Chapter 8 Learning in Your Native Language

"The limits of my language mean the limits of my world"

-Ludwig Wittgenstein, Austrian-British philosopher



panchayat In the hall, Adhyaksha Solar Saleem holds a meeting with the elected representatives of his panchayat. A few elected members casually are strolling around the hall while

others are engrossed in their mobile phones. The Navigated Learning Technology (NLT) has just been implemented in their Gram Panchayat. Adhyaksha Saleem wishes to teach the elected members how to open their accounts. He begins to explain how they can use their smartphones to download the app and utilize the provided username and password to log into their accounts.

"I understand what you are saying. But I don't know how to use the phone for that," interrupts Upadhyaksha Petrol Pump Papanna, during Adhyaksha's speech.

"Papanna, you can read and write on the phone. So, I will teach you personally. Using the application is not that difficult," Adhyaksha Saleem reassures Papanna.

"But what about me, Sir! I don't know how to read or write," Gram Panchayat member Kattige Katayya voices his concerns to the Adhyaksha. In fact, Katayya had not even completed secondary school. He had completely forgotten reading and writing because his education was halted at middle school, as he started selling firewood to earn his livelihood from an early age.

"Don't worry, Katayya. I am in discussion with the provider of this technology. They are planning to implement Natural Language Processing (NLP) technology for our Gram Panchayat," says Adhyaksha Saleem.

"What is that, Adhyaksha? How will that help me learn about the Gram Panchayat?" Katayya immediately inquires, his curiosity piqued after Adhyaksha's talk about enabling more people like him to start learning.

"Using Natural Language Processing or NLP technology, you can directly converse with a computer or phone, and the device will respond to you in Kannada. So, you don't have to type on the phone, just ask your question and the phone will answer," Adhyaksha explains. Upon hearing this, Katayya's face lights up with excitement and relief as he grasps the potential of how NLP could be used to learn about Gram Panchayats through voice processing.

Explaining this incident during one of the Gram Panchayat meetings, I posed a question to the Adhyakshas and the elected representatives, "Dear Adhyakshas, are you interested in adopting another transformative technology that can greatly contribute to the capacity building of our elected members?"

"Yes," the gathering replied.

"If we want to ensure effective training delivery to elected representatives, regardless of their literacy status, we need technologies like Natural Language Processing (NLP) that enable individuals like Katayya to learn without any compromises. Now, let's understand what NLP is with some examples," I began to explain.

"Natural Language Processing (NLP) is a technology that facilitates communication and interaction in natural language. Naturally, the following questions arise:

• Who is NLP for?

- Why is NLP necessary?
- And most importantly, how can the integration of NLP help us achieve 21st-century Gram Panchayats?"

"Before we explore the many applications of Natural Language Processing (NLP), we need to understand who can benefit from this technology. Not all elected representatives in our Gram Panchayat are literate. For instance, Katayya may have the desire to learn but lacks the ability to read and write. NLP technology can be utilized for individuals like Katayya, who may not be proficient in reading and writing. This technology empowers people like Katayya to acquire information effectively through human-like conversations using a computer or smartphone."

"So, can you explain how Katayya can benefit from this technology?" Hebbet Nanjamma asked, recognizing that if Katayya benefits, it would also be advantageous for her. She pondered this quietly.

"Yes, Nanjamma, let's delve into that," I replied.

"Recall the days when the only sources of information were buying books or visiting libraries, spending hours reading to find the desired information. Now, a few decades later, the Internet has made it possible to access information with just a few clicks on a smartphone or computer. You or an elected representative like Katayya may want to know about the latest schemes available in our villages for children. However, if such information is presented in Hindi, English, or German, which we may not understand, the internet becomes useless. Similarly, if we want to learn something new, we desire content in our local language. In this chapter, I will explain how we can help our people or elected representatives like Katayya overcome these challenges using Natural Language Processing (NLP) technology."

"Natural language refers to the language we speak, isn't that right, Shankranna?" Nanjamma asked.

