]. The top-left graffiti translates to “Save the Hill, Save the Country” and the top-right as “Kalpana Chakma 1996?” Perpetrators vandalized the “Save the Hill” from the top-left graffiti and the entire top-right graffiti, resulting in the bottom-left and bottom-right images, respectively.

Cultural diversity, assimilation, and conservatism

Our data shows that the young Indigenous community members in Bangladesh navigate a complex cultural landscape on social media where their sharing practices are intertwined with internal, external, and inter-community issues.

First, Indigenous social media users face criticism online from the majority Bengali community when they post about their cultural programs. In their opinion, this mainly occurs because the majority population tries to see the Indigenous practices through their own cultural and religious lens. Thus, from the majority’s perspective, the Indigenous culture seems to be ‘weird’ or ‘shameless’ in many cases.

“The water festival – the Marma people call it ‘Pani Khela’– is a traditional festival of the Marma community and it goes viral every year. So, there is always controversy to it. Let’s say when Pani Khela happens, people are indifferent to male and female identities – there is no gender difference there. Now when this goes viral, many members of the mainstream Bengali community judge it from their cultural standpoint. A typical comment would be: ‘It is Haram (prohibited in Islam)’. I

have seen many ‘haha’ reactions to those posts, sometimes people make comments such as ‘What kind of culture encourages such shameless activities?’ ” [P8, G1, Female]

The young Indigenous community members are not only facing criticism from the outside people but also from their own community members when they try to assimilate into the mainstream Bengali culture. According to our participants, the older members of the Indigenous communities are much more conservative, and as such, they are not welcoming of the younger population adopting any cultural components of the mainstream Bengali community. For example, the Saree-Punjabi day is a special event in Bangladeshi universities, which is celebrated by undergraduate students wearing traditional Bengali outfits. As college-going, young Indigenous members join the festivity by wearing these outfits and posting those pictures on social media, they are condemned by their parents and other family members. One female participant described this incident in the following way:

“I, sometimes receive negative comments from my own community. For example, on Saree-Punjabi Day at our university, I wore a saree, and the people from my community criticized me, saying things like, ‘You chose to forget your own culture and adopt another community’s culture.’ However, I wore the saree as a formality to maintain good relations with my classmates, and it does not mean that I have forgotten my own culture.” [G3, P1, Female]

Another female participant faced criticism from her parents simply because she had posted pictures with her Bengali friends and classmates:

“At my university, during our Saree-Punjabi Day, I took some pictures with my Bengali friends and posted them on Facebook. However, my parents asked me to delete them from my profile. They were worried because they felt insecure about me posting pictures with my Bengali friends, fearing that our community might not accept it.” [G3, P2, Female]

These issues are further aggravated by the fact that there is a vast diversity among the cultural practices of different Indigenous communities, and each community is protective of its own practices. In some cases, members of one community criticize other community members’ efforts to adopt their cultural elements. As one participant said:

“Although I am a part of the Tanchangya community, my mother is from the Chakma community. So I know about Chakma culture and their language. Once, I commented on a post by my Chakma friend in the Chakma language and a random person replied by asking why I commented in the Chakma language when I’m from the Tanchangya community. Another example involves one of my friends who shared a picture wearing Pinon and Hadi. She wore it in a non-traditional style and received negative comments, such as, ‘Why did you wear it like this?’ ” [I11, Female]

These accounts highlight the broader inter-community issues and reveal that cultural conservatism prevails and the misunderstandings take place on several levels, ranging from the outsiders to their own community members to the members of other Indigenous communities.

4.1.2 Online threats

In this section, we describe the online threats and challenges encountered by our participants, including privacy violations, sensational journalism, and censorship. We also provide a detailed account of how online harassment and bullying are not isolated from offline incidents, rather they are interconnected and influenced by each other.

Privacy violations and sensationalism

According to our participants, the increasing availability of smartphones and the proliferation of social media, coupled with the fact that their hometowns are among the top tourist destinations in Bangladesh, have made their privacy increasingly vulnerable. This threat manifests in the non-consensual recording of videos and photos during cultural events and everyday life, which are then shared on social media. One participant shared:

“With the excessive use of social media, the privacy that the people of CHT once had is no longer there. Tourists often come here and portray the CHT from their own perspectives on social media, rather than allowing the Indigenous communities to represent themselves.” [G1, P7, Male]

According to our participants, the portrayal of CHT tourist destinations without appropriate contexts on social media by Bengali tourists is a major concern for them. This issue gets further worsened due to the sensationalism of the journalists. Our participants shared that during the Marma water festival, the photos and videos of the event were made public on social media, which were captured in tricky ways to attract more viewers.

“Social media makes our festivals visible to everyone, and in Bangladesh, tolerance is very rare. For example, the Water Festival is a part of the Marma culture, and we should respect that, right? The journalists also play a role here as the journalists covering the festival use eye-catching footage and captions to attract more viewers and create controversy.” [G1, P8, Female]

Our participants further said that this issue is not only limited to social media but also prevalent on YouTube videos, where Bengali content creators often inaccurately portray political and geographical issues related to the Indigenous communities. One of our participants showed us videos of such misrepresentation, which can be seen in Figure 4.4.



Figure 4.2: Incorrect text and visual misrepresentation in the YouTube Thumbnail [104]. The translated thumbnail text (top) “Where there is no touch of civilization” is incorrect and the inclusion of unknown community members is misleading.



Figure 4.3: Misrepresenting the Indigenous communities by including unknown community members in the thumbnail (Creator’s Face Hidden) [168]. Thumbnail text translates to ‘Forbidden Andharmanik’ whereas “Andharmanik” has limited access.

Figure 4.4: Misrepresentation in YouTube thumbnails (‘Andharmanik’ travel vlogs).

“If you search for ‘Andharmanik’ on YouTube, you will find tons of videos with titles like ‘Forbidden Area of Bandarban, Andharmanik’. However, it is not a forbidden area; the way they present it is misleading. Additionally, if you look at the thumbnails, you’ll notice that they often use images of African Indigenous communities to represent the people living there. This is both wrong and misleading.” [I7, Male]

Censorship

Almost all of our participants cited censorship as a major challenge as they are often hesitant to share their opinions, thoughts, and personal experiences on social media. We observed that this fear of censorship is more evident among the communities with relatively smaller populations. As one participant said:

“I am from the Indigenous community, I do vlogs online, especially on Facebook. But, you see, there are many things I experience in the CHT that I cannot share. If I share too much, I might be in trouble.” [I7, Male]

In another context, participants shared how their lives could be at risk if they speak out on social media about the struggles and injustices they face. They revealed that their lands were often invaded by the settler forces, with law enforcement agencies turning a blind eye to these violations. Moreover, participants expressed fear that sharing the truth about the settlers and the hardships endured by the Indigenous people could lead to abduction or even murder – two common tragic incidents in the CHT areas. One participant provided a detailed description of this issue:

“Last year, a post about our Buddhist temple was shared by a different Indigenous community in their Facebook group, with a caption in their language. I couldn’t understand it at first, so I asked about it later. The

explanation I received was that the land where we were trying to build the temple had been invaded by a company aiming to develop their own settlement. In the caption, he wrote, ‘To preserve our land, we need to build this temple.’ At one point, the industry owners attempted to poison the hillside water stream, from which the people of that region get their drinking water, in an effort to force them to leave the land so they could settle there. The authorities are supporting the settlers in this matter. They’ve even set fire to the area ⁴. Although law enforcement agencies are aware of this, they do nothing to help us. We can’t even talk about these issues openly on social media, as we don’t have the freedom of speech. Speaking out would put us at risk of being abducted or murdered by the settlers.” [I7, Male]

The above responses indicate that freedom of speech is severely restricted for the Indigenous population. They feel endangered and are allegedly coerced into self-censorship by the law enforcement agencies themselves.

Harassment and bullying

Our participants expressed concerns about how online bullying and hate posts affect their daily lives by inciting hostility. Some of the participants shared their experiences of being harassed in public due to their ethnic identity, with social media playing a significant role in spreading these incidents widely. For instance, participants described how social media posts related to the Raozan incident ⁵ impacted their life. These posts primarily portrayed the Indigenous people as carnivorous, and various meme pages on Facebook and Instagram perpetuated this harmful stereotype. One participant provided a vivid explanation of this phenomenon:

“If you remember, an incident occurred last year –a murder in Raozan that went completely viral. The hatred against us actually peaked after this incident on social media. If you saw the news, yes, I agree that a murderer must be punished. But taking the murderer away from the police and beating him to death in front of the police is truly brutal and cannot be justified. Also, here they only took away the murderer who was from the Indigenous community. This hatred was mainly fueled by social media. Many pages created content after content, misrepresenting and spreading hatred against our entire ethnic community. At that time, you know, many of our ethnic people were living in Dhaka and other parts of Bangladesh for education and jobs. They were harassed by the people around them because of what was spread on social media. Perhaps you don’t know this, but a boy at Chittagong University was brutally beaten by a Bengali student after this Raozan incident.”[G1, P3, Male]

⁴The leasing of land to Lama Rubber Industries Limited in Bandarban violates the Chittagong Hill Tracts Peace Accord and seeks to forcefully displace the Indigenous people from their homes [194], [196].

⁵Shibli Sadiq Hridoy, a 20-year-old college student from Rauzan, Chattogram was abducted on August 23, 2023. The victim was killed over a protest against poultry theft, and his dismembered body was found on September 11, 2023. Rapid Action Battalion confirmed the murder but denied social media rumors of cannibalism, stating the body was simply discarded [192], [193].

A similar sentiment was reflected by another participant. In her case, she was asked about cannibalism multiple times by her university juniors, which was disrespectful to her. She also reported that other students threw trash at one Indigenous student at her university:

“My friend lives at her [University name anonymized] university hall. People threw bottles at her when she tried to get out of her room. People used to bully us by calling us ‘Upojati’. Also, I was harassed multiple times. Many of my friends and juniors asked me, ‘Apu (Sister), do you people eat human flesh actually?’ ” [G1, P8, Female]

Another participant shared that a boy spat on her on a busy road because of the Raozan incident:

“It was during the Raozan incident. I was returning from my university and it was late afternoon that day. I took a rickshaw to get home, but we got stuck in a traffic jam for a while. During that time, a boy on a bicycle approached and saw me. He then spat on my hand and said, ‘You eat human flesh.’ Although the rickshaw puller protested, it happened in public and on a busy road.” [I6, Female]

These responses clearly demonstrate that social media posts and rumors create real threats in the daily lives of the Indigenous population, including physical assault and harassment. Our participants further described how small rumors spread on social media can fuel widespread anger and lead to devastating results in the real world. One such story was shared by a participant:

“A few years ago, an incident occurred in my district where a Muslim biker – who was providing ride-sharing services – was murdered. His last passenger was from the Indigenous community. As the news spread on social media, it was rumored that he had been killed by that passenger. This led to widespread anger, and two or three Indigenous villages were set on fire. However, a later police investigation revealed that the biker was actually killed by his Bengali friend, who murdered him and stole his bike.” [I4, Male]

We also learned about multiple incidents of harassment and bullying, where the perpetrators were faculty members at renowned universities in Bangladesh. Our participants revealed that they experienced harassment even in classrooms and during assessments, solely because of their ethnic identity. They recounted instances of racist remarks from their instructors and shared experiences of discriminatory treatment in assessments:

“At my university, one of my faculty members bullied me for being part of the Indigenous community, and for being a student under the quota system. After finishing his lecture, he pointed a laser pointer at me and said, ‘I think that boy hasn’t understood anything. He’s from the quota system.’ Another faculty member deducted marks from my project, even though I had submitted the same work as my Bengali friend. Additionally, a different faculty member remarked, ‘Have they

ever seen a computer in their life?’ All of this stemmed from social media, where last year, some people mocked the Indigenous quota, and it went viral.” [I5, Male]

Another participant shared how she had been mocked due to the quota system:

“When I was in my first year of university, a classmate abruptly asked me, ‘You guys get admission through the quota system, right? And if I marry a Chakma girl, will my children get the quota too?’ This kind of indirect bullying is very common. Some of my seniors faced harassment during job interviews, with remarks like, ‘You got in through the quota system, so you didn’t have to study much.’ ”[I11, Female]

Besides all this, ethnic slurs directed toward our participants have been a regular phenomenon in their life. In some cases, they reported that they take it normally now and do not even get hurt by these racist comments. In their opinion, social media plays an important role in this regard:

“Some Bengali Muslims – out of ignorance – believed that we were responsible for the genocide of the Rohingya Muslims in Myanmar, mainly because social media portrayed us as having facial similarities with the people from Myanmar. I recall one incident on my way to work when an older Muslim man confronted me and used harsh slurs. I believe he didn’t realize that I am not a part of the Arakan community in Myanmar.” [I10, Male]

Notably, most of our participants experienced being called ethnic slurs (for example, *ching chong* , both online and offline. A typical response from a participant is as follows:

“When I go to market, people tease us like this by saying ‘Chung chang’. They refer to our facial similarity to the Chinese people. So, they refer to us as Chinese, or even Korean or Japanese. Sometimes, let’s say, when I am going to buy something, people ask ‘Are you from China?’” [G1, P8, Female]

To summarize, social media posts create misinformation and false stereotypes that often lead to real-world incidents, including physical harassment.

