

Commentary

Artificial Intelligence and Endangered Languages

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The increasing use of virtual digital assistants and multilingual neural machine translation services, which use artificial intelligence to recognise and respond to voice commands or translate voice into text of another language, could increase language endangerment, particularly indigenous peoples who are in the category of critically endangered languages with few thousand, or even less, speakers around the world. The use of natural language processing technology is also unlikely to be extended in the preservation of such languages which has no market value, unless governments or philanthropic and non-profit organizations intervene on this particular matter.

Keywords: Artificial Intelligence, Endangered Languages, Natural language processing, Indigenous languages, Northeast India

Introduction

On 11 May 2022 Google announced the inclusion of 24 new languages in Google Translate - the multilingual neural machine translation service. The India office of the American multinational technology company also announced that “8 new Indian languages are coming to Google Translate... including Assamese, Bhojpuri, Dogri, Konkani, Maithili, Meiteilon (Manipuri), Mizo and Sanskrit”.¹ Google translate is a “free service” in the internet that “instantly translates words, phrases, and web pages between English and over 100 other languages”.² It now has a “translate by voice” option which automatically detects and transcribes language of the spoken voice in 132 major languages of the world and translates into 109 other languages.³ This complementary translation service uses machine learning, a branch of Artificial Intelligence (AI), to analyse and translate between languages. Google adopted “AI first” strategy in 2017 to offer innovative solutions, and thus “give businesses a competitive advantage”.⁴ Since then the development of AI has been one of the core areas of Google where machine translation has been increasingly emphasised as “the global machine translation market is expected to achieve compound annual growth

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of 19% until 2024”⁵. This is more so when the native English speaking population is about 360 million, which is just 4.55% out of the 7.9 billion population of the world today, and it is estimated that roughly 20% of the world’s population speaks English and about 50% of contents in the internet are in English. Thus there is a tendency today towards learning English and other major languages of the world with an emphasis on accent neutralisation not only for rendering service but also for personal utilisation of technological services.

AI in Everyday Life

Artificial intelligence or AI is fast changing the world today with the changing pace of technological advancement and the increasing use of technological appliances in everyday life. It has increasingly impacted the way we live and how we imagine. Big tech companies increase their funding on research for the “responsible development” of AI and the integration of such intelligent technology with their products and services. Indeed the assistance of AI in the transportation system, healthcare, education, manufacturing, marketing and media has increasingly reduced costs and improved productivity and also increase efficiency and quality of the service rendered. During the coronavirus pandemic in 2020-2021, the use of video-communication services such as google meet and zoom have shoot up dramatically for organising online meetings and seminars, and regular classes were mostly conducted in such platforms. The videotelephony softwares can transcribe voice into texts when the captions are turned on, and it is indeed a technological advancement that made the differently abled, especially the deaf, inclusive in any interactions. Such transcripts can easily and conveniently be converted into texts for later use and reference.

In recent years voice-activated technology revolution is swiftly changing how a lot of people live in different parts of the world. Many applications known today use AI and machine learning algorithm, which analyse large amounts of data to recognise patterns and make decisions on its own. This helps in identifying highly personalised preferences and in turn eases marketing efforts. Virtual assistants such as Apple’s Siri, Google Assistant, Microsoft’s Cortana and Amazon’s Alexa are powered by AI in recognising speech and through voice command the AI can be asked to perform specific task without physical intervention. Today different AI assisted home applications can be used to improve the quality of life and increase comfort. Google’s assistant or Alexa can be asked to turn-on smart televisions. Such televisions, particularly which use android operating system, have voice search and google assistant can communicates with the user and a voice command can be made to play the desired video or select new videos in over the top (OTT) media services. Now alexa is used to turn-on and also off the lights in homes deploying smart technology such as smart light bulb, smart plug and smart wall switch. Through the recognition of words in speech the AI helps Netflix suggest movies, Spotify recommend songs, Amazon promote products and zomato or swiggy recommend foods. The wireless wi-fi smart speaker such as Marshall Stanmore II has built-in amazon’s alexa voice control. Apart from controlling the music system wirelessly through phone, alexa can be asked to read current headlines from leading newspapers around the world.

This indeed is an alternative to watching news in television and relieving the straining eyes from continuous desk work on computer.

As much as there are benefits in the advancement of AI there are also risks associated with it. Way back in 2014 in his interview with the BBC news, the English theoretical physicist Stephen Hawking warned: “The development of full artificial intelligence could spell the end of the human race. It would take off on its own, and re-design itself at an ever-increasing rate. Humans, who are limited by slow biological evolution, couldn’t compete, and would be superseded”.¹ The development of autonomous weapons and robots which use AI to eliminate threats can not only wreak havoc but could also possibly end humanity. Keeping aside the existential threat to human beings of the uncontrolled development of AI, the use this technology and automation at large also pose a risk to those workers whose works are repetitive and routine in nature such as sweeping, cleaning, washing dishes, etc. In future AI will be able to replace many semi-skilled and skilled works such as customer service, taxi drivers, data entry and bookkeeping, proofreading, soldiers and even doctors. It can not only adversely affect the poor and the disenfranchised, marginal groups in different parts of the world could also feel the impact slowly and inconspicuously in their existence as distinct cultural groups.