"Yes, Nanjamma, natural language is the language we speak. Your natural language may be Kannada, while someone else's natural language may be Hindi or English. If you speak to someone in Germany in Kannada, they will not understand your message. Likewise, if they speak to you in German, you won't understand what they are saying. There are thousands of such 'spoken languages' around the world. In India alone, we have 122 major languages and over a thousand other languages [1]. However, most of the information available on the internet is in English. English may or may not be a second language for many. Due to these reasons, natural language processing (NLP) technology is often employed to bridge the language gap. It provides a medium for elected members like Katayya to communicate or learn using voice processing in their natural language," I explained.

[1] Note: The number of languages mentioned is just for illustrative purposes and may not reflect the exact statistics.

8.1. How will NLP help your Gram Panchayat?

"Sir, how can Natural Language Processing technology help our village panchayat?" asked Paropakari Padmini, Adhyakshe of one of the Gram Panchayats present at the meeting.

"Listen, Padmini, you can use your phone or laptop to stay updated with the latest developments under the Ministry of Rural Development and Panchayati Raj, or citizens might want to know more about their rights in the Gram Sabha. However, not all citizens of the village can read English texts displayed on smartphones. In such cases, Natural Language Processing (NLP) technology can facilitate direct communication on a computer or smartphone to provide answers to all the queries of citizens or elected representatives," I explained.

"Now, let's consider the example of Sureshappa, who is the financial secretary of a Gram Panchayat and wants to learn more about Finance and Accounts. He searches the internet for information, but all the content appears only in English. However, Sureshappa can only read and write in Kannada. What should he do in such a situation? He would have to find a translator to help him understand finance and accounting matters in Gram Panchayats using the content on the internet, right?"

I observed the gathering, but nobody attempted to answer.

"However, today, Sureshappa can utilize Natural Language Processing (NLP)-based applications or voice robots/voice bots. This technology is particularly useful for people like Sureshappa who want to learn or access content on the internet in their dialect. Natural Language Processing technology processes inputs like Sureshappa's voice and provides meaningful answers. With the advent of NLP technology, there is no need to worry about Sureshappa or Katayya not knowing how to read and write," I clarified.

The audience seemed confused, so I continued.

8.2. Smartbots for all your queries

"What are you talking about, Shankranna? Do machines talk to humans?" asked Simple Sudarshan with great curiosity.

"Yes, Sudarshan, over time, computers will train themselves to understand and respond to human intentions. For example, Sureshappa may ask a question in different ways, but with the same objective. Machines learn to provide the same intelligent and accurate answer even when the question is phrased differently. This conversational ability of machines can be harnessed using Natural Language Processing (NLP) technology to provide experiences that are closer to reality. NLP technology can be developed with high accuracy in native languages, delivering real experiences to its users," I explained.

"We can better understand this by using an example related to the work done in the Grama Panchayat office. Let's assume that Sureshappa is responsible for distributing application forms to citizens daily and collecting them back. His daily routine includes issuing or collecting application forms and answering queries related to the application form procedures. Sureshappa often finds himself answering the same questions repeatedly, which can be tiring. This made Sureshappa realize how people ask the same question in different ways. For instance, if a citizen wants to know when to submit an application form, the questions can be asked in various ways, such as:

• When can I submit the application form?

• When is the last date for submission of the application form?

- Can I submit the application form next week?
- When will you collect the application form?
- By what date should I submit the application form?
- Can I submit the application form tomorrow?

"What all these citizens want is the same information, which is the 'deadline for submission of the application form. Sureshappa understands that all our citizens have the same objective. This is called intention. Sureshappa has to answer every citizen who comes and goes in the office one by one. The process is highly repetitive and tiresome. Imagine sitting there and having to answer the same question one after another from the citizens. You will find that this process is highly repetitive and unproductive," I explained.

"Similarly, there are several Frequently Asked Questions (FAQs) in various departments. These questions are asked regularly and are referred to as standard questions or frequently asked questions (FAQs). Let's consider another example to understand the concept better. Imagine a scene where six people are waiting in a bank queue, all wanting to withdraw money. However, they don't know which counter to go to. So, they wait in the line at the helpline to get information. Let's assume the questions are asked in the following manner:

- Where can I withdraw money from my account?
- Where is the ATM?
- Where is the cash counter?

• Can you help me with withdrawing money?

• Can you tell me which counter I should go to for withdrawing money?