4.1.3 Mitigation Strategies

To mitigate the issues mentioned above, the Indigenous community members have adopted collective offline measures, including prohibiting outsiders and cameras from large cultural events. While these actions help mitigate the issues to some extent, these are not enough. To further protect themselves online, members of the Indigenous community employ social ciphering techniques to maintain their safety. Using their distinct language as a ciphering tool, the Indigenous people communicate in their mother tongue on social media, creating a barrier that outsiders cannot easily penetrate. This practice of using their language or local dialect during online interactions allows them to discuss sensitive topics and shield themselves from harassment and bullying.

“We also use it (our native language) on social media. For example, when my other Indigenous friends mention me in the comment section of a controversial or provocative post to draw my attention, I respond using our language. I do this so that others cannot understand and verbally attack us.” [G1, P9, Male]

At times, they avoid specific terms that might trigger negative reactions, especially in the context of religious practices and food habits, which are often not accepted by the mainstream Bengali population. For instance, one participant shared that they avoid using the word “swine” and instead use their native term for it. This adjustment reflects the cultural sensitivity surrounding pork, which is prohibited in Islam [152] – the dominant religion in Bangladesh. Moreover, they use technology to enhance their privacy, such as dedicated keyboards and websites for writing in their language (depicted in Figure 4.5).

“Sometimes, we don’t use the word ‘swine’ to refer to pork. Instead, we use our local dialect, which helps protect ourselves from getting bullied. In certain situations, we also use our native language to communicate. For example, if we’re discussing a festival where we drink alcohol or eat pork, we would write the post in our language. We have our own keyboard and a website where we can write in our language. Sometimes we use English letters to represent our language. For instance, ‘Yung tak cha?’ means ‘How are you?’ in our language, but people outside our community wouldn’t understand it. We use this technique to talk about sensitive topics like politics and culture.” [I10, Male]

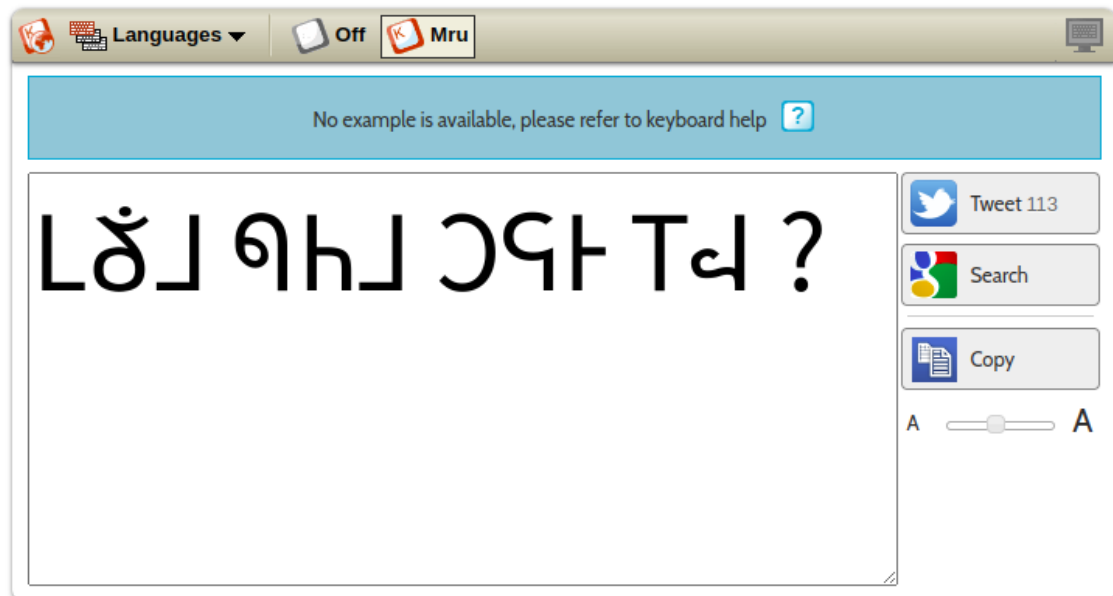


Figure 4.5: Online English to ‘Mro’ language translator [183]. “How are you?” is translated using the Mro alphabet.

Beyond social ciphering through text, we found that many participants extended this practice to voice messages on social media. During the Quota Reform Movement,

participants reported using voice messages in their native language to alert others in the same university hall about potential attacks. This approach ensured that the messages would remain incomprehensible to outsiders.

“Indigenous women in the [Anonymized] Hall (Female Student Dormitory) Messenger group shared voice messages in the Chakma language to warn others about possible attacks in specific areas. This was done to ensure that others couldn’t understand the message.” [I12, Female]

Besides social ciphering, these communities leverage some coping mechanisms to dodge the privacy threats and their aftermaths. We found that these people mostly try to use avoidance as a coping mechanism. This practice is even extended in offline settings. For example, some of our participants reported that they avoid public transport as much as possible. They think that their distinctive facial structure would make them easily recognizable, and as such, they try to take measures to hide them.

“I don’t engage much in anything, both online and offline, because I don’t want to get bullied. I generally take rickshaws or CNGs to travel; I avoid public buses and other forms of public transport. I also wear a mask (surgical mask) to hide my face, so that people can’t identify me as being Indigenous.” [I2, Male]

Another mitigation strategy reported by our participants is to get involved in constructive discussions to clarify the misconceptions regarding their culture and lifestyle. One of the participants shared that he creates short videos and uploads them on social media, but whenever he receives any negative comments from the Bengali people, he tries to educate them in a constructive way:

“In many of my vlogs, I sometimes receive hateful comments when I showcase our culture or traditions. However, I try to respond to those comments with logical answers and make an effort to educate them. In many cases, they realize they were wrong and then apologize for their comments, which is a positive outcome. If they come to understand us, it’s a good thing. I believe that every content creator from the Indigenous community should also practice this approach.” [I7, Male]

In addition to the mitigation strategies, we found instances where social media has helped our participants in their academic lives and education. One participant shared the following story:

“Social networking sites were incredibly helpful during my admission days. I received a lot of support from our community groups. Some of our senior brothers dedicated their time to teaching many students like me for free. Their guidance was invaluable and helped me immensely.” [I1, Male]

Furthermore, social media has been demonstrated to be particularly effective in a few cases, including saving lives of the community members. Social media is used extensively when any community member goes missing. While traditional search methods take longer time due to the hostile geographic feature of CHT, social media offers a lifeline in this regard:

“Technology is really helping us in many cases like one of our community members went missing a few days ago. In hilly areas, it is almost impossible to find someone solely by relying on traditional methods. So, in this case, we posted his picture on Facebook and shared it with our community group. Later, that person was found. Here I cannot imagine finding him so quickly without the help of technology.” [I7, Male]

All of these findings reveal that the young Indigenous community members not only use a diverse set of mitigation techniques to protect themselves on social media, but they also adopt innovative methods to overcome the unique local challenges and thrive in their social and academic lives.

4.2 Quantitative Findings

The multimodal model trained on the Fakeddit dataset showed impressive results in the fake news classification task. Training took place over 20 epochs, with early stopping implemented after the 7th epoch due to no further improvement in validation loss. Throughout training, the model’s accuracy steadily increased, achieving a training accuracy of 95.06% by the final epoch. However, the validation accuracy plateaued at 78%, indicating that the model had some difficulty generalizing to unseen data despite its high training accuracy.

Class	Precision	Recall	F1-Score
True (0)	0.79	0.83	0.81
Satire (1)	0.56	0.72	0.63
False Connection (2)	0.74	0.61	0.67
Imposter Content (3)	0.34	0.56	0.42
Manipulated Content (4)	0.86	0.86	0.86
Misleading Content (5)	0.66	0.72	0.69
Accuracy	0.78		
Macro Avg	0.66	0.72	0.68
Weighted Avg	0.78	0.78	0.78

Table 4.2: Classification Report

The model displayed a significant enhancement in detecting various types of fake news, although its performance varied across different categories. The best results were achieved in classifying manipulated content, where both precision and recall were high, demonstrating the model’s strong ability to accurately identify manipulated news with minimal false positives. This suggests that the model effectively recognizes more obvious forms of fake content, where manipulation is often clear and can be detected through multimodal features.

On the other hand, the model faced challenges with imposter content, showing notably lower precision and recall. This indicates that it struggled to differentiate between genuine and imposter news, which is often more subtle and may require additional context or reasoning beyond its current feature set. The categories of satire and false connections also presented difficulties, although the model performed better in identifying satire content. The relatively lower F1-scores in these areas

suggest that while the model could detect some instances of fake news, it occasionally misclassified them, especially in cases of subtle or deceptive content.

The performance is encouraging in our case, given our research focus on detecting manipulated content regarding the indigenous people of the Chittagong Hill Tracts (CHT). While there are challenges in certain categories, the model’s robust ability to identify manipulated content aligns well with our research goals.

These findings are outlined in Table 4.2, which presents precision, recall, and F1-scores for each class, showcasing the model’s strengths and areas needing improvement. With an overall accuracy of 78% on the test set and a weighted average F1-score of 0.78, the model proves to be generally effective at differentiating between true and fake news, especially in identifying manipulated content. The variations in performance across different categories of fake news point to opportunities for future enhancements, particularly for more difficult classes like imposter content, where further training or data augmentation might be required to boost precision and recall.

Chapter 5

Discussion

In the previous section, we documented a set of online activities conducted by the young Indigenous social media users in Bangladesh. We provide a situated understanding of these practices in relation to their own culture, rituals, and beliefs, as well as the local sociopolitical conditions in Bangladesh. Our findings delve into many aspects of the technological intersection with the Indigenous CHT people of Bangladesh, who are marginalized both in online and offline spheres. Some of these issues such as tourism, fake news and misinformation, forced migration, search and rescue mission in hilly areas, are unique challenges due to the geographical location and the history of this area. By analyzing their concerns, constraints, protection mechanisms, and dependency on technology to raise awareness among themselves and others, we offer a few recommendations and connect our findings to the broader issues in HCI.

