

Speech Technology of three Tonal Languages in North-East India

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Speech Technology in Last-mile Connectivity



Agriculture

Healthcare

Weather

Three Tonal Languages of North-East India

- ▶ Tibeto - Burman Languages
- ▶ Ao (ISO 639-3 code: njo) spoken in Nagaland
- ▶ Angami (also Tenyidie, ISO 639-3: njm) spoken in Nagaland
- ▶ Mizo (ISO 639-3 code: lus) spoken in Mizoram

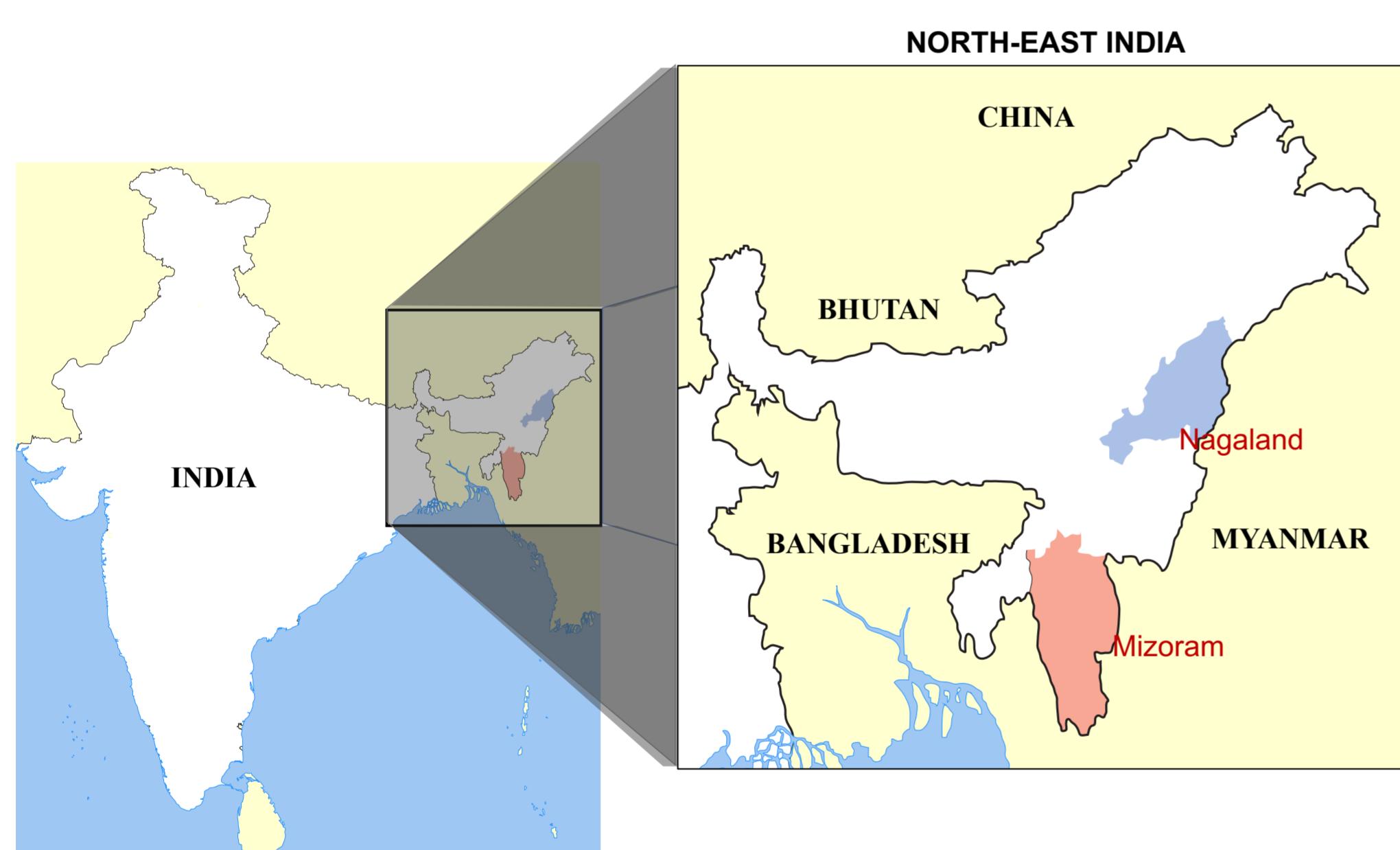


Figure: Areas of the Languages

Speech Recognition

- ▶ Mizo
 - ▶ Database : 81 speakers
 - ▶ The Phoneme Error Rate: 13.9% [1].
 - ▶ Model: SGMM-HMM
- ▶ Angami
 - ▶ Database : 11 speakers
 - ▶ Models: GMM-HMM, SGMM and DNN
 - ▶ WER: 5% (training data); 17.3% (test data) [2]