• Where can I cash this cheque?

"Now we can imagine how tiring it is for a help desk person to repeatedly answer the same question. In such cases, voice robots (chatbots) can be used to address frequently asked questions (FAQs) related to processes in the bank or Gram Panchayat. Natural language processing voice robots (Natural Language Processing Chatbots) can provide information in the native language. Katayya may not understand if the voice robot (chatbot) replies in English or Hindi, but when he interacts with the voice bot (chatbot) in his natural language Kannada, he can receive meaningful information," I said.

"So, you're saying that computers can replace humans in situations where the same answers are required?" Simple Sudarshan asked.

"Yes, with the growth and advancement of technology, we now have solutions like Natural Language Processing (NLP) that can address the issues we are discussing. Chatbots, utilizing natural language processing (NLP), can answer frequently asked questions of citizens in their native language. Before the existence of chatbots, a person had to constantly respond to citizens' queries either in person or over the phone. But now, with the deployment of voice bots, virtual assistants can assist citizens 24/7," I explained.

"So, the voice bot can answer hundreds of people?" Hebbet Nanjamma still had doubts.

"Not just hundreds, but millions of people can be answered. This is another remarkable feature of chatbots. They have the capacity to simultaneously respond to millions of users. While Sureshappa can only attend to one citizen at a time, the voice bot can provide the same answers repeatedly, without getting tired. That's why voice bots (chatbots) are extensively utilized in large enterprises, as they save human resources by training machines to handle customer inquiries," I clarified.

"I mean, the person who previously had to answer the same question repeatedly doesn't need to do so anymore, right?" Nanjamma questioned again.

"Yes, that's correct. However, most of the chatbots available today are primarily text-based, and many of them only support English. Moreover, not all chatbots are interactive, limiting their target audience. People who don't know English or have difficulty typing on a phone or computer may not be able to benefit from them," I explained.

"It is in such areas that solutions such as Natural Language Processing (NLP) can be used to make digital technology accessible even to the last mile. With voice bots powered by NLP technology, we can assist Katayya in using his voice to interact with the chatbot. He doesn't need to type or read; the voice bot (chatbot) communicates with Katayya in Kannada, as if it were a person," I replied.

"Have you implemented it anywhere?" Simple Sudarshan questioned.

"Yes, we have implemented a voice bot on our Sampoorna Swaraj Foundation website. Our goal was to address the issue of accessing reliable information for rural citizens in India," I explained.

"How was the experience?" Hebbet Nanjamma was curious.

"The questions posed to Dhwani Robot (Voice Bot) were related to local administration or rural citizens. During the initial period, we observed how the same question was asked in different ways," I continued.

"What is the history and evolution of Grama Panchayat?" "History and evolution of Village Panchayat?" 'What are the different periods of history and evolution?" "How can I understand the history and evolution?" "How can I learn about panchayat development?" "Is there any information regarding the history and development of Grama Panchayat?" "How many periods are there in the history and evolution of Grama Panchayat?" "Where can I learn about the history and evolution?"

"Dhwani Robot (Voice Bot) provides a single answer to all these questions because they share the same purpose. The response provided by the Dhwani robot (voice bot) conversationally on our website is presented in Figure 8.1 in the book," I explained.

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Hello lanu! How can I assist you ?) í
History and evolution of Gram Pan	chayat
What do you want to know?	
Panchayat History and Evolution	
Decentralization and Article of 73	
Are you interested in learning more? The following video link shows how to goLogin to the Google website	
Are you sure to close this conversation ?	
Good bye.	
Conversation ended.	

Figure 8.1. Dhvani Robot (Voice Bot) on the Sampoorna Swaraj Foundation website

"What would you like to know about the history and evolution of Panchayats?"

The question is followed by two suggestions on where to find information on the history and development of panchayats. The same information is also answered in Kannada based on the language selected by the user. Citizens then have to speak into their device, and a Dhwani Robot (Voice bot) answers the conversation in a very realistic manner. Keeping in mind that a significant number of people in rural India do not receive quality education and have relatively low literacy. Dhwani bot on our website is more focused on voice processing. "Dhwani Robots (Voice bots) and virtual assistants (Virtual Assistant) are often used for their accuracy and reliability in providing information. Technology has advanced so much that now they can converse like humans. Now you, don't have to worry about Katayya not being able to read and write or worry about help desks. You can have a virtual assistant on your gram panchayat portal who can answer all your citizen queries," I explained.