5.1 Impression Management

We begin by highlighting the design implications of our work. According to Goffman’s concept of “impression management”, social life is a dynamic process where humans constantly try to control the impressions that others have about them [148]. In this process, an individual puts up a more carefully improvised version of self – called the “front stage” – to manipulate how they are perceived to gain acceptance from others, i.e., the audience. The other side of Goffman’s theory about self – the “back stage” – is associated with a more private understanding of the self of an individual in the absence of a social setting. With the advent of social media as a “networked public” [29], impression management becomes considerably more challenging as different communities and norms coexist on these platforms.

Our data reveals that young Indigenous social media users in Bangladesh encounter a range of issues regarding impression management. While these users have a strong sentiment regarding the protection and promotion of their own culture, they also aspire to gain acceptance from their Bengali friends by assimilating with the mainstream culture. As can be seen from our data, this becomes a challenging task because when they put pictures with outfits like saree that are not representative of their own cultural heritage, these young users are reprimanded by their family members at home. On the other hand, outfits such as saree and punjabi are essential apparatuses for these users to improvise a carefully designed personality that represents their willingness to assimilate with the mainstream Bengali culture. At

the confluence of this duality, these users struggle to find a middle ground as they need to “perform” differently for different sets of audiences at the “front stage”. We advocate for the necessity of implementing fine-grained privacy settings for these marginalized community members that go beyond the straightforward design of customized friend groups, profile locks, and multiple profiles [35], [158].

Prior work with the marginalized and stigmatized communities in Bangladesh has documented that the members of those communities use techniques such as disguising, hiding, layering, and other similar mechanisms [85], [91], [94], [128], [170], [174]. This brings to the fore the concept of “personalization” in HCI as these community members need to navigate around multiple carefully curated online “selves”. For example, any design intervention that helps to determine which identity is more conducive for impression management in a particular context, and how they switch to that identity smoothly, would make such transitions easier for them.

5.2 Aftercare, Shared Meaning-making, and Shielding

Beyond personalization, we propose a few other recommendations with the goal of creating a safe and comfortable environment for Indigenous social media users. Our findings demonstrate that these users face harassment and bullying in real life based on the rumors and misinformation originating from social media. We advocate for the establishment of continuous safety and comfort measures that would provide assurance to these marginalized users. In this regard, we emphasize aftercare and recommend that social media platforms add features similar to Indigenous practices such as “healing circles” [6], [7], [93] that have been demonstrated to be effective for these communities. These circles can be utilized to create unity, foster a sense of collectiveness, and build a sense of belonging among the Indigenous community members. Prior works on theology and mental health have highlighted the importance of faith leaders in mediating these circles [66] but community leaders who have social acceptance and trust among the members can also act as moderators in this case. Under their supervision, these circles can serve as a resource for learning and collectively addressing online and offline bullying and harassment as well as functioning as a support center for healing from the associated trauma and fear.

Second, we found that there exists a lot of misconceptions among the mainstream Bengali population regarding the cultural practices and rituals of the Indigenous communities. As our data shows, this lack of cultural knowledge creates prejudices and reinforces stereotypes. However, some of our participants also reported that they were successful on a limited scale in educating the mainstream population through meaningful and constructive conversations. This highlights the importance of inter-community connections, knowledge-sharing, and shared meaning-making of cultural practices. The recent HCI literature on migration and inter-faith learning can be helpful in this context. For example, the AR/VR technology has been effective in promoting intercultural knowledge sharing [150], inter-faith learning, and empathy building [169] in multicultural environments. These technologies can be utilized to establish a sustainable process of shared meaning-making between the Indigenous community and the mainstream Bengali population.

Third, social media platforms should be more proactive in protecting these marginal-

ized users. Although “shielding” could be used as a potential countermeasure where the posts of minority communities would be shielded from undesired exposure to “others” who might misinterpret them, we argue based on our findings that shielding might limit many of the positive benefits obtained by our participants through the positive use of social media. Any platform intervention should address this trade-off to maximize the benefits while minimizing the risks for the minority communities.

5.3 Otherness, Identity, and Resilience

We found a more layered perception regarding the issue of “otherness” in our findings. As our data shows, language plays an important role in the social media activities of the Indigenous population. We found several instances where language is an important technique for them to protect their identity from “others”. These findings can be connected to a rich body of work around colonialism and otherness. We build on the definition of “otherness” by the famous postcolonial scholar Edward Said [1], [151], who argues that a person’s knowledge is shaped by their own culture, which makes it difficult to comprehend the cultural phenomena that take place within a foreign culture. As documented in our findings, several participants reported their frustrations regarding the way the photos taken at different locations around the CHT are shared on social media, where the caption captures inappropriate or partial contexts. These photos and other artifacts are apparently “open” to outsiders for viewing, capturing, and posting on social media, and yet their meaning is closed by cultural interpretation, of which language is a very important part. At the same time, we saw several instances where social media was portrayed as a mediator of positive influence by our participants. This suggests that while the Indigenous community members are open to the idea of presenting their cultural artifacts on social media, they resist against the inaccurate contextual representation of those artifacts. We propose implementing an AI-based system capable of automatically detecting the photos associated with the cultural artifacts of the Indigenous community, and if required, capable of providing suggestions for the caption that are contextually correct and more inclusive.

The politics of language and knowledge construction goes far beyond posting pictures on social media platforms. As can be seen from our findings, these community members self-identify themselves as “adivasi”, which is distinct from their official identity of “minority ethnic group”, as recognized by the Bangladesh government [190], [195]. Our participants use social media both to resist against this external labeling and to promote their own identity. The responses from our participants demonstrate that in doing so, they face repercussions both in virtual and real lives. Technology in general, and social media in particular, acts as an amplifier in this regard, where in many cases, situations escalate due to the arguments originated, or the contents posted on social media. Thus, the role of technology as an amplifier is reflected in our findings.

5.4 Privacy and Social Ciphering

Prior work with the marginalized and Indigenous community members in Bangladesh has demonstrated how these populations utilize social stenography or social cipher-

ing to exchange sensitive and confidential information between them in the presence of others [94]. In that work, the researchers documented how the beauty parlor workers in the capital city of Dhaka – those who come from diverse ethnic backgrounds – use their native languages when working in the presence of the clients to offer constructive feedback to each other on the fly without unnecessarily worrying their clients. Social ciphering is used in many other social and professional contexts, as reported in that study. Our work further augments this finding and reveals that in many cases, social ciphering is essential for the survival of these marginalized communities. This language-based ciphering can easily be beaten by an adversary through translators but to the best of our knowledge, there is no available online translator including Google Translator for the Indigenous languages in Bangladesh. Notably, our participants described that they use specially designed phonetic keyboards and websites to exchange sensitive and confidential information with their peers. In fact, there is a dedicated project on GitHub [184] related to designing different types of keyboards for Indigenous communities. We believe that the HCI community can intervene in this regard by applying the mechanisms of adversarial design as proposed by DiSalvo [57]. Our work therefore joins the growing body of HCI literature in the Global South regarding privacy protection mechanisms of the marginalized communities [94], [124], [170].

5.4.1 Indigenous experiences in the Era of Social Media

Beyond these lessons, our work contributes significantly to Indigenous HCI [96] by bringing to the fore the dual role of social media. From our data, it can be seen how social media creates a positive impact, ranging from preserving cultural artifacts to offering a lifeline for these marginalized communities. However, these effects exist alongside broader concerns such as ‘gentrification’ and the ‘commodification of culture’, as described by Sajib et al. [141], and the ‘colonial dynamics’ discussed by Alvarado et al. [113]. Our participants expressed concerns over how their cultural and religious practices, as well as daily lifestyles, are misunderstood or criticized online, reflecting themes of ‘microaggressions’ outlined in Guerrero et al. [134]. Gender inequality further compounds these challenges as our findings reveal that Indigenous women face significant hurdles, even in simple online interactions such as posting pictures with Bengali friends. These restrictions connect feminist HCI with Indigenous HCI, emphasizing the need to mitigate ‘gendered constraints’ while promoting safe and equitable online spaces.

By analyzing these interwoven themes of culture, identity, gender, and privacy, our study contributes to Indigenous HCI and advocates for design interventions that address both the systemic challenges and cultural aspirations of these communities. These insights pave the way for inclusive and culturally sensitive technologies that not only empower Indigenous populations but also safeguard their unique identities in the era of social media.

5.5 Bridging Quantitative Insights with Lived Realities

Our quantitative findings offer a complementary perspective to the lived experiences captured through interviews and group discussions. The multimodal fake news detection model, trained on the Fakeddit dataset, achieved high accuracy in identifying manipulated content (F1-score 0.86). This aligns with the qualitative reports from our participants, who frequently described facing harm through misrepresented thumbnails, misleading videos, and decontextualized portrayals on platforms like Facebook and YouTube.

However, the model performed poorly in detecting more subtle categories like imposter content (F1-score 0.42), indicating its limitations in capturing context-dependent misinformation. The Critical Race Theory suggests that technology is not neutral; rather, it often reproduces the systemic inequalities embedded in society [106]. In this light, the shortcomings of our model are not just technical but structural, reflecting the absence of Indigenous perspectives in dataset construction and algorithm design.

Citizenship, viewed through a postcolonial lens, is more than legal status, it is also a struggle for recognition, belonging, and narrative control [59]. For Indigenous communities in CHT, online misrepresentation is not an isolated digital issue but a continuation of their marginalization in broader state and societal structures. The failure of algorithms to identify or counter harmful narratives becomes part of this extended erasure.

Haque et al. have shown that in Bangladesh, misinformation spreads rapidly due to a lack of localized moderation, culturally sensitive detection systems, and grassroots engagement [103]. Our findings echo this: despite their strong online presence, Indigenous users remain vulnerable to misclassification, stereotyping, and harm — issues that quantitative tools alone cannot fully resolve without cultural grounding. Therefore, we advocate for the co-creation of detection systems with Indigenous stakeholders, incorporation of culturally nuanced data, and interdisciplinary collaboration across HCI and ML. Only then can algorithmic systems evolve from passive classifiers to active protectors of marginalized voices.

Chapter 6

Conclusion

This study has highlighted the advantages and disadvantages of digitalization for the indigenous Jumma community in Bangladesh, offering insightful information about the complicated relationship between social media and their way of life. Our research underscores the unique vulnerabilities indigenous groups face in cyberspace, which are made worse by their social marginalization. Adopting social media platforms has facilitated communication, new economic opportunities, and access to resources for these communities. However, it has also been observed that they are more vulnerable to grave risks posed by misinformation, cyberbullying, and the deterioration of cultural norms. By focusing on the Jumma people of the CHT, we have addressed a gap in the HCI literature, specifically concerning indigenous communities in the Global South, concentrating on the Jumma people of the CHT.

In conclusion, this research contributes to the growing discourse on indigenous HCI, HCI4D, and ICTD, emphasizing the importance of culturally informed and inclusive approaches to technology design. Future studies can highlight specific needs and challenges concerning indigenous communities, as digital technologies continue to permeate the lives of marginalized communities. It will make sure their digital environments are empowering, safe, and respectful of their cultural heritage.