Dialect Identification

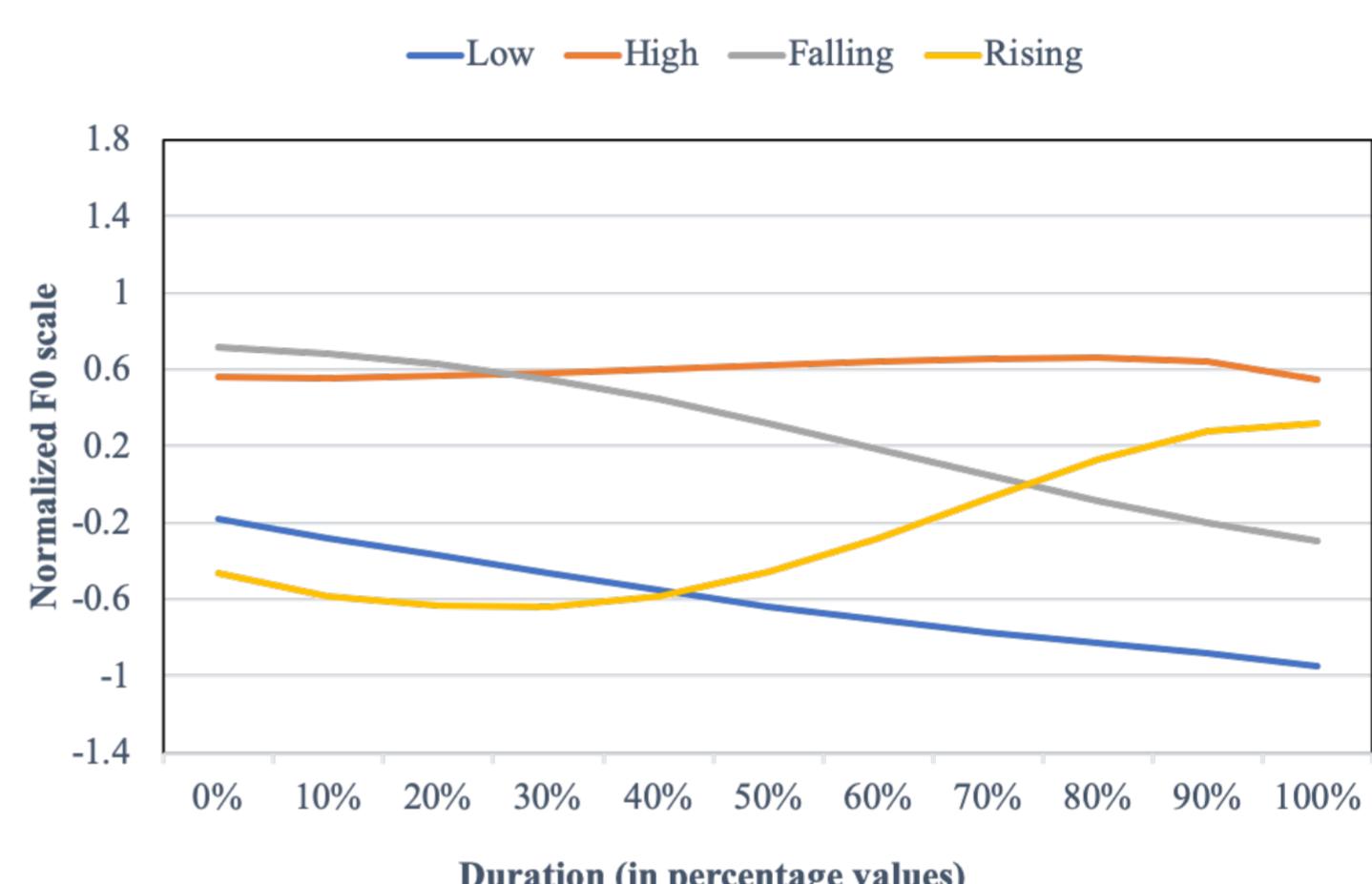
- ▶ Ao
 - ▶ 2 dialects: Changki and Mongsen
 - ▶ Database: 24 speakers
 - ▶ Spectral and tonal features
 - ▶ 86.2% accuracy [3].