8.3. Covid-19 Based (Voice Bot) by Penn Medicine

"Did you know about the use of NLP during the Corona epidemic?" I questioned.

"No Shankranna, tell us what it is" Simple Sudarshan expressed curiosity.

"This is a case study of how Artificial Intelligence (AI) and Natural Language Processing (NLP) technologies were used to develop voice bots for Covid-19 in America. Penn Medicine decided to develop a voice bot to help answer patients' queries related to Covid-19. Organizational leaders then recognized that the pattern of information patients wanted was specific to the organization. He noted that standardized answers to frequently asked questions related to disease symptoms need to be designed and they need to detail local capacities and initiative-based health system pathways. A specialized Voice Bot had to be developed by collaborating with companies experienced in machine learning and natural language processing following the need for unique response mapping, complex context facilitation and dynamic, human-guided evaluation of content. After two weeks of initial planning meetings with the companies, the special robot (voice bot) came to life. [2]."

"People had so many questions. What is Covid-19? How to take precautions regarding Covid-19? What are the home remedies for covid-19? etc. questions were before them. Information provided based on the internet and artificial intelligence was widely used to learn about epidemics." The authors said.

The authors of the article mention: "But what we didn't realize was that we didn't know where these questions would come from and that was our limitation. People from all over the world, whether literate or illiterate, living in rural and urban areas, were keenly interested. But digital disparity among people especially between urban and rural citizens and unavailability of content in dialect made it more difficult for our rural citizens to get information" I explained.

"Will you get information about this?" asked Simple Sudarshan.

"Of course. A study on how Penn Medicine developed a robot (voice bot) is available in 23 languages. This Robot was developed using artificial intelligence and natural language processing. This technology later reached more people on a wider scale. The aging medical system and the need for automated question-and-answer processes during the pandemic were achieved using a robot (voice bot). It showed how voice bots can be used in place of humans to a certain extent. Similarly Natural Language Processing (NLP) technology can also be used to carry information to villages in rural India," I said.

8.4. The Future of Natural Language Processing (NLP) in healthcare

"Does this mean, that natural language processing technology play a significant role in health care, Shankranna?" asked Nurse Nanjamma, who is the Adhyakshe of one of the Gram Panchayats. When the subject turned to the health sector, she became curious.

"Yes Nanjamma, the question of how the unavailability of information in the local language creates barriers to development is one of the many challenges the pandemic has revealed in the health sector. When the World Health Organization (WHO) declared the pandemic in March 2020, most information was available only in the English language. In times like these, communication to citizens, and transfer of information or availability of information plays a big role. The lack of information in the local language shows how there is a huge knowledge gap between people of different levels of literacy," I said.

"Now, thanks to advances in technology, we can teach robots to respond to citizens. Or through them present medical information in local language. Just like how Penn Medicine used Natural Language Processing (NLP) in its Robot to help people during Covid-19, you can use Natural Language Processing to facilitate medical information in your own language" I explained about the possibilities of Natural Language Processing.

"Can Natural Language Processing technology be used for anything other than providing information?" Nurse Nanjamma asked.

"Certainly! In addition to providing information, Natural Language Processing (NLP) can be used for data analysis and decision-making purposes. For instance, in the healthcare field, NLP can assist in translating and processing medical records written in local languages, ensuring accurate understanding and precise definitions. As healthcare relies heavily on precise semantics, NLP development is ongoing to enhance its accuracy in the near future," I explained.

8.5. Making learning inclusive with NLP

Hebbet Nanjamma, then inquired about using NLP to enhance efficiency in the panchayat. I responded, "As the Digital Gandhi, it is your responsibility to encourage your elected members to utilize technologies like NLP for gaining content competence and selfeducation in any subject. NLP transcends language and material barriers by enabling content translation into various natural languages, with speech recognition features making it accessible to everyone. This technology is not limited to just the Adhyaksha or Elected Representatives in the Gram Panchayat; all citizens can utilize it to learn effectively in their local language." "Moreover, NLP can greatly contribute to improving the educational system. It facilitates the learning process by incorporating natural language within educational systems and offers effective solutions to various educational problems and challenges," I elaborated.