Bibliography

- [1] E. W. Said, "Orientalism," *The Georgia Review*, vol. 31, no. 1, pp. 162–206, 1977.
- [2] S. A.-a. Ahsan and B. Chakma, "Problems of national integration in bangladesh: The chittagong hill tracts," *Asian Survey*, vol. 29, no. 10, pp. 959–970, 1989.
- [3] H. Hannum, "Minorities, indigenous peoples, and self-determination," *Stud. Transnat'l Legal Pol'y*, vol. 26, p. 1, 1994.
- [4] R. Boyatzis, *Transforming qualitative information: Thematic analysis and code development*. Sage, 1998.
- [5] L. Karim, "Pushed to the margins: Adivasi peoples in bangladesh and the case of kalpana chakma," *Contemporary South Asia*, vol. 7, no. 3, pp. 301–316, 1998.
- [6] J. Stevenson, "The circle of healing," 1999.
- [7] C. L. Heilbron and M. A. J. Guttman, "Traditional healing methods with first nations women in group counselling," *Canadian Journal of Counselling and Psychotherapy*, vol. 34, no. 1, 2000.
- [8] R. C. K. Roy, *Land rights of the indigenous peoples of the Chittagong Hill Tracts, Bangladesh*, 99. Iwgia, 2000.
- [9] W. Van Schendel, W. Mey, A. K. Dewan, *et al.*, *The Chittagong Hill Tracts: living in a borderland*. White Lotus Bangkok, 2000.
- [10] B. Bimber, "Information and political engagement in america: The search for effects of information technology at the individual level," *Political research quarterly*, vol. 54, no. 1, pp. 53–67, 2001.
- [11] S. Graham and J. Juvonen, "Ethnicity, peer harassment, and adjustment in middle school: An exploratory study," *The journal of early adolescence*, vol. 22, no. 2, pp. 173–199, 2002.
- [12] S. Sassen, "Towards a sociology of information technology," *Current Sociology*, vol. 50, no. 3, pp. 365–388, 2002.
- [13] K. Singh and A. S. of India, *People of India*, ser. People of India v. 1. Oxford University Press, 2002. [Online]. Available: <https://books.google.com.bd/books?id=vD3k0AEACAAJ>.
- [14] B. Bimber, *Information and american democracy: Technology in the evolution of political power*. Cambridge University Press, 2003.
- [15] A. Halavais and M. Garrido, "Mapping networks of support for the zapatista movement," *Cyberactivism: Online activism in theory and practice*. London: Routledge, pp. 165–184, 2003.

- [16] A. Mohsin, *The Chittagong Hill Tracts, Bangladesh: on the difficult road to peace*. Lynne Rienner Publishers, 2003.
- [17] C. A. Wong, J. S. Eccles, and A. Sameroff, "The influence of ethnic discrimination and ethnic identification on african american adolescents' school and socioemotional adjustment," *Journal of personality*, vol. 71, no. 6, pp. 1197–1232, 2003.
- [18] B. Mehra, C. Merkel, and A. P. Bishop, "The internet for empowerment of minority and marginalized users," *New media & society*, vol. 6, no. 6, pp. 781–802, 2004.
- [19] G. Rasul, G. B. Thapa, and M. A. Zoebisch, "Determinants of land-use changes in the chittagong hill tracts of bangladesh," *Applied geography*, vol. 24, no. 3, pp. 217–240, 2004.
- [20] Pew Research Center, *Chapter 8: Computers and technology*, Accessed: 2024-08-17, 2007. [Online]. Available: <https://www.pewresearch.org/global/2007/10/04/chapter-8-computers-and-technology/>.
- [21] R. I. Bangladesh and H. F. Society, *Khumi lives*, <https://www.archaeologychannel.org/video-guide-summary/264-khumi-lives>, [Online; accessed 11-Sept-2024], 2008.
- [22] A. Barkat, A. Poddar, M. Badiuzzaman, and A. Osman, "Situation analysis of chittagong hill tracts in bangladesh," *Human Development Research Centre*. Available from: <https://www.yumpu.com/en/document/read/6325639/situation-analysis-of-chittagong-hill-tracts-inbangladesh>, 2008.
- [23] B. G. Gunter, A. Rahman, and A. Rahman, "How vulnerable are bangladesh's indigenous people to climate change?" *Bangladesh Development Research Center (BDRC)*, 2008.
- [24] S. Qureshi and T. Trumbly-Lamsam, "Transcending the digital divide: A framing analysis of information and communication technologies news in native american tribal newspapers," in *Proceedings of the 41st Annual Hawaii International Conference on System Sciences (HICSS 2008)*, IEEE, 2008, pp. 124–124.
- [25] T. R. Coker, M. N. Elliott, D. E. Kanouse, J. A. Grunbaum, D. C. Schwebel, M. J. Gilliland, S. R. Tortolero, M. F. Peskin, and M. A. Schuster, "Perceived racial/ethnic discrimination among fifth-grade students and its association with mental health," *American journal of public health*, vol. 99, no. 5, pp. 878–884, 2009.
- [26] U. Dhaka, *Socio-economic baseline survey of chittagong hill tracts*, 2009.
- [27] M. R. Ho, T. N. Smyth, M. Kam, and A. Dearden, "Human-computer interaction for development: The past, present, and future," *Information Technologies & International Development*, vol. 5, no. 4, pp–1, 2009.
- [28] S. R. Belmain, N. Chakma, N. J. Sarker, S. U. Sarker, S. K. Sarker, and N. Q. Kamal, "The chittagong story: Studies on the ecology of rat floods and bamboo masting," *Rodent outbreaks: ecology and impacts*, p. 49, 2010.
- [29] D. Boyd, "Social network sites as networked publics: Affordances, dynamics, and implications," in *A networked self*, Routledge, 2010, pp. 47–66.

- [30] M. A. Hossain, “Indigenous technology for adapting to water logging situation for sustainable livelihood security in low lying areas of bangladesh,” 2010.
- [31] I. King, “Introduction to social computing,” in *Database Systems for Advanced Applications: 15th International Conference, DASFAA 2010, Tsukuba, Japan, April 1-4, 2010, Proceedings, Part II 15*, Springer, 2010, pp. 482–484.
- [32] I. Kral, “Plugged in: Remote australian indigenous youth and digital culture,” 2010.
- [33] B. Lumby, “Cyber-indigeneity: Urban indigenous identity on facebook,” *The Australian Journal of Indigenous Education*, vol. 39, no. S1, pp. 68–75, 2010.
- [34] I. Kral, “Youth media as cultural practice: Remote indigenous youth speaking out loud,” *Australian Aboriginal Studies*, no. 1, pp. 4–16, 2011.
- [35] Y. Wang, G. Norcie, S. Komanduri, A. Acquisti, P. G. Leon, and L. F. Cranor, ““ i regretted the minute i pressed share” a qualitative study of regrets on facebook,” in *Proceedings of the seventh symposium on usable privacy and security*, 2011, pp. 1–16.
- [36] M. J. Foundation, *Khumi indigenous people of chittagong hill tracts*, <https://www.youtube.com/watch?v=NwEj0aOKaGo>, [Online; accessed 11-Sept-2024], 2012.
- [37] —, *Khyang indigenous people of chittagong hill tracts*, <https://www.youtube.com/watch?v=MSB0yg0nyC4>, [Online; accessed 11-Sept-2024], 2012.
- [38] —, *Mro indigenous people of chittagong hill tracts*, <https://www.youtube.com/watch?v=g2y6ljR3QYY>, [Online; accessed 11-Sept-2024], 2012.
- [39] A. Krizhevsky, I. Sutskever, and G. E. Hinton, “Imagenet classification with deep convolutional neural networks,” *Advances in neural information processing systems*, vol. 25, 2012.
- [40] N. Muhammed, M. Hossain, S. Chakma, F. H. Masum, R. von Detten, and G. Oesten, “Conflict and corollaries on forest and indigenous people: Experience from bangladesh,” *Sustainable Forest Management—Case Studies*, 2012.
- [41] H. S. Ahmed, “Politics of restraint: The media and the chittagong hill tracts,” *Bangladesh’s Changing Mediascape: From State Control to Market Forces, Bristol: Intellect*, pp. 297–312, 2013.
- [42] V. Godinho and S. Singh, “Technology enabled financial inclusion and evidence-based policy for the underbanked: A study of remote indigenous australia,” in *CPRsouth8/CPRAfrica2013 conference*, 2013.
- [43] J. D. L. Healy, “Yolngu zorba meets superman. australian aboriginal people, mediated publicness and the culture of sharing on the internet,” *Anthrovision. Vaneasa Online Journal*, no. 1.1, 2013.
- [44] A. Landry, “Indian country left on far side of digital dive,” *Navajo Times*, 2013.
- [45] L. Reitsma, A. Smith, and E. Van Den Hoven, “Storybeads: Preserving indigenous knowledge through tangible interaction design,” in *2013 International conference on culture and computing*, IEEE, 2013, pp. 79–85.

- [46] C. Sandvig, “Connection at ewiaapaayp mountain: Indigenous internet infrastructure,” in *Race after the Internet*, Routledge, 2013, pp. 168–200.
- [47] K. Chow, *How “ching chong” became the go-to slur for mocking east asians*, Jul. 2014. [Online]. Available: <https://www.npr.org/sections/codeswitch/2014/07/14/330769890/how-ching-chong-became-the-go-to-slur-for-mocking-east-asians>.
- [48] R. Chowdhury, “‘adivasi’ denialism in bangladesh,” *Dhaka Tribune*, Aug. 2014. [Online]. Available: <https://www.dhakatribune.com/bangladesh/laws-rights/75930/%E2%80%98adivasi%E2%80%99-denialism-in-bangladesh>.
- [49] M. D. Clark, “To tweet our own cause: A mixed-methods study of the online phenomenon” black twitter”,” Ph.D. dissertation, The University of North Carolina at Chapel Hill, 2014.
- [50] J. Corbin and A. Strauss, *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage publications, 2014, pp. 101–121.
- [51] B. M. Dhamai, “An overview of indigenous peoples in bangladesh,” *Survival under threat: Human rights situation of indigenous peoples in Bangladesh*, pp. 10–26, 2014.
- [52] D. B. Edingo, “Re-evaluation of nepali media, social networking spaces, and democratic practices in media,” in *Digital Arts and Entertainment: Concepts, Methodologies, Tools, and Applications*, IGI Global, 2014, pp. 287–304.
- [53] A. John, “Rodent outbreaks and rice pre-harvest losses in southeast asia,” *Food Security*, vol. 6, pp. 249–260, 2014.
- [54] T. Vongvisouk, O. Mertz, S. Thongmanivong, A. Heinemann, and K. Phanvilay, “Shifting cultivation stability and change: Contrasting pathways of land use and livelihood change in laos,” *Applied geography*, vol. 46, pp. 1–10, 2014.
- [55] K. Awori, F. Vetere, and W. Smith, “Transnationalism, indigenous knowledge and technology: Insights from the kenyan diaspora,” in *Proceedings of the 33rd annual ACM conference on human factors in computing systems*, 2015, pp. 3759–3768.
- [56] S. Chess and A. Shaw, “A conspiracy of fishes, or, how we learned to stop worrying about# gamergate and embrace hegemonic masculinity,” *Journal of Broadcasting & Electronic Media*, vol. 59, no. 1, pp. 208–220, 2015.
- [57] C. DiSalvo, *Adversarial design*. Mit Press, 2015.
- [58] H. Fang, S. Gupta, F. Iandola, R. K. Srivastava, L. Deng, P. Dollár, J. Gao, X. He, M. Mitchell, J. C. Platt, *et al.*, “From captions to visual concepts and back,” in *Proceedings of the IEEE conference on computer vision and pattern recognition*, 2015, pp. 1473–1482.
- [59] E. F. Isin, *Citizenship after Orientalism: An Unfinished Project*. Routledge, Oct. 2015.
- [60] T. T. Keegan, P. Mato, and S. Ruru, “Using twitter in an indigenous language: An analysis of te reo māori tweets,” *AlterNative: An International Journal of Indigenous Peoples*, vol. 11, no. 1, pp. 59–75, 2015.