Discriminative AI

Despite the advancement in technology, studies have shown that “for people with accents - even the regional lilt, dialects and drawls native to various parts of the United States - the artificially intelligent speakers can seem very different: inattentive, unresponsive, even isolating” (Harwell 2018). It was indicated that within the United States “the wave of the future has a bias problem, and it’s leaving them behind”. The *CNN* in July 2018 published a report titled “AI is hurting people of color and the poor. Experts want to fix that”. Heather Kelly, who was then with *CNN Business*, reported about how AI is contributing to greater racial bias and exclusion while it is fundamentally changing the world. She also pointed out how “facial recognition software has trouble identifying women of color” at the M.I.T. Media Lab (Kelly 2018). A similar study that year by *The Washington Post*, in collaboration with two research groups, looks at the problem of smart speakers’ accent imbalance by testing thousands of voice commands dictated by more than 100 people across nearly 20 cities. They found that the systems “showed notable disparities in how people from different parts of the U.S. are understood”. Within the United States “People with Southern accents, for instance, were 3 percent less likely to get accurate responses from a Google Home device than those with Western accents. And Alexa understood Midwest accents 2 percent less than those from along the East Coast”. The study also pointed out that “people who spoke Spanish as a first language, for instance, were understood 6 percent less often than people who grew up around California or Washington, where the tech giants are based” (Harwell 2018). Another investigation conducted by ProPublica also revealed that “software used to sentence criminals is biased against black Americans” (Kelly 2018).

The world today, including developing and underdeveloped countries, is invaded by these smart home technologies which use virtual assistant. This assistant uses

voice recognition to take command. In attempting to command the virtual assistant communication has to be made in a dominant language only, otherwise it fails to recognise the command. This can lead to two things in order to use such applications. First, users from marginal communities need to learn dominant languages; for instance English only till August 2019, and Hindi from September 2019 in India.¹ Secondly, accent has to be imitated for the proper recognition of the command to be made. This would undoubtedly result in increasing homogenisation of languages and accent neutralisation. In other words mother tongue influence has to be neutralised.

Endangered Languages and AI

The United Nations Educational, Scientific and Cultural Organisation (UNESCO) on 19 February 2009 launched the electronic version of the new edition of its “Atlas of the World’s Languages in Danger”. This interactive digital tool provides updated data about approximately 2,500 endangered languages around the world and can be continuously supplemented, corrected and updated by users. The endangered languages are further classified into vulnerable, definitely endangered, severely endangered and critically endangered languages. In few years many critically endangered languages will become extinct if not appropriate measure are taken to preserve it. According to this UNESCO atlas, more than 200 languages have become extinct during the last 75 years, 538 are critically endangered, 502 severely endangered, 632 definitely endangered and 607 unsafe or vulnerable. In India, for instance, there are 197 endangered languages. In north-east India, out of about 220 languages spoken in the region, 80 languages are facing serious threat and 21 languages are on the verge of extinction. In the state of Manipur at least five languages are listed as critically endangered languages. Those on the verge of extinction include the Purum language spoken by 276 person, Tarao by 700, Monsang by 1270, Aimol spoken by 2400, and Moyon by 2270.

There are initiatives taken by different universities and other institutes in the north-east to describe, document and digitise the endangered languages of the region. For instance, the Centre for Endangered Languages was established in 2014 at Tezpur University “with the aim of conducting substantial research on the lesser known and endangered languages of Northeast India and to revitalise them with the direct and indirect institutional intervention”. The University Grants Commission has recognised Tezpur University as a nodal Centre for the cluster which comprises Tezpur University, Rajiv Gandhi University and Sikkim University. Despite such institutional interventions to protect and preserve endangered languages there are many forces at play which could still lead to their gradual extinction. First, there is a tendency to neglect one’s own languages and learn dominant languages for better employment prospects. Simultaneously dominant languages are imposed by the state in educational institutions and government establishments. Second, the onslaught of virtual technology unconsciously leads to accent neutralisation with the increasing use of voice assistants leading to gradual dissipation of distinct accent a cultural community possesses.

Will NLP remove discrimination?

As indicated, the increasing use of virtual assistant in different technological products is not only discriminative based on accents; it can also lead to increasing homogenisation posing threat to marginal culture and language, and now even accents. In the United States, for instance, several studies have indicated that “speakers with nonnative accent are experiencing fewer employment opportunities, differential employee compensation, lesser housing options, impoverished health care service, lower credibility and discriminatory responses in the courts”, despite “globalization is expected to improve multicultural sensitivity” (Chakraborty, 2017, p. 57). Accents are a part of cultural identities that need to be nurtured and cherished rather than neutralise it just to fit into the larger society and their norms and values. Largely “accent is interpreted as an honest signal of native-group membership that begets collaborative behavior, and a supposed native speaker speaks in a manner that betrays that categorization, he or she might be judged harshly” (Cohen, 2012, 607). Indeed “language plays a prominent role among the markers of ethnic identity. It is the first and ultimate expression of the bond that exists between a group of people” (Haokip, 2011, p. 29). Together with the acknowledgement of diversity there should be an increasing awareness and technology should be made to serve such needs even though it may not be profitable commercially. Accent plurality should be celebrated rather than despised, and technology should not perpetuate or exacerbate accent-based biases and prejudices.