Challenges

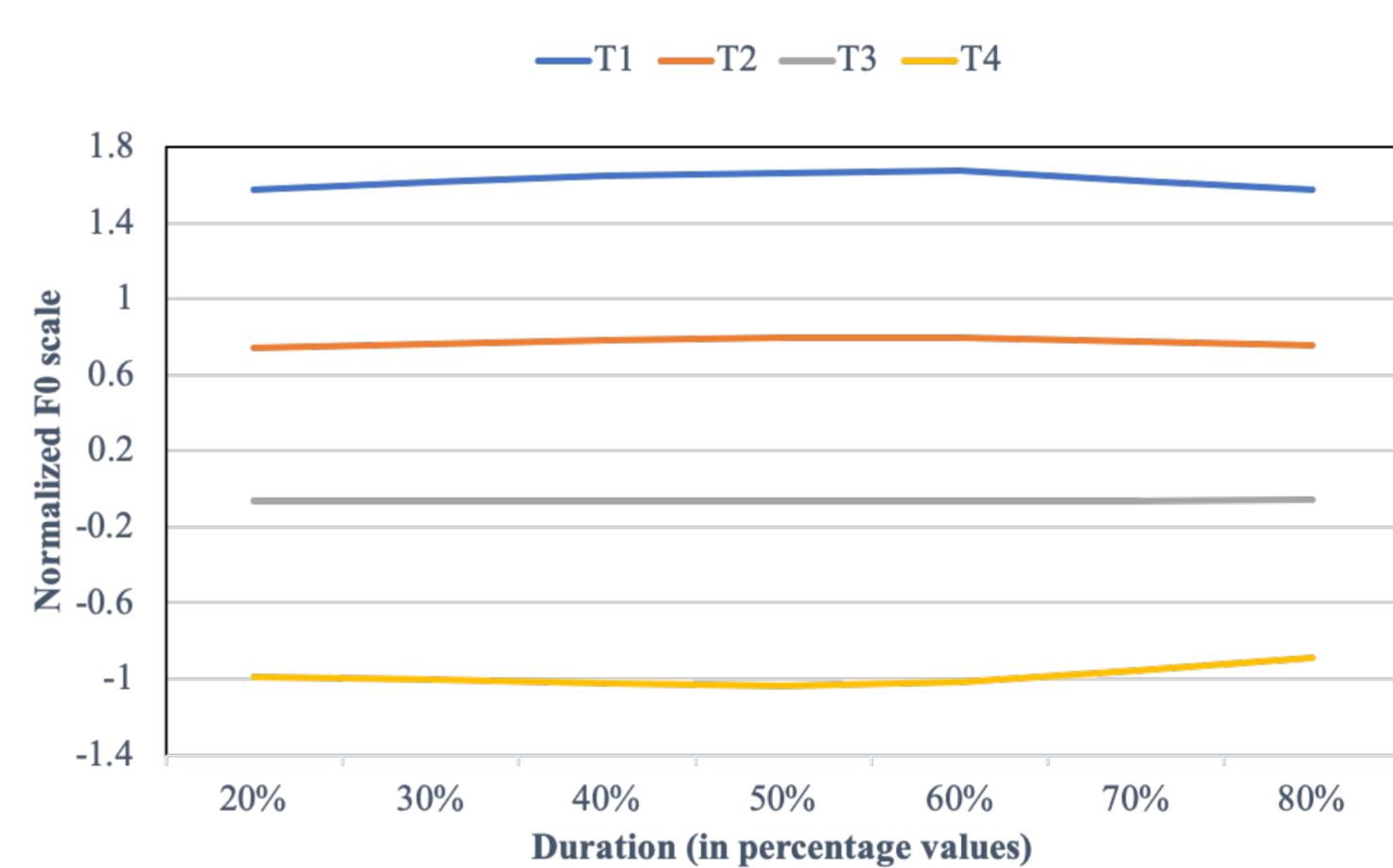
- ▶ Low resource languages
- ▶ Relatively under-researched language family
- ▶ Complex phonemic inventory
- ▶ Abundance of tones