- [61] S. K. Khisa and M. Mohiuddin, “Shrinking jum and changing livelihoods in the chittagong hill tracts of bangladesh,” *Shifting cultivation, livelihood and food security*, vol. 41, 2015.
- [62] O. Vinyals, A. Toshev, S. Bengio, and D. Erhan, “Show and tell: A neural image caption generator,” in *Proceedings of the IEEE conference on computer vision and pattern recognition*, 2015, pp. 3156–3164.
- [63] J. Waitoa, R. Scheyvens, and T. R. Warren, “E-whanaungatanga: The role of social media in māori political empowerment,” *AlterNative: An International Journal of Indigenous Peoples*, vol. 11, no. 1, pp. 45–58, 2015.
- [64] K. He, X. Zhang, S. Ren, and J. Sun, “Deep residual learning for image recognition,” in *Proceedings of the IEEE conference on computer vision and pattern recognition*, 2016, pp. 770–778.
- [65] A. J. Nath, B. Brahma, R. Lal, and A. K. Das, “Soil and jhum cultivation,” *Encyclopedia of Soil Science*, pp. 1–9, 2016.
- [66] J. Osafo, “Seeking paths for collaboration between religious leaders and mental health professionals in ghana,” *Pastoral Psychology*, vol. 65, pp. 493–508, 2016.
- [67] E. S. Rice, E. Haynes, P. Royce, and S. C. Thompson, “Social media and digital technology use among indigenous young people in australia: A literature review,” *International journal for equity in health*, vol. 15, pp. 1–16, 2016.
- [68] S. Bhattacharjee, “From animism to structured beliefs: Socio-cultural changes in lushai hills with the advent of christianity and british administration in the region,” *International Journal of Innovative Research and Advanced Studies (IJRAS)*, vol. 4, no. 11, pp. 36–40, 2017.
- [69] D. Chatzakou, N. Kourtellis, J. Blackburn, E. De Cristofaro, G. Stringhini, and A. Vakali, “Hate is not binary: Studying abusive behavior of# gamergate on twitter,” in *Proceedings of the 28th ACM conference on hypertext and social media*, 2017, pp. 65–74.
- [70] —, “Measuring# gamergate: A tale of hate, sexism, and bullying,” in *Proceedings of the 26th international conference on world wide web companion*, 2017, pp. 1285–1290.
- [71] J. T. Du, “Research on indigenous people and the role of information and communications technology in development: A review of the literature,” *Journal of the Australian library and information association*, vol. 66, no. 4, pp. 344–363, 2017.
- [72] M. Duarte, “Connected activism: Indigenous uses of social media for shaping political change,” 2017.
- [73] B. Glaser and A. Strauss, *Discovery of grounded theory: Strategies for qualitative research*. Routledge, 2017.
- [74] G. Hine, J. Onaolapo, E. De Cristofaro, N. Kourtellis, I. Leontiadis, R. Samaras, G. Stringhini, and J. Blackburn, “Kek, cucks, and god emperor trump: A measurement study of 4chan’s politically incorrect forum and its effects on the web,” in *Proceedings of the International AAAI Conference on Web and Social Media*, vol. 11, 2017, pp. 92–101.

- [75] M. Islam, M. Islam, and T. Islam, “Landslides in chittagong hill tracts and possible measures,” in *Proceedings of the international conference on disaster risk mitigation, Dhaka, Bangladesh*, vol. 23, 2017.
- [76] B. Lahiri, S. Anurag, J. Chauhan, A. K. Sangma, and S. M. Sangma, “Mobile phone use efficiency of garo tribal farmers in north-eastern himalayan region of india,” *Indian Res. J. Ext. Edu*, vol. 17, no. 1, pp. 24–31, 2017.
- [77] D. W. Louie, “Social media and the sexual exploitation of indigenous girls,” *Girlhood Studies*, vol. 10, no. 2, pp. 97–113, 2017.
- [78] Z. Nasreen, “The indigeneity question: State violence, forced displacement and women’s narratives in the chittagong hill tracts of bangladesh,” Ph.D. dissertation, Durham University, 2017.
- [79] N. Uddin and E. Gerharz, “The many faces of the state: Living in peace and conflict in the chittagong hill tracts, bangladesh,” *Conflict and Society*, vol. 3, no. 1, pp. 208–226, 2017.
- [80] M. Vigil-Hayes, M. Duarte, N. D. Parkhurst, and E. Belding, “# indigenous: Tracking the connective actions of native american advocates on twitter,” in *Proceedings of the 2017 ACM conference on computer supported cooperative work and social computing*, 2017, pp. 1387–1399.
- [81] J. Vitak, K. Chadha, L. Steiner, and Z. Ashktorab, “Identifying women’s experiences with and strategies for mitigating negative effects of online harassment,” in *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*, 2017, pp. 1231–1245.
- [82] E. Wildayana, D. Adriani, and M. E. Armanto, “Livelihoods, household income and indigenous technology in south sumatra wetlands,” *Sriwijaya Journal of Environment*, vol. 2, no. 1, pp. 24–29, 2017.
- [83] R. Broll, C. Dunlop, and C. V. Crooks, “Cyberbullying and internalizing difficulties among indigenous adolescents in canada: Beyond the effect of traditional bullying,” *Journal of Child & Adolescent Trauma*, vol. 11, pp. 71–79, 2018.
- [84] B. Carlson and R. Frazer, “Cyberbullying and indigenous australians: A review of the literature,” *Aboriginal Health and Medical Research Council of New South Wales and Macquarie University*, 2018.
- [85] M. Carrasco and A. Kerne, “Queer visibility: Supporting lgbt+ selective visibility on social media,” in *Proceedings of the 2018 CHI conference on human factors in computing systems*, 2018, pp. 1–12.
- [86] R. Chauhan, K. K. Ghanshala, and R. Joshi, “Convolutional neural network (cnn) for image detection and recognition,” in *2018 first international conference on secure cyber computing and communication (ICSCCC)*, IEEE, 2018, pp. 278–282.
- [87] J. Devlin, “Bert: Pre-training of deep bidirectional transformers for language understanding,” *arXiv preprint arXiv:1810.04805*, 2018.
- [88] P. Kinghorn, L. Zhang, and L. Shao, “A region-based image caption generator with refined descriptions,” *Neurocomputing*, vol. 272, pp. 416–424, 2018.

- [89] X. Mathieu, “The dynamics of ‘civilised’ sovereignty: Colonial frontiers and performative discourses of civilisation and savagery,” *International relations*, vol. 32, no. 4, pp. 468–487, 2018.
- [90] J. Sam, K. Wisener, N. Schuitemaker, and S. A. Jarvis-Selinger, “Aboriginal youth experiences with cyberbullying: A qualitative analysis of aboriginal e-mentoring bc,” *International Journal of Indigenous Health*, vol. 13, no. 1, pp. 5–19, 2018.
- [91] S. Sultana, F. Guimbretière, P. Sengers, and N. Dell, “Design within a patriarchal society: Opportunities and challenges in designing for rural women in bangladesh,” in *Proceedings of the 2018 CHI conference on human factors in computing systems*, 2018, pp. 1–13.
- [92] U. Bangladesh, *Many tracts one community unicef’s work in the chittagong hill tracts*, 2019. [Online]. Available: <https://www.unicef.org/bangladesh/media/2601/file/CHT%20report.pdf>.
- [93] T. L. Cross, C. Pewewardy, and A. T. Smith, “Restorative education, reconciliation, and healing: Indigenous perspectives on decolonizing leadership education,” *New Directions for Student Leadership*, vol. 2019, no. 163, pp. 101–115, 2019.
- [94] S. T. Haque, P. Saha, M. S. Rahman, and S. I. Ahmed, “Of ulti, ‘hajano’, and” matachetar otanetak datam” exploring local practices of exchanging confidential and sensitive information in urban bangladesh,” *Proceedings of the ACM on Human-Computer Interaction*, vol. 3, no. CSCW, pp. 1–22, 2019.
- [95] M. Jiang, Q. Huang, L. Zhang, X. Wang, P. Zhang, Z. Gan, J. Diesner, and J. Gao, “Tiger: Text-to-image grounding for image caption evaluation,” *arXiv preprint arXiv:1909.02050*, 2019.
- [96] C. Lawrence, T. W. Leong, M. Brereton, J. L. Taylor, N. Bidwell, and G. Wadley, “Indigenous hcl: Workshop at ozchi 2019, perth,” in *Proceedings of the 31st Australian conference on human-computer-interaction*, 2019, pp. 17–19.
- [97] K. Nakamura, S. Levy, and W. Y. Wang, “R/fakeddit: A new multimodal benchmark dataset for fine-grained fake news detection,” *arXiv preprint arXiv:1911.03854*, 2019.
- [98] F. Raifa and A.-M. Joy, “Indian traditional clothing,” Ph.D. dissertation, Sumy State University, 2019.
- [99] T. Rajeevan, S. Rajendrakumar, T. Senthilkumar, S. Udhaya Kumar, and P. Subramaniam, “Community development through sustainable technology—a proposed study with irula tribe of masinagudi and ebbanad villages of nilgiri district,” in *First International Conference on Sustainable Technologies for Computational Intelligence: Proceedings of ICTSCI 2019*, Springer, 2019, pp. 257–267.
- [100] A. Vashistha, A. Garg, R. Anderson, and A. A. Raza, “Threats, abuses, flirting, and blackmail: Gender inequity in social media voice forums,” in *Proceedings of the 2019 CHI conference on human factors in computing systems*, 2019, pp. 1–13.

- [101] N. AlDahoul, H. Abdul Karim, M. H. Lye Abdullah, M. F. Ahmad Fauzi, A. S. Ba Wazir, S. Mansor, and J. See, “Transfer detection of yolo to focus cnn’s attention on nude regions for adult content detection,” *Symmetry*, vol. 13, no. 1, p. 26, 2020.
- [102] K. Bhambani, T. Jain, and K. A. Sultanpure, “Real-time face mask and social distancing violation detection system using yolo,” in *2020 IEEE Bangalore Humanitarian Technology Conference (B-HTC)*, IEEE, 2020, pp. 1–6.
- [103] M. M. Haque, M. Yousuf, A. S. Alam, P. Saha, S. I. Ahmed, and N. Hassan, “Combating misinformation in bangladesh: Roles and responsibilities as perceived by journalists, fact-checkers, and users,” *Proceedings of the ACM on Human-Computer Interaction*, vol. 4, no. CSCW2, pp. 1–32, 2020.
- [104] N. Jamshed, *Andharmanik, bandarban - neel jamshed*, en, Video, Dec. 2020. [Online]. Available: <https://youtu.be/t2QmdPoo7Wo?feature=shared>.
- [105] N. Kuhn, S. Sarkar, L. A. White, J. Hoy, C. McCray, and C. Lefthand-Begay, “Decolonizing risk communication: Indigenous responses to covid-19 using social media,” *Journal of Indigenous Social Development*, vol. 9, no. 3, pp. 193–213, 2020.
- [106] I. F. Ogbonnaya-Ogburu, A. D. Smith, A. To, and K. Toyama, “Critical race theory for hci,” in *Proceedings of the 2020 CHI conference on human factors in computing systems*, 2020, pp. 1–16.
- [107] S. Phadke and T. Mitra, “Many faced hate: A cross platform study of content framing and information sharing by online hate groups,” in *Proceedings of the 2020 CHI conference on human factors in computing systems*, 2020, pp. 1–13.
- [108] A. M. Sadiq, H. Ahn, and Y. B. Choi, “Human sentiment and activity recognition in disaster situations using social media images based on deep learning,” *Sensors*, vol. 20, no. 24, p. 7115, 2020.
- [109] R. Tan, B. A. Plummer, and K. Saenko, “Detecting cross-modal inconsistency to defend against neural fake news,” *arXiv preprint arXiv:2009.07698*, 2020.
- [110] A. P. P. Thet and N. Tokuchi, “Traditional knowledge on shifting cultivation of local communities in bago mountains, myanmar,” *Journal of Forest Research*, vol. 25, no. 5, pp. 347–353, 2020.
- [111] H. Wang, Y. Zhang, and X. Yu, “An overview of image caption generation methods,” *Computational intelligence and neuroscience*, vol. 2020, no. 1, p. 3062706, 2020.
- [112] S. Zannettou, J. Finkelstein, B. Bradlyn, and J. Blackburn, “A quantitative approach to understanding online antisemitism,” in *Proceedings of the International AAAI conference on Web and Social Media*, vol. 14, 2020, pp. 786–797.
- [113] A. Alvarado Garcia, J. F. Maestre, M. Barcham, M. Iriarte, M. Wong-Villacres, O. A. Lemus, P. Dudani, P. Reynolds-Cuéllar, R. Wang, and T. Cerratto Pargman, “Decolonial pathways: Our manifesto for a decolonizing agenda in hci research and design,” in *Extended abstracts of the 2021 CHI conference on human factors in computing systems*, 2021, pp. 1–9.