"NLP can address social and cultural aspects of language learning, providing valuable assistance to teachers, students, writers, and academics in writing, analysis, and evaluation tasks. It has found extensive applications in research, science, linguistics, e-learning, and assessment systems. Its positive outcomes have been observed not only in schools but also in higher education systems and universities," I added, providing further insights.

8.6. Dhvani Robot (Voice Bot) for Rural Karnataka: A Success Story



Figure 8.2 Chatbot system through Dhvani Robot (Voice Bot) on the Sampoorna Swaraj Foundation website. When you click on the girl in the circled space where she is, she will talk to you and answer questions.

Janopakari Krishnappa questioned, and I responded, "Yes, governance

is improving worldwide, and the adoption of technological solutions is redefining the effectiveness of government systems. In the context of rural India, local government bodies face challenges in communication, learning, business, and networking, often due to the unavailability of resources in the native language. Sampoorna Swaraj Foundation, an NGO dedicated to the digital transformation of rural India, has developed the Dhwani Robot (voice bot) to address this issue. This technology can be utilized to answer queries related to Gram Panchayats."

"The Sampoorna Swaraj Foundation has successfully implemented the Dhwani Robot on its website, <u>www.sampoornaswaraj.org</u>. The voice bot is continuously updated and programmed to answer questions in two languages, Kannada and English. It aims to provide information in the local language, even to illiterate citizens. Additionally, the voice bots can be configured to address queries beyond the scope of Gram Panchayats," I explained.

Kattige Katayya expressed curiosity and asked if this technology could be accessed even by those who are not computer literate. I replied, "Absolutely, Katayya. The Dhwani Robots, including those programmed to answer Covid-19 related questions, can be used by illiterate citizens. Through voice processing, these bots provide information from various sources, enriching the user experience. Natural Language Processing leverages artificial intelligence to simulate human-like conversations, recognizing intent from a user's voice or text. Therefore, the information is conveyed in a languagebased format."

8.7. Integrating Natural Language Processing (NLP) in your 21st Century Gram Panchayats

Continuing the discussion, I emphasized the importance of integrating Navigated Learning Technology (NLT) and Natural

Language Processing (NLP) in the Gram Panchayats of the 21st century. I asked the participants about their vision for their Gram Panchayat's growth and highlighted the role of technology in driving future developments. I reminded them of their responsibility as Adhyakshas to understand the needs of their citizens and elected representatives and find solutions to address the challenges.

"By embracing NLP, elected members like Katayya need not worry about their literacy levels. When Adhyakshas and other members adopt powerful technologies like NLP, they can create a holistic and fair platform for learning in their Gram Panchayat. NLP is not limited to elected representatives but can be used by all citizens who aspire to learn. Voice Robots can be developed to provide information on various issues, thus increasing the capacity of the Gram Panchayat. It is up to you to take the initiative and bring these technologies to your Gram Panchayat's growth," I concluded, observing the participants' reactions in the meeting.

"So far, we have discussed two important technologies that can facilitate the process of enhancing content competence among elected members. We explored the option of training them using Navigated Learning Technology (NLT), and we also discussed how Natural Language Processing (NLP) can benefit individuals who are not proficient in reading and writing. Now, it's time to put this knowledge into practice and implement it effectively. As the saying goes, 'Only a person is educated who has learned how to learn and change.' It's crucial for your team of elected members to apply their learnings across multiple competencies within the Gram Panchayat domain."

"In the upcoming chapters, we will delve into how you can utilize your knowledge within your Gram Panchayat. We'll emphasize the importance of defining roles and responsibilities, and we'll explore techniques such as Six Sigma Management Tools and Workflow Management Technology to enhance the productivity of your Gram Panchayat. Our aim is to establish a process of perfection that can bring significant improvements," I explained.

Before moving forward, I posed a question: "How can we achieve perfection in Gram Panchayat operations and services consistently? What are your thoughts? Do you believe it is possible?"

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