Before this paper was presented in March 2019 I tested accent recognition of virtual assistant – Siri. At first I speak in my original north-east Indian accent and Siri recognised about 60 percent of what was said. In the second attempt I moderately imitate the American accent and Siri was able to recognise about 80 per cent of the speech. In the third attempt I completely imitate the American accent and the Apple’s virtual assistant application was able to recognise cent percent. During the symposium the product manager of Alexa AI, who came all the way from Boston in the United States, agreed on the concerns that I raised about discrimination and promise to work on reducing such accent discrimination. Recent advances in the natural language processing (NLP), a branch of AI, “concerned with giving computers the ability to understand text and spoken words in much the same way human beings can”¹, including the contextual nuances of the language within them, can reduce, if not totally remove, this discrimination which poses a threat to endangered languages.

Since the coronavirus was declared pandemic by the World Health Organisation and restrictions were imposed by governments since March 2020, classes and meetings in academic institutions were conducted online. Google meet and Zoom video-communication service were commonly used for such classes and meetings. In google meet speeches can be translated into text through the “turn on captions”. This is designed “to help participants who may be deaf or hard of hearing”. This speech-to-text technology of google, or the analog-to-digital-converter, provides live captions and recognises speeches almost accurately, depending on the speaker.

Within a span of three years since I experiment with Siri the recognition of different accents, especially the dominant languages, has improved to a great extent.

With all these technological advancements that use voice command and the integration of NLP in AI and machine learning, will the systems be adaptive enough in recognising accents of marginal communities especially those speaking endangered languages? NLP can happen when a population may be small but comparatively large enough to have people using technological appliances constantly engaged with the machine learning process to understand the accent. For instance, the new languages added in Google Translate in May 2022 such as Assamese, Meiteilon (Manipuri) and Mizo are languages of dominant ethnic groups in the state of Assam, Manipur and Mizoram respectively and has a speaker of at least one million people a decade ago. Even the expansion of multilingual neural machine translation services are limited to languages that are relatively spoken by large number.

Even though technology is advancing faster, including the NLP, they are restricted to areas that have market value and profit that can be derived out of it. There are recent studies on how NLP can revitalize endangered languages. But such studies are conducted on indigenous people having a population of over a million people.¹ It is highly unlikely that in the near future NLP will be advanced and inclusive to such a level to understand accents and include languages which have no market value at all. In such situation the speakers of endangered languages have to imitate accent of dominant languages. As such the increasing use of modern applications and services such as search by voice or Google Translate and other applications could, rather, hasten the extinction of critically endangered languages, until the NLP is advanced to a level that recognises all accents, including the critically endangered languages.

The way forward is a more inclusive technology in digital spaces. This needs a new approach in designing technology. As Chang has pointed out: “In technology, bias and inequalities are quite literally products of design: the design choices of a product reflect the people who make it, and who those people chose to design it for. To fix this, companies need to redesign the design process itself”.²² Inclusiveness in designing technology can come from equity and empathy. And inclusive technology in digital spaces and applications can only make speakers of endangered languages around the world safer and maintain accent plurality. The intervention of governments and non-profit organizations on this matter is the need of the hour.

Notes

¹ Google India tweeted on 11 May 2022: <https://twitter.com/googleindia/status/1524438049652080640>

² <https://translate.google.co.in/>

³ Despite the claim that 133 languages are supported and 103 languages are in the process of development as of June 2022, currently the list of languages in the translation service has 109 languages.

⁴ Mir Ali, “AI-First Strategy: Where To Start?”, *Dzone*, <https://dzone.com/articles/ai-first-strategy-where-to-start>

⁵ Ofer Tirosh, “A Machine Translation Trends in 2022 and Beyond”, viewed on 6 June 2022 at: <https://www.tomedes.com/translator-hub/machine-translation-trends>

⁶ Rory Cellan-Jones, “Stephen Hawking warns artificial intelligence could end mankind”, *British Broadcasting Corporation*, 2 December 2014, <https://www.bbc.com/news/technology-30290540>

⁷ Amazon News, “Alexa in Hindi turns one, now available on the Alexa app”, 18 September 2020, <https://www.aboutamazon.in/news/devices/alexa-in-hindi-turns-one-now-available-on-the-alexa-app>

⁸ Natural Language Processing (NLP), <https://www.ibm.com/cloud/learn/natural-language-processing>

⁹ For example Zhang, Frey, and Bansal studied the Cherokee (2022) which has more than 430,000 speakers.

¹⁰ Felix Chang, “To Build More-Inclusive Technology, Change Your Design Process”, *Harvard Business Review*, 19 October 2020, <https://hbr.org/2020/10/to-build-more-inclusive-technology-change-your-design-process>

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