- [114] Banglapedia, en, 2021. [Online]. Available: https://en.banglapedia.org/index.php/Chak,_The.
- [115] ———, *Lushei*, https://en.banglapedia.org/index.php/Lushei,_The, [Online; accessed 7-Sept-2024], 2021.
- [116] ———, *Tanchangya*, https://en.banglapedia.org/index.php/Tanchangya,_The, [Online; accessed 11-Sept-2024], 2021.
- [117] M. Begay, M. Kakol, A. Sood, and D. Upson, “Strengthening digital health technology capacity in navajo communities to help counter the covid-19 pandemic,” *Annals of the American Thoracic Society*, vol. 18, no. 7, pp. 1109–1114, 2021.
- [118] B. Carlson and R. Frazer, “Attending to difference in indigenous people’s experiences of cyberbullying: Toward a research agenda,” *The Emerald international handbook of technology-facilitated violence and abuse*, pp. 145–163, 2021.
- [119] A. Diaz Andrade, A. A. Techatassanasoontorn, H. Singh, and N. Staniland, “Indigenous cultural re-presentation and re-affirmation: The case of māori it professionals,” *Information Systems Journal*, vol. 31, no. 6, pp. 803–837, 2021.
- [120] A. Ediringhe and I. Munasinghe, “Preserving the trails: An analysis of the right of indigenous communities in sri lanka towards the environment,” *KDU LJ*, vol. 1, p. 73, 2021.
- [121] Z. Faiaz, “Attacks, land grabs leave bangladesh’s indigenous groups on edge,” *Al Jazeera*, 2021. [Online]. Available: <https://www.aljazeera.com/news/2021/7/30/bangladesh-indigenous-groups-chakma-khasi-santal-land-grab>.
- [122] V. Gong, W. Daamen, A. Bozzon, and S. Hoogendoorn, “Counting people in the crowd using social media images for crowd management in city events,” *Transportation*, vol. 48, no. 6, pp. 3085–3119, 2021.
- [123] M. N. Haque, A. Baroi, J. Gomes, A. Toppo, R. S. Das, and M. K. Hossain, “Effects of climate change and analyzing the indigenous practices for adaptation to climate change impacts in chittagong hill tracts (cht) of bangladesh,” *Asian Journal of Science and Technology*, vol. 12, no. 10, pp. 11 856–11 864, 2021.
- [124] S. M. T. Haque, R. Rashed, M. Bin Morshed, M. M. U. Rony, N. Hassan, and S. I. Ahmed, “Exploring the tensions between the owners and the drivers of uber cars in urban bangladesh,” *Proc. ACM Hum.-Comput. Interact.*, vol. 5, no. CSCW1, Apr. 2021. DOI: 10.1145/3449244. [Online]. Available: <https://doi.org/10.1145/3449244>.
- [125] C. Houkamau, N. Satherley, S. Stronge, R. Wolfgramm, K. Dell, J. Mika, J. Newth, and C. G. Sibley, “Cyberbullying toward māori is rife in new zealand: Incidences and demographic differences in experiences of cyberbullying among māori,” *Cyberpsychology, Behavior, and Social Networking*, vol. 24, no. 12, pp. 822–830, 2021.
- [126] S. Linxen, C. Sturm, F. Brühlmann, V. Cassau, K. Opwis, and K. Reinecke, “How weird is chi?” In *Proceedings of the 2021 CHI conference on human factors in computing systems*, 2021, pp. 1–14.

- [127] R. Rahman, “Conflict among indigenous communities and settler bengali community of chittagong hill tracts: Is there a way to peace,” *Asian J. Soc. Sci. Leg. Stud.*, vol. 3, no. 2, pp. 35–40, 2021.
- [128] S. Sultana, I. Mandel, S. Hasan, S. R. Alam, K. R. Mahmud, Z. Sultana, and S. I. Ahmed, “Opaque obstacles: The role of stigma, rumor, and superstition in limiting women’s access to computing in rural bangladesh,” in *Proceedings of the 4th ACM SIGCAS Conference on Computing and Sustainable Societies*, 2021, pp. 243–260.
- [129] K. Thomas, D. Akhawe, M. Bailey, D. Boneh, E. Bursztein, S. Consolvo, N. Dell, Z. Durumeric, P. G. Kelley, D. Kumar, *et al.*, “Sok: Hate, harassment, and the changing landscape of online abuse,” in *2021 IEEE Symposium on Security and Privacy (SP)*, IEEE, 2021, pp. 247–267.
- [130] X. Xiao, B. Tan, C. Leong, and F. T. C. Tan, “Powered by “qinghuai”: The melding of traditional values and digital entrepreneurship in contemporary china,” *Information Systems Journal*, vol. 31, no. 6, pp. 769–802, 2021.
- [131] A. Baez-Velazquez, A. Hernandez-Suarez, G. Sanchez-Perez, K. Toscano-Medina, J. Portillo-Portillo, J. Olivares-Mercado, and H.-M. P. Meana, “Methodology for weapon detection in social media profiles using an adaptation of yolo-v5 and natural language processing techniques,” in *2022 IEEE International Autumn Meeting on Power, Electronics and Computing (ROPEC)*, IEEE, vol. 6, 2022, pp. 1–7.
- [132] N. Docherty and A. J. Biega, “(re) politicizing digital well-being: Beyond user engagements,” in *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems*, 2022, pp. 1–13.
- [133] C. Geeng, M. Harris, E. Redmiles, and F. Roesner, “” like lesbians walking the perimeter”: Experiences of {us}. {lgbtq+} folks with online security, safety, and privacy advice,” in *31st USENIX Security Symposium (USENIX Security 22)*, 2022, pp. 305–322.
- [134] J. Guerrero, P. J. Catibag, A. F. Casauay, F. Esteban, F. Salazar, J. A. Aquino, R. Turqueza, R. Erece, P. Ramos, and G. Cabansag, “A review on the microaggressions on the internet: A framework to a discrimination-free cyberspace,” *International Journal of Arts, Sciences and Education*, vol. 3, no. 1, pp. 34–45, 2022.
- [135] N. Hasan, Y. Bao, and S. J. Miah, “Exploring the impact of ict usage among indigenous people and their quality of life: Operationalizing sen’s capability approach,” *Information Technology for Development*, vol. 28, no. 2, pp. 230–250, 2022.
- [136] M. Huang, S. Jia, M.-C. Chang, and S. Lyu, “Text-image de-contextualization detection using vision-language models,” in *ICASSP 2022-2022 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, IEEE, 2022, pp. 8967–8971.
- [137] L. Kotut and D. S. McCrickard, “Winds of change: Seeking, preserving, and retelling indigenous knowledge through self-organized online communities,” in *Proceedings of the 2022 CHI conference on human factors in computing systems*, 2022, pp. 1–15.

- [138] P. Pandiyan, R. Thangaraj, M. Subramanian, R. Rahul, M. Nishanth, and I. Palanisamy, “Real-time monitoring of social distancing with person marking and tracking system using yolo v3 model,” *International Journal of Sensor Networks*, vol. 38, no. 3, pp. 154–165, 2022.
- [139] J. Paul, R. J. McQuaid, C. Hopkins, A. Perri, S. Stewart, K. Matheson, H. Anisman, and A. Bombay, “Relations between bullying and distress among youth living in first nations communities: Assessing direct and moderating effects of culture-related variables,” *Transcultural Psychiatry*, p. 13 634 615 221 109 359, 2022.
- [140] R. J. Rony, A. Sinha, S. Amir, S. S. Khan, A. Saha, I. A. Abeer, and N. Ahmed, ““i use youtube now in covid”: Understanding technology adoption of indigenous communities during covid-19 pandemic in bangladesh,” in *Proceedings of the 5th ACM SIGCAS/SIGCHI Conference on Computing and Sustainable Societies*, 2022, pp. 596–602.
- [141] S. S. a. Sajib, “Nicknaming tourism as development: Commercialization of culture and nature in cht, bangladesh,” *Journal of Tourism and Cultural Change*, vol. 20, no. 1-2, pp. 273–285, 2022.
- [142] J.-P. Stone, *Battered hills: The struggle of bangladesh’s indigenous jumma tribes*, 2022. [Online]. Available: <https://theowp.org/reports/battered-hills-the-struggle-of-bangladeshs-indigenous-jumma-tribes/>.
- [143] Alex, *Exploring the rich tradition of traditional clothing in bangladesh*, en-US, Nov. 2023. [Online]. Available: <https://www.chiamhuiy.com/traditional-clothing-in-bangladesh/>.
- [144] F. Ara and M. M. R. Khan, “The chittagong hill tracts peace accord: Promises and performances,” in *Migration, Regional Autonomy, and Conflicts in Eastern South Asia: Searching for a Home (land)*, Springer, 2023, pp. 293–317.
- [145] S. S. Bhaduria, “Empowerment of tribal community through technology: In perspective of time,” *International Journal of Society and Education*, vol. 2, no. 1, pp. 1–9, 2023.
- [146] Boichitro, *A social media post showing hallong*, en, Apr. 2023. [Online]. Available: <https://www.facebook.com/share/1B7pfbyLk7/>.
- [147] D. N. N. Dissanayaka and M. He, “Exploring impact of “dambana radio” as an indigenous community radio in sri lanka,” *Advances in Journalism and Communication*, vol. 11, no. 3, pp. 247–262, 2023.
- [148] E. Goffman, “The presentation of self in everyday life,” in *Social theory re-wired*, Routledge, 2023, pp. 450–459.
- [149] N. H, “bangladesh has no indigenous people” — *jamhoor*, en-US, Feb. 2023. [Online]. Available: <https://www.jamhoor.org/read/bangladesh-has-no-indigenous-people>.
- [150] D. Sabie, H. Sheta, H. S. Ferdous, V. Kopalakrishnan, and S. I. Ahmed, “Be our guest: Intercultural heritage exchange through augmented reality (ar),” in *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, ser. CHI ’23, Hamburg, Germany: Association for Computing Machinery, 2023, ISBN: 9781450394215. DOI: 10.1145/3544548.3581005. [Online]. Available: <https://doi.org/10.1145/3544548.3581005>.