Tones

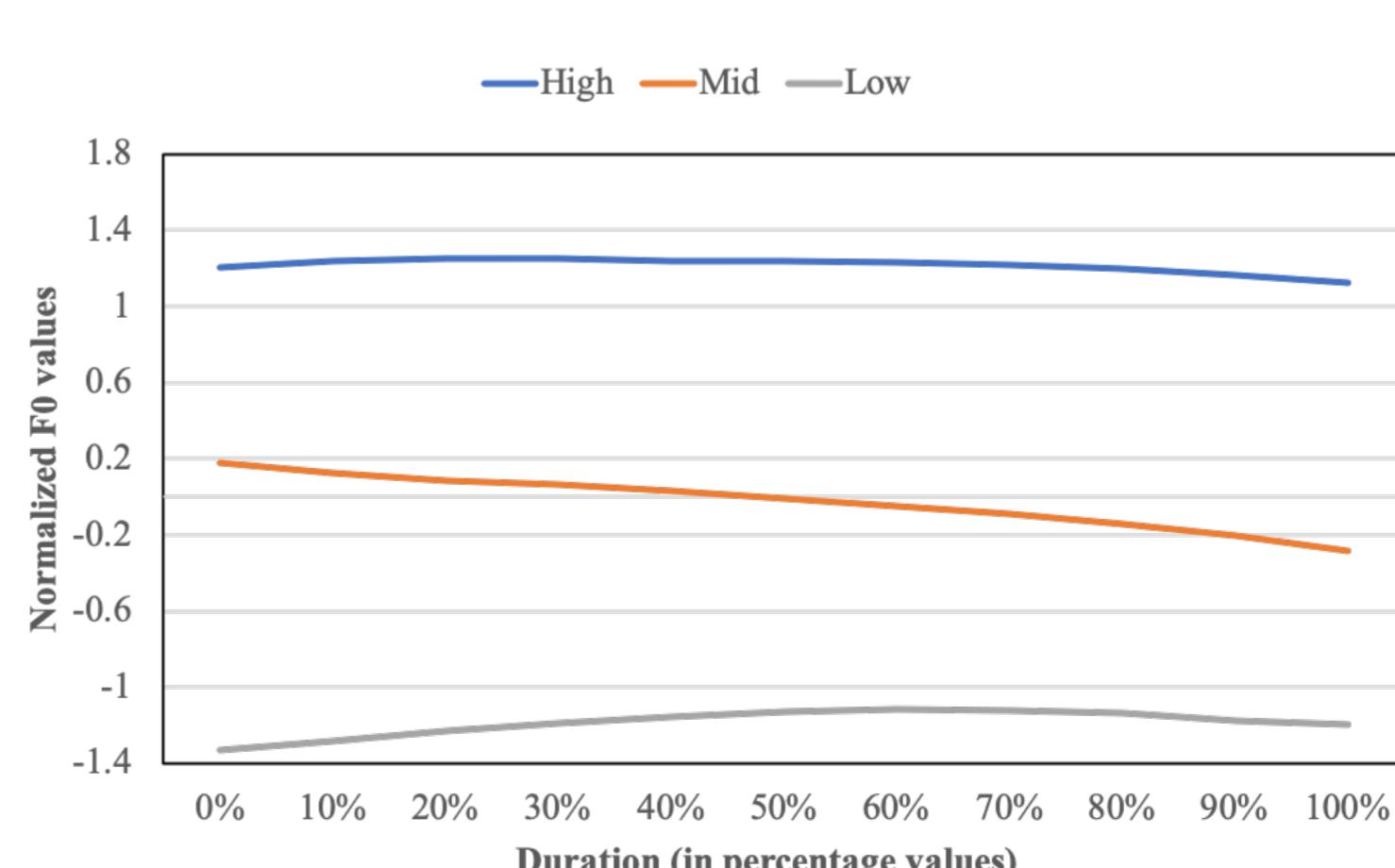
Mizo : Contour tones



Angami : Register tones



Ao : Register tones



References

- [1] Dey, A., Lalhminghlui, W., Sarmah, P., Samudravijaya, K., Prasanna, S. M., Sinha, R., Nirmala, S. R. (2017, December). "Mizo phone recognition system". In 2017 14th IEEE India Council International Conference (INDICON) (pp. 1-5). IEEE.
- [2] Terhija, V., Sarmah, P., Vijaya, S. Development of Speech Corpus and Automatic Speech Recognition of Angami. In 22nd Oriental - COCOSDA, Cebu, Philippines, 2019
- [3] Tzudir, M., Sarmah, P., Prasanna, S. M. (2018). Dialect Identification Using Tonal and Spectral Features in Two Dialects of Ao. In SLTU (pp. 137-141).