Podcast Name: *ACM ByteCast*
Episode: Partha Talukdar- Episode 52

Welcome to the *ACM ByteCast* podcast, a series from the Association for Computing Machinery! The podcast features conversations with researchers, practitioners, and innovators at the intersection of computing research and practice about their experiences, lessons learned, and visions for the future of computing. In this episode, host Bruke Kifle interviews guest Partha Talukdar, who is driving advancements to machine learning and NLP, while advocating and ensuring more inclusive and equitable language technologies. Partha is a Senior Staff Research Scientist at Google Research India where he leads a group focused on natural language processing. He is also an Associate Professor at the Indian Institute of Science Bangalore. Partha was a fellow at the machine learning department at Carnegie Mellon University and received his PHD in computer information science from the University of Pennsylvania. Partha is broadly interested in natural language processing, machine learning and in making language technologies more inclusive. He has been the recipient of several awards and co authored a book on graph-based learning.

To begin, Partha shares what drew him to computing and language technologies. He majored in computer science as an undergrad and transitioned to learning AI in his third year in university. He got exposure to language processing and how we can extract information from languages. This interested him in languages with limited resources and natural language processing. He believes language is a central component for communication and machine learning has helped with language processing, but there is still more work to be done. They are continuing to make progress and customized models for language tasks. There are increasing multi-model systems and across modalities as well. It is homogenization in terms of modeling and it happens in stages. There is acquisition of the knowledge of the world in AI and in machine learning. These machines are not just memorizing and reproducing– they are understanding the reasoning and capabilities.

Next, they discuss making language technologies more inclusive. Natural language is an interface and language models have acquired all this knowledge about the world. They have documented this knowledge and storage of the world around us. There are more than 7,000 languages in the world, but the machines only have capabilities that work well for a dozen languages. There are a vast majority of no usable language technologies which include speech and translation technologies. His team is focused on how they can make these capabilities available to a larger number of languages to reduce the language based barrier. There are also diverse geographic cultures with different kinds of language technology needs. The lack of data is also a challenge. There is an importance of representative data with different types of models. All the nuances will affect the user experience and Google is supporting and driving that program. Right now, they are looking at spoken languages across regions rather than a language approach. They ask users or computers to describe images in the languages of their choice and the diversity of languages that the machine uses changes, like tribal languages. They captured all of this diverse data and created an open source where 10% is transcribed.

There are also regional biases, so they are working with communities to learn from their experiences and incorporate those in the models.

In closing, his team is also working around large language models to include speech for additional modality. They have modalities available for the top 10 languages, but there are thousands spoken including dialect and tribal languages. There is a big gap for the large number of speakers for these languages. In Partha's paper, he describes that many words in English will have the same word that has different meanings depending on the context. For example, "bank" can mean a financial bank or a river bank. They have been giving it a particular context and deciding the word's meaning based on the particular context. Another problem he faces is the lack of data, so they utilize unlabelled data with a small amount of labeled data to create knowledge graphs. For future achievements, he would like to create multimodal modals and more use cases to increase language inclusion.

Key takeaways:
2:23 - Partha Talukdar shares what drew him to computing and language technologies.
4:49 - Language pathways that achieve artificial intelligence.
9:47 - Is this systematic learning or do these databases exhibit learning capabilities?
12:01 - Some of the current gaps and limitations in languages and efforts to address those.
18:25 - What are solutions to the data scarcity problem?
24:32 - What are other projects your team is currently working on?
28:06 - Partha describes the key insights in his paper.
32:41 - Challenges he learned in writing his book.
38:31 - How do you balance your time and priority in these two roles?
39:57 - Which hat inspires more of your work?
43:38 - Recent findings or breakthroughs that are impactful.
45:46 - Future key achievements for language inclusion.

Links:
Learn more about [Partha Talukdar.](#)
Learn more about [Bruke Kifle.](#)

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