- [151] E. W. Said, “Orientalism,” in *Social theory re-wired*, Routledge, 2023, pp. 362–374.
- [152] A. A. Saloom, “Ask ali: Why pork is forbidden for muslims,” en, *The National*, May 2023. [Online]. Available: <https://www.thenationalnews.com/arts/ask-ali-why-pork-is-forbidden-for-muslims-1.444442>.
- [153] World Bank, *Indigenous peoples*, Accessed: 2024-08-24, 2023. [Online]. Available: <https://www.worldbank.org/en/topic/indigenouspeoples>.
- [154] S. Alam, “In bangladesh, protests are no longer about the quota system,” en, *Al Jazeera*, Jul. 2024. [Online]. Available: <https://aje.io/56dosn>.
- [155] A. Arunasalam, H. Farrukh, E. Tekcan, and Z. B. Celik, “Understanding the security and privacy implications of online toxic content on refugees,” in *USENIX Security Symposium*, 2024.
- [156] Central Intelligence Agency, *Bangladesh - the world factbook*, Accessed: 2024-08-16, 2024. [Online]. Available: <https://www.cia.gov/the-world-factbook/countries/bangladesh/>.
- [157] A. Chughtai and M. Ali, “How bangladesh’s ‘gen z’ protests brought down pm sheikh hasina,” en, *Al Jazeera*, Aug. 2024. [Online]. Available: <https://www.aljazeera.com/news/longform/2024/8/7/how-bangladeshs-gen-z-protests-brought-down-pm-sheikh-hasina>.
- [158] M. M. Eshita, I. B. Rofi, S. A. Shiba, and S. T. Haque, “A first look into the profile lock feature on facebook,” *20th Symposium On Usable Privacy And Security*, 2024.
- [159] C. Guerrero Millan, B. Nissen, and L. Pschetz, “Cosmovision of data: An indigenous approach to technologies for self-determination,” in *Proceedings of the CHI Conference on Human Factors in Computing Systems*, 2024, pp. 1–13.
- [160] L. G. Guntrum, “Keyboard fighters: The use of icts by activists in times of military coup in myanmar,” in *Proceedings of the CHI Conference on Human Factors in Computing Systems*, 2024, pp. 1–19.
- [161] M. A. Hedderich, N. N. Bazarova, W. Zou, R. Shim, X. Ma, and Q. Yang, “A piece of theatre: Investigating how teachers design llm chatbots to assist adolescent cyberbullying education,” in *Proceedings of the CHI Conference on Human Factors in Computing Systems*, 2024, pp. 1–17.
- [162] International Republican Institute, *The challenges facing plainland ethnic groups in bangladesh: Land*, 2024. [Online]. Available: <https://www.iri.org/resources/new-bangladesh-report-examines-needs-of-plainland-ethnic-groups/>.
- [163] A. Jazeera, “Bangladesh job quota protesters call for nationwide shutdown,” en, *Al Jazeera*, Jul. 2024. [Online]. Available: <https://aje.io/i4f7ef>.
- [164] K. Noe and N. Kirshenbaum, “Where generalized equitable design practice meet specific indigenous communities,” in *Proceedings of the CHI Conference on Human Factors in Computing Systems*, 2024, pp. 1–8.
- [165] J. A. R. O, *Vandalized graffiti*, en, Aug. 2024. [Online]. Available: <https://www.facebook.com/share/p/1ENbbrCK71/>.

- [166] Parbatya Chattagram Jana Samhati Samiti, *Kaptai dam*, 2024. [Online]. Available: <https://www.pcjss.org/kaptai-dam/>.
- [167] P. Partha, “Unresolved adivasi questions and state reforms,” en, *New Age*, Sep. 2024. [Online]. Available: <https://www.newagebd.net/post/new-age-specials/244983/unresolved-adivasi-questions-and-state-reforms>.
- [168] A. Rakib, *Andharmanik (part-1)*, en, Video, Jan. 2024. [Online]. Available: <https://youtu.be/HkQ8rCnpHdI?feature=shared>.
- [169] M. R. Rifat, R. Ayad, A. Z. Asha, B. Huang, S. Okman, D. Sabie, H. S. Ferdous, R. Soden, and S. I. Ahmed, “Cohabitant: The design, implementation, and evaluation of a virtual reality application for interfaith learning and empathy building,” in *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems*, ser. CHI ’24, Honolulu, HI, USA: Association for Computing Machinery, 2024, ISBN: 9798400703300. DOI: 10.1145/3613904.3642821. [Online]. Available: <https://doi.org/10.1145/3613904.3642821>.
- [170] P. Saha, N. Nowsher, A. U. Baidya, N. J. Mim, S. I. Ahmed, and S. M. T. Haque, “Computing and the stigmatized: Trust, surveillance, and spatial politics with the sex workers in bangladesh,” in *Proceedings of the CHI Conference on Human Factors in Computing Systems*, ser. CHI ’24, Honolulu, HI, USA: Association for Computing Machinery, 2024, ISBN: 9798400703300. DOI: 10.1145/3613904.3642005. [Online]. Available: <https://doi.org/10.1145/3613904.3642005>.
- [171] V. Sharma, C. T. Oyewale, E. S. Lazaro Vasquez, A. S. Wani, E. Sari, J. Longdon, L. Cabrera-Quiros, and P. Singh, “Sustainabilities and hcis from the souths,” in *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems*, 2024, pp. 1–5.
- [172] V. Sheanoda, K. Bussey, and T. Jones, “Sexuality, gender and culturally diverse interpretations of cyberbullying,” *new media & society*, vol. 26, no. 1, pp. 154–171, 2024.
- [173] B. B. of Statistics, *Population and housing census 2022*, Accessed: 2024-08-11, 2024. [Online]. Available: <https://bbs.gov.bd/site/page/47856ad0-7e1c-4aab-bd78-892733bc06eb/Population-and-Housing-Census>.
- [174] J. Taylor, E. Simpson, A.-T. Tran, J. R. Brubaker, S. E. Fox, and H. Zhu, “Cruising queer hci on the dl: A literature review of lgbtq+ people in hci,” in *Proceedings of the CHI Conference on Human Factors in Computing Systems*, ser. CHI ’24, Honolulu, HI, USA: Association for Computing Machinery, 2024, ISBN: 9798400703300. DOI: 10.1145/3613904.3642494. [Online]. Available: <https://doi.org/10.1145/3613904.3642494>.
- [175] World Bank Group, *Bangladesh - indigenous/tribal population and access to secondary schools (draft): Indigenous peoples plan*, Washington, D.C.: World Bank Group, 2024. [Online]. Available: <http://documents.worldbank.org/curated/en/627571467997887013/Indigenous-peoples-plan>.

- [176] I. B. Rofi, M. M. Eshita, A. Chakma, M. S. Ahmed, S. M. T. Haque, and J. Noor, “The good, the bad and the ugly: The opportunities, challenges and the mitigation strategies of the young indigenous social media users of the chittagong hill tracts in bangladesh,” in *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems*, ser. CHI ’25, Association for Computing Machinery, 2025, ISBN: 9798400713941. DOI: 10.1145/3706598.3713268. [Online]. Available: <https://doi.org/10.1145/3706598.3713268>.
- [177] G. Akash, *The mru: A hidden tribe of bangladesh*, <https://gmbakash.blog/2019/05/15/the-mru-a-hidden-tribe-of-bangladesh/>, [Online; accessed 7-Sept-2024].
- [178] I. Archive, *Thiam tah*, <https://archive.org/details/TheirOwnTraditionalCostumes>, [Online; accessed 7-Sept-2024].
- [179] B. Cultural Heritage Hub of Bangladesh (CHIB) Ministry of Cultural Affairs (MoCA), *Cultural heritage inventory of bangladesh (chib), cultural heritage hub of bangladesh (chib)*, en. [Online]. Available: <https://heritagehub.gov.bd/HeritageInfoes/Details/2051>.
- [180] I. bibinitperiod P. R. Department, *Gallery – chakma autonomous district council*, en-US. [Online]. Available: <https://www.cadc.gov.in/gallery/#bwg3/83>.
- [181] P. A. E. Desk, *Diarrhoea outbreak grips rangamati*. [Online]. Available: <https://en.prothomalo.com/bangladesh/local-news/diarrhoea-outbreak-grips-rangamati>.
- [182] T. I. Express, *Tripura’s traditional tribal attire ‘risa’ gets gi tag: Cm manik saha*, <https://indianexpress.com/article/india/tripura-traditional-attire-risa-gi-tag-manik-saha-9193575/>, [Online; accessed 11-Sept-2024].
- [183] Keyman, *Mro phonetic keyboard*, en. [Online]. Available: https://keymanweb.com/#mro,Keyboard_mro_phonetic.
- [184] Keymanapp, *Github - keymanapp/keyman: Keyman cross platform input methods system running on android, ios, linux, macos, windows and mobile and desktop web*, en. [Online]. Available: <https://github.com/keymanapp/keyman>.
- [185] S. Magazine, *Traditional attire of the mizo tribes*, <https://photocontest.smithsonianmag.com/photocontest/detail/traditional-attire-of-the-mizo-tribes/>, [Online; accessed 11-Sept-2024].
- [186] K. Misbahuzzaman, “Community-managed forest landscapes of the chittagong hill tracts: A model of a resilient rural livelihood system in bangladesh,”
- [187] U. Nations, *Indigenous peoples*, Accessed: 2024-08-24. [Online]. Available: <https://www.un.org/en/fight-racism/vulnerable-groups/indigenous-peoples>.
- [188] J. Project, *Pankhu, panko in bangladesh*, en. [Online]. Available: https://joshuaproject.net/people_groups/14300/BG.
- [189] United Nations Educational, Scientific and Cultural Organization (UNESCO), *Indigenous peoples*, Accessed: 2024-08-24. [Online]. Available: <https://www.unesco.org/en/indigenous-peoples>.

- [190] Aljazeera, “Bangladesh and the indigenous people,” *Aljazeera Centre For Public Liberties & Human Rights*, 2022-08-10. [Online]. Available: <https://liberties.aljazeera.com/en/bangladesh-and-the-indigenous-people/> (visited on 09/07/2024).
- [191] A. K. Chakma, “Who decides on whose identity?” *The Daily Star*, 2010-02-24T00:00. [Online]. Available: <https://www.thedailystar.net/news-detail-127591> (visited on 09/07/2024).
- [192] S. C. Chattogram, “Abducted student’s dismembered body recovered in chattogram,” *NEWAGE*, 2023-09-11T23:54. [Online]. Available: <https://www.newagebd.net/article/211950/abducted-students-dismembered-body-recovered-in-chattogram> (visited on 09/07/2024).
- [193] U. . Chattogram, “Two more accused in hridoy murder case arrested,” *The Business Post*, 2023-10-1T20:37:47. [Online]. Available: <https://businesspostbd.com/national/crime/two-more-accused-in-hridoy-murder-case-arrested> (visited on 09/07/2024).
- [194] S. Correspondent., “Land lease to lama rubber industries violates cht peace accord: Discussion,” *NEWAGE*, 2022-10-08T00:29. [Online]. Available: <https://www.newagebd.net/article/183130/land-lease-to-lama-rubber-industries-violates-cht-peace-accord-discussion> (visited on 09/07/2024).
- [195] U. . Dhaka, “Govt calls for avoiding word ‘adivasi’,” *Prothom Alo*, 2014-08-07T22:01. [Online]. Available: <https://en.prothomalo.com/bangladesh/Govt-calls-for-avoiding-word-%E2%80%98adivasi%E2%80%99> (visited on 09/07/2024).
- [196] K. Foundation, “Heinous attack and torching of indigenous mro houses by lama rubber industries in bandarban - kapaeeng foundation,” *Kapaeeng Foundation*, 2023-01-05. [Online]. Available: <https://kapaeengnet.org/heinous-attack-and-torching-of-indigenous-mro-houses-by-lama-rubber-industries-in-bandarban/> (visited on 09/07/2024).

6.1 Interview Guidelines

While the questions were asked, we asked them in Bengali, and they are here translated. We refrained from using anything that might hurt their cultural sentiment and feelings.

6.1.1 Basic Demographic Information

1. Which community are you from?
2. Where are you living now?
3. What is your current job?
4. Which social media platforms do you use?
5. From when did you start using social media?
6. How active are you on these platforms?
7. (Prompt if relevant) Do you comment or post on social media?
8. (Prompt if relevant) Are you active in your community-based pages/groups?

6.1.2 About Water Festival

1. In last year (2023), during the water festival a video went viral on Facebook where many people did vulgar comments about the cultural festival, have you seen that?
2. (Prompt if relevant) Can you share some comments or posts that caught your attention?
3. (Prompt if relevant) How did you feel about those comments?
4. (Prompt if relevant) Can you share any incident related to this that led to physical or online harassment with you ?
5. (Prompt if relevant) How do you take protective measure against this kind of harassment?
6. (Prompt if relevant) This year the place for annual Water Festival was changed, was that a defence mechanism?
7. (Prompt if relevant) As you faced some negative impacts due to observing your own traditional festivals, does it affects your spontaneous participation in any upcoming festivals?
8. (Prompt if relevant) As I know, the viral video was captured from an angle to make it more catchy. What do you think about that? Does it happen always here?

6.1.3 About the Raujan murder incident

1. Last year, in Raujan, a Bengali boy named Hridoy was killed by indigenous people, and there was a rumor that the boy's flesh was eaten by them. This incident shocked the entire internet, leading to harassment and bullying of indigenous people online. How did this incident affect you?
2. According to a Facebook post, an indigenous girl was spat on by a Bengali and taunted with the words "You people eat human flesh, you are not human." Have you experienced any similar incidents where you were physically bullied?
3. (Prompt if relevant) Do you think that social media played a role in this?
4. (Prompt if relevant) Did you take any protective measures to safeguard yourself?
5. Following the incident, many meme pages on Facebook posted various memes bullying the indigenous community. Did these memes affect you or your online presence?
6. Did the bullying and harassment have any negative impact on your workplace or educational institution?
7. Have you faced any embarrassing situations due to these online events related to the incident?
8. As we know, following the incident, many leading newspapers and news channels in Bangladesh published clickbait news and YouTube videos to gain more views, often distorting the real incident. Did this news affect your online or offline presence?

6.1.4 Quota issues

These questions were mainly asked to students who are studying in universities and have benefited from quota advantages.

1. This year, during the Bangladesh Medical Admission test, a Facebook post went viral comparing an indigenous student with a Bengali student. The post highlighted that the indigenous student was admitted to medical college due to the quota system, despite having lower marks than the Bengali student. This post led to numerous hateful comments against indigenous students. Did you encounter any of this negativity?
2. Have you ever been bullied by your faculty members or friends because of benefiting from the quota system?
3. (Prompt if relevant) Do you think that social media fueled this issue?
4. (Prompt if relevant) Did you take any preventive measures to help others understand the situation?
5. During the recent Quota Reform movement, did you face any challenges or inconveniences due to having a quota, even though the protest was not specifically against the 'Indigenous Quota'?

6.1.5 Yellow Journalism

1. In the previous Raujan incident, we discussed how leading news channels and newspapers used clickbait and fabricated stories to gain more views and readership. Can you share any other incidents where you experienced something similar?
2. Have you encountered anything like this on social media?
3. (Prompt if relevant) What were the consequences of this type of news?
4. I have noticed that in many social media vlogs, your culture is not accurately represented. What are your views on this?
5. In many posts, people highlight the fact that indigenous people consume alcohol and pork, which is not widely accepted in the majority of Bangladeshi culture. Have you faced any negative consequences due to this?
6. In many YouTube videos, indigenous people are misrepresented. For example, some thumbnails feature images of African tribes instead of Bangladeshi indigenous people. Have you come across this?
7. (Prompt if relevant) Do you think that this kind of misrepresentation has any negative impact on your reputation?
8. Do you take any preventative measures to counteract these misrepresentations and raise awareness?
9. (Prompt if relevant) Can you give us any examples?

6.1.6 Conservative about culture

1. From my personal experience, I have seen that the indigenous people are conservative about their culture both online and offline. Am I right?
2. (Prompt if relevant) Can you explain why are you conservative?
3. (Prompt if relevant) Does cyber bullying play any role in your online conservative mindset?
4. Do you feel free to post pictures of your own culture and dresses?
5. Do you feel free to post about your problems online?

6.1.7 Social Ciphering

1. Do you use your mother tongue (e.g., Chakma language) to post or comment on sensitive topics on Facebook?
2. (Prompt if relevant) Do you do this to keep the post unreadable for people outside your community?
3. (Prompt if relevant) When writing posts or comments, do you use your own script, or do you use English phonetic spelling?

4. (Prompt if relevant) Do you use any special software, keyboard, or website to write in your own script?
5. (Prompt if relevant) Can you show me an example of this?
6. Within your community, do you have any special dialect or code words, like using one word to refer to something else, to keep it encrypted from outsiders?
7. (Prompt if relevant) Can you give us an example of such words?

6.1.8 Positive Sides of Social Media

1. Do you think that social media is helpful in raising awareness among the general public about your culture and history?
2. Do you use social media to increase awareness about your culture and history?
3. (Prompt if relevant) Can you give me an example?
4. (Prompt if relevant) What kind of feedback do you receive? Does it help create awareness among the general population?
5. During the ‘Student Against Discrimination Movement’ in Bangladesh, many people became more interested in learning about your community and its history. Do you think social media is helping to spread awareness and positivity?
6. What are your suggestions? What can the government and the general public do to increase awareness?

6.2 Places and Locations Mentioned in the Paper

1. Keokradong/Kyaka krah tang
2. Nafakhum/Nahphah khung
3. Debotakhum/ Nai Morong Oing
4. Dim Pahar/ Kra U Makyak Tang

6.3 Basic Background Information of Jumma people of CHT

Table 6.1: General information about indigenous communities in CHT. (*TB = Tibeto-Burman Language Family, M = Men, W = Women).

Community	Population [173]	Language	Dress	Religion
Chakma	483,229	Chakma	Dhuty(M), ‘Pinon’ (W), ‘Hadi’(W), ‘Hobong’(M-W)	Buddhism
Marma	224,261	Marma	‘Thumbui’ (W), ‘Angi’ (W), ‘Dayah’(M)	Buddhism
Tripura	156,578	Kokborok	‘Rignai’, ‘Risa’, ‘Rikutu’ [182]	Hinduism
Tanchangya	45,972	Tanchangya	‘Keboi’(W), ‘Pinon’(W), ‘Habong’(W) [116]	Buddhism
Lushai	380	TB	‘Puan’(W) [185], ‘Korchung’ (W), ‘Korchur’(M), Puanbi(M) [115]	Christianity [68]
Khumi	3,780	TB	‘Lupao’ (Turbans), ‘Bichunika’ (W), ‘Kono’ (ear rings), ‘Sang-eie-pong’ (Head Ornaments), ‘Lakao’ (Leg Ornaments) [36]	Animism, Krama, Christianity [21]
Chak	3,077	TB	‘Kotung Pangre’ (M-Dress, Dhuti), ‘Apong’ (M-Turban), ‘Nafi’ (W-Dress, Skirt), ‘Rangkeng’ (W-Dress)[114]	Buddhism [114]
Khyang	4,826	TB	‘Ukh’ (M-Dress), ‘Bong’ (M-Turban), ‘Baiu’ (W-Dress), ‘Kel-Kah-Lu’ (Leg Ornaments), ‘Luk-Hu’ (W-Turban) [37]	Animism, Buddhism, Christianity [37]
Bawm	13,193	Bawm (TB)	‘Laikawr’(M), ‘Rentak’(M), ‘Kawrechi’(W), ‘Puan’(W) [178]	Christianity
Pankhua	1,857	TB	Pirhan [188]	Christianity
Mro	52,455	Mro	‘Wanglai’ (W-Dress), ‘Kong-ar’ (M-Ornament), ‘Ramcheng’ (W-Ornament) [38]	Animism, Krama, Buddhism, Christianity [38], [177]

6.4 Demographic details of participants

Table 6.2: Details of the group discussions.

Group Number	Total Participants	Gender Ratio	Community
1	9	Male: 8, Female:1	Chakma (5), Chak (1), Tripura (1), Khumi (1), Mro (1)
2	2	Male: 0, Female: 2	Chakma (1), Bawm (1)
3	5	Male: 1, Female: 4	Chakma (1), Marma (4)
4	2	Male: 1, Female: 1	Tanchangya (2)

Table 6.3: Demographic information of participants. *Three districts - Rangamati, Khagrachari, and Bandarban constitute the CHT region.

Group No.	Participant No.	Community	Gender	Age Group	*District
Group Interviews					
1	1	Chakma	Male	20-25	Rangamati
1	2	Tripura	Male	20-25	Khagrachari
1	3	Chakma	Male	20-25	Khagrachari
1	4	Chak	Male	20-25	Bandarban
1	5	Khumi	Male	20-25	Bandarban
1	6	Chakma	Male	20-25	Rangamati
1	7	Mro	Male	20-25	Bandarban
1	8	Chakma	Female	20-25	Khagrachari
1	9	Chakma	Male	20-25	N/A
2	1	Chakma	Female	20-25	Dhaka
2	2	Bawm	Female	20-25	Bandarban
3	1	Marma	Female	20-25	N/A
3	2	Chakma	Female	20-25	N/A
3	3	Marma	Female	20-25	N/A
3	4	Marma	Female	20-25	N/A
3	5	Marma	Male	20-25	Khagrachari
4	1	Tanchangya	Male	20-25	Bandarban
4	2	Tanchangya	Female	20-25	Bandarban
Individual Interviews					
N/A	I 1	Chakma	Male	20-25	Khagrachari
N/A	I 2	Chakma	Male	20-25	Rangamati
N/A	I 3	Chakma	Female	20-25	Khagrachari
N/A	I 4	Chakma	Male	20-25	Khagrachari
N/A	I 5	Chakma	Male	20-25	Khagrachari
N/A	I 6	Tripura	Female	20-25	Khagrachari
N/A	I 7	Marma	Male	30-35	Rangamati
N/A	I 8	Mro	Male	20-25	Bandarban
N/A	I 9	Mro	Male	20-25	Bandarban
N/A	I 10	Mro	Male	30-35	Rangamati
N/A	I 11	Tanchangya	Female	25-30	Rangamati
N/A	I 12	Tanchangya	Female	25-30	Rangamati

Related Publication

The following publication is based on the qualitative findings of this thesis:

- I. B. Rofi, M. M. Eshita, A. Chakma, *et al.*, “The good, the bad and the ugly: The opportunities, challenges and the mitigation strategies of the young indigenous social media users of the chittagong hill tracts in bangladesh,” in *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems*, ser. CHI '25, Association for Computing Machinery, 2025, ISBN: 9798400713941. DOI: 10.1145/3706598.3713268. [Online]. Available: <https://doi.org/10.1145/3706598.3713268>